
The drilling permit was issued on May 11, 1959. The well was drilled to a total depth of 4030 K.B., plugged back to 3955 K.B. and completed on June 11, 1959, as a development well in the North Haas field.

Drill Stem Tests:

#1 3858-3893 (Frobisher-Alida Interval). Tool open 65 minutes. Weak blow throughout test. Recovered 255 feet of water-cut mud and 120 feet of muddy salt water. IHP 2115#, ISI 2035#/65 min., IFP 48#, FFP 109#, FSI 1895#/90 min., FHP 2091#.

#2 3929-3950 (Frobisher-Alida Interval). Tool open 60 minutes. Strong initial blow decreasing to fair in 20 minutes. Gas to surface in 30 minutes burning 2 foot flare to end of test. Recovered 1305 feet of oil and gas, calculated to be 700 feet of oil and 250 feet of heavily oil-cut drilling mud. IHP 2197, ISI 1483#/55 min., IFP 70#, FFP 310#, FSI 1430#/90 min., FHP 2178#.

Completion Data:

1. Perforated 3964-66 with 10 shots per foot. Treated with 250 gallons mud acid and 750 gallons regular acid. Swabbed 10 barrels fluid per hour, 85% to 95% water, no gas.

2. Set bridge plug at 3955.


Casing and Tubing Record:

662 feet of 8 5/8 inch surface casing cemented with 200 sacks.
4018 feet of 4 1/2 inch production casing cemented with 150 sacks.

Mechanical Logs:

Induction - Electrical (372-4023)
Microlaterolog - (3250-4026)

Core Record:

3923-4002 - Full recovery.

The formation tops were determined from samples and mechanical logs. Color names are those used in the Rock Color Chart of the National Research Council. Limestone petrography terms are those proposed by Folk (1959) Bull. Amer. Assoc. Petroleum Geologists, vol. 43, no. 1, pp. 1-38.
FORMATION TOPS

Cretaceous
   Niobrara formation  1726
   Greenhorn formation  2004
   Fall River formation  2503

Jurassic
   Piper formation  3381

Triassic (?)
   Spearfish formation  3597

Mississippian Unconformity  3750
   Midale subinterval  3750
   Frobisher-Alida interval  3790
   Top "Massive Anhydrite"  3825

Total Depth  4030

0-400  No samples.
400-490  Shale, medium gray (N6) silty, soft. Rare pieces of very light gray (N8) to pinkish gray (5YR8/1) limy siltstone. Very rare black plant fragments.
490-520  Shale as above with common limy siltstone as above.
520-1240  Shale, medium light gray, clayey, subfissile. Rare shale and siltstone as above. Rare small nodules of white clay at 730-790. Common white limy bentonitic material at 940-70.
1240-1360  Shale as above with common very light gray (N8) slightly limy shale.
1360-1450  Medium light gray shale as above. Rare brownish gray (5YR4/1) siltstone.

Niobrara formation  1726
1450-1900  Dark gray to grayish black (N2) shale. Rare bentonite 1540-1660.
1900-1960  Shale, medium light gray, fissile. Rare dark gray shale as above.

Greenhorn formation  2004
1960-2080  Shale, grayish black, subfissile, very rare brownish gray fine-grained sandstone. Abundant Inoceramus fragments at 2050-80.
2080-2140  Dark gray shale as above by containing common small Inoceramus fragments.
2140-2380  As above. Rare Inoceramus fragments. Common large subangular, quartz grains at 2350-80.
2380-2500  Shale, light olive gray (5Y6/1) with common quartz grains and black shale as above.

Fall River formation  2503
2500-2610  Shale, grayish back, as above; common quartz grains and olive gray shale as above.
2610-2750  Grayish black shale as above; rare white microgranular limestone, rare large quartz grains as above. Rare light olive gray shale. Rare medium grained quartz sandstone.
2750-2850  Black shale as above. Rare reddish brown shale and medium grained sandstone.
2850-2900  Quartz sand grains, medium to coarse, rounded, subspherical to angular. Common black shale as above.
2900-2910 Black shale as above, rare to common quartz grains as above.
2910-2940 As above, common white sublithographic (micrite) limestone.
2940-2990 Black shale as above, common light gray shale. Rare sandstone and limestone as above.
2990-3080 As above, with common, greenish gray waxy shale.
3080-3150 As above, rare greenish gray shale, rare yellowish gray (5Y8/1) soft siltstone.
3150-3160 Black shale as above, common light olive gray (5Y6/1) silty shale.
3160-3290 Abundant greenish gray shale, common reddish brown, gray, and black shale. Rare white sublithographic (micrite) sandy limestone.
3290-3300 Abundant olive gray shale, rare black, greenish gray, and red shale as above. Rare white limy bentonite.
3300-3350 Abundant greenish gray shale as above, common reddish brown shale as above. Rare white sandy limestone.

Piper formation 3381
3350-3510 Limestone as above, common shale as above. Limestone is slightly dolomitic. Limestone becomes less sandy and less dolomitic with increasing depth.

Spearfish formation 3597
3510-3610 Abundant shale as above, common to rare limestone as above, rare white fine-grained friable quartz sandstone. Rare white gypsum at 3560-3600.
3610-3650 Black shale as above, common reddish brown shale. Rare pink and white gypsum. Common reddish brown fine-grained, friable, silty quartz sandstone at 3630 and below.

Midale subinterval 3750
3650-3770 Abundant reddish brown sands; one as above. Common black shale (cavings ?) as above. Common medium-sized rounded subspherical quartz grains at 3680-3730, less common below this.

