GL000748

Baroid
Petroleum Services

BEN-EX LOW SOLIDS

Date: May 17, 1983

Prepared By: Bill Anderson — Tech. Serv. Engr. (Title)
600 Guaranty Bank Plaza
Corpus Christi, Texas 78475 (Address) — 512/882-7487 (Phone)

LOCAL BAROID PERSONNEL

		Address	Phone
Engineer	To be assigned		
Dist. Engr.	Wayne Shepherd	Beeville, Texas	512/358-5280
Dist. Mgr.	Rick Kidd	Corpus Christi, Texas	512/882-7487

Baroid Service Center nearest to well:

Beeville, Texas Phone No. 512/358-5280

This store has:

- Bulk Baroid
- Complete Stock Sack Materials
- Corrosion Treating Chemicals
- Delivery Service
- Radio Communication
- Liquid Oil Mud
- Solids Control Equipment
- Logging Services

Prepared For:

United States Federal Government
c/o R. W. Dirks Petroleum Engineer Inc.
Attention: J. R. Fischer
P. O. Drawer 200
Tuleta, Texas 78162-0200

Field Lackland AFB Well Lackland #1

County Bexar State Texas

UNITED STATES FEDERAL GOVERNMENT
C/O R. W. DIRKS PETROLEUM ENGINEER INC.
LACKLAND #1
BEXAR COUNTY, TEXAS

PROGNOSIS

OBJECTIVE

The operator proposes to drill to a total depth of 4200' to test for production. Location is on Lackland Airforce Base, Bexar County, Texas.

GEOLOGICAL CONTROL

This mud program is based on the following wells:

Coastal States	-	Loessberg #1
Pagenkopf	-	Blum #1
General Crude	-	Rogers Ranch #1
General Crude	-	Talley #1

RECOMMENDED MUD TYPE

0-1100'	Native Spud Mud, AQUAGEL, lime, water.
1100-4200'	BEN-EX Low Solids: BEN-EX, AQUAGEL, MF-1, WL-100.

RECOMMENDED EQUIPMENT

0-1100'	Rig Shaker/Desander/Desilter.
1100-4200'	Baroid Double Deck Shaker/Desander-Desilter/ Degasser.

CASING DESIGN

Depth	Hole Size	Casing Size	Est. Fracture Gradient @ Casing Seat
1100'	14-3/4"	10-3/4"	13.2 ppg
4200'	9-7/8"	7"	--

DRILLING PRECAUTIONS

Abnormal Pressure - Your proposed well anticipates encountering minimal abnormal pressure. In this case, abnormal pressure is defined as any pressure that exceeds 0.465 psi/foot (8.9 lbs/gal). A maximum anticipated mud weight of 9.2-9.4 ppg is expected at total depth.

It is recommended that trip gas, connection gas and total gas should be carefully monitored. "Drilling breaks" should be properly checked, especially for increase in differential chlorides or gas-cut mud.

Avoid excessive swabbing while tripping, keep hole full at all times and check for well flowing as conditions warrant.

Lost Circulation - If seepage is encountered, we recommend mixing 3-4#/ barrel fine mica. For severe lost circulation, if reducing mud weight is not possible, we recommend using a DIASEAL M squeeze.

Stuck Pipe - Stuck pipe is usually the result of "differential sticking". The term differential sticking refers to a stuck pipe condition that occurs when the drill string comes into contact with a permeable formation and is then held in place by the differential existing between the mud column and the formation.

It is important to note that the mud density does not have to be high for differential sticking to occur. This phenomena can occur with mud densities ranging from 10.0 lbs/gal. to 18.0 lbs/gal. The hydrostatic pressure of the mud has only to be significantly higher than the formation and the mud contain enough solids to form a wall cake.

Since differential sticking intensifies exponentially with time, it is important that proper remedial action be taken immediately after the pipe becomes wall stuck. Remedial action involves (1) estimation of free point, and (2) spotting a fluid to relieve the condition. We recommend EZ-SPOT.

Lubrication - Historically, the addition of Diesel Oil to drilling fluids has been credited with benefits such as (1) increased penetration rates, (2) reduced torque and drag, (3) reduced bit balling, and (4) prolonged bit life. Recent field and laboratory data indicates that the Baroid product TORQ-TRIM II fulfills these benefits and at the same time, eliminates concerns dictated by ecological and/or geological concerns. The usual concentration of this nontoxic, nonpolluting, biodegradable additive is 3-6 lbs/bbl.

Recently Baroid introduced a new lubricant to its product line. LUBRA-BEADS is a plastic sphere lubricant that offers an option to TORQ-TRIM II. It provides effective lubrication with advantages such as: no pollution hazard, reduction or elimination of bit balling, and improved filtration control. LUBRA-BEADS has proven successful in effectively reducing torque and/or drag, especially in sensitive environmental or geographical areas. Problems associated with torque and/or drag can be avoided by maintaining a LUBRA-BEADS concentration of 4-8 lbs/bbl.

Sloughing Shale - If encountered, we recommend increasing viscosity first to help clean hole. It might also be necessary to increase mud weight and lower filtration rate. SOLTEX may also aid to prevent hole sloughing in water base muds.

