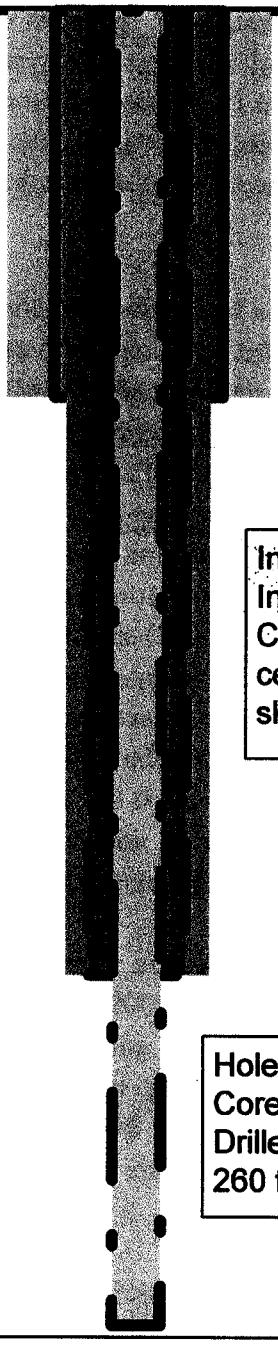
Hutchinson Core Test Well
Completion Diagram

Hutchinson Core Test Well
Location - North Hutch Field
API-15-155-21458-0000
SW-NW-NW 22-23S-6W



Surface Casing - **10-3/4" 32.75#**
Surface Casing Depth - **154.4 ft**
Cemented with 150 sks of common cement w/3% CaCl. Circulated 20 sks to pit.

Intermediate Casing - **7" 20#**
Intermediate String Depth - **260.6 ft**
Cemented with 125 sks of common cement w/3% CaCl. Circulated 40 sks to pit.

Hole - **260 ft. to TD**
Core - **310 ft. to TD**
Drilled with salt-saturated mud from 260 ft. to TD.

Total Depth - **894 ft**

3.0 DESCRIPTION OF FIELD ACTIVITIES

Prior to mobilization, Koch performed site preparation activities, such as pad grading and initial pit construction. Contractor-related field activities associated with the test well at Hutchinson began on January 8, 2001, with the rig mobilization from Medford, Oklahoma. However, contractor licensing and well permit issues necessitated a hiatus in activities until January 18, 2002.

After reinitiating activities, Pratt Drilling, who performed a wide rage of supporting functions during the conduct of this project, began the hole by drilling the conductor casing. The purpose of the conductor casing was to protect and isolate the Equis Beds Aquifer. This casing (10 3/4-inch-diameter) was placed in a 14 3/4-inch hole to a depth of 154.4 feet and fully cemented by circulation. Pratt rigged down on January 20, 2002, and Dynatec Drilling began rigging up on January 21.

Rig set-up was performed during daylight hours and consumed the better part of the next 2 days. A UDR 1500 drilling rig operated by Dynatec Drilling was set up over the precollared hole and used for all drilling below the conductor casing. Dynatec began drilling out the conductor casing cement on January 22, 2002, and 24-hour operations were initiated. Drilling continued to 270 feet using a 9 7/8-inch-diameter tricone bit. On January 23, 2002, 260.6 feet of 7-inch-diameter casing was set in the hole and cemented by circulation. After waiting on the cement for 12 hours, the blow-out prevention equipment (BOPE) was installed. The BOPE consisted of a pipe rams, blind rams, and an annular preventer. Following testing of the BOPE, the cement and an additional 40 feet of new hole (310 feet total depth) were drilled using 6 1/4-inch tricone bit. The drilling system was subsequently changed over to 4-inch wireline coring tools (5 1/2-inch coring rod with a 4-inch core barrel, yielding a 6-inch-diameter hole), and the mud system was changed over to brine with added starch (no gel). Coring began on January 24, 2002. The brine system (as well as the freshwater-based mud) was contained in tanks set below grade in lined pits. Using a 5-foot-long barrel, the hole was cored from 310 feet to a total depth of 894 feet. Total hole depth was reached early on the morning of January 27, 2002.

Following the completion of drilling, logging activities (services provided by Schlumberger) were initiated on the afternoon of January 27, 2002. Logging was completed without difficultly that evening. Immediately following hole logging, an inflatable straddle packer assembly was put together and lowered into the hole using the coring rod. The straddle packer assembly was supplied by TAM international and was used to isolate test zones within the salt section for fracture gradient measurements. Testing was completed in the early morning of January 28, 2002.