Frobisher-Alida interval 3790
3770-3793 Limestone, very pale orange (10YR8/2) to white, micrite or microsparite, tight, low porosity. Black shale cavings as above. Rare pieces of pale yellowish brown (10YR6/2) pelmicrite limestone.
3793-3800 Circulated 1 hour. As above with abundant pale red (5R6/2) anhydrite.
3800-3820 Abundant anhydrite as above, rare limestone as above. Black shale cavings. Common olive gray silty soft shale 3810-3820.
3820-3830 Limestone, pale yellowish brown (10YR6/2), micrite with patches of pelmicrite, tight and dense. Rare pale red anhydrite.

Drill stem test #1 (3858-3893) Recovered water cut mud and muddy salt water.
3830-3923 Common white anhydrite, rare limestone and pale red anhydrite as above. Badly caved.
3923 Circulated 1 hour. Common white anhydrite, abundant black shale cavings.
Drill stem test #2 (3929-3950) Recovered 700 feet of oil and 250 feet oil cut mud.

Core chips
3923-3938 Anhydrite, pale yellowish brown to very light gray, dense and tight. Becomes dark gray at 3936.

Perforated interval 3936-38.
3938-3939 Sandstone, white, quartzitic, medium to fine-grained. Composed of angular quartz grains. Cement in one chip is anhydrite, in another chip is probably silica. Low intergranular porosity and permeability.
3939-3940 Sandstone, as above, common concentrations of small pyrite crystals. No stain.
3940-3941 Sandstone as above. Parts of the rock have less cement and are therefore more porous. These more porous areas have a good oil stain.
3941-3942 Sandstone as above, good stain and good cut. Oil stained portion is very friable.
3942-3943 Sandstone as above, no stain.
3943-3944 Anhydrite, sandy, contains many fine quartz grains floating in the anhydrite matrix.
3944-3945 Anhydrite, no quartz grains but common masses of small pyrite crystals.
3945-3946 Anhydrite, medium gray, dense, tight.
3946-3947 Anhydrite, medium gray, mottled with medium light gray slightly dolomitic laminae and veins.
3947-3948 Anhydrite, dark gray, with contorted laminae of white microgranular dolomite. The dolomite contains abundant small pyrite crystals.
3948-3949 Dolomite and anhydrite intermixed. Anhydrite is medium gray, fine crystalline. Dolomite is very pale orange (10YR8/2) microgranular and slightly limy.
3949-3950 As above.
3950-3951 Dolomite, medium light gray, microgranular, anhydritic. Fair intergranular porosity.
3951-3952 Dolomite, white, as above.
3952-3953 Dolomite, white, as above, with abundant brown dolomitic pellets and common medium sized pyrite crystals.
3953-3954 As above, no pyrite seen.
3954-3955 As above, limy.
3956-3957 Limestone, dolomitic, white, microgranular to sucrosic. Common small anhydrite crystals.
3957-3958 Anhydrite, medium gray, translucent, with veins and laminae of very pale orange microgranular dolomite.
3958-3959 Dolomite, very light gray. With common large masses of anhydrite.
3959-3960 Anhydrite. Rare dolomite laminae as above.
3960-3961 Dolomite, white, limy, microgranular to sucrosic. Parts of the chip show white dolomitized pellets closely packed in clear cement.
3961-3962 Dolomite, white, common brown dolomitic pellets.
3962-3963 Anhydrite, fine crystalline, medium gray to pale yellowish brown. Common very pale orange dolomite laminae.
Dolomite, pale yellowish brown, common large acicular and rectangular anhydrite crystals. Rare medium pyrite crystals.

Anhydrite, white, fine crystalline.

As above.

As above, rare brown dolomite laminae.

Dolomite(?), microgranular, Heavily oil-stained. Low porosity and permeability.

As above, common brown anhydrite (?) crystals.

As above.

Anhydrite, medium crystalline.

As above.

Anhydrite as above, with common laminae and interbeds of very pale orange microgranular “pelletoidal” limy dolomite.

Anhydrite, medium crystalline. Coon laminae of microgranular to sucrosic dolomite.

Dolomite, very light gray, sucrosic, limy.

Dolomite, white, with common small crystals of halite.

Anhydrite, gray, with contorted laminae of very light gray microgranular dolomite.

As above.

Dolomite, white, limy, sucrosic with remnants of a previous pelletoidal texture. Calcite filled fractures.

As above, very limy.

Dolomite, white, veins of halite (?)

Dolomite, white, limy, clear anhydrite masses.

As above.

As above.

Dolomite, pale yellowish brown, slightly limy, microgranular, pelletoidal.

Dolomite, limy, medium light gray, sucrosic.

Dolomite, limy. Pelletoidal texture very evident. Large included anhydrite crystals.

Dolomite, white, sucrosic. Common small halite crystals.

As above.

Limestone, very pale orange, pelmicrosparite, dolomitic. Closely packed pellets with microsparite cement. Fair intergranular porosity.

Limestone, very pale orange, microsparite, common brown dolomite and clear anhydrite crystals.

Limestone, very pale orange, microsparite, common brown dolomite.

Limestone, very pale orange, intrapelmicrosparite. Intraclasts and pellets floating in a microsparite matrix.

As above.

Limestone, dolomitic, white, oil stained, good cut.

As above, rare anhydrite crystals.

As above, good pinpoint porosity and common large pores. Rare anhydrite crystals.

Dolomite, limy, white, no oil stain. Common small angular quartz crystals.

As above.

Limestone, very pale orange, dolomitic, microsparite.

As above, common large pores.

4001-4002  As above.

End of core.
4000-4030  Abundant limestone as above. Common black shale cavings.
4030       Total depth.
3955       P.B.T.D.