RECOMMENDED MUD PROGRAM

NL Baroid/NL Industries, Inc

Company United States Federal Government c/o R. W. Dirks Petroleum Engineer Inc. **Date** May 17, 1983

Well Name and Number Lackland #1 **Proposed Depth** 4200'

Location Lackland AFB **County** Bexar **State** Texas

Casing: Surf. 10-3/4" @ 1100' **Inter.** 9-7/8" Bit **Prod.** 7" @ T.D.

RECOMMENDED MUD PROPERTIES

DEPTH FEET	WEIGHT LB/GAL	VISCOSITY SEC.	FILTRATE ml	TREATMENT
0-1100'	9.0-9.2	34-40	N.C.	Native Mud: AQUAGEL, lime, water.
1100-2000'	9.0-9.2	34-40	10-20	BEN-EX Low Solids System: Remove calcium with Soda Ash. Add one (2#) bag BEN-EX with each 5 sacks of AQUAGEL until desired viscosity is reached. Control fluid loss with WL-100. Additions of MF-1 (a selective flocculant) at the shale shaker will aid in settling undesirable drill solids. Maintain volume with water, viscosity with AQUAGEL and BEN-EX.
2000-3000'	9.0-9.2	34-40	10-12	
3000-3500'	9.2-9.4	36-40	8-10	
3500-4200'	9.2-9.4*	36-40	6-8	

*Adjust mud weights as hole conditions dictate.

Estimated cost for mud materials: $6,000 - $6,500 (See Cost Estimate)

Recommended Program Based Upon

See Prognosis

UNITED STATES FEDERAL GOVERNMENT
C/O R. W. DIRKS PETROLEUM ENGINEER INC.
LACKLAND #1
BEXAR COUNTY, TEXAS

DEPTH INTERVAL DISCUSSION

0-1100'

A native spud mud is recommended for this interval. Treat with AQUAGEL and lime for carrying capacity and freshwater for weight and viscosity control. Run Desanders and Desilters to aid in maintaining minimum weights and reducing drilled solids buildup.

1100-4200'

A freshwater AQUAGEL/BEN-EX Mud System is recommended. Add Soda Ash to remove calcium in the drill water. Build desired viscosity with AQUAGEL and BEN-EX, use ratio of 5 sacks AQUAGEL to one (2#) bag of BEN-EX (normally 10-12 sacks AQUAGEL per each 100 barrels of volume).

Mud up may be quickly accomplished by the addition of Soda Ash to remove any calcium. Then add 1/2 the amount of BEN-EX through the chemical barrel while adding the remainder through the hopper with the AQUAGEL. Always add one (2#) bag of BEN-EX to each 5 sacks of AQUAGEL for the correct ratio. Use Caustic Soda as needed for alkalinity.

Be sure that Desander/Desilter and the Double Deck Shaker are operating properly. This insures that all mud that is returned to the surface is processed by the 30-50/80 mesh screens on the shaker, then through a cone device before being returned to the pump.

Maintenance

1. Run a stream of water while drilling to maintain volume.
2. Jet pits as necessary to remove settled solids.
3. Add Soda Ash to remove calcium contaminates.
4. In normal drilling add 2 to 14# BEN-EX each tour for flocculation. The exact amounts will be determined by rate of penetration, additional volume and frequency of pit jetting.
5. Add AQUAGEL each tour to maintain or raise the viscosity.

Continue the above mud system with the additions of: (1) WL-100 for filtration control, (2) Baroid, as needed, for weight, and (3) diesel oil 4-6% by volume as determined only if operator elects. Refer to attached data for maintenance and non-dispersed weighted mud specifications.

Continue stringent control of drill solids by use of solids control equipment. During this interval keep the jetting and dumping of solids to a minimum with utilization of the solids control equipment.

Monitoring of pit level changes, drilling breaks, and trip/connection/ background gases pursuant to safe drilling practices are recommended should higher than proposed mud weights be necessary.

In the drilling operation it is suggested that the reserve pits can be "skimmed" for usable drill-water for return to the active mud circulating system as volume. That is, to reduce water consumption when the rig pits only are being used, water may be reclaimed from the reserve pit after the solids settle out.

BEN-EX LOW SOLIDS DRILLING FLUID

GENERAL

It has been generally accepted that 6% solids by volume is the maximum for a low solids drilling fluid. Field experience shows better results in penetration rates in the 2 - 4% solids range in comparison with 6% solids. Operating personnel should strive for the lowest solids range practical to reduce overall drilling costs. The use of BEN-EX will help achieve these results. A general guide is presented herein to help in the application of BEN-EX for reduced drilling costs.

ADVANTAGES

1. Ben-Ex will extend the yield of bentonite while selectively flocculating low yield native solids.
2. Penetration rates are increased with a lower solids content.
3. Bit life is extended. The number of bits are reduced - fewer round trips.
4. Pump maintenance costs are reduced.
5. Mixing time is reduced. Ben-Ex will accelerate the yield of bentonite.
6. Ben-Ex stabilizes the hole by removing drilled solids. Improved wall cake.
7. Hydraulics are improved.
8. Water costs may be reduced by pit design and reclaiming.

