DENVER EAST
DIVISION

MOBIL OIL CORPORATION
DRILLING ENGINEERING

DENVER
AFE #: 5AA2
AFE $: 278M
Loc. Code: 11602
BC: 02
API: 15-055-20,613

DECEMBER 11, 1985

PROCEDURE FOR DRILLING
ORANGE BROWN #1
SECTION 21-T24S-R34W
FINNEY COUNTY, KANSAS

OBJECTIVE: This is to be an oil producing well completed in the Morrow formation at approximately 4750'. Estimated time from spud to TD is 12 days. A Chase backout does exist for this well. Also, two DST's are planned for this well.

PROPOSED TD: 5100'

SURFACE LOCATION: 2310' FSL & 330' FEL of Sec. 21-T24S-R34W

ELEVATION: Approximately 2962' Ground and 2978' K.B.

TUBULAR GOODS REQUIRED:

Conductor:	80' of 20"
Surface:	2000' of 8-5/8", 32#, K-55, LTC ($25,750)
Production:	5100' of 5-1/2", 15.5#, K-55, LTC ($35,595)
Tubing:	5100' of 2-7/8" EUE, 8rd 6.5#/ft, J-55

B.O.P.E. REQUIRED:

2000'-5100' Hydraulically operated double ram
B.O.P. w/pipe and blind rams.
WP=3000 psi
Annular preventer WP=3000

NOTE: Use lower kelly-cock valve and keep inside blow-out preventer on rig floor at all times.

DRILLING PROCEDURE:

1. Set 80' of 20" conductor pipe and cement to surface.

   NOTE: Contact Geologist Rick Stever prior to spudding well. Office (303) 298-2294 Home (303) 426-5522.

   NOTE: Surveys should be taken every 500' during the drilling of the surface hole. Additional surveys should be taken every 1000' through TD.

2. Move in drilling rig and spud 12¼" hole.

   NOTE: A verbal notice should be given to the Kansas Corporation Commission (Richard Lacey (316) 225-6760 or (316) 225-6718) prior to spudding or setting any string of casing.

3. Drill 12-¼" hole to 2000' or 30' through the thirdfinger. Drilling deeper is an effort to reduce the salt content of the mud and to prevent sticking the surface pipe when cementing. Run Dresser long spacing sonic and gamma ray logs, then cement the 8-5/8" casing. Contact Dowell at at (316) 356-1272 in Ulysses for cementing the surface pipe.

   NOTE: Operations will contact Petroleum Well Logging to provide the mudlogging services. Their number in Oklahoma City is (405) 524-1431.

4. Weld on 8-5/8" X 11" 3000 psi casing head, nipple up double rams and annular preventer, and pressure test.

5. Run in hole with 7-7/8" bit and drill to 5100'.

6. Circulate and condition hole. RU Dresser (Liberal: 316-624-0618).

   1. Gamma Ray/sonic
   2. Dual Induction/SFL-SP
   3. Compensated Neutron/Spectral Density-GR
   4. Microlog - if necessary
   5. Diplog

7. Depending on logs, set 5½", 15.5#, K-55 casing to T.D. and cement in two stages. Contact Halliburton in Liberal (316) 624-3879 for cementing the 5-1/2" casing. Reduce viscosity to less than 35 sec/quart after logging. The 5½" casing to be equipped with the following:

   - Guide shoe and float collar one joint above shoe.

   - Space centralizers every other joint from T.D. through pay zones to approximately 4100' (or as per drilling supervisor's recommendation) (See 5½" Cement Procedure)

   - Place DV tool at approximately 3250' (200'± below Council Grove top). Space centralizers on the joints above and below the stage tool and every third joint up to 2450'.

8. Rig down and move out drilling rig.

8-5/8" CEMENTING PROCEDURE:

Run 8-5/8" K-55 equipped with guide shoe and insert float collar one joint above casing shoe. Use threadlocking compound on bottom two joints, and shoe. Place centralizers above and below the insert float. Run 4 more centralizers every third joint above the insert float.

Cement volumes are based on 12-1/4" hole with calculated excess to circulate cement to surface.

PREFLUSH: 10 bbls fresh water

LEAD SLURRY:

750 sx (226 bbls) Poz mix (65/35/6) + 3% $CaCl_2$.

Slurry Weight:	13.1 lb/gal
Slurry Yield:	1.69 ft^3/sk
Water Requirement:	8.8 gal/sk
Pump Time:	5:10 hours
24 Hr. Comp. Strength:	810 psi.

