

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
Budget Bureau No. 1004-0135
Expires: March 31, 1993

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to deepen or reentry to a different reservoir.
Use "APPLICATION FOR PERMIT—" for such proposals

5. Lease Designation and Serial No.

14-20-603-2168A

6. If Indian, Allottee or Tribe Name

Navajo Nation

7. If Unit or CA, Agreement Designation

NW Cha Cha Unit

8. Well Name and No.

NW Cha Cha Unit #47

9. API Well No.

30-045-29124

10. Field and Pool, or Exploratory Area

Cha Cha Gallup

11. County or Parish, State

San Juan, NM

SUBMIT IN TRIPLICATE

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other

2. Name of Operator

Mountain States Petroleum Corp.

3. Address and Telephone No.

P O Box 3531, Midland, TX 79702 915/685-0878

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

1567' FNL & 1849' FEL Sec. 27, T29N, R14W

12. CHECK APPROPRIATE BOX(s) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION

- ☒ Notice of Intent
☐ Subsequent Report
☐ Final Abandonment Notice

TYPE OF ACTION

- ☐ Abandonment
☐ Recompletion
☐ Plugging Back
☐ Casing Repair
☐ Altering Casing
☒ Other Add perfs & frac
☐ Change of Plans
☐ New Construction
☐ Non-Routine Fracturing
☐ Water Shut-Off
☐ Conversion to Injection
☐ Dispose Water

(Note: Report results of multiple completion on Well Completion or Recompletion Report and Log form.)

Describe Proposed or Completed Operations (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

- 1) Approximate time frame March 1, 1995
- 2) Rig up, trip tubing and rods
- 3) Perforate to add 2 SPF to existing perfs. at 5129-5348'
- 4) Frac perfs. 5129-5348' w/60,000# sd + water
- 5) Return to production

14. I hereby certify that the foregoing is true and correct

Signed

Title Agent

Date Feb. 8, 1995

(This space for Federal or State office use)

Approved by

Title

Date

Conditions of approval, if any:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN DUPLICATE

(See other instructions on reverse side)

RECEIVED
BLMFORM APPROVED
OMB NO. 1004-0137
Expires: February 28, 1995

5. LEASE DESIGNATION AND SERIAL NO.

14-20-603-2168A

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

Navajo Nation

7. UNIT AGREEMENT NAME

NW Cha Cha Unit

8. FARM OR LEASE NAME, WELL NO.

NW Cha Cha Unit #47

9. API WELL NO.

30-045-29124

10. FIELD AND POOL, OR WILDCAT

Cha Cha Gallup

11. SEC., T., R., M., OR BLOCK AND SURVEY OR AREA

Sec. 27, T29N, R14W
NMPM

12. COUNTY OR PARISH

San Juan

13. STATE

NM

1a. TYPE OF WELL:

OIL WELL ☒GAS WELL ☐DRY ☐

Other

1b. TYPE OF COMPLETION:

NEW WELL ☒WORK OVER ☐DEEP-EN ☐PLUG BACK ☐DIFF. REVEN. ☐

Other

94 OCT 25 PM 1:08

070 FARMINGTON, NM

2. NAME OF OPERATOR Sirgo Brothers Energy Corp Agent for
Mountain States Petroleum Corp.

3. ADDRESS AND TELEPHONE NO.

P O Box 3531, Midland TX 79702 915/685-0878

4. LOCATION OF WELL (Report location clearly and in accordance with any State requirements)*

At surface 1567' FNL & 1849' FEL Unit G

At top prod. interval reported below Same

At total depth Same

14. PERMIT NO.

DATE ISSUED

15. DATE SPUDDED

7-1-94

16. DATE T.D. REACHED

7-9-94

17. DATE COMPL. (Ready to prod.)

9-5-94

18. ELEVATIONS (OF RKB, RT, OR, ETC.)*

5713' GR

19. ELEV. CASINGHEAD

20. TOTAL DEPTH, MD & TVD

5494'

21. PLUG, BACK T.D., MD & TVD

5456'

22. IF MULTIPLE COMPL., HOW MANY*

23. INTERVALS DRILLED BY

ROTARY TOOLS

CABLE TOOLS

X

24. PRODUCING INTERVAL(S), OF THIS COMPLETION—TOP, BOTTOM, NAME (MD AND TVD)*

Cha Cha Gallup 5129-5348'

25. WAS DIRECTIONAL SURVEY MADE

No

26. TYPE ELECTRIC AND OTHER LOGS RUN

Mud Log, Cased Hole GR Neutron

27. WAS WELL CORED

28. CASING RECORD (Report all strings set in well)

CASING SIZE/GRADE	WEIGHT, LB./FT.	DEPTH SET (MD)	HOLE SIZE	TOP OF CEMENT, CEMENTING RECORD	AMOUNT FULLED
8-5/8" J55	24#	225'	12-1/4"	Surface 190 sx	
5-1/2" J55	15.5#	5494'	7-7/8"	Surface 580 sx	

29. LINER RECORD

SIZE	TOP (MD)	BOTTOM (MD)	BACKS CEMENT*	SCREEN (MD)	SIZE	DEPTH SET (MD)	PACKER SET (MD)
					2-7/8"	5434'	

31. PERFORATION RECORD (Interval, size and number)

Gallup 5129-5348' 37 holes 0.5"

32. ACID, SHOT, FRACTURE, CEMENT SQUEEZE, ETC.

DEPTH INTERVAL (MD)	AMOUNT AND KIND OF MATERIAL USED
5129-5348'	F 76,333 gals N2 foam + 181,000# sd

33. PRODUCTION

DATE FIRST PRODUCTION		PRODUCTION METHOD (Flowing, gas lift, pumping—size and type of pump)					WELL STATUS (Producing or shut-in)	
8-7-94		Pumping					Producing	
DATE OF TEST	HOURS TESTED	CHOKE SIZE	PROD'N. FOR TEST PERIOD	OIL—BSL.	GAS—MCF.	WATER—BSL.	GAS-OIL RATIO	
9-5-94	24		→	101	166	97	1656	
FLOW, TUBING PRIME.	CASING PRESSURE	CALCULATED 24-HOUR RATE	OIL—BSL.	GAS—MCF.	WATER—BSL.	OIL GRAVITY-API (CORR.)		
		→	101	166	97	40		

34. DISPOSITION OF GAS (Sold, used for fuel, vented, etc.)

Used for fuel

TEST WITNESSED BY

M.A. Sirgo III

35. LIST OF ATTACHMENTS

GR Neutron Log, Deviation Survey

I hereby certify that the foregoing and attached information is complete and correct as determined from all available records.

SIGNED

M.A. Sirgo III

TITLE

Agent

DATE

10-21-94

*(See Instructions and Spaces for Additional Data on Reverse Side)

OCT 26 1994

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within the jurisdiction of the United States.

Xc Sirgo report

OPERATOR

ov

Sm

FARMINGTON DISTRICT OFFICE

37. SUMMARY OF POROUS ZONES: (Show all important zones of porosity and contents thereof; cored intervals; and all drill-stem, tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures, and recoveries):

FORMATION	TOP	BOTTOM	DESCRIPTION, CONTENTS, ETC.	NAME	TOP	
					MEAS. DEPTH	TRUE VERT. DEPTH
Picture Cliffs	1193'					
Lewis Shale	1338'					
Chacra	2136'					
Cliffhouse SS	2775'					
Menefee	2825'					
Point Lookout	3715'					
Gallup	4912'					
Gallup A	5283'					
Gallup B	5335'					

38. GEOLOGIC MARKERS

NAME	TOP	
	MEAS. DEPTH	TRUE VERT. DEPTH

WELL NAME AND NUMBER NW Cha Cha 47
LOCATION 1567' FNL & 1849' FEL Unit G, Sec. 27, T29N, R14W, NMPM
San Juan County, NM
OPERATOR Sirgo Brothers Energy Corporation Agent for Mountain States
Petroleum Corp.
DRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation tests and obtained the following results:

<u>Degrees @ Depth</u>	<u>Degrees @ Depth</u>	<u>Degrees @ Depth</u>
<u>1/4° 595'</u>	<u>1/4° 4498'</u>	<u> </u>
<u>1/4° 1026'</u>	<u>3/4° 4996'</u>	<u> </u>
<u>1/2° 1522'</u>	<u> </u>	<u> </u>
<u>3/4° 2017'</u>	<u> </u>	<u> </u>
<u>3/4 2512'</u>	<u> </u>	<u> </u>
<u>3/4° 3040'</u>	<u> </u>	<u> </u>
<u>1° 3598'</u>	<u> </u>	<u> </u>
<u>1-1/4° 4065'</u>	<u> </u>	<u> </u>

Drilling Contractor United Drilling, Inc.

By: L. M. Gibbs

Title: Business Manager

Subscribed and sworn to before me this 11th day of July,
1994.

Karma Tankusky
Notary Public

My Commission Expires: 9-25-95

Chaves N. M.
County State



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR DEEPEN

1. TYPE OF WORK DRILL ☒ DEEPEN ☐		5. LEASE DESIGNATION AND SERIAL NO. 14-20-603-2168A	
2. TYPE OF WELL OIL WELL ☒ GAS WELL ☐ OTHER ☐ SINGLE ZONE ☒ MULTIPLE ZONE ☐		6. IF INDIAN, ALLOTTED OR TRIBE NAME NAVAJO NATION	
3. NAME OF OPERATOR SIRGO BROTHERS ENERGY CORP. AS AGENT FOR MOUNTAIN STATES PETROLEUM CORP. 15346		7. UNIT AGREEMENT NAME N.W. CHA CHA UNIT	
4. ADDRESS AND TELEPHONE NO. P. O. BOX 3531, MIDLAND, TX 79702 (915) 685-0878		8. FARM OR LEASE NAME WELL NO. 5195 NW Cha Cha Unit #47	
LOCATION OF WELL (Report location clearly and in accordance with any State requirements.) At surface 1567' FNL & 1849' FEL Unit G At proposed prod. zone Sec. 27, T29N, R14W, NMPM Same		9. API WELL NO. 30-045-29124	
DISTANCE IN MILES AND DIRECTION FROM NEAREST TOWN OR POST OFFICE* 5 MILES SOUTHWEST OF FARMINGTON		10. FIELD AND POOL, OR WILDCAT 11850 CHA CHA (GALLUP)	
DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR, ON THIS LEASE, FT. 41376' from unit boundary 1637' from Well #39		11. SEC., T., R., M., OR BLK. AND SURVEY OR AREA G Sec. 27, T29N, R14W, NMPM	
18. NO. OF ACRES IN LEASE 1440		17. NO. OF ACRES ASSIGNED TO THIS WELL W/ 80	
19. PROPOSED DEPTH 5450'		20. ROTARY OR CABLE TOOLS Rotary	
ELEVATIONS (Show whether DF, RT, GR, etc.) 5713' GR		22. APPROX. DATE WORK WILL START* March 20, 1994	

This action is subject to technical and procedural review pursuant to 43 CFR 3105.8 and appeal pursuant to 43 CFR 3105.6

DRILLING OPERATIONS AUTHORIZED ARE
SUBJECT TO QUALITY OF CEMENT
GENERAL REQUIREMENTS:
860 sacks

SIZE OF HOLE	GRADE SIZE OF CASING	WEIGHT PER FOOT	SETTING DEPTH
12-1/4"	J-55, 8-5/8"	24#	210'
7-7/8"	J-55, 5-1/2"	15.5#	5450'

1. Circulate cement to surface on 8-5/8" surface pipe.
2. Will two stage 5-1/2" casing to circulate cement back surface pipe.
3. BOP Diagram attached.

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FARMINGTON, NM
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MAY 19 1994

IN ABOVE SPACE DESCRIBE PROPOSED PROGRAM: If proposal is to deepen, give data on present productive zone and proposed new productive zone. If proposal is to drill or deepen directionally, give pertinent data on subsurface locations and measured and true vertical depths. Give blowout prevention program if any.

SIGNED: M. A. Sirgo, III TITLE: President DATE: Feb. 17, 1994

(This space for Federal or State office use)

PERMIT NO. _____ APPROVAL DATE _____

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

CONDITIONS OF APPROVAL, IF ANY:

APPROVED BY: 154-3392 TITLE: _____ DATE: _____

*See Instructions On Reverse Side

APPROVED
AS AMENDED

MAY 08 1994

DISTRICT MANAGER

NMOCD

SIRGO BROTHERS ENERGY CORP.

N. W. CHA CHA UNIT #47

CHA CHA

SAN JUAN COUNTY, NM

GALLUP SANDS FORMATION



The Western Company

CEMENTING RECOMMENDATION

PREPARED FOR

**MR. MANNY SIRGO
OWNER**

**SERVICE POINT
FARMINGTON, NM
(505) 327-6222**

**PREPARED BY
MIKE MCNEESE
TECH REP II
FARMINGTON**

JUNE 28, 1994

FM050019

**SALES REPRESENTATIVE
MIKE MCNEESE
TECH REP II**

THE WESTERN COMPANY
CEMENTING RECOMMENDATION
LONG STRING

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	N. W. CHA CHA UNIT #47
FIELD	CHA CHA
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP SANDS
PREPARED BY	MIKE MCNEESE
DATE	JUNE 28, 1994

ANNULAR GEOMETRIES

ANNULAR I.D. (IN)	DEPTH (FT)
8.097 CASING	210
7 7/8 HOLE	5494

SUSPENDED PIPES

DIAMETER (IN)		DEPTH (FT)	WEIGHT (LB/FT)
O.D.	I.D.		
5 1/2	4.950	5494	15.500

THE WESTERN COMPANY
CEMENTING RECOMMENDATION
LONG STRING

FM050019 02

STAGE 1

VOLUME CALCULATIONS

1814 FT X 0.1732 CU-FT/FT WITH 30 % EXCESS = 408 CU-FT
680 FT X 0.1732 CU-FT/FT WITH 0 % EXCESS = 118 CU-FT

TOTAL SLURRY VOLUME: 526 CU-FT
94 BBLs

SLURRY NO.	VOLUME CU-FT	VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
1	408	/ 2.39	= 175 SACKS PACESETTER LITE (B) + 12.00 LB/SK GEL(BENTONITE) + 0.25 LB/SK CELLO-SEAL + 2.000 % CACL2 + 5.00 LB/SK HI-SEAL + 124.930 % WATER
2	118	/ 1.18	= 100 SACKS CLASS B + 46.340 % WATER

CEMENT PROPERTIES

	SLURRY NO.1	SLURRY NO.2
SLURRY WEIGHT (LB/GAL)	11.80	15.60
SLURRY YIELD (CU-FT PER SACK)	2.39	1.18
AMOUNT OF MIX WATER (GALS PER SACK)	12.78	5.23

THE WESTERN COMPANY
CEMENTING RECOMMENDATION
LONG STRING

STAGE 2 COLLAR DEPTH 3000 FT

VOLUME CALCULATIONS

210 FT X	0.1926 CU-FT/FT WITH	0 % EXCESS	=	40 CU-FT
2450 FT X	0.1732 CU-FT/FT WITH	30 % EXCESS	=	552 CU-FT
340 FT X	0.1732 CU-FT/FT WITH	0 % EXCESS	=	59 CU-FT

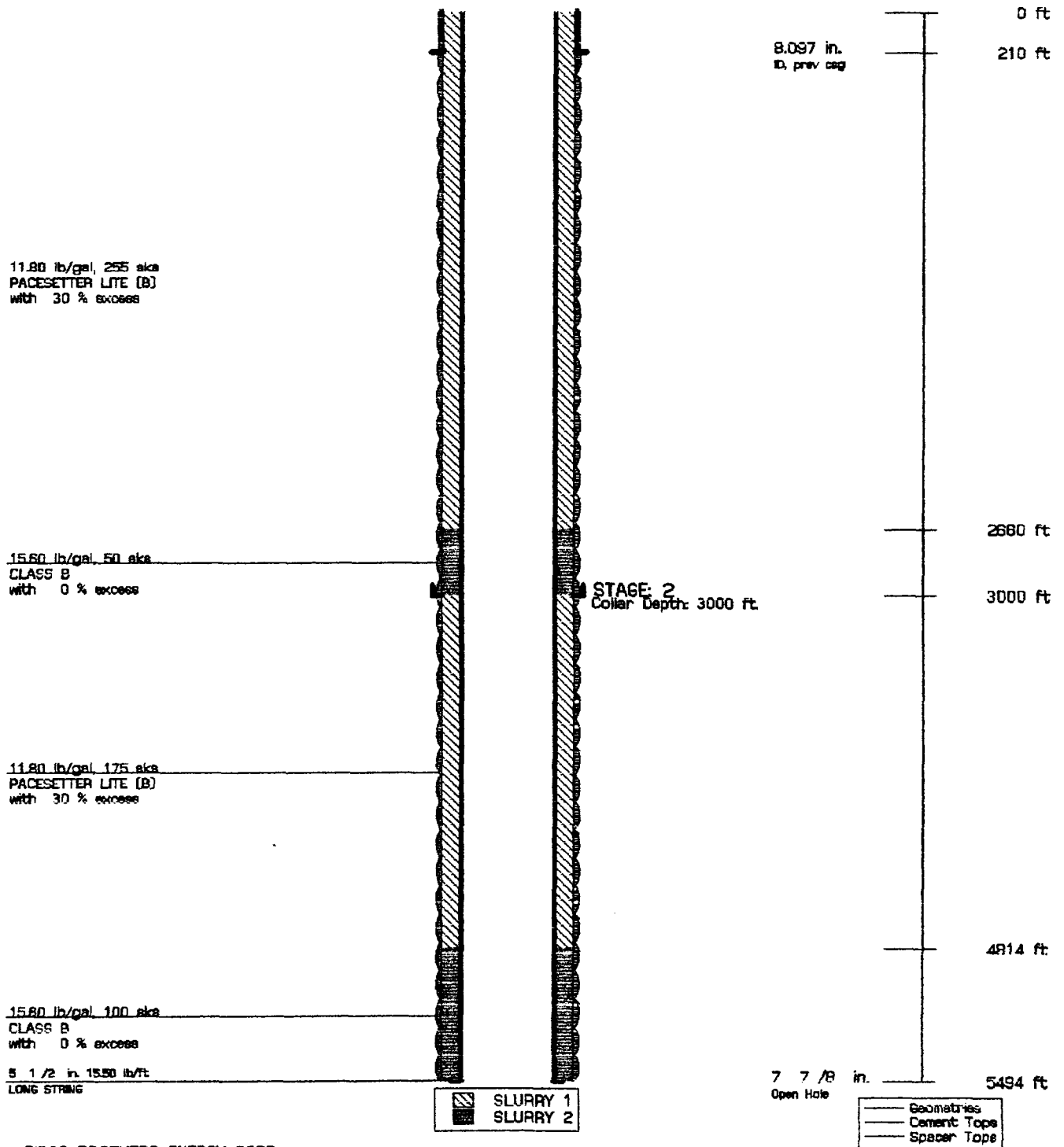
TOTAL SLURRY VOLUME: 651 CU-FT
116 BBLs

SLURRY NO.	VOLUME CU-FT	VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
1	592	/ 2.34	= 255 SACKS PACESETTER LITE (B) + 12.000 % GEL (BENTONITE) + 5.00 LB/SK HI-SEAL + 0.25 LB/SK CELLO-SEAL + 2.000 % CACL2 + 122.600 % WATER
2	59	/ 1.18	= 50 SACKS CLASS B + 46.340 % WATER

CEMENT PROPERTIES

	SLURRY NO.1	SLURRY NO.2
SLURRY WEIGHT (LB/GAL)	11.80	15.60
SLURRY YIELD (CU-FT PER SACK)	2.34	1.18
AMOUNT OF MIX WATER (GALS PER SACK)	12.54	5.23

The Western Company



SIRGO BROTHERS ENERGY CORP.

N. W. CHA CHA UNIT 47

FM050019 02

THE WESTERN COMPANY
CEMENTING RECOMMENDATION
COST ESTIMATE FOR LONG STRING

MATERIALS:

QTY	UNIT	DESCRIPTION	UNIT PRICE	GROSS AMNT	DISC%	NET AMNT
800	LB	CALCIUM CHLORIDE	0.440	352.00	35.0	228.80
108	LB	CELLO-SEAL	1.980	213.84	35.0	139.00
2510	LB	GEL (BENTONITE)	0.160	401.60	35.0	261.04
2150	LB	HI-SEAL	0.880	1,892.00	35.0	1,229.80
430	SKS	PACESETTER LITE	8.050	3,461.50	35.0	2,249.98
150	SKS	STANDARD CEMENT	9.350	1,402.50	35.0	911.63
1	EA	RUBBER TOP PLUG	66.500	66.50	35.0	43.22
MATERIAL TOTAL:				\$7,789.94		\$5,063.46

EQUIPMENT CHARGES:

QTY	UNIT	DESCRIPTION	UNIT PRICE	GROSS AMNT	DISC%	NET AMNT
1	EA	CEMENT PUMP CHARGES	2270.000	2,270.00	35.0	1,475.50
20	MILE	MILEAGE CHARGE 1 VEHICLE(S)	2.900	58.00	35.0	37.70
20	MILE	PICKUP MILEAGE 1 VEHICLE(S)	1.550	31.00	35.0	20.15
1	STG	MULTIPLE STAGE CHARGE PER PUMP	1615.000	1,615.00	35.0	1,049.75
708	FT3	SERVICE CHARGE	1.400	991.20	35.0	644.28
567	T-M	DELIVERY CHARGE	0.960	544.32	35.0	353.81
EQUIPMENT TOTAL:				\$5,509.52		\$3,581.19
MATERIAL AND EQUIPMENT TOTAL:				\$13,299.46		\$8,644.65

FLOAT EQUIPMENT CHARGES: 8-RD, K-55 UNLESS OTHERWISE NOTED.

QTY	UNIT	DESCRIPTION	UNIT PRICE	GROSS AMNT	DISC%	NET AMNT
1	EA	5-1/2" FLOAT COLLAR	380.000	380.00	25.0	285.00
16	EA	5-1/2" CENTRALIZER	66.500	1,064.00	25.0	798.00
1	EA	5-1/2" STOP COLLARS	20.500	20.50	25.0	15.38
3	EA	THREAD LOCK	23.900	71.70	25.0	53.78
1	EA	5-1/2" GUIDE SHOE	192.000	192.00	25.0	144.00
2	EA	5-1/2" CEMENT BASKET	216.000	432.00	25.0	324.00
4	EA	5-1/2" TURBOLIZER	67.000	268.00	25.0	201.00
1	EA	5-1/2" STAGE TOOL	3910.000	3,910.00	25.0	2,932.50
FLOAT EQUIPMENT TOTAL:				\$6,338.20		\$4,753.65

TOTAL COST ESTIMATE:	\$19,637.66	\$13,398.30
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UNLESS SPECIFIED, THE PRICES ARE BASED ON 6 HOURS ON LOCATION.
 THE TECHNICAL DATA CONTAINED IN THIS PROPOSAL IS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF WRITING AND IS SUBJECT TO FURTHER ANALYSIS AND TESTING. THE PRICING DATA CONTAINED IN THIS PROPOSAL ARE ESTIMATES ONLY AND MAY VARY DEPENDING ON THE WORK ACTUALLY PERFORMED. PRICING DOES NOT INCLUDE FEDERAL, STATE AND LOCAL TAXES, OR ROYALTIES.
 THIS QUOTATION IS BASED ON THE WESTERN COMPANY BEING AWARDED THE WORK ON A FIRST CALL BASIS AND WITHIN THIRTY (30) DAYS OF THE PROPOSAL DATE. THESE PRICES WILL BE SUBJECT TO REVIEW IF THE WORK IS DONE AFTER THIRTY (30) DAYS FROM THE PROPOSAL DATE, OR ON A SECOND OR THIRD CALL BASIS.

PRODUCT DESCRIPTIONS

CLASS B CEMENT (API) [Standard Cement]

Intended for use from surface to 6000 Ft. Class B Cement exhibits moderate to high sulfate resistance.