MUD-UP DEPTH

1. For best results the system should be free of all drilled solids.
2. Jet and clean pits thoroughly. Re-build volume with fresh water.
3. Add SODA ASH to remove any calcium present in the make-up water.
4. Add one (2#) bag of Ben-Ex with each 5 sacks of bentonite until desired viscosity is reached (usually 10-12 sacks bentonite to each 100 barrels of volume).
5. To reduce the fluid loss and gel strengths, add sodium polyacrylates in a concentration of 1/4# to 3/4# per barrel.
6. Mud-up may be quickly accomplished by the addition of soda ash first to remove any calcium. Then add 1/2 the amount of BEN-EX through the chemical barrel while adding the remainder through the hopper with the BENTONITE. Add one (2#) bag of BEN-EX to each 5 sacks of BENTONITE for the correct ratio.

MAINTENANCE

1. Run a stream of water while drilling to maintain volume.
2. Jet and clean pits when necessary to remove settled solids.
3. Add soda ash to remove calcium contaminates.
4. In normal drilling add 2 - 16# BEN-EX each tour for flocculation. (See table for treatment recommendations.) Rate of penetration, additional volume, and frequency of jetting will dictate the amount of BEN-EX to be used. FOR BEST RESULTS, mud weight in the suction should be kept as low as possible. OBSERVE MUD WEIGHT in the suction and adjust BEN-EX treatments accordingly.

APPROXIMATE AMOUNT OF BEN-EX FOR FLOCCULATION IN LOW SOLIDS MUD

(Additional Ben-Ex should be used when adding Bentonite - 1 (2#) bag per 5 sacks)

Pounds of Ben-Ex per Tour

HOLE SIZE	Rate of Penetration - Feet per Tour (8 hour Tours)										
	25	50	75	100	150	200	250	300	350	400	
To 6"	2	2	2	4	4	6	6	8	8	10	
6" - 7"	2	2	4	4	6	6	8	8	10	10	
7" - 8"	2	4	4	6	6	8	8	10	10	12	
9" - 11"	4	6	6	8	8	10	10	12	12	14	
11" - 13"	6	6	8	8	10	10	12	12	14	16	

5. Add BENTONITE each tour to maintain or raise the viscosity. When adding BENTONITE, add 1 (2#) bag of BEN-EX to each 5 sacks of BENTONITE through the hopper.
6. If oil is being used, add oil daily as desired to maintain concentration in the system.

REMARKS

1. Best drilling rates are obtained in the 2 - 4% solids range. However, to maintain a low solids drilling fluid, the solids should not exceed 6% by volume in un-weighted mud systems.
2. If practical, the use of an extra pit would be of great advantage to gain additional settling time. The use of a desander will also help in removal of drilled solids.
3. As volume increases by frequent jetting to the reserve pit and additional time is gained by this fluid remaining static in the reserve pit, water and/or mud costs may be reduced by reclaiming the upper portion of this fluid after the drilled solids have completely settled.
4. Friction losses in drill pipe, tool joints, and drill collars are reduced approximately 20% in a low solids mud, which allows a more flexible hydraulics program.
5. If a system should become over treated with BENTONITE and BEN-EX, the viscosity may be reduced to normal by dilution with water.
6. Soda Ash is only necessary for treatment of calcium contamination, and/or treatment of a bentonite that may contain traces of calcium.
7. In remote areas where transportation costs of mud additives are high, and a low solids mud is not the objective, Ben-Ex may be used with bentonite in the ratio of 1 (2#) bag of Ben-Ex to each 5 sacks of bentonite to reduce the amount of bentonite required; thereby transportation costs may be reduced.
8. Normally BEN-EX may be used in any system in which BENTONITE is being used.
9. In certain areas, permeable zones may be encountered that contain fluids of dissolved salts, and when drill pipe is pulled, hydrostatic pressure may be reduced and these fluids allowed to enter the borehole. The presence of these fluids is often the reason for rejection of a low mud weight, low solids mud program. Native solids are allowed to build up as a substitute for weight material to control salt water intrusions. Native drilled solids impede drilling rates, increase chemical treatment costs, reduce bit life and increase overall drilling costs. However, some operating personnel prefer to go ahead with a low solids program, and avoid swabbing the salt water zones by reducing the withdrawal time of the drill string. The common solution to this problem is to add barite to the system to increase the hydrostatic pressure rather than allow the native solids to build up in the mud.

ROTARY DRILLING SERVICES, INC.