TAIL SLURRY:

100 sx (19 bbls) Class "H" + 3% $CaCl_2$.

Slurry Weight:	16.5 lb/gal
Slurry Yield:	1.07 ft^3/sk
Water Requirement:	4.3 gal/sk
Pump Time:	1:40 hours
24 hr. Comp. Strength:	2760 psi.

Reciprocate casing in 10' to 20' strokes while displacing cement around the shoe. Bump plug W/500 psi over final pumping pressure. Bleed off pressure to check float equipment.

NOTE: Cement must be circulated to surface. Record and report what amount, if any, is received back. If no cement returns are seen, top in the 12-1/4" x 8-5/8" annulus using 1" tubing with Class "H" + 2% CaCl (15.5 lb/gal).

5-1/2" CEMENTING PROCEDURE:

FIRST STAGE:

Cement volumes are based on 7-7/8" hole to 70% excess. The open hole caliper log should be looked at prior to cementing and cement volumes adjusted on integrated hole volume + 15%. The cement top should be approximately 4200'.

PREFLUSH:

20 bbl. of fresh water

SLURRY: (5100'-4200')

270 sacks of Class "H" (2% Total Gel) + 5% salt

Slurry Weight:	15.5 lb/gal
Slurry Yield:	1.22 ft^3/sk
Water Requirements:	5.43 gal/sk
Thickening Time:	2 hrs 48 min.
Compressive Strength:	2160 psi

Reciprocate casing in 10' to 20' strokes while displacing cement around the shoe. Displace at 6-8 bpm, slowing down to 2-3 bpm through the DV tool 10 bbls short of the float collar. Bump plug with 750 psi over final pumping pressure and bleed off to check float equipment. After dropping the bomb and opening the stage tool, circulate 2 hours for 2nd stage.

SECOND STAGE: (3250'-2450')

PREFLUSH:

10 bbls fresh water

LEAD SLURRY

75 sx (33 bbls) Poz mix (65/35/6) + 3% $CaCl_2$

Slurry Weight:	13.1 lb/gal
Slurry Yield:	1.69 ft^3/sk
Water Requirement:	8.8 gal/sk
Pump Time:	5:10 hours
24 Hr. Comp. Strength:	810 psi

Lead slurry is designed to cover 400' (2450-2850) with 75% excess required for washout.

TAIL SLURRY:

130 sx (25 bbls) 50/50 (Poz/"H") + 2% CaCl

Slurry Weight:	15.1 lb/gal
Slurry Yield:	1.07 ft^3/sk
Water Requirement:	4.4 gal/sk
Pump Time:	4:45 hours
24 Hr. Comp. Strength	1350 psi

Tail slurry is calculated to cover 400' (3250'-2850') with 100% excess required for washout.

NOTE: Volumes based on cement on 5-1/2" casing to cover from 3250'-2450' (800').

ESTIMATED TOPS

Elevation: +2962' K.B.: +2978 T.D.: 7700'

PROGNOSIS:

FORMATION TOPS	DRILL DEPTH
Stone Corral	1929'
Chase	2494'
Council Grove	2764'
Wabaunsee	3141'
Shawnee	3451'
Lansing	3809'
Kansas City	4039'
Marmaton	4330'
Cherokee	4461'
Morrow	4681'
St. Louis	4841'
TD	5100'

CONTACTS

TELEPHONE	OFFICE	RESIDENCE
R. W. Vines (Randy)	(303) 298-3692	(303) 693-4711
V. D. Youngblood (Volan)	(303) 298-3744	(303) 795-3605
R. C. Stever (Rick)	(303) 298-2294	(303) 426-5522
R. K. Scott (Kent)	(701) 774-7156	(701) 572-7156

MAILING ADDRESS

MOBIL OIL CORPORATION
P.O. Box 5444
Denver, Colorado 80217-5444

MUD PROGRAM

0'-2000'

Weight:	less than 9.0 ppg
Viscosity:	28-34
Water Loss:	No Control
Comments:	Native mud, some gel and cottonseed hulls for Glorietta at approximately 1150'-1350'

2000'-4500'

Weight:	less than 9.0 ppg
Viscosity:	30-34
Water Loss:	25-50 cc
Comments:	low solids non-dispersed

4500'-5100'

Weight:	less than 9.1 ppg
Viscosity:	35-50
Water Loss:	10-20 cc
Comments:	Obtain maximum fluid control possible with natural bentonite. Polymers will not be required.