CALCIUM CHLORIDE (CaCl₂)

A powdered, flaked or pelletized material used to decrease thickening time and increase the rate of strength development.

CELLO-SEAL

Graded (3/8 to 3/4 inch) cellophane flakes used as a lost circulation material.

BENTONITE (GEL)

Commonly called gel, it is a clay material used as a cement extender and to control excessive free water.

HI-SEAL 2

An inert, highly effective, precisely sized (6 mesh to 200 mesh) lost circulation material specifically designed to prevent slurry loss to highly permeable zones.

PACESETTER LITE [Class B (API) Cement Base]

A blend of Portland cement with Poz A at a ratio of 65:35, cement to Poz A. A small percentage of Bentonite is incorporated to help control free water. Depending on the density used, it can be a lightweight, economical filler slurry, or an intermediate density production cement. Pacesetter Lite slurries have good resistance to sulfate attack and also strength retrogression above 230 Degrees Fahrenheit (BHCT).

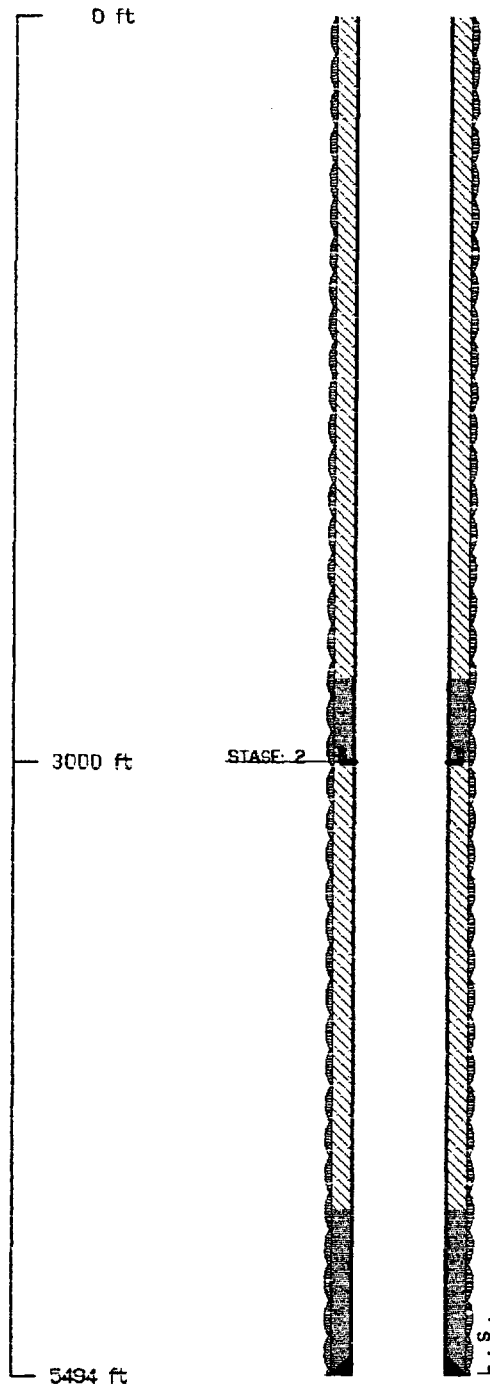
THE WESTERN COMPANY
FIELD RECEIPT WORKSHEET

LONG STRING

CODE	QUANTITY	UNIT	PRODUCT DESCRIPTION	PRICE
H5020	800	LB	CALCIUM CHLORIDE	0.440
P1716	108	LB	CELLO-SEAL	1.980
P2496	2510	LB	GEL (BENTONITE)	0.160
P1786	2150	LB	HI-SEAL	0.880
P493E	430	SKS	PACESETTER LITE	8.050
P403E	150	SKS	STANDARD CEMENT	9.350
P3576	1	EA	RUBBER TOP PLUG	66.500
F0126	1	EA	CEMENT PUMP CHARGES	2270.000
J3906	20	MILE	MILEAGE CHARGE 1 VEHICLE(S)	2.900
J3916	20	MILE	PICKUP MILEAGE 1 VEHICLE(S)	1.550
K2306	1	STG	MULTIPLE STAGE CHARGE PER PUMP	1615.000
M1006	708	FT3	SERVICE CHARGE	1.400
J4016	567	T-M	DELIVERY CHARGE	0.960
16029	1	EA	5-1/2" FLOAT COLLAR	380.000
17064	16	EA	5-1/2" CENTRALIZER	66.500
17131	1	EA	5-1/2" STOP COLLARS	20.500
P3256	3	EA	THREAD LOCK	23.900
13152	1	EA	5-1/2" GUIDE SHOE	192.000
17116	2	EA	5-1/2" CEMENT BASKET	216.000
17215	4	EA	5-1/2" TURBOLIZER	67.000
17348	1	EA	5-1/2" STAGE TOOL	3910.000

The Western Company

Wellbore Schematic



LONG STRING

7 7/8" HOLE
5 1/2" 15.50 # CASING

Stage 1

DRILLING MUD

11.80 #, 175 SKS PACESETTER LITE (B) to 3000 ft.
with 30 % excess

15.60 #, 100 SKS CLASS B to 4814 ft.
with 0 % excess

Stage 2

DRILLING MUD

11.80 #, 255 SKS PACESETTER LITE (B) to 0 ft.
with 30 % excess

15.60 #, 50 SKS CLASS B to 2660 ft.
with 0 % excess

SIRGO BROTHERS ENERGY CORP.
N. W. CHA CHA UNIT 47

FM050019

SIRGO BROTHERS ENERGY CORP.

NORTH WEST CHA CHA #47

CHA CHA

SEC.27,T29N,R14W

SAN JUAN COUNTY, NM

GALLUP A & B FORMATION



The Western Company

65-60Q N2/VIKING ID-30 FRAC

PREPARED FOR

MR. MANNY SIRGO

OWNER

MR. DREW BATES - PROTOCOM

SERVICE POINT

FARMINGTON, NM

(505) 327-6222

PREPARED BY

MIKE MCNEESE

TECH REP II

FARMINGTON

JULY 26, 1994

FM050119

SALES REPRESENTATIVE

MIKE MCNEESE

TECH REP II

THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

WELL DATA

Net Pay	35 ft
Depth to Middle Perforation	5,214 ft
Reservoir Pressure	2,250 psi
Permeability	4 md
Porosity	15 percent
Casing	5 1/2", 15.5#, J-55
Gross Fracture Height	200 ft
Net Fracture Height	35 ft
Fracture Gradient	.65 psi/ft
Bottom Hole Frac Pressure	3,389 psi
Bottom Hole Temperature	130 deg F
Perforated Interval	5129'-5300' (1 SPF)
	TOTAL OF 35 HOLES @
	0.50"

THE WESTERN COMPANY**Treatment Requirements for: 65-60Q N2/VKG ID-30****PRE-PAD: 5,000 GALLONS 2% KCL/PARATROL L***Containing per 1000 Gallons:*11.00 Gallons PARATROL-L, PARAFFIN CONTROL
0.38 Pounds FRAC-CIDE 20, BACTERIACIDERUN 55 GALLONS OF PARATROL L WITH 5,000 GAL OF 2% KCL WATER.
THIS TANK USED FOR BREAKDOWN, ACID AND THIS PRE-PAD.**PAD - 3 PPG: 52,500 GALLONS 65Q N2/VKG ID-30***Pumped Volumes:*

18,371 Gallons 30# J-4

Mixed Volumes:

20,371 Gallons 30# J-4

*Containing per 1000 Gallons:*0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT
0.75 Gallons CL-30, CROSSLINKER
0.40 Gallons CL-2L, CROSSLINKERTHE ABOVE VOL INCLUDES 1,000 GAL FOR TANK BOTTOMS-2. CHECK THE
X-LINKER/BREAKER LOADINGS PRIOR TO THE JOB. THIS TESTED @ 125 F**3 PPG - 4 PPG: 10,000 GALLONS 65Q N2/VKG ID-30***Pumped Volumes:*

3,499 Gallons 30# J-4

Mixed Volumes:

3,499 Gallons 30# J-4

*Containing per 1000 Gallons:*0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
3.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT
0.75 Gallons CL-30, CROSSLINKER
0.40 Gallons CL-2L, CROSSLINKER

BREAK THIS STAGE AT 115 DEG F IN TWO HOURS.

continued.....

THE WESTERN COMPANY**Treatment Requirements (continued)****4 PPG - 5 PPG: 5,000 GALLONS 65Q N2 FOAM 30***Pumped Volumes:*

1,751 Gallons 30# J-4

Mixed Volumes:

1,751 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

BEGIN 30# LINEAR/65 Q FOAM FROM 4 PPG TO 5 PPG RAMP.
BREAK THIS STAGE IN TWO HOURS AT 115 DEG F.

5 PPG TO 7 PPG+: 8,000 GALLONS 60Q N2 FOAM 30*Pumped Volumes:*

3,200 Gallons 30# J-4

Mixed Volumes:

3,200 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

RAMP THIS STAGE FROM 5 PPG TO 7 PPG SAND IF POSSIBLE.
BREAK AT 115 DEG. F IN TWO HOURS.

continued.....

THE WESTERN COMPANY**Treatment Requirements (continued)**

FLUSH: 5,000 GALLONS 60Q N2 FOAM 30

Pumped Volumes:

1,999 Gallons 30# J-4

Mixed Volumes:

1,999 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE

30.00 Pounds J-4, GELLING AGENT

1.00 Gallons NINE-40, SURFACTANT

2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER

2.00 Pounds B-5, GEL BREAKER

1.00 Pounds ULTRA PERM BREAKER, C.R.B.

5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

ADDITIONAL MATERIALS:

55.00 Gallons PARATROL-L, PARAFFIN CONTROL

PROPPANTS: 175,000 Pounds 16/30 MESH BRADY

NORTH WEST CHA CHA #47 FRACTURE PROCEDURE

1. PUMP 5,000 GALLONS OF 2% KCL WATER WITH 55 GALLONS OF PARATROL L AT 18 BPM AS PRE-PAD.
2. PUMP 17,500 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM AS PAD.
3. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 1/2 PPG TO 1 PPG OF 16/30 MESH BRADY SAND.
4. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 1 PPG TO 2 PPG OF 16/30 MESH BRADY SAND.
5. PUMP 15,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 2 PPG TO 3 PPG OF 16/30 MESH BRADY SAND.
- *** THE ABOVE BREAKER SCHEDULE SHOULD BE BASED ON 2-7 HOUR BREAK AT 125 DEG. F ***
6. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 3 PPG TO 4 PPG OF 16/30 MESH BRADY SAND. (INCREASE BREAKER TO ALLOW A 2 HOUR BREAK AT 115 DEG. F)
7. PUMP 5,000 GALLONS OF 65 Q N2 FOAM-30 AT 50 BPM WITH SAND RAMPED FROM 4 PPG TO 5 PPG OF 16/30 MESH BRADY SAND.
8. PUMP 8,000 GALLONS OF 60 Q N2 FOAM-30 AT 50 BPM WITH SAND RAMPED FROM 5 PPG TO 7 PPG + OF 16/30 MESH BRADY SAND.
9. FLUSH WELL WITH 5,000 GALLONS OF 60 Q N2 FOAM-30 AT 50 BPM OR RATE REQUESTED BY PROTOCOM. (RECALCULATE FLUSH VOLUME ON LOCATION)

THE WESTERN COMPANY**PROPPANT PROFILE STUDY
WEST-FOAM ANALYSIS
GEERTSMA-DE KLERK GEOMETRY**

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC.27,T29N,R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

RESERVOIR PARAMETERS

Permeability to Reservoir Fluid	4.0000 md
Porosity	15.00 percent
Reservoir Fluid Viscosity	1.800 cp
Reservoir Fluid Compressibility	1.30E-06 1/psi
Young's Modulus	5.00E+06 psi
Bottom Hole Fracture Pressure	3389 psi
Reservoir Pressure	2250 psi

FOAM PARAMETERS

Power Law Model	
Foam Quality	65 percent
Leak-off Fluid Viscosity	1.0000 cp
Stim Fluid C III at 1000 psi	2.11E-03 ft/sqrt(min)
Combined C	1.09E-04 ft/sqrt(min)
N Prime	0.489
K Prime	0.08100 lbf sec ^{n'} /ft ²

TREATMENT PARAMETERS

Injection Rate	50.0 bpm
Total Volume	83437 gal
Fluid Penetration	648 ft
Average Width while Pumping	0.493 in
Gross Fracture Height	200 ft
Net Fracture Height	35 ft

THE WESTERN COMPANY**PROPPANT PROFILE STUDY
WEST-FOAM ANALYSIS
GEERTSMA-DE KLERK GEOMETRY**

FLUID VOLUME (GALS)	PROPPANT TYPE	SURFACE PROPPANT CONC. (LB/GAL)	LOCATION IN FRACT. (FT)		AVERAGE PROPPED WIDTH (IN)	FRACTURE PROPPANT CONC. (LB/FT ²)	CUMULATIVE CUMULATIVE PROPPANT (LBS)
			FROM	TO			
17500	PAD	0.00	517	648	0.0000	0.000	0
10000	SAND	0.75	439	517	0.0469	0.238	7500
10000	SAND	1.50	357	439	0.0532	0.456	22500
15000	SAND	2.50	226	357	0.0837	0.718	60000
10000	SAND	3.50	134	226	0.1108	0.951	95000
5000	SAND	4.50	86	134	0.1358	1.166	117500
8000	SAND	7.19	0	86	0.1952	1.675	175020
TOTAL FOAM VOLUME -						75500 GAL	

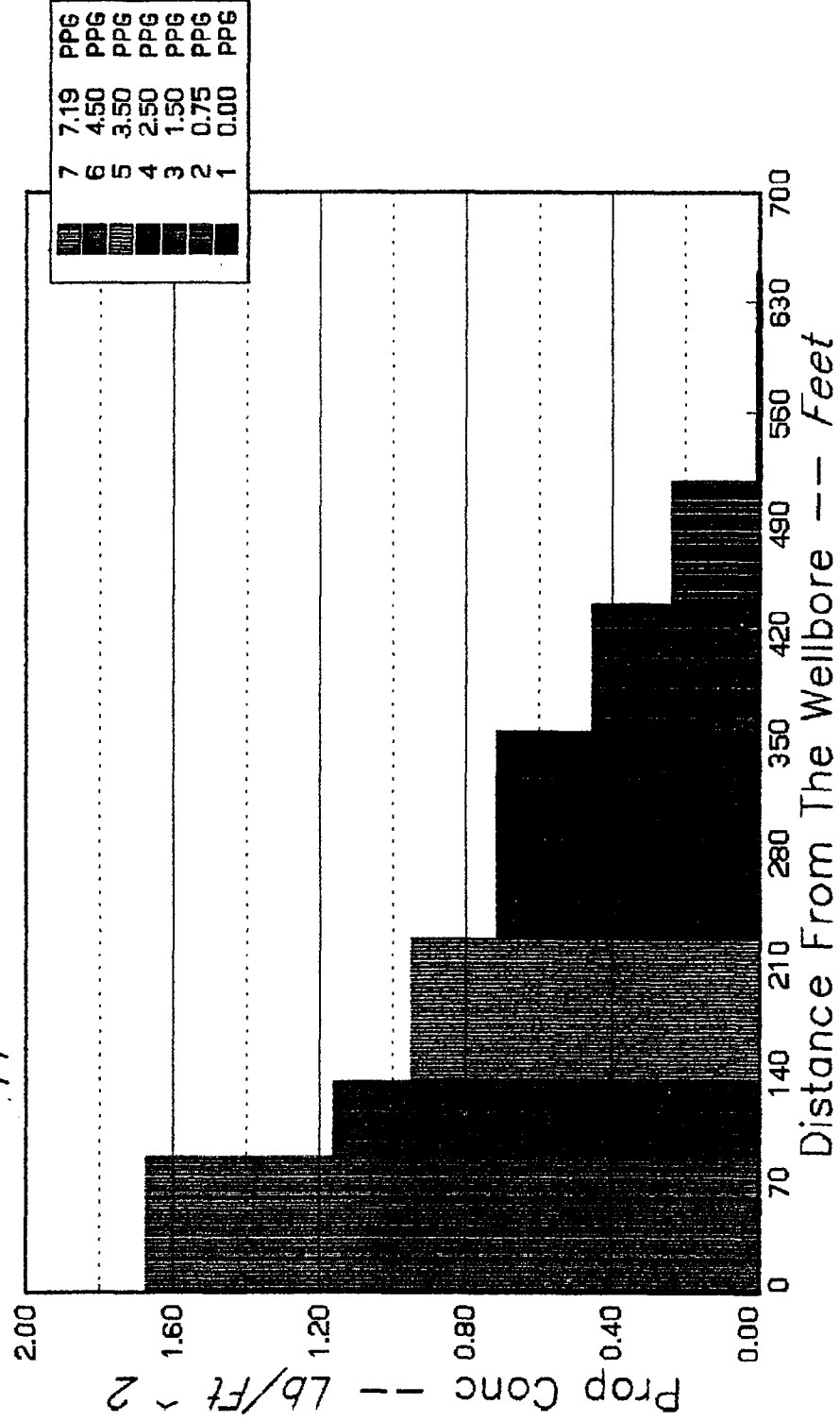
The Western Company

Proppant Profile Study

Foam Frac

Geertsma-De Klerk Geometry

Proppant Distribution In The Fracture



SIRGO BROTHERS ENERGY CORP.
 NORTH WEST CHA CHA #47
 GALLUP A & B

THE WESTERN COMPANY**NITROGEN FOAM PUMPING SCHEDULE**

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC. 27, T29N, R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

WELL AND RESERVOIR PARAMETERS

Depth (mid perforation)	5214 ft
Bottom Hole Frac Pressure	3389 psi
Bottom Hole Static Temperature	130 deg F

TREATMENT PARAMETERS

Treating Conductor I.D.	4.950 in
Fluid Specific Gravity	1.010
Gel Temperature in Tanks	70 deg F
Temperature of N2 at surface	100 deg F
Foam Injection Rate	50.0 bpm
Total Slurry Treatment Volume	93437 gal

Foam Quality and Injection Rate are held constant downhole.

CALCULATED TEMPERATURES

	Low	High
Foam at Surface	70 deg F	72 deg F
Foam at Perfs	72 deg F	82 deg F

Average Formation Pumping Temperature 120 deg F

THE WESTERN COMPANY

NITROGEN FOAM PUMPING SCHEDULE

PROCEDURE

STAGE	DOWNHOLE FOAM VOLUME (GALS)	DOWNHOLE FOAM QUALITY	DOWNHOLE FOAM RATE (BPM)	PROPPANT				CLEAN GEL VOLUME (BBLs)	N2 VOLUME (MSCF)
				CONC. LB/GAL	MESH	TYPE	(LBS)		
PP1	5000	0.0	18.0	0.00			0	119.0	0.00
1	17500	65.0	50.0	0.00			0	145.8	290.28
2	10000	65.0	50.0	0.75	16/30	SAND	7500	83.3	165.88
3	10000	65.0	50.0	1.50	16/30	SAND	15000	83.3	165.89
4	15000	65.0	50.0	2.50	16/30	SAND	37500	125.0	248.84
5	10000	65.0	50.0	3.50	16/30	SAND	35000	83.3	165.90
6	5000	65.0	50.0	4.50	16/30	SAND	22500	41.7	82.95
7	8000	60.0	50.0	7.19	16/30	SAND	57520	76.2	122.82
FLUSH	5000	60.0	50.0	0.00	FLUSH		0	47.6	76.76
	85500						175020	805.4	1319.30

TREATMENT SCHEDULE

STAGE	PROPPANT CONC. (LB/GAL)		CLEAN GEL RATE (BPM)	BLENDR SLURRY RATE (BPM)	SLURRY VOLUME (WITHOUT N2)			N2 RATE SCFM	PROP RATE LB/MIN	STAGE PUMP TIME HH:MM:SS
	PERF.	BLNDR			(BBLs)	(CUM.)	ON PERFS			
PP1	0.0	0.0	18.00	18.00	119.0	119	119	0	0	00:06:36
1	0.0	0.0	17.50	17.50	145.8	265	161	34833	0	00:08:20
2	0.8	2.1	16.92	18.57	91.4	356	309	33689	1523	00:04:55
3	1.5	4.3	16.39	19.57	99.5	456	403	32617	2949	00:05:05
4	2.5	7.1	15.72	20.81	165.5	621	505	31290	4715	00:07:57
5	3.5	10.0	15.10	21.95	121.1	742	674	30066	6343	00:05:31
6	4.5	12.9	14.53	23.01	66.0	808	797	28933	7848	00:02:52
7	7.2	18.0	15.08	27.38	138.3	947	874	24312	11386	00:05:03
FLUSH	0.0	0.0	20.00	20.00	47.6	994	994	32239	0	00:02:22
TOTAL PUMP TIME:										00:48:43

THE WESTERN COMPANY

FOAM PRESSURE/VOLUME ANALYSIS

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC.27,T29N,R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

INPUT PARAMETERS

Treatment via	5 1/2", 15.5 lb pipe
Number of Perforations	35
Perforation Diameter	0.500 in
Total Treatment Volume	75500 gals
Flush Volume	5212 gals
Bottom Hole Frac Pressure	3389 psi
Foam Injection Rate	50 bpm
Foam Quality	65.0 percent
Temperature of N2 at Surface	100 deg F
Design Formation Temperature	120 deg F
Specific Gravity of Base Fluid	1.01
Well Depth	5214 ft
I.D. of Treating Conductor	4.950 in
Friction Pressure	135 psi/1000 ft

PREDICTED PRESSURES

Fluid Rate	17.5 bpm
Perforation Pressure Drop	33.5 psi
Foam Friction Pressure	704 psi
Surface Treating Pressure	3004 psi
ISDP with Nitrogen	2895 psi
ISDP with Foam	2376 psi
Nitrogen Rate	34672 scfm

VOLUME REQUIREMENTS

	USING NITROGEN AS FLUSH		USING FOAM AS FLUSH	
	NITROGEN SCF	FLUID GALS	NITROGEN SCF	FLUID GALS
TREATMENT FLUSH	1246556 129299	26425 0	1246556 80103	26425 1824
TOTALS	1375855	26425	1326659	28249

THE WESTERN COMPANY**COST ESTIMATE**

N.W. CHA CHA #47 - X-L FOAM

QTY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE	GROSS AMOUNT	DISC (%)	NET AMOUNT
62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	12.00	744.00	36.0	476.16
62	LBS	B-5, GEL BREAKER	4.30	266.60	36.0	170.62
9	GAL	CL-2L, CROSSLINKER	12.90	116.10	36.0	74.30
17	GAL	CL-30, CROSSLINKER	29.25	497.25	36.0	318.24
12	LBS	FRAC-CIDE 20, BACTERIACIDE	35.55	426.60	36.0	273.02
145	GAL	FRAC-FOAM 1, FOAMING AGENT	25.90	3,755.50	36.0	2,403.52
950	LBS	J-4, GELLING AGENT	4.65	4,417.50	36.0	2,827.20
31	GAL	NINE-40, SURFACTANT	34.85	1,080.35	36.0	691.42
55	GAL	PARATROL-L, PARAFFIN CONTROL	20.85	1,146.75	36.0	733.92
29	LBS	ULTRA PERM BREAKER, C.R.B.	33.65	975.85	0.0	975.85
40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	2.90	116.00	36.0	74.24
1750	CWT	MOD SGTH 12/20,16/20 P CH (GAS)	1.30	2,275.00	36.0	1,456.00
1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	0.26	455.26	36.0	291.37
3200	GAL	PROP CONC PUMP CHG(FOAM)16.1-20 PPG	0.33	1,056.00	36.0	675.84
3499	GAL	PROP CONC PUMP CHG(FOAM)4.1 TO 6 PPG	0.07	244.93	36.0	156.76
5250	GAL	PROP CONC PUMP CHG(FOAM)6.1-9 PPG	0.13	682.50	36.0	436.80
3499	GAL	PROP CONC PUMP CHG(FOAM)9.1-12 PPG	0.20	699.80	36.0	447.87
1750	CWT	16/30 MESH BRADY	9.50	16,625.00	36.0	10,640.00
1750	T-M	DELIVERY CHARGE, 20 MILES	0.96	1,680.00	36.0	1,075.20
1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	1,370.00	1,370.00	36.0	876.80
1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5.55	8,991.00	36.0	5,754.24
40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	1.55	62.00	36.0	39.68
160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	2.90	464.00	36.0	296.96
2	UNIT	BLENDING CHARGE 1 HRS	470.00	940.00	36.0	601.60
1	EACH	DENSIOMETER	575.00	575.00	36.0	368.00
3	USE	LIQUID ADD PUMP	750.00	2,250.00	36.0	1,440.00
1	EACH	SANDMASTER, FIRST 3 DAYS	840.00	840.00	36.0	537.60
1	DAYS	SKID, QC, GEL MONITORING	410.00	410.00	36.0	262.40
1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1,750.00	1,750.00	0.0	1,750.00
40	MILE	HVY. EQUIP. FOR RETURN SAND-2	2.90	116.00	36.0	74.24
3693	T-M	HAULING & RETURN OF 20/40 SAND	0.96	3,545.28	36.0	2,268.98
500	C-SCF	NITROGEN	1.89	945.00	32.0	642.60
12693	C-SCF	NITROGEN > 50000 SCF	1.84	23,355.12	32.0	15,881.48
20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	1.55	31.00	32.0	21.08
120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	2.90	348.00	32.0	236.64
6	UNIT	NITROGEN PUMPING 0-4000 SCFM	1,060.00	6,360.00	32.0	4,324.80
1	EACH	N2 TARGET FLOWMETER	290.00	290.00	32.0	197.20
1	EACH	SERVICE CHARGE, VALVE ON N2	370.00	370.00	32.0	251.60
TOTALS:				\$90,273.39		\$60,024.24

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THIS QUOTATION IS BASED ON THE WESTERN COMPANY BEING AWARDED THE WORK ON A FIRST CALL BASIS AND WITHIN THIRTY (30) DAYS OF THE PROPOSAL DATE. THESE PRICES WILL BE SUBJECT TO REVIEW IF THE WORK IS DONE AFTER THIRTY (30) DAYS FROM THE PROPOSAL DATE, OR ON A SECOND OR THIRD CALL BASIS.

