From: Pat Brotherton — Rock Springs, Wyoming

To: T. M. Colson — November 16, 1976

Tentative Plan to Drill
Fruitland Well No. 1
San Juan County, New Mexico

This well will be drilled to total depth by the _____ Drilling Company. One work order has been originated for the drilling and completion of the well, namely 23148, Drill Fruitland Well No. 1, located in the NE NE Sec. 28, T. 30 N., R. 14 W., San Juan County, New Mexico. This well will be drilled to a total depth of 12,550 feet. Surface elevation is at 5572 feet.

1. Drill a 17-1/2-inch hole to 325 feet. Run and cement approximately 300 feet 13-3/8-inch O.D., 54.5-pound, K-55, 8 round thread, ST&C casing. Cement 13-3/8-inch O.D. casing to surface with 362 sacks regular Class "G" cement with 2 percent calcium chloride and 1/4-pound flocele per sack, which represents theoretical requirements plus 100 percent excess cement for 13-3/8-inch O.D. casing in a 17-1/2-inch hole with cement returned to surface. Plan on leaving a 20 foot cement plug in the bottom of the casing after displacement is completed. Floating equipment will consist of a Baker guide shoe. The top and bottom of all casing collars and the guide shoe will be spot welded in the field as the casing is being run. The bottom of the surface casing should be landed in such a manner that the top of the 12-inch 3000 psi casing flange will be at ground level. A cellar three feet deep will be required. Prior to cementing circulate 75 barrels of mud. The capacity of the 13-3/8-inch O.D. casing is 46 barrels.
2. After a WOC time of 12 hours, remove the landing joint and wash off the casing collar. Install a NSCo. 12-inch 3000 psi casing flange tapped for 13-3/8-inch O.D., 8 round thread, ST&C casing. Install a 2-inch extra heavy nipple, 6-inches long, and a WKM Figure 824, 2000 psi WOG ball valve on one side outlet of the casing flange and a 2-inch extra heavy bull plug in the opposite side. Install

a 12-inch 3000 psi by 10-inch 3000 psi crossover spool and a 10-inch 3000 psi double gate preventer with 4-1/2-inch rams in top and blind rams in bottom. Pressure test surface casing, all preventer rams and kelly valve to 1000 psi for 15 minutes using rig pump and drilling mud. The burst pressure rating for 13-3/8-inch O.D., 54.5-pound, K-55 casing is 2730 psi.

3. Drill an 11-inch hole to a depth of approximately 6000 feet (through the Dakota formation). A mud desander should be run to keep the mud weight to a minimum and to remove the undesirable solids from the mud. 15 drill stem tests are anticipated starting at a depth of 1000 feet, however, the first open hole drill stem test is not anticipated until approximately 2670 feet in the Cliffhouse formation. In the event the shallower zones are to be tested, a multi-stage cementing collar should be run in the 8-5/8-inch O.D. casing. A fully manned logging unit will be used from surface to total depth. The logging unit will catch 10 foot samples from surface to total depth. Some lost circulation may be encountered in the intermediate hole. Based on experience in this area, this will probably occur in the lower part of the Gallup section and possibly some through the Greenhorn section. No lost circulation is expected in the hole below the intermediate casing. In the lower portion of the hole some water flows will probably be encountered and some trip gas is anticipated. No coring is anticipated. Any shows encountered below the Paradox (10,440 feet) should contain hydrogen sulfide. The mud should be treated with a H2S scavenger. Air breathing equipment will be on the rig floor, and rig crews instructed in the proper safety procedures while operating in an H2S environment. Anticipated tops are as follows:

	Approximate Depth (Feet KBM)
Kirtland	Surface
Fruitland	510
Pictured Cliffs	1,100
Lewis	1,300
Cliffhouse	2,670
Menefee	2,835
Point Lookout	3,545
Upper Mancos	3,915
Gallup	4,840
Lower Mancos	5,240
Greenhorn	5,580
Graneros	5,640
Dakota	5,690
Morrison	5,980
Bluff	6,670
Summerville	6,805
Todilto	6,875
Entrada	6,900
Chinle	7,050
Mossback Member	8,000
Monitor Butte Member	8,130
Shinarump	8,265
DeChelly	8,310
Cutler	8,390
Honaker Trail	9,980
Paradox	10,440
Ismay Zone	10,840
Desert Creek Zone	11,050
Akah Zone	11,180
Barker Creek Zone	11,405
Molas	11,985
Mississippian	12,100
Devonian	12,300
Precambrian	12,490
Total Depth	12,550 or 15 feet into the Precambrian

Objective Reservoirs: Ismay Zone from 10,840 feet to 11,050 feet
Desert Creek Zone from 11,050 feet to 11,180 feet
Akah Zone from 11,180 feet to 11,405 feet
Barker Creek Zone from 11,405 feet to 11,985 feet

Secondary Reservoirs: Fruitland Zone from 510 feet to 1100 feet
Pictured Cliffs from 1100 feet to 1300 feet
Cliffhouse from 2670 feet to 2835 feet
Menefee from 2835 feet to 3545 feet
Point Lookout from 3545 feet to 3915 feet
Gallup from 4840 feet to 5240 feet
Dakota from 5690 feet to 5980 feet
Mississippian from 12,100 feet to 12,300 feet

4. Upon reaching a total depth of approximately 6000 feet, run dual induction laterolog (2-inch linear, 5-inch logarithmic), BHC sonic-gamma ray caliper (gamma ray to surface), and compensated neutron formation density (FDC/CNL) from below surface casing to total depth. Condition hole prior to running 8-5/8-inch O.D. intermediate casing.