TULSA, OKLAHOMA

UNWEIGHTED MUD

DIAGNOSING AND TREATING NON-DISPERSED MUD SYSTEMS

PROBLEM	OTHER PROPERTIES					TREATMENT
	WEIGHT	VISCOSITY	MBT	LOW DENSITY SOLIDS	CALCIUM CONTENT	
WEIGHT TOO HIGH	------	Normal	Normal	High	Normal	Check solids removal equipment - insufficient settling time - add MF-1 or Ben-Ex.
	------	High	High	High	Normal	If using Ben-Ex may have drilled bentonitic shale. Dilute and switch to MF-1.
VISCOSITY TOO HIGH	Normal	------	High	Normal	Normal	Dilute with water - add Ben-Ex - stop adding bentonite.
	Normal	------	Low	High	Normal	Dilute with water - add Ben-Ex and some bentonite - check solids removal equipment.
	High	------	High	High	Normal	Dilute with water - check solids removal equipment.
	Normal	------	Normal	Normal	Normal	Dilute with water - reduce bentonite and Ben-Ex additions.
	Normal	------	Normal	High	High	Drilled anhydrite with high clay solids - dilute with water, add soda ash, Ben-Ex or MF-1.
FLUID LOSS TOO HIGH	------	Normal	Low	Normal	Normal	Add bentonite and Ben-Ex.
	------	Normal	Normal	Normal	Normal	Add WL-100
	------	High	Normal	Normal	High	Remove calcium with soda ash or sodium bicarbonate.
VISCOSITY TOO LOW	Normal	------	Low	Normal	Normal	Add bentonite and Ben-Ex.
	Normal	------	High	Normal	Normal	Check reaction of bentonite with soda ash - add soda ash with bentonite.
	Normal	------	Normal	Normal	High in make-up water	Pretreat make-up water with soda ash to remove calcium.

MF-1

A SELECTIVE FLOCCULANT

DESCRIPTION

MF-1 is an excellent flocculant of undesirable drilled solids in clear water drilling. As a selective flocculant, MF-1 will drop out drilled solids, but allows bentonite to be retained in the system, and is effective in dispersed and non-dispersed mud systems.

APPLICATION

Clear Water Drilling or Drilling with Minimum Solids Muds.

1. When using the rig tanks for settling, add 1 pound of MF-1 to each 100 barrels of volume for an initial treatment.
2. While drilling, add MF-1 immediately below the shale shaker or below the desander or desilter if they are in use. (See Table 1 for recommended additions.)
3. Keep pit risers high in the tanks, and keep all pit divider gates closed. This will provide a "skimming" action which allows only the top portion of the fluid to flow through each tank.
4. Jet or dump tanks as often as needed to insure only clear water or clean mud reaching the pump suction.

APPLICATION

For rigs without Pit Dividers, Riser Pipes, Jets or Dump Doors.

1. Place chemical barrel on the rig floor.
2. Add MF-1 at the bell nipple or through a collar welded on the flow line.
3. Do not spray water on shaker screen. The flocculant is mixed in the flow line, and the flocks form in the "Possum Belly". A water spray will break up the flocks and force them through the screen.
4. If the mud contains a high concentration of low density solids and the flocculant is added in the flow line, the shaker screen may blind with some mud loss for a few circulations. This would depend on the screen mesh size, solids content and flow rate.

REMARKS

1. Frequency of jetting, type of formation being drilled and the type and efficiency of mechanical solids removal equipment will dictate the amount of flocculant to be used. For best results, observe mud weight in the suction tank and adjust the treatments accordingly.
2. If practical, the use of an extra pit or circulation through the reserve pit will be beneficial.
3. To reduce water consumption when the rig pits only are being used, water may be reclaimed from the reserve pit as the solids settle. Some flocculant will also be reclaimed with the water from the reserve pit.
4. MF-1 will effectively flocculate native solids in the presence of salt or calcium contaminants.
5. MF-1 will also effectively flocculate bentonitic type clays when 200-500 ppm of calcium is present in the system. Use of calcium should be discontinued before mudding up. Prior to mud up, the remaining calcium should be treated out to insure a maximum yield of the bentonite.

There are three problems most often encountered when drilled solids are removed with selective flocculants.

Problem 1 – The mud tanks are agitated while trying to flocculate and settle the solids. Mud guns, rollers or lightning mixers should be turned off, and the settling tanks should not be agitated while using MF-1.

Problem 2 – Pit divider gates are left open at the bottom, or riser pipes are pushed to the bottom; and the flocculated and settled solids move through the tanks to the suction.

Pit divider gates should be closed and riser pipes should be high to provide a skimming effect across the mud tanks.

Problem 3 – Settling tanks are not cleaned often enough.

RECOMMENDED TREATMENT

TABLE 1

Addition of MF-1 should be controlled by the amount of hole being drilled.

Hole Size	6"–7"	8"–10"	11"–13"
Pounds Per 100 Ft. of Hole	2	3	4

ROTARY DRILLING SERVICES, INC.

TULSA, OKLAHOMA

W L - 100 WHAT IT IS

- **COMPOSITION**

  W L - 100 is a water soluble synthetic organic polymer in dry powder form.

- **APPLICATION**

  W L - 100 is for use in muds containing small amounts of low density solids. W L - 100 can be employed in either weighted or unweighted systems; and, it is a very effective and complimentary additive when used with BEN - EX treated muds.

- **STABILITY**

  W L - 100 stabilizes muds against changes in high temperature environments. The material does not biologically degrade, and can be used in a wide range of operating conditions.