CUSTOMER WILL BE CHARGED FOR ALL 'SPECIAL PROPPANTS' DELIVERED TO LOCATION, WHETHER THEY ARE PUMPED OR NOT. ALL PROPPANTS OTHER THAN STANDARD GRADE FRAC SAND ARE CONSIDERED 'SPECIAL PROPPANTS'.

THE WESTERN COMPANY

COST ESTIMATE

N.W. CHA CHA #47 - X-L FOAM

QTY	UNIT	PRODUCT DESCRIPTION	NET AMOUNT
62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	476.16
62	LBS	B-5, GEL BREAKER	170.62
9	GAL	CL-2L, CROSSLINKER	74.30
17	GAL	CL-30, CROSSLINKER	318.24
12	LBS	FRAC-CIDE 20, BACTERIACIDE	273.02
145	GAL	FRAC-FOAM 1, FOAMING AGENT	2,403.52
950	LBS	J-4, GELLING AGENT	2,827.20
31	GAL	NINE-40, SURFACTANT	691.42
55	GAL	PARATROL-L, PARAFFIN CONTROL	733.92
29	LBS	ULTRA PERM BREAKER, C.R.B.	975.85
40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	74.24
1750	CWT	MOD SGTH 12/20,16/20 P CH (GAS)	1,456.00
1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	291.37
3200	GAL	PROP CONC PUMP CHG(FOAM)16.1-20 PPG	675.84
3499	GAL	PROP CONC PUMP CHG(FOAM)4.1 TO 6 PPG	156.76
5250	GAL	PROP CONC PUMP CHG(FOAM)6.1-9 PPG	436.80
3499	GAL	PROP CONC PUMP CHG(FOAM)9.1-12 PPG	447.87
1750	CWT	16/30 MESH BRADY	10,640.00
1750	T-M	DELIVERY CHARGE, 20 MILES	1,075.20
1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	876.80
1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5,754.24
40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	39.68
160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	296.96
2	UNIT	BLENDING CHARGE 1 HRS	601.60
1	EACH	DENSIOMETER	368.00
3	USE	LIQUID ADD PUMP	1,440.00
1	EACH	SANDMASTER, FIRST 3 DAYS	537.60
1	DAYS	SKID, QC, GEL MONITORING	262.40
1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1,750.00
40	MILE	HVY. EQUIP. FOR RETURN SAND-2	74.24
3693	T-M	HAULING & RETURN OF 20/40 SAND	2,268.98
500	C-SCF	NITROGEN	642.60
12693	C-SCF	NITROGEN > 50000 SCF	15,881.48
20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	21.08
120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	236.64
6	UNIT	NITROGEN PUMPING 0-4000 SCFM	4,324.80
1	EACH	N2 TARGET FLOWMETER	197.20
1	EACH	SERVICE CHARGE, VALVE ON N2	251.60
TOTALS:			\$60,024.24

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PRODUCT DESCRIPTIONS

B-31 (Gel Breaker Catalyst/Buffering Agent)

A liquid catalyst for use in conjunction with B-5 and Ultra Perm CRB™, in low temperatures (below 120 Degrees Fahrenheit) water-base fracturing fluids.

™Trademark of Western Company of North America.

B-5 (Gel Breaker)

An ammonium persulfate oxidizing breaker use in moderate temperatures (120 to 200 Degrees Fahrenheit) wells to sufficiently reduce the viscosity of crosslinked gels allowing for clean-up of the treating system. Used in conjunction with a catalyst, it may be run at low temperatures (below 120 Degrees Fahrenheit).

CL-2L (Crosslinker)

A liquid borate crosslinker (Boric Acid) used in Viking gel systems.

CL-30 (Crosslinker)

A slurried delayed borate crosslinker used in the high temperature Viking D gel systems.

FRAC-CIDE 20 (Bactericide)

An extremely effective biocide for the inhibitory control of aerobic and anaerobic (sulfate-reducing) bacteria in well treatment fluids. It is packaged as a dry powder for safety and easy of handling in all weather conditions.

FRAC FOAM-1 (Foaming Agent)

An amphoteric (cationic and anionic) surfactant used as a foaming agent for water and acid-base fracturing fluids.

J-4 (Gelling Agent)

A guar gum gelling agent blended with a buffering system. It is used in gelled water, gelled acid and crosslinked water-base fluids. The polymer residue is 6% to 9% by weight.

NINE-40 (Surfactant)

A nonionic non-emulsifier with excellent load recovery capabilities in some reservoirs.

PARATROL-L (Paraffin Control)

A liquid paraffin inhibitor for use in paraffin-producing reservoirs. It inhibits the paraffin by modifying the paraffin growth and adhesion process. The length of protection is determined by oil production rates.

PRODUCT DESCRIPTIONS

ULTRA PERM CRB™ (Gel Breaker)

A controlled release breaker (C.R.B.) for use in water-base fracturing fluids. It degrades aqueous gels and reduces gel residues to facilitate fluid recovery following fracture treatments. The filter cake degradation increases production rates due to significantly lower residue in the proppant pack and on the fracture face. It degrades the base polymer for crosslinked and linear gel systems. Used in reservoirs of temperatures between 90 and 350 Degrees Fahrenheit.

™Trademark of the Western Company of North America.

THE WESTERN COMPANY

FIELD RECEIPT WORKSHEET

N.W. CHA CHA #47 - X-L FOAM

PRODUCT CODE	QUANTITY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE
H0556	62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	12.00
H0906	62	LBS	B-5, GEL BREAKER	4.30
H1846	9	GAL	CL-2L, CROSSLINKER	12.90
H1286	17	GAL	CL-30, CROSSLINKER	29.25
H0356	12	LBS	FRAC-CIDE 20, BACTERIACIDE	35.55
H2186	145	GAL	FRAC-FOAM 1, FOAMING AGENT	25.90
H0846	950	LBS	J-4, GELLING AGENT	4.65
H0146	31	GAL	NINE-40, SURFACTANT	34.85
H1996	55	GAL	PARATROL-L, PARAFFIN CONTROL	20.85
H1016	29	LBS	ULTRA PERM BREAKER, C.R.B.	33.65
J7406	40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	2.90
E118BB	1750	CWT	MOD SGTH 12/20,16/20 P CH (GAS)	1.30
J4646B	1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	0.26
J4656B	3200	GAL	PROP CONC PUMP CHG(FOAM)16.1-20 PPG	0.33
J4616B	3499	GAL	PROP CONC PUMP CHG(FOAM)4.1 TO 6 PPG	0.07
J4626B	5250	GAL	PROP CONC PUMP CHG(FOAM)6.1-9 PPG	0.13
J4636B	3499	GAL	PROP CONC PUMP CHG(FOAM)9.1-12 PPG	0.20
NOTPR	1750	CWT	16/30 MESH BRADY	9.50
J4016	1750	T-M	DELIVERY CHARGE, 20 MILES	0.96
F3036B	1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	1370.00
F2016B	1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5.55
J3916	40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	1.55
J3906	160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	2.90
J2186	2	UNIT	BLENDING CHARGE 1 HRS	470.00
J3216	1	EACH	DENSIOMETER	575.00
J0556	3	USE	LIQUID ADD PUMP	750.00
J3106	1	EACH	SANDMASTER, FIRST 3 DAYS	840.00
J3016	1	DAYS	SKID, QC, GEL MONITORING	410.00
J3006	1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1750.00
NOTPR	40	MILE	HVY. EQUIP. FOR RETURN SAND-2	2.90
NOTPR	3693	T-M	HAULING & RETURN OF 20/40 SAND	0.96
N023E	500	C-SCF	NITROGEN	1.89
N003E	12693	C-SCF	NITROGEN > 50000 SCF	1.84
J3916	20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	1.55
J3906	120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	2.90
N2006	6	UNIT	NITROGEN PUMPING 0-4000 SCFM	1060.00
N1686	1	EACH	N2 TARGET FLOWMETER	290.00
H4456	1	EACH	SERVICE CHARGE, VALVE ON N2	370.00

THE WESTERN COMPANY

POSTFRAC TREATMENT SUMMARY

**SIRGO BROTHERS ENERGY CORP.
NORTH WEST CHA CHA #47
SEC.27, T29N, R14W
SAN JUAN COUNTY, NM
*GALLUP A & B FORMATION***

**JULY 28, 1994
FARMINGTON, NM
(505) 327-6222**

1994 WCNA STIMULATION SERVICES

DATE: July 24, 1994

Sirgo Brothers Energy Corp.
1512 Murray
Farmington, NM 87401

Re: Treatment Summary
North West Cha Cha #47
Sec.27, T29N, R14W
San Juan County, NM.
Gallup A & B Formation

This Treatment Summary contains information that was gathered through The Western Company's real time data acquisition system. The stimulation treatment on the above referenced well was performed by our Farmington District.

The information presented consists of the well data, proposed vs actual treatment, treatment graphs, and treatment data.

Thank you for giving us the opportunity to evaluate this treatment. If you have any questions or comments, please call me at (505) 327-6222.

Sincerely,


Loren L. Diede
District Engineer

TABLE OF CONTENTS

SECTION	1	WELL DATA
SECTION	2	PROPOSED VS ACTUAL TREATMENT
SECTION	3	TREATMENT GRAPHS
SECTION	4	TREATMENT DATA
SECTION	5	PROCEDURE AND MISCELLANEOUS

SECTION 1

WELL DATA

WELL DATA

Operator:	Sirgo Brothers Energy Corp.
Well:	North West Cha Cha #47
Formation:	Gallup A & B
Location:	Sec.27, T29N, R14W
Perforated Interval:	5,129' - 5,300'
Depth to Middle Perforation:	5,250'
Number of Perforations:	35
Perforation Size:	.50"
Tubing:	N/A
Casing:	5 1/2" 15.5#
Frac Gradient:	.65 PSI/ft
Bottom Hole Fracture Pressure:	3,389 PSI
Bottom Hole Temperature:	130 DEG. F.
Net Fracture Height:	35' (Estimated)

SECTION 2

PROPOSED VS ACTUAL
TREATMENT

PROPOSED TREATMENT

TREATING CONDUCTOR: 5 1/2" 15.5#

INJECTION RATE: 50 BPM

EXPECTED SURFACE TREATING PRESSURE: 3,004 PSI (Pad)

FLUID VOLUMES:

PRE PAD FLUID VOLUME: 5,000 GALLONS 2% KCL/PARATROL L

PAD & FRAC FLUID VOLUME: 75,500 GALLONS VIKING ID-30 65-60Q FOAM

FLUSH VOLUME: 5,000 GALLONS 30# LINEAR 60Q FOAM

PROPPANT:

175,000 POUNDS 16/30 MESH BRADY

ADDITIVES PER 1000 GALLONS:

FRAC FLUID

30.00	LB	J-4	GELLING AGENT
0.38	LB	FRAC-CIDE 20	BACTERIACIDE
1.00	LB	ULTRA PERM C.R.B.	GEL BREAKER
0.40	GL	CL-2L	CROSSLINKER {XL PAD - 3 ppg.}
0.75	GL	CL-30	CROSSLINKER {XL PAD - 3 ppg.}
1.00	GL	NINE-40	SURFACTANT
2.00	LB	B-5	GEL BREAKER
2.00	GL	B-31	GEL BREAKER CATALYST/BUFFER
5.00	GL	FRAC-FOAM 1	FOAMING AGENT

PROPOSED TREATMENT SCHEDULE

No. **	Volume *****	Fluid *****	Proppant *****
1	5,000	30# LINEAR	0.00 ppg. PRE PAD
2	17,500	VIKING ID-30 65Q	0.00 ppg. PAD
3	10,000	VIKING ID-30 65Q	0.75 ppg. 16/30
4	10,000	VIKING ID-30 65Q	1.50 ppg. 16/30
5	15,000	VIKING ID-30 65Q	2.50 ppg. 16/30
6	10,000	VIKING ID-30 65Q	3.50 ppg. 16/30
7	5,000	30# LINEAR 65Q	4.50 ppg. 16/30
8	8,000	30# LINEAR 60Q	7.19 ppg. 16/30
9	5,000	30# LINEAR 60Q	0.00 ppg. FLUSH

ACTUAL TREATMENT

TREATING CONDUCTOR: 5 1/2" 15.5#

INJECTION RATE: 55 BPM

ACTUAL SURFACE TREATING PRESSURE: 2,630 PSI (pad)

FLUID VOLUMES:

PRE PAD FLUID VOLUME: 5,000 GALLONS 2% KCL/PARATROL L

PAD & FRAC FLUID VOLUME: 76,866 GALLONS VIKING ID-30 65-60Q FOAM

FLUSH VOLUME: 4,900 GALLONS 30# LINEAR 60Q FOAM

PROPPANT:

181,040 POUNDS 16/30 MESH BRADY

ADDITIVES PER 1000 GALLONS:

FRAC FLUID

30.00	LB	J-4	GELLING AGENT
0.38	LB	FRAC-CIDE 20	BACTERIACIDE
1.00	LB	ULTRA PERM C.R.B.	GEL BREAKER
0.40	GL	CL-2L	CROSSLINKER {XL PAD - 3 ppg.}
0.75	GL	CL-30	CROSSLINKER {XL PAD - 3 ppg.}
1.00	GL	NINE-40	SURFACTANT
2.00	LB	B-5	GEL BREAKER
2.00	GL	B-31	GEL BREAKER CATALYST/BUFFER
5.00	GL	FRAC-FOAM 1	FOAMING AGENT

ACTUAL TREATMENT SCHEDULE

No. **	Volume *****	Fluid *****	Proppant *****
1	5,000	30# LINEAR	0.00 ppg. PRE PAD
2	17,500	VIKING ID-30 65Q	0.00 ppg. PAD
3	15,768	VIKING ID-30 65Q	0.75 ppg. 16/30
4	6,816	VIKING ID-30 65Q	1.50-2.50 ppg. 16/30
5	10,529	VIKING ID-30 65Q	2.50-3.50 ppg. 16/30
6	9,465	VIKING ID-30 65Q	3.50-4.50 ppg. 16/30
7	10,584	30# LINEAR 65Q	4.50-7.00 ppg. 16/30
8	6,204	30# LINEAR 60Q	7.19-8.00 ppg. 16/30
9	4,900	30# LINEAR 60Q	0.00 ppg. FLUSH

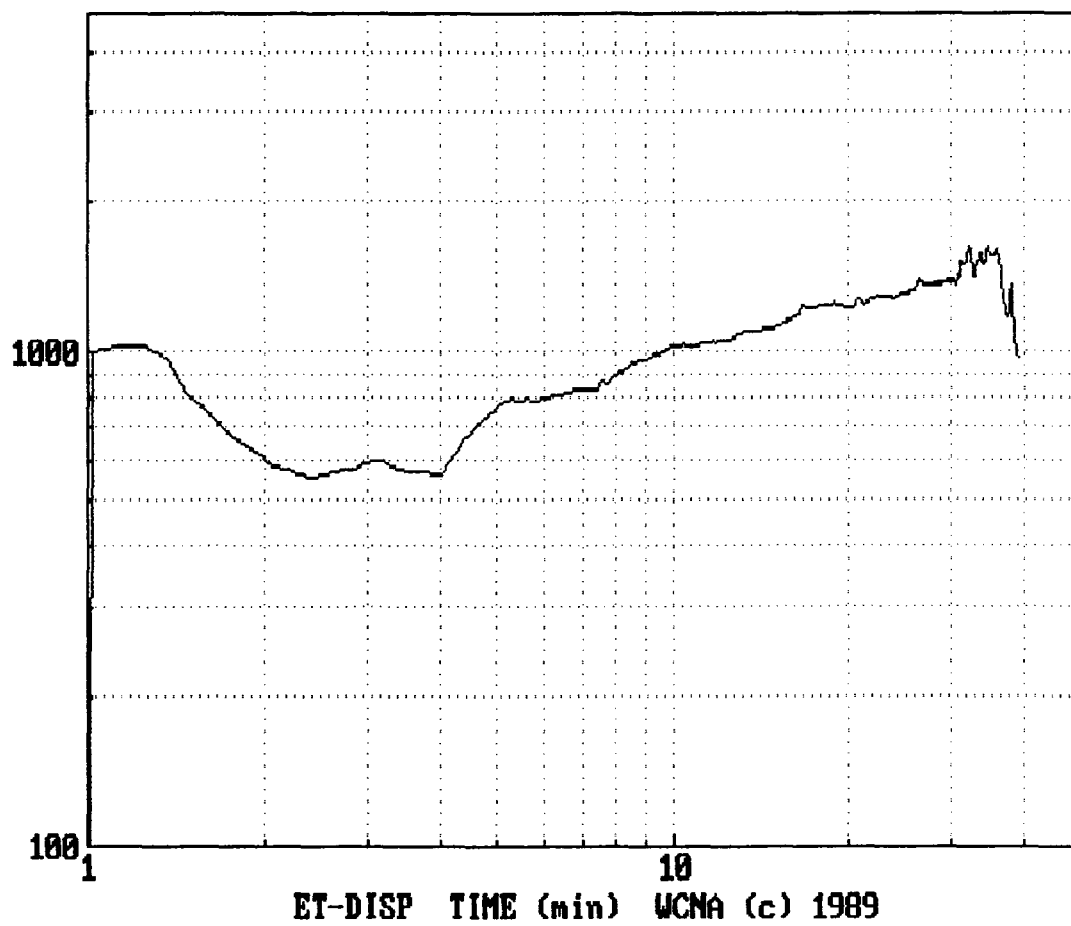
SECTION 3

TREATMENT GRAPHS

SURFACE PRESSURE (PSI)

PSI

CALC. ACTUAL TOOL NET PRESSURE (psi)



ET-DISP TIME (min) WCNA (c) 1989

SECTION 4

TREATMENT DATA



Date July 28, 1994 District Farmington F.Receipt 283501 Operator Sirgo Brothers
 Lease N.W. Cha Cha Well No. 47 Field Basin Location Sec.27,T29N,R14W
 County San Juan State NM Stage Number 1 This Zone ☐ This Well ☒

WELL DATA

OG ☐ NG ☐ NO ☒ OO ☐ WD ☐ IW ☐ Misc. ☐ Depth TD/PB 5,448' Formation Gallup A & B
 Tubing Size N/A Wt. _____ Set at: _____ Type Packer N/A Set at _____
 Casing Size 5 1/2" Wt. 15.5# Set From SUR To TD Liner Size N/A Wt. _____
 Liner Set From _____ To _____ Open Hole: Size N/A From _____ To _____
 Casing Perforation: Size .50 Holes Per Foot 1 Intervals 5,129'-5,300' 35 Holes
 Previous Treatment N/A Prior Production N/A

TREATMENT DATA

Pad Used: Yes ☒ No ☐ Pad Type VIKING ID-30 65Q
 Treat. Fluid Type: Foam ☒ Water ☐ Acid ☐ Oil ☐ Vol. 39,312 Gal.
 Base Fluid type 2% KCL/30# J-4 Base Fluid Vol. 30,660 Gal.
 Foam Qual. 65 % Mitchell ☒ Slurry ☐ Surface ☐ Downhole ☐ Total Prop Qty. 181,040 Lbs.
 Prop Type: Sand ☒ WP-1 ☐ WP-3 ☐ Baux. ☐ Other _____
 Prop Mesh Sizes, Types and Quantities 181,040 16/30 BRADY
 Hole Loaded With 2% KCL Treat Via: Tubing ☐ Casing ☒ Anul. ☐ Tubing & Anul. ☐
 Ball Sealers: N/A In _____ Stages of _____
 Types and Number of Pumps Used 5-1000
 Auxiliary Materials 900# J-4/18# FRAC-CIDE 20/32 G. 9-40/64 G. B-31/55 G. PARATROL L
26 G. CL-30/12 G. CL-21/82# B-5/35# ULTRA PERM

LIQUID/GAS PUMPED AND CAPACITIES IN BBLS.