Anticipate lost circulation by building up with cottonseed hulls prior to drilling the Glorietta at approximately 1150'. Keep this LCM in the system until 8-5/8" casing has been set.

It may be desired to drill with water from 2000' to approximately 2500'. If loss occurs in the Chase, Council Grove (2500'-3200') spot pills of 50/50 mineral fiber and cottonseed hulls - after being sealed off shake out and run desander, desilter & shaker. If loss occurs the 2nd time consider leaving LCM in system.

MUD PROGRAM FOR CORING OR DST:

Weight:	less than 9.1 ppg
Viscosity:	35-50
Water Loss:	10 cc
Comments:	To control fluid loss, add 1-2 sx of Drispac and/or 4-5 sx of Lignite. After circulating approximately 30 minutes with the desired mud properties, a short trip will be necessary up above the Morrow and Cherokee formations. (Approximately 10 stands). Return to bottom and circulate one hour prior to tripping out of the hole. Assemble DST tool, run in hole and set packers. A basic timetable for the test should be: 15 minutes initial open flow 30 minutes shut in 60 minutes final open flow 120 minutes final shut in

These times may be varied at the discretion of the on-site geologist.

BIT RECOMMENDATIONS:

Surface Hole:

Bit:	12¼" HTC R-1
Nozzles:	3-14's
Weight:	30-45M#
RPM:	130
GPM:	290-320

Bit #1 from 8-5/8" csg. (5100')

Bit:	7-7/8" Hughes J-22
Nozzles:	3x12's
Weight:	40M#
RPM:	70-100
GPM:	290-320

Bit #2 from 8-5/8" csg.

Bit:	7-7/8" Hughes J-22
Nozzles:	3x12
Weight:	40M#
RPM:	60-70
GPM:	290-320

SOLIDS CONTROL:

The effective use of a system consisting of a dual shaker, two cone desander and 12 cone desilter is strongly recommended to economically maintain a low weight, low solids drilling fluid. Due to lack of information this area has not been established or identified as a lost circulation area.

PIPE STICKING:

Pipe sticking problems experienced earlier this year in most cases are attributed to mud weights above 9.0 from excessive drilled solids buildup. Use of the shale shaker desander and desilter is required to control the buildup of drill solids to minimize dumping of whole mud and to minimize mud cake.

LOST CIRCULATION:

The method for regaining circulation simply by loading up the drilling mud with LCM is not recommended. This method seems to be moderately effective if LCM is left in the mud but is lacking in success if the LCM is screened out.

The theory for this is that the drill collars and mud removes the LCM that had previously plated off and no LCM in the mud is able to take its place once it has been removed.

If seepage becomes a problem prior to drilling the productive formation, it may be desired to periodically run LCM pills (mica recommended) to alleviate this problem. These pills should only be allowed one or two circulations. Do not bypass the shaker or shut down any other solids control equipment.

BOTTOM HOLE ASSEMBLIES

(From surface pipe)

Bit
21 - 6¼" X 2¼" D.C. (91 ppf)
Approximate BHA weight - 57,330 lbs.
Max. calculated W.O.B. (15% S.F.) - 55,000

OFFSET INFORMATION

The Brown 10-11 was drilled two miles east of the proposed location. The surface pipe stuck 13' off bottom and was cemented in place. A DST was made at 4453' with no problems. No LCM was used and circulation was never lost during the drilling of the long string. Lost circulation problems are not anticipated. The borehole volume log of the Brown was analyzed and showed severe washout. The Morrow Shale was extremely washed out. It is recommended to reduce your pump rate when drilling from 4700'-4900'. When calculating the cement volume for the long string, add 15% excess to the borehole volume log. The cement top should be approximately 4200'.

R. W. Vines

RWV/kw
D/8643

TYPICAL COUNCIL GROVE PLUGBACK PROCEDURE

OBJECTIVE: This procedure is designed to be used when a typical deep well (approx. 6200') is drilled but the decision has been made to set the 5½" casing through the Council Grove only. (approx. 3200')

COMMENT: The state has no set of requirements for placing plugs when the decision has been made on a new deep well to run casing only through the Council Grove formation.
From: Paul Luthe of the KCC (2/5/85).

PROCEDURE:

1. Set a 75 sack Class H + .3% $CaCl_2$ plug (16.5 ppg), the top of which is to be within 50' from the bottom of the planned casing depth. Thickening time: 1 hr. 40 min at 90° BHCT and 105° BHST. Tag top of cement.