- **TOLERANCE TO CONTAMINATES**

  A desirable characteristic of W L-100 is its ability to control the flow properties of most muds when contaminating formations are drilled. The effect of calcium on the fluid loss of a WL-100 treated mud is shown on Page 3.

UNITED STATES FEDERAL GOVERNMENT
C/O R. W. DIRKS PETROLEUM ENGINEER INC.
LACKLAND #1
BEXAR COUNTY, TEXAS

COST ESTIMATE

			CUMULATIVE COST
0-1100'			
Hole Size: 14-3/4"			
Estimated Pit Volume:	250 bbls.		
Estimated Days to Drill:	2		
Estimated Volume:	475 bbls.		
Estimated Initial Cost:		$ 500.00	$ 500.00
1100-4200'			
Casing: 10-3/4" @ 1100'			
Hole Size: 9-7/8"			
Estimated Days to Drill:	8		
Estimated Volume:	650 bbls.		
Estimated Maintenance Cost:		$4,500.00	
Barite (Slugs):		$ 800.00	
Estimated Interval Cost:		$5,300.00	$5,800.00
Estimated Sales Tax:		$ 300.00	$6,100.00
Estimated Drayage:		$ 400.00	$6,500.00
TOTAL ESTIMATED DAYS TO DRILL:	10±		
TOTAL ESTIMATED MUD COST:	$6,500.00		

WELL DATA SHEET

Magcobar DRILLING FLUID SERVICES — DRESSER

MAG-380-A

OPERATOR: COASTAL STATES GAS PRODUCING	SURVEY SEC. T R	CASING SIZE / DEPTH: 13-3/8" at 80'	BIT SIZE
WELL: Loesberg #1	FIELD: Fairfield - McDona - Lytle	SURFACE: 8-5/8" at 2555'	7-7/8" - 9
CONTRACTOR: Cibolo Drilling Company	COUNTY: Bexar	INTERMEDIATE:	
ENGINEER: Lloyd West	STATE: Texas	PRODUCTION: Dry Hole	

DATE 1973	DEPTH	WT.	VIS.	AV	PV	YP	GELS		pH	W/L	PF	CL PPM.	CA PPM.	SOL %	OIL %	M.T.H.P.
3-31	935	9.3	31		10	10	2	5	9.0	14.0	TR.	400	20	7		
4-1	1300	9.3	36		8	7	2	7	10.0	12.0	05	550	40	7		
4-2	1884	9.4	34		6	4	2	4	9.0	18.0	.1	400	NIL			
4-3	2009	9.2	33		5	4	1	3	9.0	22.0	.1	350	NIL	6		
4-4	2225	9.1	31		7	3	2	4	8.5	26.0	.1	400	NIL	6		
4-5	2412	9.2	34		5	5	2	3	10.0	15.0	.1	400	TR.	6		
4-6	2526	9.3	40		10	10	2	10	9.0	12.2	05	450	TR.	7		
4-10	3200	9.2	30		5	5	1	2	9.5	30.0	05	350	120	7		
4-11	3300	9.3	32		10	5	2	4	10.5	18.0	.18	400	40	7		
4-13	3650	9.4	37		13	4	0	2	10.5	9.4	.2	450	40			
4-13	3806	9.7	47		26	18	3	6	9.0	8.0	05	350	130	9		
4-14	4120	9.3	35		9	4	2	5	9.2	8.0	.2	400	100	7		
4-15	4365	9.4	35		9	3	?		9.3	8.2	.1	400	80	8		
4-16	4700	9.4	36		11	7	6	14	8.5	9.4	.1	300	80	8		
4-19	5178	9.5	42		18	5	0	2	8.0	7.8	.1	400	140	9		

TOTAL MUD COST: $3,721.00 — TOTAL DEPTH: 5200'

REMARKS

Drilled through Edwards sand with no trouble; then shot 8-5/8inch casing at 2555feet.

No Hole or Mud trouble

DATE SPUD: 3-30-73 — DATE T.D.: 4-23-73 — B.H.T. — COMPLETION FLUID TYPE: — COST:

PACKER FLUID TYPE:

Schlumberger

DUAL INDUCTION - LATEROLOG

WITH LINEAR CORRELATION LOG

COUNTY BEXAR
FIELD or LOCATION FAIRFIELD
WELL C.R. LOESSBERG #1
COMPANY COASTAL STATES

COMPANY COASTAL STATES GAS PRODUCING COMPANY
WELL C.R. LOESSBERG #1
FIELD FAIRFIELD
COUNTY BEXAR STATE TEXAS
LOCATION 9550'FSL & 2150'FWL OF JUAN DE DIOS NIETOS SUR.#8, A-543

Other Services: FDC/CNL/GR BHC

Elev.: K.B. 714 D.F. 713 G.L. 706

Permanent Datum: GROUND LEVEL Elev. 706
Log Measured From KB 8.0 Ft. Above Perm. Datum
Drilling Measured From KB