Tubing Cap. N/A
 Casing Cap. 122
 Annular Cap. N/A
 Open Hole Cap. N/A
 Fluid to Load N/A
 Pad Volume 146
 Treating Fluid 738
 Flush 52
 Over Flush N/A
 Fluid to Recover 730
 Total N2 1,013,000
 Total CO2 N/A

PROCEDURE SUMMARY

PUMPED 5,000 PRE PAD/17,500 PAD/15,768 .8#/6,816 1.5-2.5#/10,529 2.5-3.5#
9,465 3.5-4.5#/10,584 4.5-7#/6,204 7-8#/4,900 FLUSH

Time AM/PM	Treating Press.-Psi		Surface Slurry bbls Pumped		Slurry Rate BPM	Surface CO2 bbls Pumped		CO2 Rate BPM	Surface N2 MSCF Pumped		N2 Rate SCFM	Comments
	STP	Annulus	Stage	Total		Stage	Total		Stage	Total		Safety Meeting/Test Lines
AM8:29	0		0	0	18				0	0	0	START PRE PAD
8:34	830		119	119	17.5				255	0	30,100	START PAD X LINK 65Q
8:41	2600		146	265	18.6				119K	255K	30,100	START .8# 65Q
8:47	2610		71	336	19.6				117K	374K	31,100	START 1.5#
8:50	2580		74	410	21				163K	491K	31,300	START 2.5# 65Q
8:56	2460		117	527	22				143K	654K	24,700	START 3.5# 65Q
9:02	2430		116	643	23				141K	797K	22,700	START 4.5 60Q
9:07	2100		147	770	27				55K	938K	20,300	START 7.2# 60Q
9:10	2000		94	884	27				20K	993K	11,600	START FLUSH
9:13	1280		52	936	10				0	1013K	0	SHUT DOWN

Treating Pressure: Min 2300 Max. 2600 Avg. 2450 Customer Representative Cam Billington
 Inj. Rate on Treating Fluid 55 Rate on Flush 50 Western Representative Harry Mitchell
 Avg. Inj. Rate 55 I.S.D.P. 1100 Flush Dens. lbs/gal 50Q Distribution Normal

Job Number

201601

Final Shut-in Pressure N/A In _____ Minutes
 Operator's Maximum Pressure (psi) 4000
 Recommendation ID# FM050119

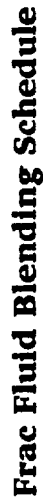
**THE WESTERN COMPANY OF NORTH AMERICA
ON THE FLY ADDITIVES SCHEDULE
FARMINGTON DISTRICT**

OPERATOR:
WELL NAME & NO.
PREPARED BY:

SIRGO BROS
WEST CHA CHA # 47
L DIEDE

DATE: **JULY 27, 1994**

					CHEMICAL 1		CHEMICAL 2		CHEMICAL 3		CHEMICAL 4	
					CL-30		CL-2L 50:50		CRB+B-5		FRAC-FOAM 1	
STAGE	SAND	TOTAL	N2	BLENDER	ADDITIVE	RATE	ADDITIVE	RATE	ADDITIVE	RATE	ADDITIVE	RATE
VOLUME	CONC.	RATE	QUALITY	CLEAN	CONC.	STAGE	CONC.	STAGE	CONC.	STAGE	CONC.	STAGE
GAL	PPG	BPM	%	RATE	PER/1000	NEED	PER/1000	NEED	PER/1000	NEED	PER/1000	NEED
17500	0.0	50.0	65.0	17.5	0.75	0.55	0.80	0.58	3.00	2.19	5.00	3.65
						5		5		18		31
						12		13		72		114
10000	0.8	50.0	65.0	16.9	0.75	0.53	0.80	0.56	3.00	2.12	5.00	3.53
						3		3		11		18
						9		10		61		96
10000	1.5	50.0	65.0	16.4	0.75	0.51	0.80	0.55	3.00	2.05	5.00	3.41
						3		3		11		18
						7		7		51		79
15000	2.5	50.0	65.0	15.7	0.75	0.49	0.80	0.52	3.00	1.96	5.00	3.27
						4		4		16		26
						3		3		35		52
10000	3.5	50.0	65.0	15.1	0.75	0.47	0.80	0.50	4.00	2.52	5.00	3.14
						3		3		14		18
						0		0		21		35
5000	4.5	50.0	65.0	14.5	0.00	0.00	0.00	0.00	3.00	1.82	5.00	3.03
						0		0		5		9
						0		0		16		26
8000	7.2	50.0	60.0	15.1	0.00	0.00	0.00	0.00	3.00	1.88	5.00	3.14
						0		0		10		16
						0		0		6		10
5000	0.0	50.0	60.0	20.0	0.00	0.00	0.00	0.00	3.00	2.50	5.00	4.17
						0		0		6		10
						0		0		0		0
				0.0		0.00		0.00		0.00		0.00
						0		0		0		0
						0		0		0		0
				0.0		0.00		0.00		0.00		0.00
						0		0		0		0
						0		0		0		0
				0.0		0.00		0.00		0.00		0.00
						0		0		0		0
						0		0		0		0
				0.0		0.00		0.00		0.00		0.00
						0		0		0		0
						0		0		0		0
80500					CUM =	16.4	CUM =	17.5	CUM =	90.0	CUM =	144.1

Date **July 28, 1994**

Field Receipt No.:

Formation GALLUP A&B

Perforation Interval:

County & State SAN JUAN, NM

[illegible]

Prepare by SHEPHERD/DIEDE

Crosslinked Frac Fluid Quality Control



Operator: **SIRGO BROS** Date: **July 28, 1994**
 Lease Name & Well No.: **WEST CHA CHA, # 47** Field Receipt No.:
 Field:
 Formation **GALLUP A&B**
 Perforation Interval:
 County & State **SAN JUAN, NM**

I. Tank/Transport No.	1	2							
A. Tank/Transport Condition	OK	OK							
B. Sampling Location	VALVE	VALVE							

II. Water Quality		Date water sampled:		Date tanks filled:	
A. Clarity, Color, Odor	GOOD	GOOD			
B. Sample Temperature, deg F	80	82			
C. Specific Gravity	1.01	1.01			
D. Initial pH	7.0	7.0			
E. Iron II - Iron III, ppm	0	0			
F. Reducing agent	NO	NO			
G. Phosphate, ppm					
H. Bacteria 1) aerobic +/-time					
2) anaerobic +/-time					

III. Base Gel Quality (field blend)		30# J-4	30# J-4
A. Name of Product system			
B. Fish eyes: 1) thickness of layer			
2) partic size			
B. Sampling location/time	BLENDER	BLENDER	
C. Sample temperature	83	82	
D. pH	10.0	10.0	
E. Viscosity @ 511 1/sec	17	18	
F. Calculate, lb polymer/1000			
G. Crosslink time, minutes	15	15	
H. Appearance of sample	GOOD	GOOD	

IV. Frac Fluid Quality					
A. Stage					
B. Time pumped					
C. Sample temperature, deg F					
D. Blender crosslink time, sec.					
E. Appearance of sample					

Source of water: city ☐ well ☐ pond ☐ other ☐ Geographic location of water source

Tested by **SHEPHERD/DIEDE**

Page 1 of 1



Date July 28, 1994

Field Receipt No.:

Perforation Interval:

County & State SAN JUAN, NM

Is total weight for each size appropriate for job requirement **Yes**

If not appropriate, correct problem before sieve analysis. If appropriate but insufficient, do sieve analysis.

Recombine all proppant samples to represent 100,000 lbm or fraction. Gravel samples should represent 2,000 lbm or fraction

THE WESTERN COMPANY OF NORTH AMERICA - N2 FOAM ANALYSIS MODEL

SIRGO BROTHERS ENERGY CORP. NORTH WEST CHA CHA #47 GALLUP FOAM FRAC 7-28-94

F min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
0.1	70	2147	100	0.1	20.7	0.0	29	0	0.0/ 0.0
0.3	70	2152	100	0.1	20.3	0.0	29	0	0.0/ 0.0
0.6	70	2153	100	0.1	20.1	0.0	38	0	0.0/ 0.0
0.7	70	2152	100	0.1	20.1	0.0	41	0	0.0/ 0.0
0.8	70	2149	100	0.1	20.2	0.0	43	0	0.0/ 0.0
0.9	70	2148	100	0.1	20.2	0.0	45	0	0.0/ 0.0
1.0	70	2146	100	0.1	20.3	0.0	47	0	0.0/ 0.0
1.1	70	2145	100	0.1	20.3	0.0	50	0	0.0/ 0.0
1.3	70	2146	100	0.1	20.2	0.0	52	0	0.0/ 0.0
1.4	70	2143	100	0.1	20.3	0.0	54	0	0.0/ 0.0
1.5	74	2153	100	0.1	19.9	0.0	57	0	0.0/ 0.0
1.6	302	2479	279	0.1	12.4	0.0	58	0	0.0/ 0.0
1.7	1074	3204	1004	0.1	15.8	0.0	60	0	0.0/ 0.0
1.8	1160	3244	1044	0.1	18.6	0.0	61	0	0.0/ 0.0
2.0	1217	3225	1025	0.1	23.1	0.0	64	0	0.0/ 0.0
2.1	1143	3124	924	0.1	24.2	0.0	66	0	0.0/ 0.0
2.2	1075	3057	857	0.1	23.5	0.0	68	0	0.0/ 0.0
2.3	1103	3069	869	0.1	24.1	0.0	71	0	0.0/ 0.0
2.4	1127	3064	864	0.1	25.5	0.0	73	0	0.0/ 0.0
2.6	1061	2991	791	0.1	25.3	0.0	76	0	0.0/ 0.0
2.7	1012	2942	742	0.1	24.7	0.0	79	0	0.0/ 0.0
2.8	987	2915	715	0.1	24.2	0.0	81	0	0.0/ 0.0
2.9	973	2896	696	0.1	24.1	0.0	84	0	0.0/ 0.0
3.0	961	2876	676	0.1	24.2	0.0	86	0	0.0/ 0.0
3.2	944	2856	656	0.1	23.9	0.0	89	0	0.0/ 0.0
3.3	894	2809	609	0.1	23.2	0.0	91	0	0.0/ 0.0
3.4	861	2781	581	0.1	22.3	0.0	94	0	0.0/ 0.0
3.5	843	2768	568	0.1	21.6	0.0	96	0	0.0/ 0.0
3.6	840	2762	562	0.1	21.4	0.0	98	0	0.0/ 0.0
3.8	839	2755	555	0.1	21.5	0.0	101	0	0.0/ 0.0
3.9	837	2750	550	0.1	21.3	0.0	103	0	0.0/ 0.0
4.0	834	2742	542	0.1	21.2	0.0	105	0	0.0/ 0.0
4.1	833	2738	538	0.1	21.1	0.0	107	0	0.0/ 0.0
4.2	831	2728	528	0.1	21.3	0.0	109	0	0.0/ 0.0
4.3	902	2746	546	0.1	24.1	0.0	112	0	0.0/ 0.0
4.5	1065	2814	614	0.1	29.0	0.0	114	0	0.0/ 0.0
4.6	1410	3003	803	0.1	36.9	0.0	116	0	0.0/ 0.0
4.7	1606	3091	891	0.1	40.6	0.0	118	0	0.0/ 0.0
4.8	1757	3122	922	0.1	44.3	0.0	120	0	0.0/ 0.0
4.9	1842	3133	933	0.1	45.8	0.0	122	0	0.0/ 0.0
5.0	1901	3114	914	0.1	47.0	0.0	125	0	0.0/ 0.0
5.2	1955	3095	895	0.1	47.9	0.1	127	0	1.0/ 1.4
5.3	1990	3078	878	0.1	47.9	0.1	129	0	1.0/ 1.4
5.4	2011	3120	920	0.1	44.9	0.1	131	0	1.0/ 1.4
5.5	2045	3126	926	0.1	44.2	0.0	133	0	1.0/ 1.0
5.6	2095	3107	907	0.1	45.1	0.1	135	0	1.0/ 1.2
5.7	2139	3081	881	0.1	46.3	0.1	137	0	1.0/ 1.4
5.9	2180	3092	892	0.1	45.7	0.0	139	0	0.9/ 1.0
6.0	2210	3090	890	-0.1	46.2	0.0	141	0	9.3/ 9.4
6.1	2232	3128	928	2.3	44.0	0.0	143	0	8.5/ 8.5
6.2	2251	3117	917	-0.6	43.5	0.1	144	0	8.4/ 8.7
6.3	2268	3076	876	-2.6	44.1	0.0	146	0	7.7/ 7.8
6.4	2284	2913	713	-10.9	49.0	0.0	148	0	8.3/ 8.3

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SIRGO BROTHERS ENERGY CORP. NORTH WEST CHA CHA #47 GALLUP FOAM FRAC 7-28-94

I min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
6.7	2307	2792	592	-6.1	50.8	0.0	152	0	8.5/ 8.5
6.8	2312	2748	548	-4.3	50.7	0.0	154	0	8.7/ 8.7
6.9	2318	2722	522	-3.0	50.1	0.0	156	0	8.8/ 8.8
7.0	2324	2686	486	-4.1	49.8	0.0	158	0	8.9/ 8.9
7.1	2333	2672	472	-1.8	50.2	0.0	160	0	24.6/24.6
7.2	2342	2660	460	-1.7	51.5	0.0	162	0	41.6/41.6
7.4	2356	2652	452	-1.1	52.9	0.0	164	0	53.1/53.1
7.5	2365	2660	460	1.2	52.7	0.0	166	0	54.4/54.4
7.6	2378	2672	472	1.7	52.6	0.0	169	0	57.3/57.4
7.7	2388	2678	478	0.8	52.8	0.0	171	0	58.8/58.9
7.8	2397	2675	475	-0.3	53.2	0.0	173	0	59.0/59.0
7.9	2410	2690	490	2.4	53.5	0.0	174	0	62.7/62.8
8.1	2416	2703	503	1.7	53.3	0.0	177	0	65.0/65.1
8.1	2417	2699	499	-0.6	53.4	0.0	178	0	63.2/63.2
8.3	2411	2688	488	-1.4	53.4	0.0	181	0	63.0/63.0
8.4	2410	2680	480	-1.5	53.5	0.0	181	0	62.2/62.2
8.5	2403	2671	471	-1.7	53.6	0.0	181	0	64.2/64.2
8.6	2400	2666	466	-0.5	54.0	0.0	188	0	67.6/67.6
8.8	2399	2671	471	0.8	53.7	0.0	190	0	67.6/67.6
8.9	2392	2659	459	-1.8	53.7	0.0	192	0	66.4/66.5
9.0	2397	2664	464	0.8	53.7	0.0	194	0	65.0/65.1
9.1	2413	2698	498	5.4	52.9	0.0	196	0	64.8/64.8
9.2	2431	2728	528	4.4	52.7	0.0	198	0	65.2/65.2
9.3	2446	2755	555	4.2	52.3	0.0	200	0	65.4/65.5
9.5	2459	2779	579	3.3	51.9	0.0	202	0	65.7/65.7
9.6	2471	2803	603	3.5	51.5	0.0	204	0	65.6/65.7
9.7	2484	2827	627	3.1	51.2	0.0	206	0	65.8/65.8
9.8	2495	2846	646	2.6	51.0	0.0	208	0	65.6/65.7
9.9	2507	2865	665	2.6	50.8	0.0	210	0	65.7/65.8
10.0	2519	2885	685	2.5	50.6	0.0	212	0	65.9/65.9
10.1	2522	2892	692	0.9	50.5	0.0	214	0	65.6/65.6
10.3	2528	2900	700	1.0	50.4	0.0	217	0	65.0/65.0
10.4	2527	2896	696	-0.5	50.6	0.0	219	0	64.7/64.7
10.5	2527	2897	697	0.1	50.5	0.0	221	0	64.8/64.9
10.6	2528	2900	700	0.3	50.5	0.0	223	0	64.9/65.0
10.7	2530	2896	696	-0.5	50.7	0.0	225	0	65.1/65.1
10.8	2530	2899	699	0.3	50.6	0.0	227	0	65.0/65.1
10.9	2533	2901	701	0.3	50.5	0.0	229	0	64.9/65.0
11.1	2539	2900	700	-0.1	50.9	0.0	231	0	64.9/65.0
11.2	2543	2913	713	1.8	50.7	0.0	233	0	65.0/65.0
11.3	2549	2917	717	0.5	50.7	0.0	235	0	64.6/64.6
11.4	2550	2920	720	0.4	50.7	0.0	237	0	64.7/64.8
11.5	2556	2925	725	0.8	50.7	0.0	239	0	64.8/64.9
11.6	2560	2929	729	0.5	50.8	0.0	241	0	64.6/64.6
11.8	2560	2934	734	0.7	50.5	0.0	243	0	64.6/64.7
11.9	2563	2935	735	0.1	50.6	0.0	245	0	64.5/64.6
12.0	2569	2940	740	0.6	50.7	0.0	247	100	64.5/64.6
12.1	2570	2938	738	-0.3	50.8	0.0	249	100	64.6/64.7
12.2	2570	2934	734	-0.5	51.0	0.0	251	100	64.5/64.5
12.3	2574	2943	743	1.4	50.8	0.0	253	100	64.5/64.6
12.4	2579	2957	757	1.9	50.4	0.0	255	100	64.4/64.5
12.6	2585	2969	769	1.9	50.2	0.0	257	200	64.4/64.4
12.7	2594	2965	765	-0.6	51.0	0.0	260	200	64.2/64.3

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T min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
12.9	2611	2991	791	1.5	51.1	0.0	264	400	64.2/64.3
13.0	2617	3006	806	2.1	50.9	0.0	266	600	64.3/64.4
13.1	2621	3010	810	0.6	51.1	0.0	268	700	64.1/64.2
13.3	2624	3025	825	2.1	50.7	0.0	270	800	64.3/64.4
13.4	2624	3028	828	0.4	50.8	0.0	272	900	64.5/64.5
13.5	2628	3040	840	1.6	50.6	0.0	274	1100	64.0/64.1
13.6	2628	3045	845	0.7	50.6	0.0	276	1200	64.3/64.3
13.7	2630	3055	855	1.4	50.4	0.0	278	1400	64.1/64.1
13.8	2630	3051	851	-0.6	50.8	0.0	281	1500	64.3/64.3
13.9	2630	3061	861	1.3	50.6	0.0	283	1700	64.4/64.4
14.1	2630	3069	869	1.1	50.5	0.1	285	1900	64.3/64.4
14.2	2629	3080	880	1.3	50.2	0.0	287	2100	64.5/64.5
14.3	2635	3083	883	0.5	50.7	0.0	289	2300	64.4/64.5
14.4	2636	3087	887	0.5	50.9	0.0	291	2500	64.4/64.4
14.5	2635	3096	896	1.4	50.7	0.0	294	2800	64.3/64.3
14.7	2638	3108	908	1.6	50.7	0.0	296	3100	64.2/64.2
14.8	2638	3115	915	0.9	50.8	0.1	298	3300	64.5/64.7
14.9	2639	3125	925	1.4	50.7	0.2	300	3600	64.9/65.2
15.0	2633	3126	926	0.2	50.6	0.3	303	3900	65.3/65.7
15.1	2631	3127	927	0.0	50.6	0.3	305	4100	64.5/65.0
15.2	2627	3125	925	-0.2	50.7	0.4	307	4400	64.3/64.9
15.4	2630	3133	933	1.1	50.7	0.5	309	4600	64.5/65.2
15.5	2624	3129	929	-0.6	50.7	0.5	311	4900	64.7/65.5
15.6	2621	3126	926	-0.4	50.9	0.5	314	5200	65.0/65.7
15.7	2617	3129	929	0.6	50.7	0.6	316	5500	65.1/65.9
15.8	2615	3129	929	-0.1	50.8	0.6	318	5700	65.4/66.3
16.0	2613	3127	927	-0.2	51.0	0.6	321	6000	65.6/66.5
16.1	2611	3132	932	0.7	50.8	0.7	323	6300	66.0/67.0
16.2	2609	3136	936	0.6	50.7	0.7	325	6600	65.6/66.7
16.3	2604	3137	937	0.2	50.5	0.8	327	6800	65.9/67.0
16.4	2604	3139	939	0.2	50.6	0.8	329	7100	66.1/67.3
16.5	2602	3144	944	0.7	50.5	0.9	332	7500	66.3/67.6
16.7	2612	3144	944	0.1	51.2	0.9	334	7800	65.7/67.1
16.8	2616	3142	942	-0.2	51.7	1.0	336	8200	65.5/67.0
16.9	2620	3154	954	1.8	51.6	1.1	339	8600	65.8/67.4
17.0	2618	3157	957	0.4	51.5	1.2	341	8900	66.0/67.7
17.1	2616	3155	955	-0.2	51.6	1.2	343	9200	65.9/67.7
17.2	2612	3149	949	-0.9	51.7	1.2	346	9500	65.8/67.5
17.4	2610	3148	948	-0.2	51.8	1.1	348	9900	65.8/67.4
17.5	2611	3153	953	0.7	51.8	1.1	350	10200	65.6/67.2
17.6	2610	3160	960	1.1	51.7	1.1	353	10600	65.6/67.2
17.7	2610	3170	970	1.5	51.4	1.1	355	11000	65.3/67.0
17.8	2611	3176	976	0.9	51.5	1.1	357	11400	65.4/67.0
17.9	2610	3175	975	-0.0	51.5	1.1	360	11700	65.2/66.9
18.1	2610	3181	981	0.9	51.5	1.1	362	12100	65.4/67.1
18.2	2610	3189	989	1.3	51.3	1.2	364	12500	65.3/67.0
18.3	2604	3190	990	0.1	51.1	1.2	367	12900	65.2/67.0
18.4	2603	3190	990	0.0	51.3	1.2	369	13300	65.3/67.1
18.5	2602	3192	992	0.4	51.3	1.2	371	13700	65.4/67.2
18.6	2600	3195	995	0.6	51.3	1.3	374	14100	65.7/67.6
18.8	2600	3199	999	0.5	51.3	1.4	376	14500	65.8/67.7
18.9	2594	3195	995	-0.7	51.2	1.4	378	14900	66.1/68.2
19.0	2593	3197	997	0.2	51.2	1.5	381	15300	65.6/67.8
19.1	2591	3200	1000	0.6	50.8	1.6	383	15700	65.1/67.4

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T min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
19.2	2590	3201	1001	0.2	51.0	1.5	386	16200	65.0/67.3
19.3	2590	3204	1004	0.4	51.0	1.5	388	16600	64.9/67.0
19.5	2588	3209	1009	0.9	50.9	1.4	391	17100	64.6/66.7
19.6	2583	3203	1003	-1.0	51.0	1.4	393	17600	64.5/66.6
19.7	2586	3212	1012	1.3	51.1	1.4	395	18000	64.4/66.5
19.8	2585	3211	1011	-0.1	51.2	1.5	398	18500	64.8/67.1
19.9	2588	3223	1023	1.9	51.1	1.6	400	19100	65.2/67.6
20.0	2586	3225	1025	0.4	51.1	1.7	402	19600	65.3/67.8
20.1	2586	3229	1029	0.7	51.1	1.7	405	20100	65.3/67.7
20.3	2586	3234	1034	0.7	51.2	1.7	407	20600	65.2/67.7
20.4	2588	3240	1040	1.2	51.2	1.7	410	21100	65.3/67.7
20.5	2582	3236	1036	-0.6	51.2	1.7	412	21700	65.3/67.8
20.6	2584	3246	1046	1.8	51.1	1.8	414	22200	65.3/67.8
20.7	2580	3252	1052	0.9	50.9	1.8	417	22800	64.9/67.5
20.8	2580	3258	1058	1.0	50.9	1.8	419	23400	64.6/67.3
21.0	2580	3264	1064	1.0	50.9	1.8	422	24000	64.5/67.1
21.1	2580	3272	1072	1.3	50.8	1.7	424	24600	64.3/66.9
21.2	2583	3278	1078	1.2	50.9	1.8	426	25200	64.5/67.1
21.3	2583	3280	1080	0.2	51.1	1.8	429	25800	64.5/67.1
21.4	2585	3301	1101	3.8	50.6	1.8	431	26400	64.5/67.1
21.5	2569	3331	1131	4.9	48.9	1.9	434	27000	64.5/67.3
21.6	2561	3327	1127	-0.8	49.0	2.0	436	27700	64.7/67.6
21.8	2554	3324	1124	-0.4	49.1	2.0	439	28400	64.9/67.8
21.9	2549	3324	1124	-0.0	49.1	2.1	441	29000	64.9/68.0
22.0	2545	3324	1124	0.0	49.1	2.2	444	29600	65.1/68.3
22.1	2540	3319	1119	-1.0	49.3	2.3	446	30300	65.1/68.4
22.2	2535	3314	1114	-0.8	49.4	2.3	449	30900	65.2/68.5
22.4	2531	3316	1116	0.3	49.3	2.3	451	31500	65.1/68.4
22.5	2529	3323	1123	0.9	49.1	2.3	454	32200	65.2/68.5
22.6	2526	3327	1127	0.8	49.0	2.3	457	32800	65.3/68.6
22.7	2523	3326	1126	-0.1	49.0	2.4	459	33400	65.4/68.8
22.8	2521	3327	1127	0.0	49.0	2.5	461	34000	65.6/69.1
23.0	2520	3325	1125	-0.2	49.1	2.6	464	34700	65.9/69.4
23.1	2521	3330	1130	0.8	49.0	2.7	467	35300	66.3/70.0
23.2	2520	3330	1130	-0.1	49.0	2.9	469	35900	66.6/70.4
23.3	2520	3332	1132	0.4	49.0	2.9	472	36500	66.8/70.6
23.4	2519	3339	1139	1.5	48.7	2.8	473	37000	66.5/70.2
23.7	2521	3342	1142	0.2	49.0	2.7	479	38500	65.9/69.7
23.8	2527	3343	1143	0.2	49.4	2.8	481	39100	66.1/69.9
23.9	2525	3337	1137	-0.9	49.4	3.0	484	39900	64.8/69.0
24.0	2521	3331	1131	-1.1	49.3	3.0	487	40500	64.4/68.7
24.2	2520	3335	1135	0.7	49.0	3.0	489	41000	64.4/68.6
24.3	2519	3331	1131	-0.8	49.1	3.0	492	41600	64.4/68.7
24.4	2519	3326	1126	-0.8	49.1	3.0	494	42300	64.4/68.7
24.5	2518	3321	1121	-0.9	49.1	3.0	497	42800	64.3/68.5
24.7	2511	3313	1113	-1.5	49.0	2.9	500	43500	64.1/68.3
24.8	2510	3307	1107	-1.1	49.2	2.9	502	44100	64.3/68.4
24.9	2518	3316	1116	2.2	49.3	2.9	502	44100	64.7/68.7
25.0	2520	3317	1117	0.2	49.4	2.9	502	44100	64.9/69.0
25.1	2520	3314	1114	-0.6	49.6	2.9	502	44100	65.0/69.1
25.2	2520	3318	1118	0.7	49.5	2.9	502	44100	64.9/69.0
25.3	2520	3321	1121	0.7	49.4	2.9	502	44100	64.8/68.9
25.4	2503	3348	1148	5.5	47.7	2.9	502	44100	64.7/68.7