2. Run 5½" casing 200'+ below the top of the Council Grove formation (approx. 3200') and cement with 235 sacks of cement slurry. Use 10 bbls of fresh water as a mud flush.

3. Do not reciprocate pipe.

4. Casing should have nine centralizers, one centralizer every third joint from the bottom.

CEMENT SLURRY:

235 sacks of 50/50 Poz Cement with + 2% Total Bentonite

Density:	14.1 lb/gal
Yield:	1.28 $ft.^3/sk$
Water Requirement:	5.81 gal/sk
Thickening Time:	4 hr. 27 min.
Compressive Strength:	24 hr. - 360 psi

NOTE: This slurry is based on 1000' of fill. The caliper log should be used for actual cement volumes. Cement must cover 500' over the top of the Chase formation.

D - 204 (10/70)

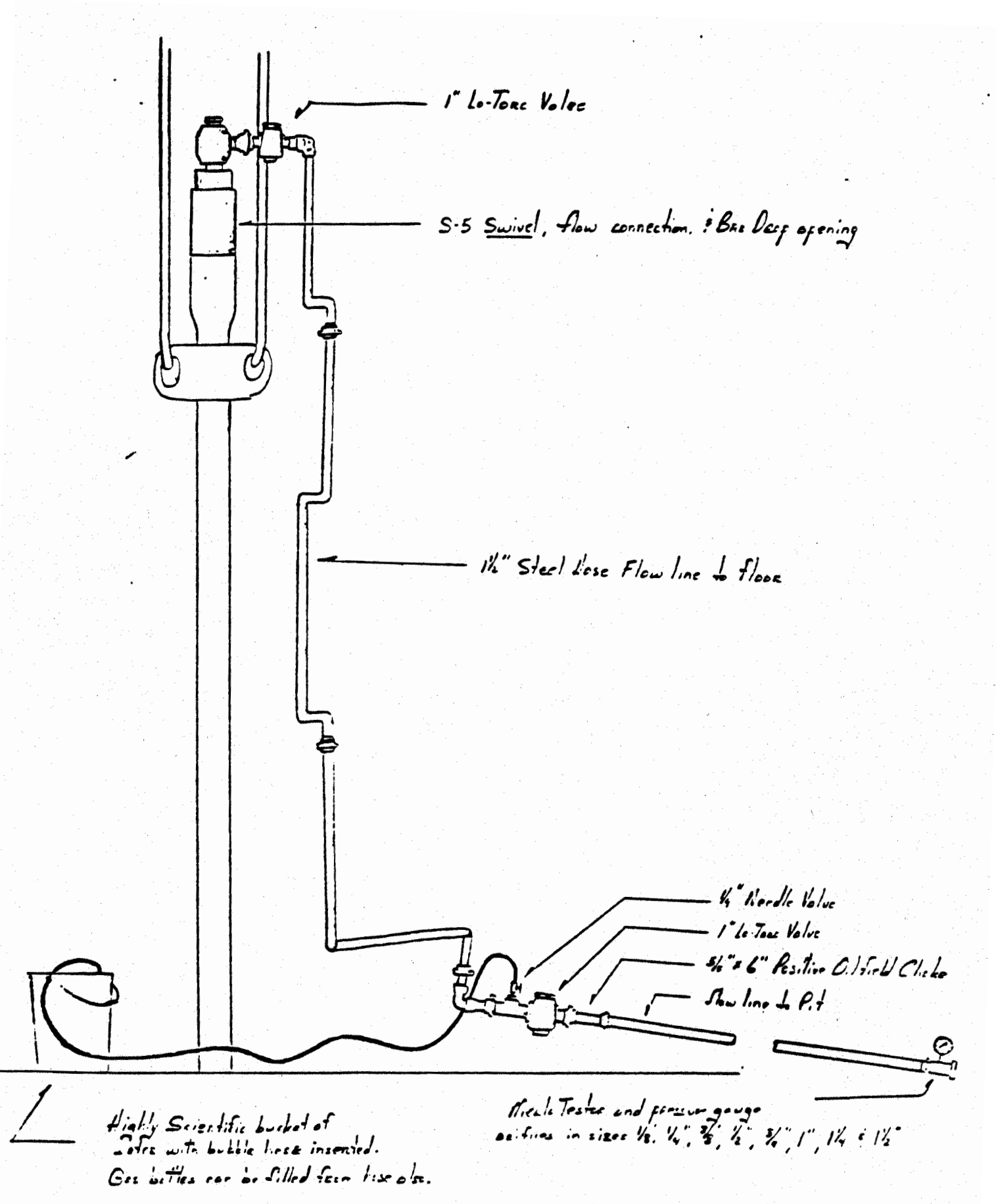
CASING DESIGN DETAIL SHEET

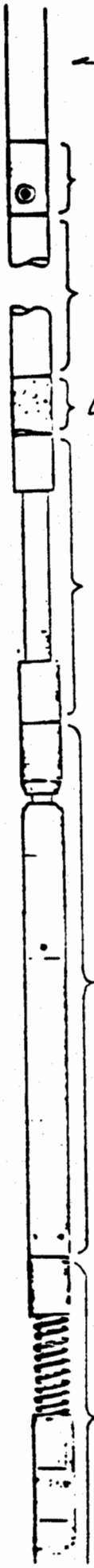
ORANGE BROWN #1

DEPTH FT.	CASING OD INCHES	WEIGHT #/FT.	GRADE	JOINT THREAD	CASING ID INCHES	DRIFT DIAMETER INCHES	COUPLING OD INCHES	COLLAPSE PSI	BURST PSI	TENSION 1000 PSI
ENGINEERING DESIGN										
0-2000'	8 5/8	32	K-55	LT&C	7.921	7.796	9.625	2530	3930	452
0-5100	5 1/2	15.5	K-55	LT&C	4.950	4.825	6.050	4040	4810	239

DEPTH FT.	CASING OD INCHES	HOLE SIZE INCHES	MAX. MUD WEIGHT #/GAL.	MUD GRDNT. PSI/FT.		MAX HYD @ PREV. SHOE PSI	MAX. FORM. PRESSURE PSI	MAX. HYD PRESSURE PSI	CASING CUM WEIGHT M #
0-2000'	8 5/8"	12 1/4"	9.1	.473	FORMATION	-	-	946	64
0-5100	5 1/2	7 7/8"	9.1	.473	WILL BE OVERBALANCED	946	1400	2412	79