Date	4-6-73	4-20-73
Run No.	ONE	TWO
Depth—Driller	2550	5292
Depth—Logger	2564	5277
Btm. Log Interval	2558	5267
Top Log Interval	83	2558
Casing—Driller	13 3/8@80	8 5/8@2555
Casing—Logger	83	2558
Bit Size	12 1/4"	7 7/8"
Type Fluid in Hole	WATER/GEL LO PH	
Dens. / Visc.	9.3 40	9.5 48
pH / Fluid Loss	9.0 12.2ml	8.2 6.9 ml
Source of Sample	FLOWLINE PIT	
R_m @ Meas. Temp.	3.49 @ 70 °F	2.09 @ 70 °F
R_{mf} @ Meas. Temp.	3.29 @ 69 °F	2.12 @ 74 °F
R_{mc} @ Meas. Temp.	2.1 @ 70 °F	1.30 @ 70 °F
Source R_{mf} R_{mc}	M C	C C
R_m @ BHT	2.7 @100 °F	1.2 @135 °F
Time Since Circ.	3 HRS	3 HRS
Max. Rec. Temp.	> 100 °F	135 °F
Equip. Location	7676 PLEAS	7676 PLEAS
Recorded By	MCNABB	JOHNSTON
Witnessed By	MR. VALENTIN	

The well name, location and borehole reference data were furnished by the customer.

REMARKS SO #.83371,78440

Changes in Mud Type or Additional Samples

Date	Sample No.		
Depth—Driller			
Type Fluid in Hole			
Dens. / Visc.			
pH / Fluid Loss			ml
Source of Sample			
R_m @ Meas. Temp.	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F
Source R_{mf} R_{mc}	—	—	
R_m @ BHT	@ °F	@ °F	@ °F
R_{mf} @ BHT	@ °F	@ °F	@ °F
R_{mc} @ BHT	@ °F	@ °F	@ °F

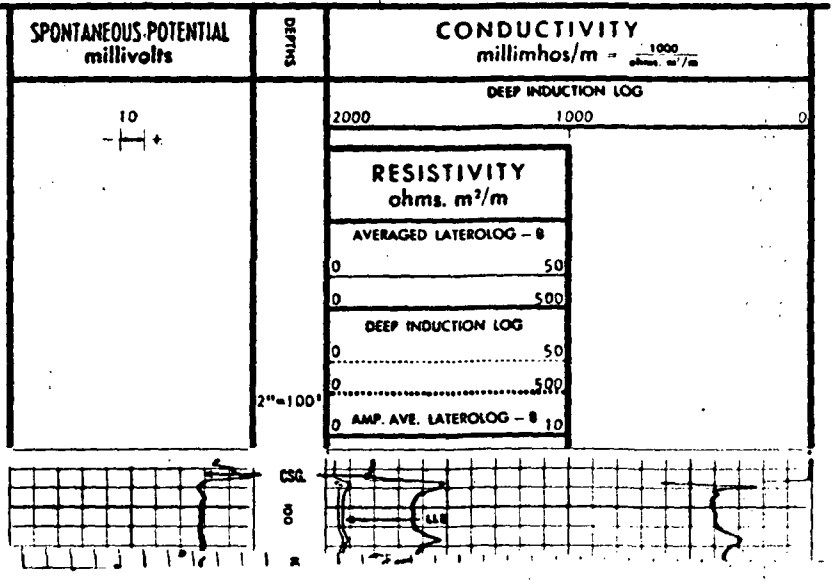
Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole
RES.	1110	0-50	0-100
COND	1110	0-1000	0-200
RES.	2558	0-100	0-50
COND.	2558	0-200	0-1000

Run No.	Tool Type	Equipment Data Tool Position	Other

	ONE	TWO
Run No.:	---	USED
C.D.:	1.5"	1.5"
S.O.:	X-2	X-2
Equip. PANEL No.:	79	79
Used: CART. No.:	104	104
SONDE No.:	11	95
IAP No.:	1.0	1.0
S.B.R.:		

Check one, filling in blanks where applicable:
- [x] Surface determined sonde errors used for ILM and ILD.
- [ ] ILM and ILD sonde errors corrected for _____ inch borehole signal at R_m
- [ ] ILM and ILD zeros set in hole at depth of _____ feet.



Pagenkopf

Location of Well

COMPANY [illegible]

Blum #1

WELL: [illegible]

RUN NO.: [illegible]

FIELD: [illegible]

SURVEY: [illegible]

COUNTY: [illegible]

STATE: TEXAS

FILING No. [illegible]

First Reading . . . . [illegible] ft.
Last Reading . . . . 800 ft.
Footage Measured . . . . [illegible] ft.
Casing Shoe Depth . . . . 800 ft.
Max. depth reached . . . . [illegible] ft.
Bottom Depth . . . . [illegible] ft.