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F min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
25.8	2480	3363	1163	0.8	46.8	3.0	524	49800	65.2/69.3
25.9	2477	3352	1152	-2.2	46.9	3.3	526	50500	65.5/69.9
26.0	2469	3347	1147	-1.0	47.1	3.3	529	51300	65.5/70.0
26.1	2461	3338	1138	-1.7	47.5	3.2	532	52000	64.9/69.4
26.3	2460	3348	1148	1.8	47.4	2.9	534	52900	64.1/68.2
26.4	2457	3349	1149	0.2	47.5	2.9	537	53700	64.1/68.2
26.5	2451	3349	1149	-0.1	47.6	2.7	540	54400	63.8/67.7
26.6	2450	3359	1159	2.1	47.5	2.7	542	55100	64.2/68.0
26.7	2449	3366	1166	1.5	47.5	2.8	545	55900	64.3/68.3
26.8	2442	3360	1160	-1.2	47.6	2.7	547	56600	64.3/68.2
27.0	2440	3369	1169	1.7	47.5	2.6	550	57300	64.0/67.8
27.1	2440	3372	1172	0.6	47.7	2.8	552	58100	64.3/68.3
27.2	2440	3379	1179	1.3	47.7	3.0	555	58800	64.7/68.9
27.3	2437	3375	1175	-0.7	48.0	3.0	558	59600	64.5/68.8
27.4	2435	3377	1177	0.3	48.0	2.9	560	60300	64.3/68.5
27.5	2431	3376	1176	-0.2	48.0	3.0	563	61000	64.4/68.6
27.7	2430	3382	1182	1.2	47.9	3.0	565	61800	64.4/68.6
27.8	2430	3392	1192	1.9	47.8	3.1	568	62600	64.4/68.7
27.9	2427	3389	1189	-0.5	47.8	3.3	570	63300	63.5/68.2
28.0	2421	3381	1181	-1.6	47.4	3.5	573	64100	63.4/68.5
28.1	2420	3380	1180	-0.3	47.5	3.5	576	64800	63.4/68.5
28.2	2421	3380	1180	0.0	47.9	3.7	578	65600	63.6/68.9
28.4	2420	3379	1179	-0.3	47.9	3.8	581	66400	63.0/68.4
28.5	2420	3377	1177	-0.4	47.9	3.8	583	67100	62.8/68.3
28.6	2420	3377	1177	0.0	47.9	3.9	586	67900	62.8/68.3
28.7	2418	3372	1172	-1.1	48.0	3.9	588	68600	63.0/68.6
28.8	2415	3369	1169	-0.6	48.0	3.8	591	69600	62.7/68.2
29.0	2417	3381	1181	2.4	47.8	3.7	594	70400	62.3/67.7
29.1	2419	3385	1185	1.1	47.8	3.7	597	71200	62.5/67.9
29.2	2417	3385	1185	0.0	47.7	3.8	599	72000	62.6/68.1
29.3	2416	3386	1186	0.2	47.7	3.8	602	72800	62.4/67.9
29.4	2418	3392	1192	1.3	47.6	3.8	604	73600	62.6/68.0
29.5	2418	3397	1197	1.1	47.5	3.8	607	74500	62.5/68.1
29.6	2419	3400	1200	0.6	47.5	3.8	609	75300	62.7/68.2
29.8	2418	3399	1199	-0.3	47.5	3.8	612	76100	62.4/67.9
29.9	2418	3402	1202	0.6	47.5	3.7	615	76900	62.4/67.8
30.0	2418	3405	1205	0.7	47.4	3.8	617	77800	62.6/68.1
30.1	2419	3408	1208	0.7	47.4	3.9	620	78600	62.9/68.5
30.2	2418	3404	1204	-1.0	47.6	3.9	622	79400	63.2/68.7
30.4	2420	3412	1212	1.8	47.5	3.9	625	80300	63.1/68.7
30.5	2424	3412	1212	0.1	47.8	3.9	628	81100	62.9/68.4
30.6	2427	3414	1214	0.4	47.9	3.8	630	81900	62.7/68.2
30.7	2428	3420	1220	1.0	48.0	3.9	633	82900	62.9/68.4
30.8	2430	3423	1223	0.6	48.1	3.9	636	83800	63.0/68.6
31.0	2431	3438	1238	2.8	47.8	3.9	639	84900	62.9/68.4
31.1	2422	3475	1275	8.4	46.4	3.9	642	85800	62.7/68.2
31.2	2408	3472	1272	-0.7	46.0	4.1	644	86800	63.1/68.9
31.3	2395	3484	1284	2.2	45.3	4.1	647	87800	63.1/68.9
31.4	2378	3475	1275	-2.0	45.1	4.2	650	88700	63.5/69.4
31.6	2372	3475	1275	-0.0	45.1	4.4	652	89600	63.8/69.8
31.7	2360	3468	1268	-1.5	45.0	4.3	655	90400	63.6/69.5
31.8	2348	3458	1258	-2.1	45.0	4.2	658	91300	63.5/69.3
31.9	2337	3455	1255	-0.7	44.8	4.3	660	92200	63.6/69.5

THE WESTERN COMPANY OF NORTH AMERICA - N2 FOAM ANALYSIS MODEL

SIRGO BROTHERS ENERGY CORP. NORTH WEST CHA CHA #47 GALLUP FOAM FRAC 7-28-94

r min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
32.1	2320	3455	1255	-0.1	44.5	4.2	666	93900	63.6/69.4
32.3	2316	3456	1256	0.1	44.6	4.1	668	94800	63.1/68.9
32.4	2308	3455	1255	-0.3	44.5	4.1	671	95600	63.3/69.1
32.5	2300	3446	1246	-1.8	44.6	4.3	674	96500	63.8/69.7
32.6	2299	3453	1253	1.6	44.6	4.3	676	97400	63.9/69.8
32.7	2289	3450	1250	-0.7	44.5	4.4	679	98300	64.0/70.0
32.8	2290	3458	1258	2.0	44.6	4.4	681	99200	63.9/69.9
32.9	2287	3466	1266	1.6	44.4	4.4	684	100200	63.2/69.3
33.1	2278	3459	1259	-1.5	44.4	4.4	687	101100	63.2/69.3
33.2	2275	3464	1264	1.1	44.3	4.6	689	102100	63.5/69.7
33.3	2277	3462	1262	-0.7	44.8	4.6	692	103000	63.5/69.7
33.4	2279	3468	1268	1.5	44.9	4.6	695	103900	63.4/69.7
33.5	2271	3460	1260	-1.8	44.9	4.8	698	104800	63.7/70.2
33.6	2277	3467	1267	1.6	45.1	5.1	700	105800	63.2/70.1
33.8	2276	3460	1260	-1.5	45.5	5.1	703	106700	62.6/69.6
33.9	2279	3470	1270	2.4	45.4	5.1	706	107700	61.9/69.1
34.0	2275	3469	1269	-0.3	45.5	5.3	709	108700	61.9/69.2
34.1	2284	3466	1266	-0.7	46.2	5.1	711	109800	61.5/68.7
34.2	2286	3467	1267	0.2	46.4	4.9	714	110800	60.6/67.7
34.3	2268	3478	1278	2.8	45.5	4.8	717	111800	60.1/67.2
34.4	2253	3483	1283	1.1	44.9	4.8	720	112800	59.8/67.0
34.6	2246	3487	1287	0.8	44.7	4.9	723	113800	59.6/67.0
34.7	2239	3484	1284	-0.7	44.8	5.0	726	114900	59.8/67.2
34.8	2230	3478	1278	-1.3	44.9	4.9	729	115900	59.7/67.0
34.9	2222	3481	1281	0.6	44.8	4.9	732	117000	59.5/66.8
35.0	2218	3477	1277	-0.9	45.0	5.0	735	118100	59.6/67.0
35.1	2218	3485	1285	1.9	45.1	5.1	738	119200	59.8/67.3
35.3	2210	3475	1275	-2.6	45.3	5.4	741	120300	60.7/68.3
35.4	2195	3460	1260	-3.4	45.4	5.5	743	121400	60.9/68.6
35.5	2195	3473	1273	3.3	45.2	5.4	746	122500	60.6/68.3
35.6	2200	3495	1295	5.1	45.0	5.5	749	123600	60.5/68.3
35.7	2202	3510	1310	3.3	44.9	5.5	752	124800	60.4/68.3
35.8	2210	3513	1313	0.8	45.5	5.4	755	126000	59.5/67.4
36.0	2215	3566	1366	12.8	44.3	5.4	758	127200	58.9/67.0
36.1	2201	3616	1416	10.7	42.6	5.5	761	128400	58.7/66.9
36.2	2237	3608	1408	-1.9	45.3	5.5	764	129800	58.3/66.5
36.3	2220	3594	1394	-2.9	45.5	5.5	768	131200	58.2/66.5
36.4	2179	3591	1391	-0.7	44.2	5.7	771	132400	58.6/67.1
36.5	2158	3585	1385	-1.4	43.7	6.0	774	133600	59.3/68.0
36.7	2128	3610	1410	5.5	41.5	6.1	776	134500	58.5/67.4
36.8	2115	3603	1403	-1.7	41.2	5.7	779	135500	57.7/66.4
36.9	2128	3640	1440	8.1	40.6	5.7	782	136500	56.0/65.0
37.0	2160	3708	1508	15.4	40.0	5.9	784	137600	55.1/64.5
37.1	2183	3698	1498	-2.0	41.6	6.1	787	138800	55.8/65.4
37.2	2210	3683	1483	-3.3	43.8	6.1	790	140100	55.9/65.5
37.3	2209	3627	1427	-12.9	46.0	6.2	793	141600	56.4/66.0
37.5	2155	3565	1365	-12.9	46.1	6.5	797	143200	57.6/67.2
37.6	2116	3506	1306	-13.7	46.5	6.8	800	144500	58.4/68.2
37.7	2101	3501	1301	-1.3	46.3	6.6	804	145800	57.8/67.5
37.8	2080	3517	1317	4.2	45.1	6.5	807	147100	57.4/67.0
37.9	2089	3563	1363	11.0	44.3	6.5	810	148300	57.3/67.0
38.1	2118	3582	1382	4.8	45.3	6.8	813	149600	57.8/67.8
38.2	2134	3612	1412	6.8	45.4	6.8	816	151000	57.8/67.7

THE WESTERN COMPANY OF NORTH AMERICA - N2 FOAM ANALYSIS MODEL

SIRGO BROTHERS ENERGY CORP. NORTH WEST CHA CHA #47 GALLUP FOAM FRAC 7-28-94

Time min.	STP psi.	BHTP psi.	NET P psi.	SLOPE	RATE Fm bpm	PROP Fm ppg	Cumm Wh vol	Cumm Wh Prop	Fm Qual mich/slry
38.4	2142	3649	1449	8.2	45.3	7.3	823	153900	57.2/67.8
38.5	2117	3659	1459	2.2	44.4	7.4	826	155200	57.8/68.4
38.6	2095	3660	1460	0.4	43.5	8.6	829	156600	57.2/69.1
38.8	2077	3635	1435	-5.6	43.6	9.1	833	158000	54.3/67.7
38.9	2028	3602	1402	-8.2	42.7	8.1	836	159300	53.2/65.8
39.0	2001	3609	1409	1.6	41.6	7.8	839	160600	54.3/66.2
39.1	1975	3589	1389	-4.7	41.4	6.7	842	161800	53.4/64.2
39.2	1984	3614	1414	6.4	41.6	6.0	845	163100	55.3/64.8
39.3	1997	3633	1433	4.3	42.2	6.2	848	164500	56.3/65.9
39.4	1987	3680	1480	11.6	40.9	6.9	851	165900	58.2/68.1
39.6	1968	3712	1512	7.0	39.8	8.1	855	167300	60.3/70.9
39.7	1951	3687	1487	-6.0	40.3	8.5	858	168800	59.0/70.5
39.8	1927	3659	1459	-6.4	40.6	9.0	861	170200	57.0/69.4
39.9	1886	3639	1439	-4.5	39.6	9.4	864	171600	55.1/68.5
40.0	1837	3646	1446	1.8	37.6	8.7	867	172800	53.8/66.8
40.1	1789	3646	1446	-0.1	36.0	7.9	870	174000	52.0/64.6
40.3	1772	3644	1444	-0.6	35.8	7.9	874	175300	52.0/64.6
40.4	1753	3639	1439	-1.1	35.7	7.7	877	176500	52.1/64.4
40.5	1746	3648	1448	2.2	35.8	7.7	880	177800	54.1/66.0
40.6	1746	3664	1464	4.1	35.9	8.1	883	179100	55.5/67.5
40.7	1753	3681	1481	3.8	35.9	8.8	886	180100	55.0/67.8
40.8	1756	3668	1468	-3.3	36.4	8.8	889	180900	55.0/67.9
41.0	1755	3647	1447	-4.9	36.5	9.0	892	181400	55.1/68.1
41.1	1754	3620	1420	-6.3	36.7	9.1	895	181800	54.9/68.0
41.2	1727	3577	1377	-11.7	36.1	8.8	898	182000	53.7/66.9
41.3	1681	3554	1354	-5.7	33.8	8.9	901	182100	52.2/66.0
41.4	1620	3514	1314	-8.9	31.2	9.1	905	182200	51.1/65.4
41.6	1583	3444	1244	-20.6	30.9	8.9	907	182300	50.9/65.0
41.7	1568	3400	1200	-12.4	30.8	8.4	910	182300	51.4/64.8
41.8	1560	3359	1159	-12.2	30.9	8.3	912	182300	51.7/64.9
41.9	1557	3324	1124	-10.7	31.2	8.1	915	182300	53.5/65.9
42.0	1560	3301	1101	-8.0	31.4	8.5	918	182300	54.7/67.3
42.1	1567	3292	1092	-2.9	31.3	8.9	921	182300	55.0/67.9
42.3	1578	3280	1080	-4.1	31.5	8.8	924	182300	55.1/67.9
42.4	1585	3268	1068	-3.8	31.4	9.2	926	182400	54.9/68.1
42.5	1568	3274	1074	1.9	29.1	9.8	929	182400	52.7/67.3
42.6	1528	3309	1109	11.3	24.2	10.6	931	182400	49.3/65.7
42.7	1497	3410	1210	33.9	17.2	10.7	932	182400	48.6/65.4
42.8	1440	3458	1258	15.0	10.3	10.7	934	182400	48.3/65.2
43.0	1328	3328	1128	-39.2	8.2	10.6	935	182400	48.6/65.3
43.1	1256	3284	1084	-15.4	2.8	10.6	936	182400	48.8/65.4
43.2	1210	3227	1027	-21.2	0.6	10.5	936	182400	49.2/65.6
43.3	1177	3174	974	-18.9	0.9	9.9	936	182400	48.6/64.5
43.4	1157	3139	939	-14.7	0.1	9.8	936	182400	48.8/64.6
43.5	1142	3115	915	-10.1	0.0	9.8	936	182400	49.0/64.7
43.6	1132	3099	899	-6.9	0.0	9.8	936	182400	49.1/64.7
43.8	1121	3082	882	-7.1	0.0	9.8	936	182400	49.2/64.8
43.9	1112	3068	868	-6.5	0.0	9.8	936	182400	49.3/64.8

SECTION 5

PROCEDURE AND
MISCELLANEOUS

SIRGO BROTHERS ENERGY CORP.

NORTH WEST CHA CHA #47

CHA CHA

SEC.27,T29N,R14W

SAN JUAN COUNTY, NM

GALLUP A & B FORMATION



The Western Company

65-60Q N2/VIKING ID-30 FRAC

PREPARED FOR

MR. MANNY SIRGO

OWNER

MR. DREW BATES - PROTOCOM

SERVICE POINT

FARMINGTON, NM

(505) 327-6222

PREPARED BY

MIKE MCNEESE

TECH REP II

FARMINGTON

JULY 26, 1994

FM050119

SALES REPRESENTATIVE

MIKE MCNEESE

TECH REP II

THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

WELL DATA

Net Pay	35 ft
Depth to Middle Perforation	5,214 ft
Reservoir Pressure	2,250 psi
Permeability	4 md
Porosity	15 percent
Casing	5 1/2", 15.5#, J-55
Gross Fracture Height	200 ft
Net Fracture Height	35 ft
Fracture Gradient	.65 psi/ft
Bottom Hole Frac Pressure	3,389 psi
Bottom Hole Temperature	130 deg F
Perforated Interval	5129'-5300' (1 SPF)
	TOTAL OF 35 HOLES @
	0.50"

THE WESTERN COMPANY

Treatment Requirements for: 65-60Q N2/VKG ID-30

PRE-PAD: 5,000 GALLONS 2% KCL/PARATROL L

Containing per 1000 Gallons:

11.00 Gallons PARATROL-L, PARAFFIN CONTROL
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE

RUN 55 GALLONS OF PARATROL L WITH 5,000 GAL OF 2% KCL WATER.
THIS TANK USED FOR BREAKDOWN, ACID AND THIS PRE-PAD.

PAD - 3 PPG: 52,500 GALLONS 65Q N2/VKG ID-30

Pumped Volumes:

18,371 Gallons 30# J-4

Mixed Volumes:

20,371 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT
0.75 Gallons CL-30, CROSSLINKER
0.40 Gallons CL-2L, CROSSLINKER

THE ABOVE VOL INCLUDES 1,000 GAL FOR TANK BOTTOMS-2. CHECK THE
X-LINKER/BREAKER LOADINGS PRIOR TO THE JOB. THIS TESTED @ 125 F

3 PPG - 4 PPG: 10,000 GALLONS 65Q N2/VKG ID-30

Pumped Volumes:

3,499 Gallons 30# J-4

Mixed Volumes:

3,499 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
3.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT
0.75 Gallons CL-30, CROSSLINKER
0.40 Gallons CL-2L, CROSSLINKER

BREAK THIS STAGE AT 115 DEG F IN TWO HOURS.

continued.....

THE WESTERN COMPANY**Treatment Requirements (continued)**

4 PPG - 5 PPG: 5,000 GALLONS 65Q N2 FOAM 30

Pumped Volumes:

1,751 Gallons 30# J-4

Mixed Volumes:

1,751 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

BEGIN 30# LINEAR/65 Q FOAM FROM 4 PPG TO 5 PPG RAMP.
BREAK THIS STAGE IN TWO HOURS AT 115 DEG F.

5 PPG TO 7 PPG+: 8,000 GALLONS 60Q N2 FOAM 30

Pumped Volumes:

3,200 Gallons 30# J-4

Mixed Volumes:

3,200 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

RAMP THIS STAGE FROM 5 PPG TO 7 PPG SAND IF POSSIBLE.
BREAK AT 115 DEG. F IN TWO HOURS.

continued.....

THE WESTERN COMPANY**Treatment Requirements (continued)**

FLUSH: 5,000 GALLONS 60Q N2 FOAM 30

Pumped Volumes:

1,999 Gallons 30# J-4

Mixed Volumes:

1,999 Gallons 30# J-4

Containing per 1000 Gallons:

0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
30.00 Pounds J-4, GELLING AGENT
1.00 Gallons NINE-40, SURFACTANT
2.00 Gallons B-31, GEL BREAKER CATALYST/BUFFER
2.00 Pounds B-5, GEL BREAKER
1.00 Pounds ULTRA PERM BREAKER, C.R.B.
5.00 Gallons FRAC-FOAM 1, FOAMING AGENT

ADDITIONAL MATERIALS:

55.00 Gallons PARATROL-L, PARAFFIN CONTROL

PROPPANTS: 175,000 Pounds 16/30 MESH BRADY

NORTH WEST CHA CHA #47 FRACTURE PROCEDURE

1. PUMP 5,000 GALLONS OF 2 $\frac{1}{2}$ KCL WATER WITH 55 GALLONS OF PARATROL L AT 18 BPM AS PRE-PAD.
 2. PUMP 17,500 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM AS PAD.
 3. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 1/2 PPG TO 1 PPG OF 16/30 MESH BRADY SAND.
 4. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 1 PPG TO 2 PPG OF 16/30 MESH BRADY SAND.
 5. PUMP 15,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 2 PPG TO 3 PPG OF 16/30 MESH BRADY SAND.
- *** THE ABOVE BREAKER SCHEDULE SHOULD BE BASED ON 2-7 HOUR BREAK AT 125 DEG. F ***
6. PUMP 10,000 GALLONS OF 65 Q N2/VIKING ID-30 AT 50 BPM WITH SAND RAMPED FROM 3 PPG TO 4 PPG OF 16/30 MESH BRADY SAND. (INCREASE BREAKER TO ALLOW A 2 HOUR BREAK AT 115 DEG. F)
 7. PUMP 5,000 GALLONS OF 65 Q N2 FOAM-30 AT 50 BPM WITH SAND RAMPED FROM 4 PPG TO 5 PPG OF 16/30 MESH BRADY SAND.
 8. PUMP 8,000 GALLONS OF 60 Q N2 FOAM-30 AT 50 BPM WITH SAND RAMPED FROM 5 PPG TO 7 PPG + OF 16/30 MESH BRADY SAND.
 9. FLUSH WELL WITH 5,000 GALLONS OF 60 Q N2 FOAM-30 AT 50 BPM OR RATE REQUESTED BY PROTOCOM. (RECALCULATE FLUSH VOLUME ON LOCATION)

THE WESTERN COMPANY**PROPPANT PROFILE STUDY
WEST-FOAM ANALYSIS
GEERTSMA-DE KLERK GEOMETRY**

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC.27,T29N,R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

RESERVOIR PARAMETERS

Permeability to Reservoir Fluid	4.0000 md
Porosity	15.00 percent
Reservoir Fluid Viscosity	1.800 cp
Reservoir Fluid Compressibility	1.30E-06 1/psi
Young's Modulus	5.00E+06 psi
Bottom Hole Fracture Pressure	3389 psi
Reservoir Pressure	2250 psi

FOAM PARAMETERS

Power Law Model	
Foam Quality	65 percent
Leak-off Fluid Viscosity	1.0000 cp
Stim Fluid C III at 1000 psi	2.11E-03 ft/sqrt(min)
Combined C	1.09E-04 ft/sqrt(min)
N Prime	0.489
K Prime	0.08100 lbf sec ⁿ /ft ²

TREATMENT PARAMETERS

Injection Rate	50.0 bpm
Total Volume	83437 gal
Fluid Penetration	648 ft
Average Width while Pumping	0.493 in
Gross Fracture Height	200 ft
Net Fracture Height	35 ft