DEPTH FT.	CASING OD INCHES		SAFETY FACTORS		
			COLLAPSE	BURST	TENSION
0-2000'	8 5/8"	CASING COST 8 5/8 # 25,750.00	2.67	1.5	7.10
0-5100'	5 1/2"	5 1/2 # 35,595.00	1.68	1.3	3.03
		# 61,345.00			
		*No Substitutions Necessary			


1" Lo-Torc Valve
S-5 Swivel, flow connection. ¾ Bbl Derf opening
1¼" Steel Hose Flow line to floor
¼" Needle Valve
1" Lo-Torc Valve
⅝" x 6" Positive Offset Choke
Flow line to Pit
Highly Scientific bucket of water with bubble hose inserted. Gas bottles can be filled from hose also.
Needle Testers and pressure gauge orifices in sizes ⅛, ¼, ⅜, ½, ¾, 1, 1¼ & 1½



Drill Collars and Drill Pipe above Reversing Sub

Reversing Sub

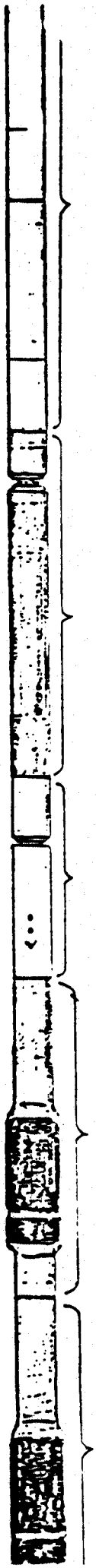
1 Stand of Drill Collars

Change over Sub - from Collars to Handling Sub

Handling Sub - used to pick up tool in sig's elevators

Dual Closed-In-Pressure Sampler Gives 2nd flow period and both Closed-in Periods. Catches sample & pressure at end of final flow period. Operates by drill pipe actuation.

Hydro Spring Tester Valve Closed going in hole keeping drilling fluid out. Weight operated, timed opening. Gives initial open flow period. Closes when weight is picked up at end of test.



Two (2) B.T. Type Pressure - Time recording gauges
Only one (1) is usually run. The second gauge is optional

Big John Hydraulic Jars

VR Safety Joint

Two (2) Open hole Packer Assembly's
Expand by setting weight on tools

6 feet between Packer rubbers