DIAMETER OF HOLE | MUD CHARACTERISTICS | SPACINGS

AM 20"
AM' 80"
OA [illegible]

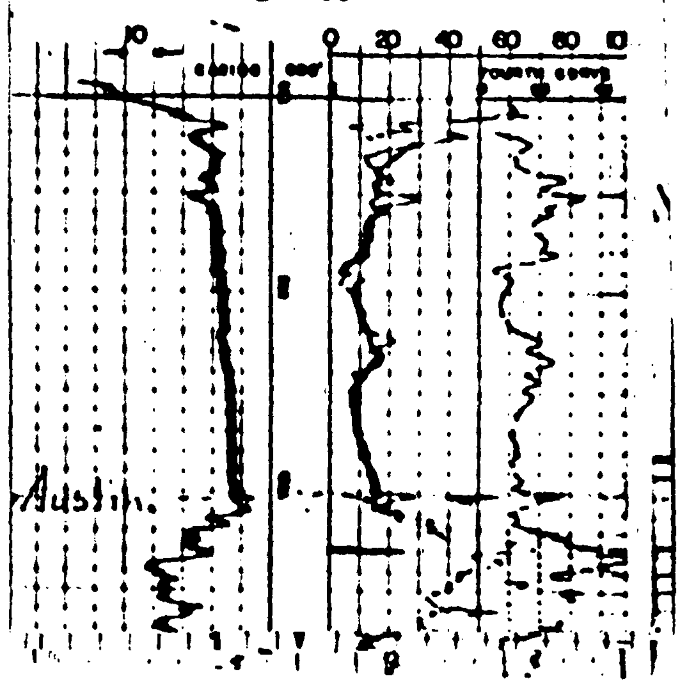
REMARKS

9.0 ppg

DATE [illegible] OBSERVERS [illegible]

SELF-POTENTIAL millivolts | DEPTH | RESISTIVITY ohms. m²/m.

2" = 100'



SCHLUMBERGER WELL SURVEYING CORPORATION

Electrical Log

COUNTY	BEXAR
FIELD or LOCATION	WILDCAT
WELL	ROGERS RANCH #1
COMPANY	GENERAL CRUDE OIL COMPANY

COMPANY	GENERAL CRUDE OIL COMPANY
WELL	ROGERS RANCH #1
FIELD	WILDCAT
LOCATION	J. S. COLLARD SUR. #256, A-15
COUNTY	BEXAR
STATE	TEXAS

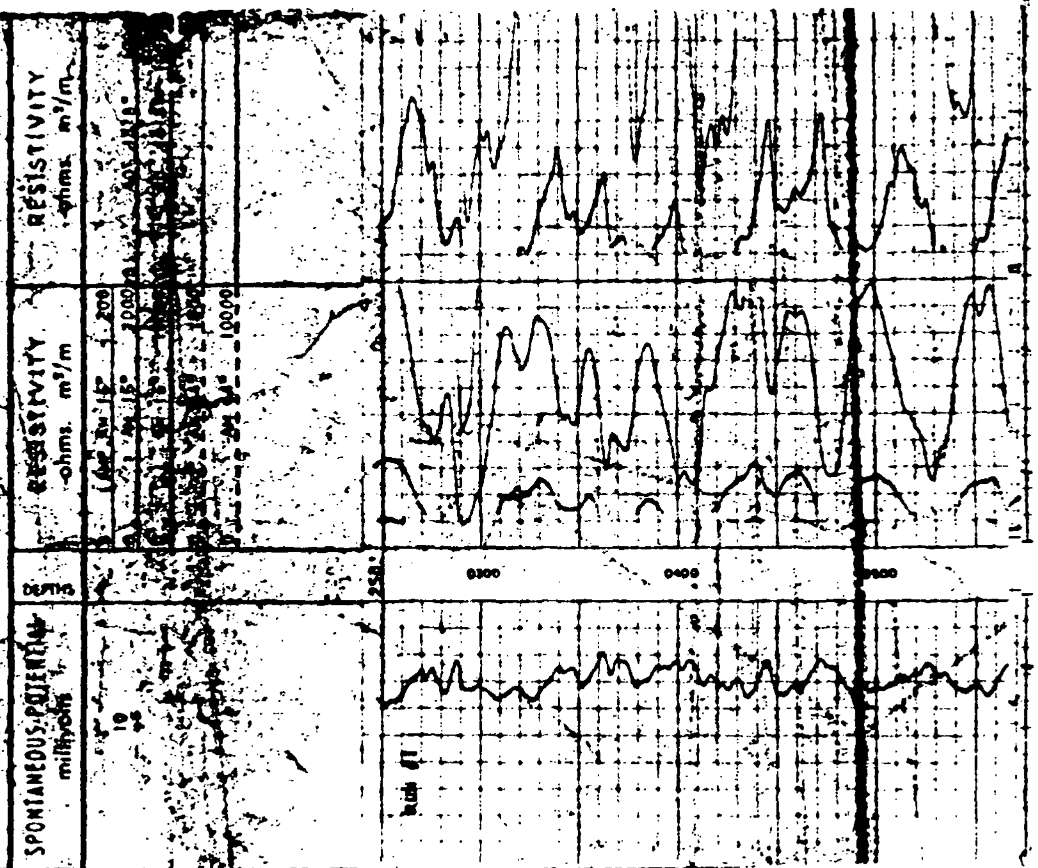
Location of Well: 1100' SWL & 1950' SEL OF 320 AC. TR. & OF J.S. COLLARD SURVEY #256, A-15. (8 MILES WEST OF SAN ANTONIO) (ML, TDM)