THE WESTERN COMPANY

**PROPPANT PROFILE STUDY
WEST-FOAM ANALYSIS
GEERTSMA-DE KLERK GEOMETRY**

FLUID VOLUME (GALS)	PROPPANT TYPE	SURFACE PROPPANT CONC. (LB/GAL)	LOCATION IN FRACT. (FT)		AVERAGE PROPPED WIDTH (IN)	FRACTURE PROPPANT CONC. (LB/FT ²)	CUMULATIVE CUMULATIVE PROPPANT (LBS)
			FROM	TO			
17500	PAD	0.00	517	648	0.0000	0.000	0
10000	SAND	0.75	439	517	0.0469	0.238	7500
10000	SAND	1.50	357	439	0.0532	0.456	22500
15000	SAND	2.50	226	357	0.0837	0.718	60000
10000	SAND	3.50	134	226	0.1108	0.951	95000
5000	SAND	4.50	86	134	0.1358	1.166	117500
8000	SAND	7.19	0	86	0.1952	1.675	175020
TOTAL FOAM VOLUME -					75500 GAL		

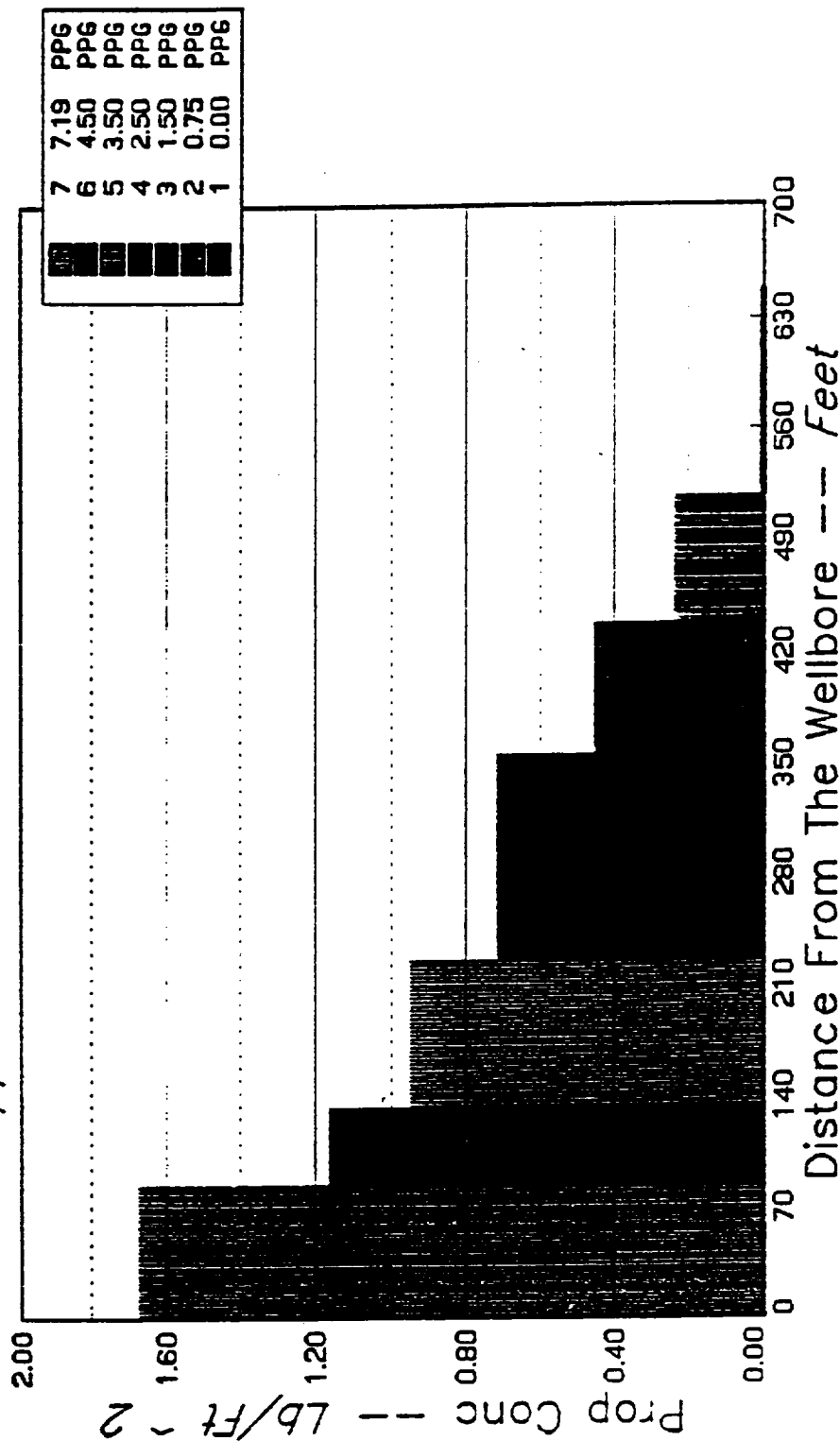
The Western Company

Proppant Profile Study

Foam Frac

Geertsma-De Klerk Geometry

Proppant Distribution In The Fracture



SIRGO BROTHERS ENERGY CORP.
NORTH WEST CHA CHA #47
GALLUP A & B

FM050119 01 01

THE WESTERN COMPANY

FM050119 01 01

NITROGEN FOAM PUMPING SCHEDULE

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC.27,T29N,R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

WELL AND RESERVOIR PARAMETERS

Depth (mid perforation)	5214 ft
Bottom Hole Frac Pressure	3389 psi
Bottom Hole Static Temperature	130 deg F

TREATMENT PARAMETERS

Treating Conductor I.D.	4.950 in
Fluid Specific Gravity	1.010
Gel Temperature in Tanks	70 deg F
Temperature of N2 at surface	100 deg F
Foam Injection Rate	50.0 bpm
Total Slurry Treatment Volume	93437 gal

Foam Quality and Injection Rate are held constant downhole.

CALCULATED TEMPERATURES

	Low	High
Foam at Surface	70 deg F	72 deg F
Foam at Perfs	72 deg F	82 deg F

Average Formation Pumping Temperature 120 deg F

THE WESTERN COMPANY

NITROGEN FOAM PUMPING SCHEDULE

PROCEDURE

STAGE	DOWNHOLE FOAM VOLUME (GALS)	DOWNHOLE FOAM QUALITY	DOWNHOLE FOAM RATE (BPM)	PROPPANT				CLEAN GEL VOLUME (BBLs)	N2 VOLUME (MSCF)
				CONC. LB/GAL	MESH	TYPE	(LBS)		
PP1	5000	0.0	18.0	0.00			0	119.0	0.00
1	17500	65.0	50.0	0.00			0	145.8	290.28
2	10000	65.0	50.0	0.75	16/30	SAND	7500	83.3	165.88
3	10000	65.0	50.0	1.50	16/30	SAND	15000	83.3	165.89
4	15000	65.0	50.0	2.50	16/30	SAND	37500	125.0	248.84
5	10000	65.0	50.0	3.50	16/30	SAND	35000	83.3	165.90
6	5000	65.0	50.0	4.50	16/30	SAND	22500	41.7	82.95
7	8000	60.0	50.0	7.19	16/30	SAND	57520	76.2	122.82
FLUSH	5000	60.0	50.0	0.00	FLUSH		0	47.6	76.76
	85500						175020	805.4	1319.30

TREATMENT SCHEDULE

STAGE	PROPPANT CONC. (LB/GAL)		CLEAN GEL RATE (BPM)	BLENDER SLURRY RATE (BPM)	SLURRY VOLUME (WITHOUT N2)			N2 RATE SCFM	PROP RATE LB/MIN	STAGE PUMP TIME HH:MM:SS
	PERF.	BLNDR			(BBLs)	(CUM.)	ON PERFS			
PP1	0.0	0.0	18.00	18.00	119.0	119	119	0	0	00:06:36
1	0.0	0.0	17.50	17.50	145.8	265	161	34833	0	00:08:20
2	0.8	2.1	16.92	18.57	91.4	356	309	33689	1523	00:04:55
3	1.5	4.3	16.39	19.57	99.5	456	403	32617	2949	00:05:05
4	2.5	7.1	15.72	20.81	165.5	621	505	31290	4715	00:07:57
5	3.5	10.0	15.10	21.95	121.1	742	674	30066	6343	00:05:31
6	4.5	12.9	14.53	23.01	66.0	808	797	28933	7848	00:02:52
7	7.2	18.0	15.08	27.38	138.3	947	874	24312	11386	00:05:03
FLUSH	0.0	0.0	20.00	20.00	47.6	994	994	32239	0	00:02:22
TOTAL PUMP TIME:										00:48:43

THE WESTERN COMPANY

FOAM PRESSURE/VOLUME ANALYSIS

OPERATOR	SIRGO BROTHERS ENERGY CORP.
WELL	NORTH WEST CHA CHA #47
FIELD	CHA CHA
LOCATION	SEC.27,T29N,R14W
COUNTY, STATE	SAN JUAN, NM
FORMATION	GALLUP A & B
PREPARED BY	MIKE MCNEESE
DATE	JULY 26, 1994

INPUT PARAMETERS

Treatment via	5 1/2", 15.5 lb pipe
Number of Perforations	35
Perforation Diameter	0.500 in
Total Treatment Volume	75500 gals
Flush Volume	5212 gals
Bottom Hole Frac Pressure	3389 psi
Foam Injection Rate	50 bpm
Foam Quality	65.0 percent
Temperature of N2 at Surface	100 deg F
Design Formation Temperature	120 deg F
Specific Gravity of Base Fluid	1.01
Well Depth	5214 ft
I.D. of Treating Conductor	4.950 in
Friction Pressure	135 psi/1000 ft

PREDICTED PRESSURES

Fluid Rate	17.5 bpm
Perforation Pressure Drop	33.5 psi
Foam Friction Pressure	704 psi
Surface Treating Pressure	3004 psi
ISDP with Nitrogen	2895 psi
ISDP with Foam	2376 psi
Nitrogen Rate	34672 scfm

VOLUME REQUIREMENTS

	USING NITROGEN AS FLUSH		USING FOAM AS FLUSH	
	NITROGEN SCF	FLUID GALS	NITROGEN SCF	FLUID GALS
TREATMENT FLUSH	1246556 129299	26425 0	1246556 80103	26425 1824
TOTALS	1375855	26425	1326659	28249

THE WESTERN COMPANY**COST ESTIMATE**

N.W. CHA CHA #47 - X-L FOAM

QTY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE	GROSS AMOUNT	DISC (%)	NET AMOUNT
62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	12.00	744.00	36.0	476.16
62	LBS	B-5, GEL BREAKER	4.30	266.60	36.0	170.62
9	GAL	CL-2L, CROSSLINKER	12.90	116.10	36.0	74.30
17	GAL	CL-30, CROSSLINKER	29.25	497.25	36.0	318.24
12	LBS	FRAC-CIDE 20, BACTERIACIDE	35.55	426.60	36.0	273.02
145	GAL	FRAC-FOAM 1, FOAMING AGENT	25.90	3,755.50	36.0	2,403.52
950	LBS	J-4, GELLING AGENT	4.65	4,417.50	36.0	2,827.20
31	GAL	NINE-40, SURFACTANT	34.85	1,080.35	36.0	691.42
55	GAL	PARATROL-L, PARAFFIN CONTROL	20.85	1,146.75	36.0	733.92
29	LBS	ULTRA PERM BREAKER, C.R.B.	33.65	975.85	0.0	975.85
40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	2.90	116.00	36.0	74.24
1750	CWT	MOD SGTH 12/20,16/20 P CH (GAS)	1.30	2,275.00	36.0	1,456.00
1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	0.26	455.26	36.0	291.37
3200	GAL	PROP CONC PUMP CHG(FOAM)16.1-20 PPG	0.33	1,056.00	36.0	675.84
3499	GAL	PROP CONC PUMP CHG(FOAM)4.1 TO 6 PPG	0.07	244.93	36.0	156.76
5250	GAL	PROP CONC PUMP CHG(FOAM)6.1-9 PPG	0.13	682.50	36.0	436.80
3499	GAL	PROP CONC PUMP CHG(FOAM)9.1-12 PPG	0.20	699.80	36.0	447.87
1750	CWT	16/30 MESH BRADY	9.50	16,625.00	36.0	10,640.00
50	T-M	DELIVERY CHARGE, 20 MILES	0.96	1,680.00	36.0	1,075.20
1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	1,370.00	1,370.00	36.0	876.80
1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5.55	8,991.00	36.0	5,754.24
40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	1.55	62.00	36.0	39.68
160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	2.90	464.00	36.0	296.96
2	UNIT	BLENDING CHARGE 1 HRS	470.00	940.00	36.0	601.60
1	EACH	DENSIOMETER	575.00	575.00	36.0	368.00
3	USE	LIQUID ADD PUMP	750.00	2,250.00	36.0	1,440.00
1	EACH	SANDMASTER, FIRST 3 DAYS	840.00	840.00	36.0	537.60
1	DAYS	SKID, QC, GEL MONITORING	410.00	410.00	36.0	262.40
1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1,750.00	1,750.00	0.0	1,750.00
40	MILE	HVY. EQUIP. FOR RETURN SAND-2	2.90	116.00	36.0	74.24
3693	T-M	HAULING & RETURN OF 20/40 SAND	0.96	3,545.28	36.0	2,268.98
500	C-SCF	NITROGEN	1.89	945.00	32.0	642.60
12693	C-SCF	NITROGEN > 50000 SCF	1.84	23,355.12	32.0	15,881.48
20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	1.55	31.00	32.0	21.08
120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	2.90	348.00	32.0	236.64
6	UNIT	NITROGEN PUMPING 0-4000 SCFM	1,060.00	6,360.00	32.0	4,324.80
1	EACH	N2 TARGET FLOWMETER	290.00	290.00	32.0	197.20
1	EACH	SERVICE CHARGE, VALVE ON N2	370.00	370.00	32.0	251.60
TOTALS:				\$90,273.39		\$60,024.24

THE TECHNICAL DATA CONTAINED IN THIS PROPOSAL IS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF WRITING AND IS SUBJECT TO FURTHER ANALYSIS AND TESTING. THE PRICING DATA CONTAINED IN THIS PROPOSAL ARE ESTIMATES ONLY AND MAY VARY DEPENDING ON THE WORK ACTUALLY PERFORMED. PRICING DOES NOT INCLUDE FEDERAL, STATE AND LOCAL TAXES OR ROYALTIES.

THIS ESTIMATION IS BASED ON THE WESTERN COMPANY BEING AWARDED THE WORK ON A FIRST CALL BASIS AND WITHIN THIRTY (30) DAYS FROM THE PROPOSAL DATE. THESE PRICES WILL BE SUBJECT TO REVIEW IF THE WORK IS DONE AFTER THIRTY (30) DAYS FROM THE PROPOSAL DATE, OR ON A SECOND OR THIRD CALL BASIS.

CUSTOMER WILL BE CHARGED FOR ALL 'SPECIAL PROPPANTS' DELIVERED TO LOCATION, WHETHER THEY ARE PUMPED OR NOT. ALL PROPPANTS OTHER THAN STANDARD GRADE FRAC SAND ARE CONSIDERED 'SPECIAL PROPPANTS'.

THE WESTERN COMPANY**COST ESTIMATE****N.W. CHA CHA #47 - X-L FOAM**

QTY	UNIT	PRODUCT DESCRIPTION	NET AMOUNT
62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	476.16
62	LBS	B-5, GEL BREAKER	170.62
9	GAL	CL-2L, CROSSLINKER	74.30
17	GAL	CL-30, CROSSLINKER	318.24
12	LBS	FRAC-CIDE 20, BACTERIACIDE	273.02
145	GAL	FRAC-FOAM 1, FOAMING AGENT	2,403.52
950	LBS	J-4, GELLING AGENT	2,827.20
31	GAL	NINE-40, SURFACTANT	691.42
55	GAL	PARATROL-L, PARAFFIN CONTROL	733.92
29	LBS	ULTRA PERM BREAKER, C.R.B.	975.85
40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	74.24
1750	CWT	MOD SGTH 12/20,16/20 P CH (GAS)	1,456.00
1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	291.37
3200	GAL	PROP CONC PUMP CHG(FOAM)16.1-20 PPG	675.84
3499	GAL	PROP CONC PUMP CHG(FOAM)4.1 TO 6 PPG	156.76
5250	GAL	PROP CONC PUMP CHG(FOAM)6.1-9 PPG	436.80
3499	GAL	PROP CONC PUMP CHG(FOAM)9.1-12 PPG	447.87
1750	CWT	16/30 MESH BRADY	10,640.00
1750	T-M	DELIVERY CHARGE, 20 MILES	1,075.20
1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	876.80
1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5,754.24
40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	39.68
160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	296.96
2	UNIT	BLENDING CHARGE 1 HRS	601.60
1	EACH	DENSIOMETER	368.00
3	USE	LIQUID ADD PUMP	1,440.00
1	EACH	SANDMASTER, FIRST 3 DAYS	537.60
1	DAYS	SKID, QC, GEL MONITORING	262.40
1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1,750.00
40	MILE	HVY. EQUIP. FOR RETURN SAND-2	74.24
3693	T-M	HAULING & RETURN OF 20/40 SAND	2,268.98
500	C-SCF	NITROGEN	642.60
12693	C-SCF	NITROGEN > 50000 SCF	15,881.48
20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	21.08
120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	236.64
6	UNIT	NITROGEN PUMPING 0-4000 SCFM	4,324.80
1	EACH	N2 TARGET FLOWMETER	197.20
1	EACH	SERVICE CHARGE, VALVE ON N2	251.60
TOTALS:			\$60,024.24

THE TECHNICAL DATA CONTAINED IN THIS PROPOSAL IS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF WRITING AND IS SUBJECT TO FURTHER ANALYSIS AND TESTING. THE PRICING DATA CONTAINED IN THIS PROPOSAL ARE ESTIMATES ONLY AND MAY VARY DEPENDING ON THE WORK ACTUALLY PERFORMED. PRICING DOES NOT INCLUDE FEDERAL, STATE AND LOCAL TAXES OR ROYALTIES.

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JUSTICE WILL BE CHARGED FOR ALL 'SPECIAL PROPPANTS' DELIVERED TO LOCATION, WHETHER THEY ARE PUMPED OR NOT. ALL PROPPANTS OTHER THAN STANDARD GRADE FRAC SAND ARE CONSIDERED 'SPECIAL PROPPANTS'.

PRODUCT DESCRIPTIONS

B-31 (Gel Breaker Catalyst/Buffering Agent)

A liquid catalyst for use in conjunction with B-5 and Ultra Perm CRB™, in low temperatures (below 120 Degrees Fahrenheit) water-base fracturing fluids.

™Trademark of Western Company of North America.

B-5 (Gel Breaker)

An ammonium persulfate oxidizing breaker use in moderate temperatures (120 to 200 Degrees Fahrenheit) wells to sufficiently reduce the viscosity of crosslinked gels allowing for clean-up of the treating system. Used in conjunction with a catalyst, it may be run at low temperatures (below 120 Degrees Fahrenheit).

CL-2L (Crosslinker)

A liquid borate crosslinker (Boric Acid) used in Viking gel systems.

CL-30 (Crosslinker)

A slurried delayed borate crosslinker used in the high temperature Viking D gel systems.

FRAC-CIDE 20 (Bactericide)

An extremely effective biocide for the inhibitory control of aerobic and anaerobic (sulfate-reducing) bacteria in well treatment fluids. It is packaged as a dry powder for safety and easy of handling in all weather conditions.

FRAC FOAM-1 (Foaming Agent)

An amphoteric (cationic and anionic) surfactant used as a foaming agent for water and acid-base fracturing fluids.

J-4 (Gelling Agent)

A guar gum gelling agent blended with a buffering system. It is used in gelled water, gelled acid and crosslinked water-base fluids. The polymer residue is 6% to 9% by weight.

NINE-40 (Surfactant)

A nonionic non-emulsifier with excellent load recovery capabilities in some reservoirs.

PARATROL-L (Paraffin Control)

A liquid paraffin inhibitor for use in paraffin-producing reservoirs. It inhibits the paraffin by modifying the paraffin growth and adhesion process. The length of protection is determined by oil production rates.

PRODUCT DESCRIPTIONS

ULTRA PERM CRB™ (Gel Breaker)

A controlled release breaker (C.R.B.) for use in water-base fracturing fluids. It degrades aqueous gels and reduces gel residues to facilitate fluid recovery following fracture treatments. The filter cake degradation increases production rates due to significantly lower residue in the proppant pack and on the fracture face. It degrades the base polymer for crosslinked and linear gel systems. Used in reservoirs of temperatures between 90 and 350 Degrees Fahrenheit.

™Trademark of the Western Company of North America.

THE WESTERN COMPANY

FIELD RECEIPT WORKSHEET

N.W. CHA CHA #47 - X-L FOAM

PRODUCT CODE	QUANTITY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE
H0556	62	GAL	B-31, GEL BREAKER CATALYST/BUFFER	12.00
H0906	62	LBS	B-5, GEL BREAKER	4.30
H1846	9	GAL	CL-2L, CROSSLINKER	12.90
H1286	17	GAL	CL-30, CROSSLINKER	29.25
H0356	12	LBS	FRAC-CIDE 20, BACTERIACIDE	35.55
H2186	145	GAL	FRAC-FOAM 1, FOAMING AGENT	25.90
H0846	950	LBS	J-4, GELLING AGENT	4.65
H0146	31	GAL	NINE-40, SURFACTANT	34.85
H1996	55	GAL	PARATROL-L, PARAFFIN CONTROL	20.85
H1016	29	LBS	ULTRA PERM BREAKER, C.R.B.	33.65
J7406	40	MILES	CHEMICALS DELIVERY, HEAVY VEHICLE	2.90
E1188B	1750	CWT	MOD SGTH 12/20, 16/20 P CH (GAS)	1.30
J4646B	1751	GAL	PROP CONC PUMP CHG(FOAM) 12.1-16 PPG	0.26
J4656B	3200	GAL	PROP CONC PUMP CHG(FOAM) 16.1-20 PPG	0.33
J4616B	3499	GAL	PROP CONC PUMP CHG(FOAM) 4.1 TO 6 PPG	0.07
J4626B	5250	GAL	PROP CONC PUMP CHG(FOAM) 6.1-9 PPG	0.13
J4636B	3499	GAL	PROP CONC PUMP CHG(FOAM) 9.1-12 PPG	0.20
NOTPR	1750	CWT	16/30 MESH BRADY	9.50
J4016	1750	T-M	DELIVERY CHARGE, 20 MILES	0.96
F3036B	1	UNIT	MASTER MIXER 21 TO 30 BPM (GAS)	1370.00
F3016B	1620	HHP	FRAC PUMP (GAS) (22 BPM, 3004 PSI)	5.55
J3916	40	MILES	LIGHT EQUIPMENT 2 VEH. 20 MILES	1.55
J3906	160	MILES	HEAVY EQUIPMENT 8 VEH. 20 MILES	2.90
J2186	2	UNIT	BLENDING CHARGE 1 HRS	470.00
J3216	1	EACH	DENSIOMETER	575.00
J0536	3	USE	LIQUID ADD PUMP	750.00
J3106	1	EACH	SANDMASTER, FIRST 3 DAYS	840.00
J3016	1	DAYS	SKID, QC, GEL MONITORING	410.00
J3006	1	EACH	TREATMENT MONITORING VAN (T.M.V.)	1750.00
NOTPR	40	MILE	HVY. EQUIP. FOR RETURN SAND-2	2.90
NOTPR	3693	T-M	HAULING & RETURN OF 20/40 SAND	0.96
NC23E	500	C-SCF	NITROGEN	1.89
NC03E	12693	C-SCF	NITROGEN > 50000 SCF	1.84
J3916	20	MILES	LIGHT EQUIPMENT 1 VEH. 20 MILES	1.55
J3906	120	MILES	HEAVY EQUIPMENT 6 VEH. 20 MILES	2.90
N2006	6	UNIT	NITROGEN PUMPING 0-4000 SCFM	1060.00
N1686	1	EACH	N2 TARGET FLOWMETER	290.00
H4456	1	EACH	SERVICE CHARGE, VALVE ON N2	370.00

THE WESTERN COMPANY

POSTFRAC TREATMENT SUMMARY

**SIRGO BROTHERS ENERGY CORP.
NORTH WEST CHA CHA #47
SEC.27, T29N, R14W
SAN JUAN COUNTY, NM.
GALLUP A & B FORMATION
REFRAC**

**APRIL 7, 1995
FARMINGTON, NM
(505) 327-6222**

1995 WCNA STIMULATION SERVICES

DATE: April 7, 1995

Sirgo Brothers Energy Corp.
1512 Murray
Farmington, NM 87401

Re: Treatment Summary
North West Cha Cha #47
Sec.27, T29N, R14W
San Juan County, NM.
Gallup A & B Formation
Refrac

This Treatment Summary contains information that was gathered through The Western Company's real time data acquisition system. The stimulation treatment on the above referenced well was performed by our Farmington District.