5. Run 8-5/8-inch O.D. intermediate casing as follows:

   (Top of String in Well)

   A. Approximately 5960 feet 8-5/8-inch O.D., 36-pound, L-80, buttress thread casing.

   B. One Baker Model G differential float collar, buttress thread.

   C. One joint 8-5/8-inch O.D., 36-pound, L-80, buttress thread casing.

   D. One Baker Model G differential float shoe.

   Cement casing with 50-50 Pozmix with 2% gel, a water loss additive, and a retarder to allow four hours pumping time. Bring cement 1000 feet above any potentially productive zones. If it is determined that the cement behind the 8-5/8-inch O.D. casing has been brought up 2000 to 3000 feet, a multi-stage cementing collar should be used. If the very shallow zones (Fruitland and Kirkland) are to be tested, it will be necessary to perforate and squeeze behind the 8-5/8-inch O.D. casing. Cement volume will be calculated from the caliper log. Circulate 400 barrels of mud prior to beginning cementing operations. Capacity of the 8-5/8-inch O.D. casing is approximately 300 barrels. Rotate casing while circulating, mixing, and displacing cement. Displace cement with mud.

6. Immediately after cementing operations are completed, land the 8-5/8-inch O.D. casing with full weight of casing on slips in the NSCo. 12-inch 3000 psi casing flange and record indicator weight. Install a NSCo. 12-inch 3000 psi by 10-inch 5000 psi heavy duty casing spool and pressure test seals to 2500 psi. The collapse

pressure rating for 8-5/8-inch O.D., 36-pound, L-80 casing is 4100 psi. Install a 10-inch 5000 psi by 10-inch 5000 psi drilling spool with two 3-inch outlets and a control manifold. Install a 10-inch 5000 psi double gate preventer with blind rams in the bottom and 4-1/2-inch rams in the top. Install a 10-inch 5000 psi preventer and drilling nipple.

7. After a WOC time of 24 hours, run a Schlumberger cement bond and gamma ray perforating log from plugged back depth to top of cement behind the 8-5/8-inch O.D. casing. Using rig pump and mud, pressure test casing and blind rams to 3000 psi for 15 minutes. The minimum internal yield for 8-5/8-inch O.D., 36-pound, L-80 casing is 6490 psi. The wellhead is 5000 psi WOG, 10,000 psi test. Pick up a 7-5/8-inch bit, sufficient 6-1/8-inch drill collars, and 4-1/2-inch O.D. drill pipe and go in the hole to plugged back depth. Install a drill pipe rubber on each joint of drill pipe. Pressure test the casing and pipe rams to 3000 psi for 15 minutes.

8. Drill out the float collar and float shoe. Drill to a total depth of 12,550 feet or to such depth as the Geological Department may recommend. After reaching total depth, condition hole and mud. Run dual induction laterolog (2-inch linear, 5-inch logarithmic), BHC sonic-gamma ray caliper, and compensated neutron-formation density (FDC/CNL) logs from below intermediate casing to total depth. Condition hole prior to running 5-1/2-inch O.D. production casing. Pull and lay down drill pipe and drill collars.

9. Run 5-1/2-inch O.D. casing as follows:

   (Top of String in Well)

   A. Approximately 6700 feet 5-1/2-inch O.D., 23-pound, Soo-90, 8 round thread, LT&C casing.

B. Approximately 5800 feet 5-1/2-inch O.D., 20-pound, L-80, 8 round thread, LT&C casing.

C. One Baker Model G differential float collar.

D. One joint 5-1/2-inch O.D., 20-pound, L-80, 8 round thread, LT&C casing.

E. One Baker Model G differential float collar.

Cement 5-1/2-inch O.D. casing with Class G cement with 30 percent silica flour, 15 percent salt, 0.25 percent retarder, and 0.5 percent fluid loss additive. The cement slurry will have the following properties. Cement volumes will be determined from the caliper log. Slurry weight, 16.0 ppg; slurry yield, 1.50 cubic feet per sack; water ratio, 5.99 gallons per sack; thickening time, 6-1/2 hours. Circulate 350 barrels of drilling mud prior to cementing. The capacity of the 5-1/2-inch O.D. casing is approximately 270 barrels. Displace cement with mud. Bump plug to 5000 psi and hold for 15 minutes.

10. Immediately after cementing operations are completed, land the 5-1/2-inch O.D. casing with full weight of casing on slips in a NSCo. 12-inch 3000 psi by 10-inch 3000 psi casing spool and record indicator weight. Remove blowout preventers. Install a NSCo. 10-inch 3000 psi by 6-inch 5000 psi stainless steel tubing spool. Pressure test primary and secondary seals to 2500 psi for 5 minutes. The minimum collapse pressure for 5-1/2-inch O.D., 23-pound, Soo-90 casing is 12,370 psi. Install a steel plate on the 6-inch 5000 psi tubing spool.
11. Release drilling rig and move off location.
12. Move in and rig up a completion rig.
13. Install a 6-inch 5000 psi double gate preventer with 2-7/8-inch rams in top and blind rams in bottom.

14. After a WOC time of at least 50 hours, rig up Schlumberger and run a cement bond log and gamma ray collar log from plugged back depth to top of cement behind the 5-1/2-inch O.D. casing.
15. After a WOC time of 56 hours, pick up and run a 4-1/2-inch bit on 2-7/8-inch O.D., 6.5-pound, C-75, Hydril CS tubing to check plugged back depth.
16. Using Halliburton pump truck and water, pressure test casing and tubing rams to 4000 psi for 15 minutes. The minimum internal yield for 5-1/2-inch O.D., 20-pound, L-80 casing is 9190 psi and the wellhead has a working pressure of 5000 psi. Pull bit standing tubing in derrick.
17. A tentative plan to complete the well will be issued after the results of the above items have been evaluated.