Elevation: D.F.: 820
K.B.:
or G.L.: 812

FILING No. 56-29

RUN No.	ONE	TWO	THREE		
Date	8-14-54	9-30-54	10-17-54		
First Reading	1046	5030	5895		
Last Reading	250	1044	5030		
Feet Measured	796	3986	865		
Csg. Schlum.	- - - -	1044	- - - -		
Csg. Driller	- - - -	1044	- - - -		
Depth Reached	1047	5031	5896		
Bottom Driller	1060	5031	5896		
Depth Datum	K. B. =	12.5' ABOVE GL			
Mud Nat.	NATURAL	NATURAL	NATURAL		
Density		10.1	10.2		
Viscosity		57	55		
Resist.		2.5 @ 87 °F	3.[illegible] @ 71 °F	@ °F	@ °F
Res. BHT		1.[illegible] @ 117 °F	1.[illegible] @ 123 °F	@ °F	@ °F
pH		[illegible]		@ °F	@ °F
Wtr. Loss	CC 30 min.	4.2 CC 30 min.	[illegible] CC 30 min.	CC 30 min.	CC 30 min.
Max. Temp. °F	99	117° F	123° F		
Bit Size	14-3/4				
Spcgs. – AM	16"	16"	16"		
AM'	64"	64"	64"		
AO	18'8"	18'8"	18'8"		
Opr. Rig Time	11 HRS.	21 HRS.	31 HRS.		
Truck No.	713 PC	720 PC	713 PC		
Recorded By	ALLEN	MARSH	MARTIN		
Witness By	[illegible]	[illegible]	[illegible]		

REMARKS: [illegible] NOT AVAILABLE – LOST RETURNS AND NO MUD AVAILABLE. LESS THAN [illegible] 1500' [illegible] TO [illegible]



SCHLUMBERGER WELL SURVEYING CORPORATION

HOUSTON, TEXAS

Electrical Log

COUNTY	BEXAR
FIELD or LOCATION	WILDCAT
WELL	JAMES HADY TALLEY #1
COMPANY	GENERAL CRUDE OIL COMPANY

COMPANY GENERAL CRUDE OIL COMPANY

WELL JAMES HADY TALLEY #1

FIELD WILDCAT

LOCATION T. & R. EDMONDSON SURVEY #203

COUNTY BEXAR

STATE TEXAS

Location of Well
BEGIN AT N.COR. OF 208.04 AC. LSE., 80 SSE 831' ALONG ITS NEL (TALLEY RD) THENCE WSW AT R/A 330' TO LOC. SC: 700' NWL & 100' NEL OF (SEE REMARKS)

Elevation: D.F.
K.B. 881
G.L. 869

FILING No. [illegible]

RUN No.	ONE	TWO	THREE	FOUR	FIVE
Date	11-13-54	11-20-54			
First Reading	154	2617			
Last Reading	250	841			
Feet Measured	583	1776			
Csg. Schlum.	- - -	841			
Csg. Driller	- - -	840			
Depth Reached	855	2618			
Bottom Driller	855	2622			
Depth Datum	K. B. =	12' ABOVE GL			
Mud Nature	NATURAL	NAT., GEL., QUEB.			
" Density	*	10.6			
" Viscosity	*	41			
" Resist.	* @ * °F	2.1 @ 55 °F	@ °F	@ °F	@ °F
" Res. BHT	* @ * °F	1.4 @ 110 °F	@ °F	@ °F	@ °F
" pH	* @ * °F	11 @ * °F	@ °F	@ °F	@ °F
" Wtr. Loss	* CC 30 min.	11 CC 30 min.	CC 30 min.	CC 30 min.	CC 30 min.
Max. Temp. °F	**	110° F			
Bit Size	15"	8-3/4"			
Spcgs.—AM	16"	16"	16"	16"	16"
----AM'	64"	64"	64"	64"	64"
— —AO	18'8"	18'8"	18'8"	18'8"	18'8"
Opr. Rig Time	1 HR.	24 HRS.			
Truck & District	120 PL.	162 PL.			
Recorded By	MARTIN	CHAPMAN			
Witness By MR.	PINKLEY	PINKLEY			

REMARKS * NOT AVAILABLE
(LOCATION CON'T.) T. & R. EDMONDSON SURVEY #203. (13 MI.N. OF SAN ANTONIO) (ML)
RUN #1 - LOST RETURNS AND NO MUD AVAILABLE
RUN #2 - MUD SAMPLE OBTAINED FROM PIT
** LESS THAN 100° F

SPONTANEOUS-POTENTIAL millivolts	DEPTHS	RESISTIVITY ohms. m²/m	RESISTIVITY ohms. m²/m
- 10 +		0 AMP. AM 16" 200	
		0 AM - 16" 1000	0 AO - 18'8" 1000
		0 AM - 16" 10000	0 AO - 18'8" 10000
		0 AM' - 64" 1000	
		0 AM' - 64" 10000	
	2310