The information presented consists of the well data, proposed vs actual treatment, treatment graphs, and treatment data.

Thank you for giving us the opportunity to evaluate this treatment. If you have any questions or comments, please call me at (505) 327-6222.

Sincerely,

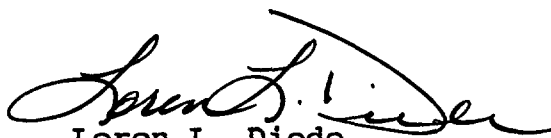

Loren L. Diede
District Engineer

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SECTION	3	TREATMENT GRAPHS
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SECTION	5	PROCEDURE AND MISCELLANEOUS

SECTION 1

WELL DATA

WELL DATA
**** *

Operator:	Sirgo Brothers Energy Corp.
Well:	North West Cha Cha #47
Formation:	Gallup A & B
Location:	Sec.27, T29N, R14W
Perforated Interval:	5,016' - 5,348'
Depth to Middle Perforation:	5,182'
Number of Perforations:	90
Perforation Size:	.50"
Tubing:	N/A
Casing:	5 1/2" 15.5#
Frac Gradient:	.65 PSI/ft
Bottom Hole Fracture Pressure:	3,389 PSI
Bottom Hole Temperature:	130 DEG. F.
Net Fracture Height:	30' (Estimated)

SECTION 2

PROPOSED VS ACTUAL
TREATMENT

PROPOSED TREATMENT

TREATING CONDUCTOR: 5 1/2" 15.5# CASING

INJECTION RATE: 40 BPM

EXPECTED SURFACE TREATING PRESSURE: 1,346 psi (Average)

FLUID VOLUMES:

TREATING FLUID VOLUME: 51,000 GALLONS SLICK WATER

FLUSH VOLUME: 5,000 GALLONS SLICK WATER

PROPPANT:

60,500 POUNDS 20/40 OTTAWA

ADDITIVES PER 1000 GALLONS:

PAD FLUID:

28.00	GL	TECHNI-SOLV	155	PARRIFIN CONTROL
0.38	LB	FRAC-CIDE	20	BACTERIACIDE
TREATING & FLUSH FLUID:				
0.38	LB	FRAC-CIDE	20	BACTERIACIDE
0.50	GL	NINE-40		SURFACTANT (CUT ON 1.5#)
0.75	GL	FR-30		FRICTION REDUCER

* CUSTOMER PROVIDED 2% KCL *

PROPOSED TREATMENT SCHEDULE

No. **	Volume *****	Fluid *****	Proppant *****
1	15,000 gals.	SLICK WATER	0.00 ppg. PAD
2	10,000 gals.	SLICK WATER	0.75 ppg. 20/40
3	10,000 gals.	SLICK WATER	1.50 ppg. 20/40
4	10,000 gals.	SLICK WATER	2.00 ppg. 20/40
5	6,000 gals.	SLICK WATER	3.00 ppg. 20/40
6	5,000 gals.	SLICK WATER	0.00 ppg. FLUSH

ACTUAL TREATMENT

TREATING CONDUCTOR: 5 1/2" 15.5#

INJECTION RATE: 42 BPM

ACTUAL SURFACE TREATING PRESSURE: 1,450 psi (PAD)

FLUID VOLUMES:

TREATING FLUID VOLUME: 43,797 GALLONS WATER

FLUSH VOLUME: 4,788 GALLONS WATER

PROPPANT:

61,440 POUNDS 20/40 OTTAWA

ADDITIVES PER 1000 GALLONS:

PAD FLUID:			
28.00	GL	TECHNI-SOLV 155	PARRIFIN CONTROL
0.38	LB	FRAC-CIDE 20	BACTERIACIDE
TREATING & FLUSH FLUID:			
0.38	LB	FRAC-CIDE 20	BACTERIACIDE
0.50	GL	NINE-40	SURFACTANT (CUT ON 1.5#)

* CUSTOMER PROVIDED 2% KCL *

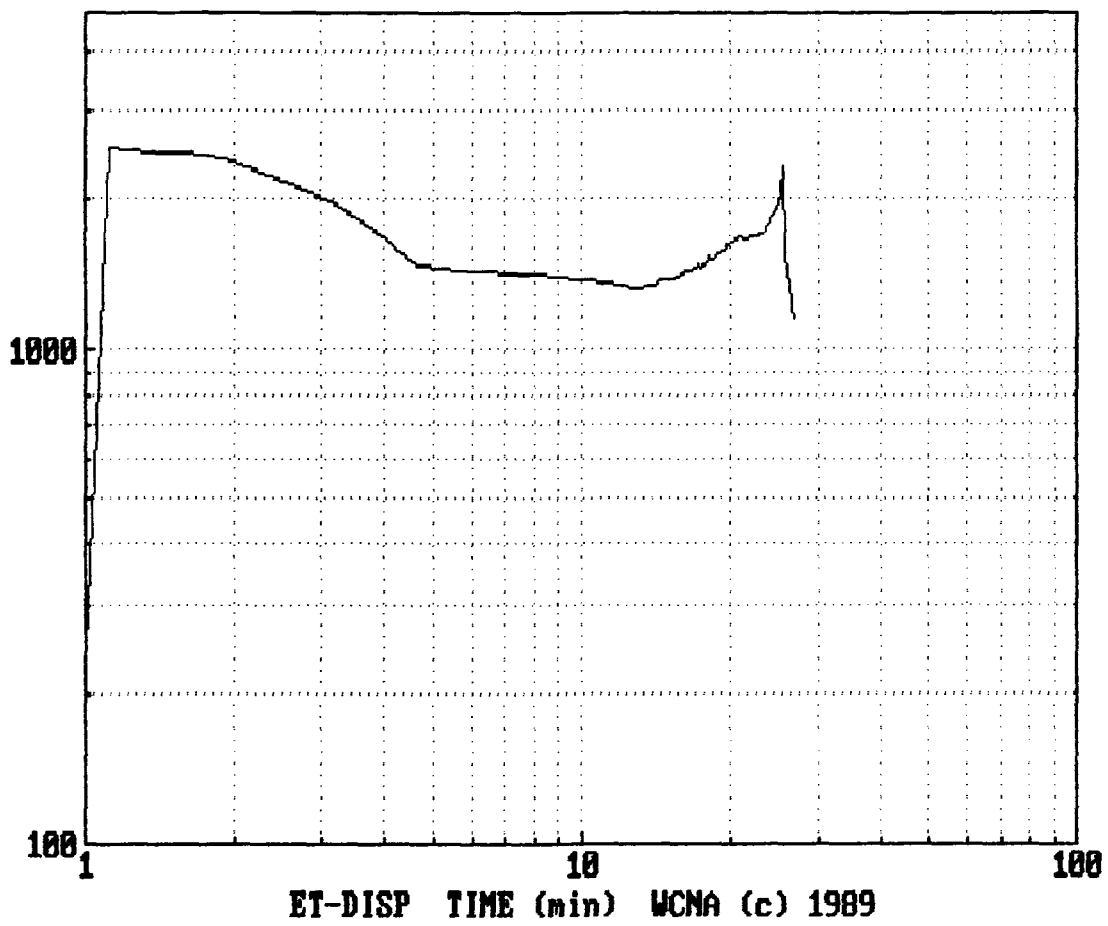
ACTUAL TREATMENT SCHEDULE

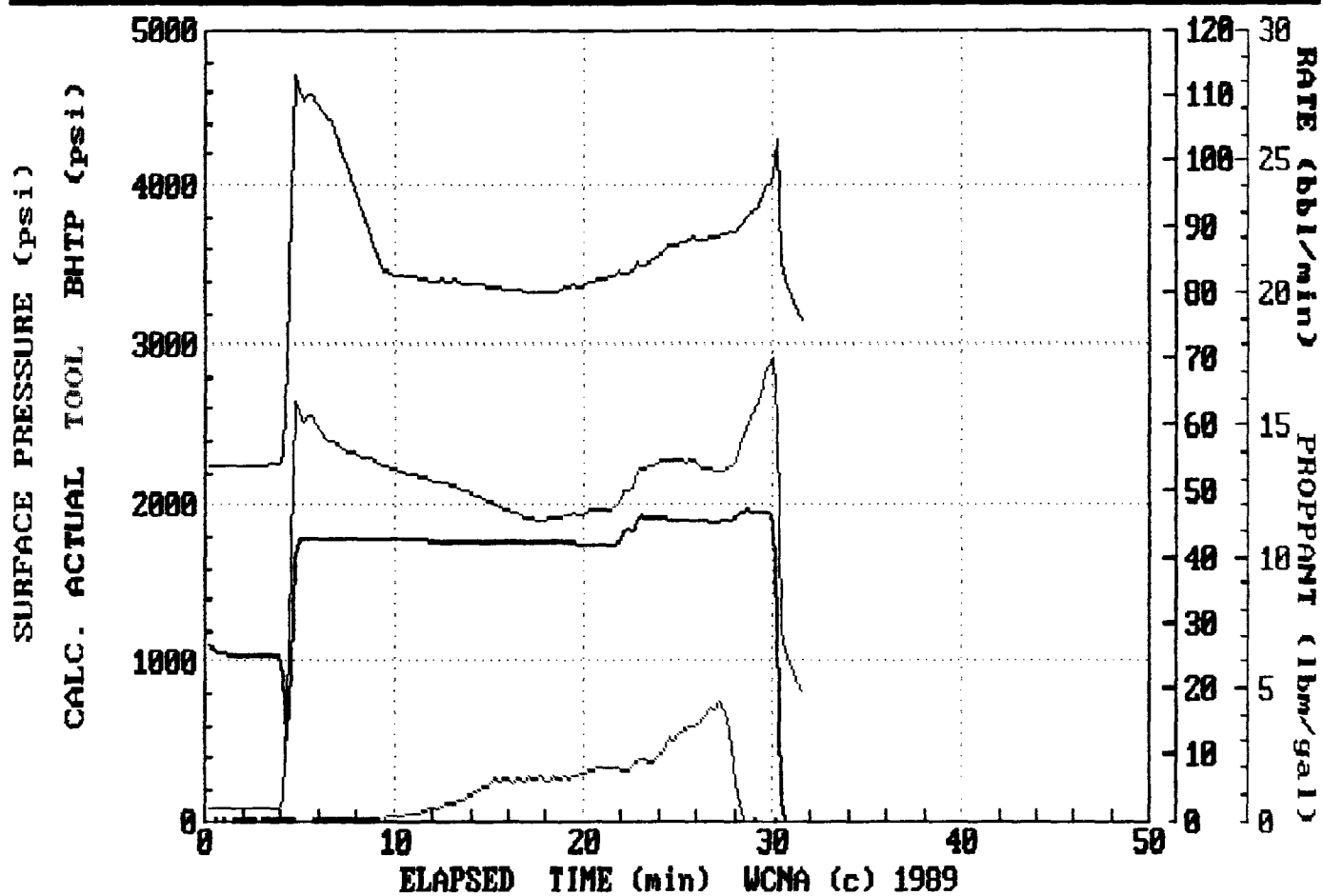
No. **	Volume *****	Fluid *****	Proppant *****
1	15,000 gals.	WATER	0.00 ppg. PAD
2	10,000 gals.	WATER	.5 TO 1 ppg. 20/40
3	7,612 gals.	WATER	1 TO 2 ppg. 20/40
4	7,140 gals.	WATER	2 TO 3 ppg. 20/40
5	4,045 gals.	WATER	3 TO 4 ppg. 20/40
6	4,788 gals.	WATER	0.00 ppg. FLUSH

SECTION 3

TREATMENT GRAPHS

CALC. ACTUAL TOOL NET PRESSURE (psi)





SECTION 4

TREATMENT DATA

[illegible]

Date April 7, 1995

Field Receipt No.: 311739

Field: Cha Cha

Formation Gallup A & B

Perforation Interval:

County & State San Juan, NM

[illegible]

Prepare by MIKE MCNEESE.

Quality Assurance of Proppant/Gravel/100 Mesh Sand

Page 1 of 1



Operator: Sirgo Brothers Energy

Date April 7, 1995

Lease Name & Well No.: N.W. Cha Cha, 47

Field Receipt No.: 311740

Field: Cha Cha

Formation Gallup A & B

Perforation Interval: _____

County & State San Juan, NM

Proppant ☐ Gravel ☐ 100 Mesh Sand ☐

If proppant (check one)

Westprop 1 ☐

Westprop 2 ☐

Westprop 3 ☐

Westprop 4 ☐

Other _____

"Ottawa" type sand ☒

"Brady" type sand ☐

Sintered Bauxite ☐

Westprop Lite ☐

If gravel (check one)

Wespak Gravel ☐

Wespak 4 Gravel ☐

Other _____

Truck Number	6452				
Trucking Company	WCNA				
Weight Slip Available? Attach All	Yes				
Net Weight Delivered	61,440				
Nominal Size from list below	20/40 O				
Total Weight, each size	Size 20/40 O Weight 61,440 lb	Size	Weight	lb	Size
			Weight	lb	

Is total weight for each size appropriate for job requirement Yes

Is the content of the truck proper?	color right	Yes			
	low dust	Yes			
	appearance right	Yes			
	no contamination	Yes			
Is the manufacturer's sieve analysis proper? Attach all.	oversize < 0.1%	Yes			
	finer < 1.0% (2.0%+)	Yes			
	in-size > 90% (96%)	Yes			
Sample taken ?	Yes				
Is the truck content acceptable ?	Yes				

Are above answers appropriate and sufficient as compared to job requirements? Yes

If not appropriate, correct problem before sieve analysis. If appropriate but insufficient, do sieve analysis.

SIEVE ANALYSIS

Nominal Size <u>20/40 O</u>				Nominal Size _____				Nominal Size _____			
Initial Sample Wt.(gram) <u>34.7</u>				Initial Sample Wt.(gram) _____				Initial Sample Wt.(gram) _____			
Sieve mesh	Amount Retained			Sieve mesh	Amount Retained			Sieve mesh	Amount Retained		
	gram	%			gram	%			gram	%	
16	0.00	0.00	oversize				oversize				oversize
20	0.06	0.17									
30	11.30	32.48	total				total				total
35	14.21	40.84	in-size 94.13				in-size				in-size
40	7.24	20.81									
50	1.98	5.69									
PAN	0.00	0.00	finer				finer				finer
Total wt.				Total wt.				Total wt.			
Cleanliness of	Turbidity		Pass	Cleanliness of	Turbidity			Cleanliness of	Turbidity		
proppant/gravel	pH		Pass	proppant/gravel	pH			proppant/gravel	pH		

Recognized proppant or gravel sizes: 6/12,8/16,12/20,16/20,16/30,20/40,30/50, or 40/70 (40/60 for gravel)

Recombine all proppant samples to represent 100,000 lbm or fraction. Gravel samples should represent 2,000 lbm or fraction



Crosslinked Frac Fluid Quality Control

Operator: Sirgo Brothers Energy
Lease Name & Well No.: N.W. Cha Cha, 47
Field: Cha Cha
Formation Gallup A & B
Perforation Interval: _____
County & State San Juan, NM

Date April 7, 1995
Field Receipt No.: 311740

I. Tank/Transport No.	1-4								
A. Tank/Transport Condition	GOOD								
B. Sampling Location	VALVE								

II. Water Quality		Date water sampled: 4-7-95	Date tanks filled:						
A. Clarity, Color, Odor	GOOD								
B. Sample Temperature, deg F	55-57 deg F								
C. Specific Gravity	1.01								
D. Initial pH	6.0-6.5								
E. Iron II - Iron III, ppm	0.00								
F. Reducing agent	NO								
G. Phosphate, ppm	N/A								
H. Bacteria 1) aerobic +/-time	N/A								
2) anaerobic +/-time	N/A								

III. Base Gel Quality (field blend)		Prod. Water							
A. Name of Product system		N/A							
B. Fish eyes: 1) thickness of layer		N/A							
2) partic size		VALVE							
B. Sampling location/time		55							
C. Sample temperature		6.0-6.5							
D. pH		N/A							
E. Viscosity @ 511 1/sec		N/A							
F. Calculate, lb polymer/1000		N/A							
G. Crosslink time, minutes		N/A							
H. Appearance of sample		N/A							

IV. Frac Fluid Quality									
A. Stage		N/A							
B. Time pumped		N/A							
C. Sample temperature, deg F		N/A							
D. Blender crosslink time, sec.		N/A							
E. Appearance of sample									

Source of water: city ☐ well ☐ pond ☐ other PRODUCED/CITY Geographic location of water source _____

Tested by MIKE MCNEESE

THE WESTERN COMPANY OF NORTH AMERICA - REAL TIME MONITORING SYSTEM

SIRGO BROTHERS ENERGY CORP. NW CHA CHA #47 GALLUP A&B SAND REFRAC 4-7-95

min.	STP psi.	BHTP psi.	NET P psi.	PRESS 2 psi.	SLR RATE bpm.	PROP lb/gal	Cumm Volume	Cumm Proppant
0.21	82	2240	1240	132	26.8	0.0	15	0
0.43	81	2244	1244	133	26.1	0.0	21	0
0.65	80	2246	1246	132	25.6	0.0	27	0
0.86	80	2248	1248	129	25.3	0.0	32	0
1.08	80	2249	1249	130	25.2	0.1	38	0
1.30	80	2250	1250	121	25.1	0.0	43	100
1.52	74	2245	1245	114	25.1	0.0	49	100
1.74	80	2251	1251	120	25.0	0.0	54	100
1.96	80	2251	1251	124	25.0	0.0	60	100
2.17	80	2251	1251	120	25.0	0.0	65	100
2.39	80	2251	1251	121	25.1	0.1	70	100
2.61	80	2252	1252	119	25.1	0.1	76	200
2.82	80	2252	1252	119	25.0	0.0	81	200
3.04	80	2253	1253	121	25.0	0.1	87	200
3.25	80	2253	1253	115	25.0	0.1	92	200
3.47	80	2255	1255	113	24.8	0.1	97	200
3.69	80	2255	1255	102	24.8	0.0	103	200
3.90	80	2255	1255	113	24.9	0.1	108	200
4.12	142	2335	1335	173	22.3	0.1	113	300
4.33	657	2900	1900	678	12.5	0.1	116	300
4.55	1706	3894	2894	1701	23.1	0.1	120	300
4.77	2646	4700	3700	2614	40.4	0.1	129	300
4.98	2566	4599	3599	2534	42.6	0.0	138	300
5.20	2517	4548	3548	2487	42.7	0.0	147	300
5.42	2554	4585	2085	2523	42.7	0.0	156	400
5.63	2555	4586	2086	2514	42.7	0.0	165	400
5.86	2499	4530	2030	2460	42.7	0.1	175	400
6.09	2446	4476	1976	2411	42.8	0.0	185	400
6.30	2423	4453	1653	2399	42.8	0.1	194	500
6.52	2409	4441	1641	2383	42.8	0.1	203	500
6.74	2397	4365	1565	2372	42.8	0.1	212	500
6.95	2382	4286	1486	2363	42.9	0.1	221	500
7.17	2353	4192	1392	2338	42.8	0.1	231	600
7.35	2341	4130	1330	2326	42.8	0.1	234	600
7.60	2337	4050	1250	2320	42.8	0.0	234	600
7.86	2325	3964	1164	2315	42.8	0.0	260	700
8.07	2318	3893	1093	2297	42.8	0.0	269	700
8.29	2306	3817	1017	2288	42.9	0.0	278	700
8.51	2299	3746	946	2275	42.9	0.1	287	700
8.73	2290	3672	872	2266	42.9	0.1	297	800
8.94	2278	3596	796	2256	42.9	0.1	306	800
9.16	2261	3516	716	2207	42.9	0.1	315	900
9.39	2247	3460	660	2150	42.9	0.0	325	900
9.60	2247	3462	662	2211	42.9	0.1	334	900
9.83	2230	3449	649	2153	42.8	0.2	343	1000
10.06	2221	3442	642	2135	42.8	0.1	353	1100
10.28	2211	3430	630	2124	42.8	0.1	363	1100
10.50	2209	3432	632	2112	42.8	0.2	372	1200
10.73	2200	3433	633	2110	42.6	0.3	382	1300
10.95	2196	3430	630	2130	42.6	0.3	391	1500
11.18	2196	3432	632	2143	42.7	0.3	400	1600
11.39	2180	3419	619	2095	42.6	0.3	410	1700
11.61	2170	3412	612	2090	42.6	0.4	419	1900
11.84	2158	3407	607	2080	42.5	0.4	428	2000

THE WESTERN COMPANY OF NORTH AMERICA - REAL TIME MONITORING SYSTEM

SIRGO BROTHERS ENERGY CORP. NW CHA CHA #47 GALLUP A&B SAND REFRAC 4-7-95

min.	STP psi.	BHTP psi.	NET P psi.	PRESS 2 psi.	SLR RATE bpm.	PROP lb/gal	Cumm Volume	Cumm Proppant
12.05	2150	3403	603	2070	42.5	0.4	438	2200
12.27	2149	3405	605	2068	42.5	0.4	447	2400
12.49	2145	3410	610	2068	42.4	0.6	456	2600
12.70	2135	3405	605	2056	42.4	0.7	465	2900
12.92	2128	3403	603	2061	42.4	0.7	474	3100
13.15	2132	3413	613	2113	42.4	0.7	484	3400
13.37	2110	3394	594	2054	42.5	0.8	493	3700
13.58	2097	3386	586	2028	42.4	0.8	502	4000
13.81	2085	3386	586	2006	42.3	0.9	511	4300
14.03	2076	3383	583	2000	42.3	1.0	520	4700
14.24	2064	3379	579	1985	42.3	1.1	530	5100
14.46	2054	3379	579	2002	42.2	1.2	539	5500
14.69	2042	3374	574	1978	42.3	1.3	548	6100
14.90	2030	3372	572	1960	42.2	1.3	557	6500
15.12	2019	3372	572	1946	42.2	1.5	566	7100
15.34	2004	3365	565	1936	42.2	1.7	576	7700
15.56	1995	3362	562	1989	42.2	1.5	585	8200
15.79	1978	3355	555	1959	42.2	1.6	594	8800
16.01	1971	3354	554	1964	42.2	1.6	603	9400
16.23	1962	3345	545	1955	42.4	1.4	613	9900
16.45	1949	3343	543	1943	42.3	1.6	622	10500
16.67	1941	3342	542	1939	42.3	1.6	632	11100
16.89	1927	3330	530	1926	42.3	1.5	640	11700
17.11	1920	3328	528	1918	42.3	1.7	649	12200
17.32	1913	3327	527	1910	42.2	1.6	658	12800
17.54	1909	3326	526	1901	42.2	1.6	668	13400
17.77	1909	3327	527	1901	42.3	1.7	677	14000
17.98	1910	3327	527	1903	42.3	1.5	686	14600
18.20	1911	3328	528	1909	42.3	1.5	695	15100
18.42	1918	3337	537	1915	42.2	1.7	704	15700
18.63	1920	3338	538	1920	42.2	1.6	713	16300
18.86	1924	3344	544	1881	42.2	1.6	723	16900
19.08	1940	3364	564	1931	42.2	1.7	732	17500
19.31	1943	3367	567	1936	42.2	1.6	742	18100
19.52	1949	3375	575	1931	42.2	1.7	751	18700
19.74	1939	3367	567	1866	42.1	1.7	760	19300
19.96	1940	3369	569	1869	42.1	1.8	769	20000
20.18	1946	3380	580	1909	42.1	1.9	778	20600
20.39	1962	3397	597	1951	42.1	1.9	787	21300
20.61	1970	3407	607	1959	42.1	2.0	796	22000
20.83	1970	3413	613	1964	42.1	2.0	805	22700
21.04	1970	3419	619	1960	42.0	2.0	814	23400
21.26	1970	3421	621	1962	42.1	2.0	823	24100
21.48	1976	3430	630	1970	42.0	2.0	832	24800
21.70	1980	3437	637	1968	42.0	2.0	841	25500
21.91	2026	3465	665	1982	42.5	2.0	850	26200
22.13	2088	3453	653	2009	44.2	1.9	860	26900
22.36	2095	3459	659	2024	44.2	1.9	870	27700
22.57	2105	3476	676	2032	44.2	2.1	879	28400
22.79	2203	3517	717	2135	45.5	2.2	889	29300
23.01	2225	3503	703	2155	46.3	2.3	899	30100
23.23	2226	3508	708	2160	46.3	2.4	909	31000
23.44	2239	3523	723	2168	46.3	2.2	919	31900
23.66	2252	3543	743	2178	46.2	2.3	929	32700

THE WESTERN COMPANY OF NORTH AMERICA - REAL TIME MONITORING SYSTEM

SIRGO BROTHERS ENERGY CORP. NW CHA CHA #47 GALLUP A&B SAND REFRAC 4-7-95

min.	STP psi.	BHTP psi.	NET P psi.	PRESS 2 psi.	SLR RATE bpm.	PROP lb/gal	Cumm Volume	Cumm Proppant
23.88	2269	3562	762	2196	46.2	2.4	939	33700
24.10	2276	3576	776	2203	46.1	2.5	949	34600
24.31	2283	3599	799	2211	45.9	3.0	959	35600
24.53	2289	3619	819	2222	45.8	3.1	969	36800
24.75	2284	3622	822	2210	45.8	3.1	978	37900
24.97	2278	3630	830	2204	45.8	3.2	988	39100
25.18	2280	3645	845	2223	45.7	3.4	998	40300
25.40	2269	3645	845	2201	45.7	3.5	1008	41500
25.62	2278	3664	864	2211	45.6	3.6	1018	42800
25.83	2288	3682	882	2238	45.7	3.5	1028	44100
26.05	2254	3663	863	2182	45.6	3.7	1037	45400
26.27	2236	3660	860	2167	45.5	3.8	1047	46700
26.48	2229	3664	864	2159	45.5	4.1	1057	48100
26.70	2224	3675	875	2154	45.4	4.2	1067	49600
26.93	2212	3671	871	2142	45.4	4.2	1077	51100
27.15	2209	3681	881	2136	45.4	4.5	1087	52600
27.36	2211	3685	885	2158	45.5	4.2	1097	54000
27.58	2222	3692	892	2156	45.6	3.9	1106	55400
27.81	2241	3704	904	2179	45.7	2.8	1117	56500
28.02	2284	3703	903	2209	46.2	1.4	1127	57100
28.24	2366	3739	939	2326	46.7	0.7	1137	57400
28.46	2445	3770	970	2439	47.1	0.0	1147	57500
28.67	2517	3809	1009	2507	47.1	0.0	1157	57500
28.89	2570	3831	1031	2553	47.1	0.0	1167	57500
29.11	2627	3854	1054	2614	47.1	0.0	1177	57500
29.32	2701	3897	1097	2682	47.0	0.0	1187	57500
29.54	2825	3991	1191	2803	46.9	0.0	1197	57500
29.76	2868	4003	1203	2846	46.8	0.0	1207	57600
29.97	2916	4077	1277	2894	45.5	0.0	1217	57600
30.19	2547	4297	1497	2532	29.9	0.0	1224	57600
30.40	1200	3521	721	1151	3.3	0.0	1225	57600
30.62	1078	3412	612	1035	0.0	0.0	1225	57600
30.83	993	3327	527	953	0.0	0.0	1225	57600
31.05	921	3255	455	889	0.0	0.0	1225	57600
31.27	865	3199	399	842	0.0	0.0	1225	57600
31.48	818	3152	352	796	0.0	0.0	1225	57600

SECTION 5

PROCEDURE AND
MISCELLANEOUS

SIRGO BROTHERS ENERGY CORP.

NORTH WEST CHA CHA #47

CHA CHA FIELD

SAN JUAN COUNTY, NM

GALLUP A & B FORMATION



The Western Company

RE-FRAC ON N.W. CHA CHA #47

PREPARED FOR

MR. MANNY SIRGO - OWNER
MR. SAM BILLINGTON

SERVICE POINT
FARMINGTON, NM
(505) 327-6222

PREPARED BY
MIKE MCNEESE
TECH REP II
FARMINGTON

APRIL 5, 1995

FM050241

SALES REPRESENTATIVE
MIKE MCNEESE
TECH REP II

THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

WELL DATA

Net Pay	35 ft
Depth to Middle Perforation	5,214 ft
Reservoir Pressure	2,250 psi
Permeability	4 md
Porosity	15 percent
Casing	5 1/2", 15.5#, J-55
Gross Fracture Height	175 ft
Net Fracture Height	35 ft
Fracture Gradient	.65 psi/ft
Bottom Hole Frac Pressure	3,389 psi
Bottom Hole Temperature	130 deg F
Perforated Interval	5129'-5300' (3 JSPF)
	TOTAL OF 105 HOLES @
	0.50".

THE WESTERN COMPANYTreatment Requirements for: RE-FRAC ON #47

PAD FLUID: 15,000 GALLONS SLICK WATER PUMPED VOLUME
16,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER
0.50 Gallons NINE-40, SURFACTANT

THE ABOVE VOL INCLUDES 1,000 GAL FOR TANK BOTTOMS-1.

0.5 - 1.5 PPG: 20,000 GALLONS SLICK WATER PUMPED VOLUME
22,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER
0.50 Gallons NINE-40, SURFACTANT

THE ABOVE VOLUME INCLUDES 1,000 GALLONS FOR TANK BOTTOMS-2.

2.0 PPG - FLUSH: 21,000 GALLONS SLICK WATER PUMPED VOLUME
22,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER

CUT THE NINE 40 AT THE END OF THE 1.5 PPG SAND STAGE.

ADDITIONAL MATERIALS:
55.00 Gallons TECHNI-SOL 155

PROPPANTS: 60,500 Pounds 20/40 MESH OTTAWA

NORTH WEST CHA CHA #47 RE-FRAC PROCEDURE

1. PUMP 15,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM AS PAD.
2. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH SAND RAMPED FROM 0.50 PPG TO 1.0 PPG OF 20/40 MESH OTTAWA SAND.
3. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH 1.5 PPG 20/40 MESH OTTAWA SAND.
4. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH 2.0 PPG 20/40 MESH OTTAWA SAND.
5. PUMP 6,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH SAND RAMPED FROM 2.5 PPG TO 3.5 PPG OF 20/40 MESH OTTAWA SAND.
6. PUMP 5,000 GALLONS OF SLICK WATER AS FLUSH - RE-CALCULATE FLUSH ON LOCATION.

*** BRING ENOUGH FRAC PUMPS TO PUMP AT 50 BPM IF NEEDED ***

*** RUN 55 GALLONS OF TECHNI-SOLV 155 IN PRE-PAD (1,000 GALLONS) PRIOR TO THE FRAC ***

THE WESTERN COMPANY

FRAC CALCULATIONS

OPERATOR: SIRGO BROTHERS ENERGY CORP.
 WELL: NORTH WEST CHA CHA #47
 FORMATION: GALLUP A & B

DEFINITIONS

BHFP = Bottom Hole Frac Pressure
 HH = Hydrostatic Head
 PF = Friction Loss in 5 1/2", 15.5# CASING
 PFP = Perforation Friction Pressure
 = $[2.93 \times (\text{rate/perfs})^2 / (\text{perf diam})^4] \times \text{spec gravity}$
 ISDP = Instantaneous Shut Down Pressure
 = BHFP - HH
 STP = Surface Treating Pressure
 = BHFP - HH + PF + PF + PFP
 HHP = Hydraulic Horsepower
 = STP x Rate / 40.80

CALCULATIONS

BHFP = 0.650 psi/ft x 5214 ft = 3389 psi
 HH = 0.433 psi/ft x 5214 ft = 2258 psi
 PF = 40 psi/1000 ft x 5214 ft = 208 psi
 PFP = $\frac{[2.93 \times (40.0 \text{ bpm} / 105)^2]}{(0.500 \text{ in})^4} \times 1.00 = 7 \text{ psi}$
 ISDP = 3389 psi - 2258 psi = 1131 psi
 STP = 3389 psi - 2258 psi + 208 psi + 7 psi = 1346 psi
 HHP = (1346 psi x 40.0 bpm) / 40.80 = 1320 hhp

* Surface treating pressure (STP) estimated using a
 0.650 psi/ft frac gradient. The frac gradient should
 be verified by ISDP calculation during prepac or pad.

THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
 WELL: NORTH WEST CHA CHA #47
 FORMATION: GALLUP A & B

FLUID & PROPPANT PUMPING SCHEDULE

FLUID TYPE	FLUID VOLUME (GALS)	PROPPANT				VOLUME		
		CONC. (LB/GAL)	TOTAL (LBS)	MESH SIZE	TYPE	FLUID (BBLs)	SLURRY (BBLs)	CUM (BBLs)
SLICK H2O	15000	0.00	0			357	357	357
SLICK H2O	10000	0.75	7500	20/40	SAND	238	246	603
SLICK H2O	10000	1.50	15000	20/40	SAND	238	254	857
SLICK H2O	10000	2.00	20000	20/40	SAND	238	260	1117
SLICK H2O	6000	3.00	18000	20/40	SAND	143	162	1279
FLUSH	5000	0.00	0			119	119	1398
TOTALS	56000		60500			1333	1398	1398

RATE SCHEDULE

FLUID TYPE	FLUID VOLUME (GALS)	PROPPANT CONC. (LB/GAL)	SLURRY RATE (BPM)	FLUID RATE (BPM)	PROPPANT RATE (LBS/MIN)	SLURRY VOLUME (BBLs)	PUMP TIME HH:MM:SS
SLICK H2O	15000	0.00	40.0	40.0	0.0	357	00:08:55
SLICK H2O	10000	0.75	40.0	38.7	1218.6	246	00:06:09
SLICK H2O	10000	1.50	40.0	37.5	2359.5	254	00:06:21
SLICK H2O	10000	2.00	40.0	36.7	3080.6	260	00:06:29
SLICK H2O	6000	3.00	40.0	35.2	4436.4	162	00:04:03
FLUSH	5000	0.00	40.0	40.0	0.0	119	00:02:58
TOTAL PUMP TIME							00:34:57

THE WESTERN COMPANY**COST ESTIMATE.**

W. CHA CHA #47 - RE-FRAC

QTY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE	GROSS AMOUNT	DISC (%)	NET AMOUNT
42	GAL	FR-30, FRICTION REDUCER	37.70	1,583.40	42.0	918.37
24	LBS	FRAC-CIDE 20, BACTERIACIDE	37.00	888.00	42.0	515.04
18	GAL	NINE-40, SURFACTANT	36.25	652.50	42.0	378.45
40	MILES	CHEMICALS DELIVERY, LIGHT VEHICLE, LIGHT	1.80	72.00	42.0	41.76
55	GAL	TECHNI-SOLV 155	24.15	1,328.25	42.0	770.39
605	CWT	20/40 MESH OTTAWA	12.60	7,623.00	42.0	4,421.34
605	T-M	DELIVERY CHARGE, 20 MILES	1.00	605.00	42.0	350.90
20	MILES	HEAVY EQUIPMENT 1 VEH. 20 MILES	2.95	59.00	42.0	34.22
TOTALS:				\$12,811.15		\$7,430.47

THE TECHNICAL DATA CONTAINED IN THIS PROPOSAL IS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF WRITING AND IS SUBJECT TO FURTHER ANALYSIS AND TESTING. THE PRICING DATA CONTAINED IN THIS PROPOSAL ARE ESTIMATES ONLY AND MAY VARY DEPENDING ON THE WORK ACTUALLY PERFORMED. PRICING DOES NOT INCLUDE FEDERAL, STATE AND LOCAL TAXES OR ROYALTIES. THIS QUOTATION IS BASED ON THE WESTERN COMPANY BEING AWARDED THE WORK ON A FIRST CALL BASIS AND WITHIN THIRTY (30) DAYS FROM THE PROPOSAL DATE. THESE PRICES WILL BE SUBJECT TO REVIEW IF THE WORK IS DONE AFTER THIRTY (30) DAYS FROM THE PROPOSAL DATE, OR ON A SECOND OR THIRD CALL BASIS.

THE WESTERN COMPANY**COST ESTIMATE**

N.W. CHA CHA #47 - RE-FRAC

QTY	UNIT	PRODUCT DESCRIPTION	NET AMOUNT
42	GAL	FR-30, FRICTION REDUCER	918.37
24	LBS	FRAC-CIDE 20, BACTERIACIDE	515.04
18	GAL	NINE-40, SURFACTANT	378.45
40	MILES	CHEMICALS DELIVERY, LIGHT VEHICLE, LIGHT V	41.76
55	GAL	TECHNI-SOLV 155	770.39
605	CWT	20/40 MESH OTTAWA	4,421.34
605	T-M	DELIVERY CHARGE, 20 MILES	350.90
20	MILES	HEAVY EQUIPMENT 1 VEH. 20 MILES	34.22
TOTALS:			\$7,430.47

THE TECHNICAL DATA CONTAINED IN THIS PROPOSAL IS BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF WRITING AND IS SUBJECT TO FURTHER ANALYSIS AND TESTING. THE PRICING DATA CONTAINED IN THIS PROPOSAL ARE ESTIMATES ONLY AND MAY VARY DEPENDING ON THE WORK ACTUALLY PERFORMED. PRICING DOES NOT INCLUDE FEDERAL, STATE AND LOCAL TAXES OR ROYALTIES. THIS QUOTATION IS BASED ON THE WESTERN COMPANY BEING AWARDED THE WORK ON A FIRST CALL BASIS AND WITHIN THIRTY (30) DAYS OF THE PROPOSAL DATE. THESE PRICES WILL BE SUBJECT TO REVIEW IF THE WORK IS DONE AFTER THIRTY (30) DAYS FROM THE PROPOSAL DATE, OR ON A SECOND OR THIRD CALL BASIS.

PRODUCT DESCRIPTIONS

FR-30 (Friction Reducer)

An anionic polymeric friction reducer used in water and light brines. Friction reduction of up to 80% can be achieved.

FRAC-CIDE 20 (Bactericide)

An extremely effective biocide for the inhibitory control of aerobic and anaerobic (sulfate-reducing) bacteria in well treatment fluids. It is packaged as a dry powder for safety and easy of handling in all weather conditions.

NINE-40 (Surfactant)

A nonionic non-emulsifier with excellent load recovery capabilities in some reservoirs.

THE WESTERN COMPANY
FIELD RECEIPT WORKSHEET

N.W. CHA CHA #47 - RE-FRAC

PRODUCT CODE	QUANTITY	UNIT	PRODUCT DESCRIPTION	UNIT PRICE
H0596	42	GAL	FR-30, FRICTION REDUCER	37.70
H0356	24	LBS	FRAC-CIDE 20, BACTERIACIDE	37.00
H0146	18	GAL	NINE-40, SURFACTANT	36.25
J7416	40	MILES	CHEMICALS DELIVERY, LIGHT VEHICLE, LIGHT	1.80
NOTPR	55	GAL	TECHNI-SOLV 155	24.15
NOTPR	605	CWT	20/40 MESH OTTAWA	12.60
J4016	605	T-M	DELIVERY CHARGE, 20 MILES	1.00
J3906	20	MILES	HEAVY EQUIPMENT 1 VEH. 20 MILES	2.95



The Western Company of North America

REMIT TO: P.O. BOX 911543
DALLAS, TX 75391-1543

SIRGO BROTHERS ENERGY
1512 W. MURRAY
FARMINGTON NM 87401

INVOICE NO. 4/0060	OUR RECEIPT NO. 311740	DATE 04/07/95
YOUR ORDER NO.		
80631	1314	

SERVICES FROM OUR STATION AT FARMINGTON STIMULATI	OUR ENGINEER MITCHELL	SIGNED FOR YOU BY SAM BILLINGTON
FOR SERVING WELL NAME N.W. CHA CHA #47	COUNTY SAN JUAN	STATE NM 30

FEDERAL I.D. NO. G 75-0763484

PRODUCT CODE	DESCRIPTION	UNIT OF MEASURE	QUANTITY	LIST PRICE/UNIT	GROSS AMOUNT	PERCENT DISC.	NET AMOUNT
J3906	MILEAGE, HEAVY VEHICLE, PER UNIT	MILE	10.0	2.950	29.50	42.00	17.11
J4016	BULK MATERIAL DELIVERY, DRY	TONMI	579.5	1.000	579.50	42.00	336.11
J7416	DEL CHARGE, 1.5 TON UNITS & SMALLER	MILE	38.0	1.800	68.40	42.00	39.67
H0356	FRAC-CIDE 20	LB	24.0	37.000	888.00	42.00	515.04
C9985	TECHNISOLV	EACH	28.0	24.150	676.20	42.00	392.20
E333E	SAND, STD BLK, 20/40, FARMINGTON, NM	CWT	614.4	12.600	7741.44	42.00	4,490.04
	SUB TOTAL				9983.04		5,790.17
98447	NEW MEXICO SALES TAX 4.5%						260.56
98438	NEW MEXICO, SAN JUAN SALES TAX .25%						14.48
98449	NEW MEX., FARMINGTON SALES TAX 1.188%						68.78
	PD BY CK# 1936 AMT. \$31975.62						
	THANK YOU FOR USING WESTERN						
	YOUR FILE COPY ONLY						

PHONE: (713) 629-2600

TERMS: NET 30 DAYS

6.133.99

SIRGO BROTHERS ENERGY CORP.

NORTH WEST CHA CHA #47

CHA CHA FIELD

SAN JUAN COUNTY, NM

GALLUP A & B FORMATION



The Western Company

RE-FRAC ON N.W. CHA CHA #47

PREPARED FOR

**MR. MANNY SIRGO - OWNER
MR. SAM BILLINGTON**

**SERVICE POINT
FARMINGTON, NM
(505) 327-6222**

**PREPARED BY
MIKE MCNEESE
TECH REP II
FARMINGTON**

JANUARY 17, 1995

FM050241

**SALES REPRESENTATIVE
MIKE MCNEESE
TECH REP II**

THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

WELL DATA

Net Pay	35 ft
Depth to Middle Perforation	5,214 ft
Reservoir Pressure	2,250 psi
Permeability	4 md
Porosity	15 percent
Casing	5 1/2", 15.5#, J-55
Gross Fracture Height	175 ft
Net Fracture Height	35 ft
Fracture Gradient	.65 psi/ft
Bottom Hole Frac Pressure	3,389 psi
Bottom Hole Temperature	130 deg F
Perforated Interval	5129'-5300' (3 JSPF)
	TOTAL OF 105 HOLES @
	0.50".

THE WESTERN COMPANY**Treatment Requirements for: RE-FRAC ON #47**

PAD FLUID: 15,000 GALLONS SLICK WATER PUMPED VOLUME
16,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER
0.50 Gallons NINE-40, SURFACTANT

THE ABOVE VOL INCLUDES 1,000 GAL FOR TANK BOTTOMS-1.

0.5 - 1.5 PPG: 20,000 GALLONS SLICK WATER PUMPED VOLUME
22,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER
0.50 Gallons NINE-40, SURFACTANT

THE ABOVE VOLUME INCLUDES 1,000 GALLONS FOR TANK BOTTOMS-2.

2.0 PPG - FLUSH: 21,000 GALLONS SLICK WATER PUMPED VOLUME
22,000 GALLONS TO BE MIXED

Containing per 1000 Gallons:
0.38 Pounds FRAC-CIDE 20, BACTERIACIDE
0.75 Gallons FR-30, FRICTION REDUCER

CUT THE NINE 40 AT THE END OF THE 1.5 PPG SAND STAGE.

ADDITIONAL MATERIALS:
55.00 Gallons TECHNI-SOL 155

PROPPANTS: 60,500 Pounds 20/40 MESH OTTAWA

NORTH WEST CHA CHA #47 RE-FRAC PROCEDURE

1. PUMP 15,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM AS PAD.
2. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH SAND RAMPED FROM 0.50 PPG TO 1.0 PPG OF 20/40 MESH OTTAWA SAND.
3. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH 1.5 PPG 20/40 MESH OTTAWA SAND.
4. PUMP 10,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH 2.0 PPG 20/40 MESH OTTAWA SAND.
5. PUMP 6,000 GALLONS OF SLICK 2% KCL WATER AT 40 BPM WITH SAND RAMPED FROM 2.5 PPG TO 3.5 PPG OF 20/40 MESH OTTAWA SAND.
6. PUMP 5,000 GALLONS OF SLICK WATER AS FLUSH - RE-CALCULATE FLUSH ON LOCATION.

*** BRING ENOUGH FRAC PUMPS TO PUMP AT 50 BPM IF NEEDED ***

*** RUN 55 GALLONS OF TECHNI-SOLV 155 IN PRE-PAD (1,000 GALLONS) PRIOR TO THE FRAC ***

THE WESTERN COMPANY**FRAC CALCULATIONS**

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

DEFINITIONS

BHFP = Bottom Hole Frac Pressure
 HH = Hydrostatic Head
 PF = Friction Loss in 5 1/2", 15.5# CASING
 PFP = Perforation Friction Pressure
 = $[2.93 \times (\text{rate/perfs})^2 / (\text{perf diam})^4] \times \text{spec gravity}$
 ISDP = Instantaneous Shut Down Pressure
 = BHFP - HH
 STP = Surface Treating Pressure
 = BHFP - HH + PF + PF + PFP
 HHP = Hydraulic Horsepower
 = STP x Rate / 40.80

CALCULATIONS

BHFP = 0.650 psi/ft x 5214 ft = 3389 psi
 HH = 0.433 psi/ft x 5214 ft = 2258 psi
 PF = 40 psi/1000 ft x 5214 ft = 208 psi
 PFP = $\frac{[2.93 \times (40.0 \text{ bpm} / 105)^2]}{(0.500 \text{ in})^4} \times 1.00 = 7 \text{ psi}$
 ISDP = 3389 psi - 2258 psi = 1131 psi
 STP = 3389 psi - 2258 psi + 208 psi + 7 psi = 1346 psi
 HHP = (1346 psi x 40.0 bpm) / 40.80 = 1320 hhp

* Surface treating pressure (STP) estimated using a 0.650 psi/ft frac gradient. The frac gradient should be verified by ISDP calculation during prepad or pad.

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THE WESTERN COMPANY

OPERATOR: SIRGO BROTHERS ENERGY CORP.
WELL: NORTH WEST CHA CHA #47
FORMATION: GALLUP A & B

FLUID & PROPPANT PUMPING SCHEDULE

FLUID TYPE	FLUID VOLUME (GALS)	PROPPANT				VOLUME		
		CONC. (LB/GAL)	TOTAL (LBS)	MESH SIZE	TYPE	FLUID (BBLs)	SLURRY (BBLs)	CUM (BBLs)
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FLUSH	5000	0.00	40.0	40.0	0.0	119	00:02:58
TOTAL PUMP TIME							00:34:57