After tripping the packers out of the hole, 2 3/8–inch tremmie pipe was tripped into the hole and the hole was cemented to surface and the BOPE was nippled down. The drill was broken

down on January 29, 2002, and the drilling contractor demobilized on January 30, 2002. Koch assumed responsibility for site closure after this date.

During the coring activities, the retrieved 4-inch core was examined, photographed, and logged on site. All of the collected core was loaded into a heated truck and shipped to the RESPEC offices in Rapid City, South Dakota, on January 29, 2002.

Cuttings Log for Conductor Pipe Drilling

Date	Depth (ft)	Description
1/18/02	10	Top Soil / Clays
1/18/02	20	Sand, Medium to Coarse, Medium Fraction ~ 10%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	30	Sand, Medium to Coarse, Medium Fraction ~ 15%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	40	Sand, Medium to Coarse, Medium Fraction ~ 10%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	50	Sand, Medium to Coarse, Medium Fraction ~ 10%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	60	Sand, Medium to Coarse, Medium Fraction ~ 10%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	70	Sand, Medium to Coarse, Medium Fraction ~ 15%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	80	Sand, Medium to Coarse, Medium Fraction ~ 40%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	90	Sand, Medium to Coarse, Medium Fraction ~ 5%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	100	Sand, Medium to Coarse, Medium Fraction ~ 5%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	110	Sand, Medium to Coarse, Medium Fraction ~ 10%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	115	Sand, Medium to Coarse, Medium Fraction ~ 40%, Sub Rounded with Very Minor Sub Angular, Generally Well Graded.
1/18/02	120	Shale with Sand, Shale Red-Brown.
1/18/02	125	Shale with Sand, Shale Green-Gray to Light Gray with Very Minor Red.
1/18/02	130	Shale with Sand, Shale Mixed Gray and Red-Brown.
1/18/02	140	Shale with Sand, Shale Red-Brown with Minor Gray.
1/18/02	150	Shale with Sand, Shale Red-Brown with Minor Gray.
1/18/02	159.5	Shale with Sand, Shale Red-Brown with Minor Gray.
1/19/02		Conductor Pipe Set and Cemented at 154.4'.

Cuttings Log for Surface Casing Drilling

Date	Depth (ft)	Description
1/22/02	166	Cement with Shale, Shale Red-Brown, Sand Present, Cement is 95% of Sample.
1/22/02	176	Cement with Shale, Shale Red-Brown, Minor Sand Present, Cement is 90% of Sample.
1/22/02	186	Cement with Shale, Shale Red-Brown with Minor Gray, Very Minor Sand Present, Cement is 90% of Sample.
1/23/02	196	Shale with Cement, Shale Red-Brown with Minor Gray and Very Minor Sand and Very Minor Gypsum, Cement is 50% of Sample.
1/23/02	206	Shale with Cement, Shale Red-Brown, Cement is 40% of Sample.
1/23/02	216	Shale with Cement, Shale Red-Brown with Gray-Green, Minor Gypsum, Cement is 15% of Sample.
1/23/02	226	Shale, Red-Brown with Minor Gray-Green, Very Minor Gypsum.
1/23/02	236	Shale, Red-Brown with Minor Gray-Green, Very Minor Gypsum.
1/23/02	246	Shale, Mixed Red-Brown and Gray-Green (60/40), with Very Very Minor Gypsum.
1/23/02	256	Shale, Mixed Red-Brown and Gray-Green (60/40), with Very Very Minor Gypsum.
1/23/02	266	Shale, Mixed Red-Brown and Gray-Green (60/40), with Minor Limestone and Very Very Minor Gypsum.
1/23/02	270	Shale, Mixed Red-Brown and Gray-Green (70/300), with Minor Limestone and Very Very Minor Gypsum.
1/23/02		Surface Casing Set and Cemented at 260.6'.
1/24/02		Drilling Cement Plug, Shoe and 40' of New Hole.
1/24/02	280	Shale, Gray-Green with Red-Brown, Minor Gypsum, Possible Carbonate but Cement Makes Determination Difficult.
1/24/02	290	Shale, Gray-Green with Red-Brown, Minor Gypsum, Minor Carbonate.
1/24/02	300	Shale, Gray-Green with Minor Red-Brown, Minor Gypsum, Very Minor Carbonate.
1/24/02	310	Shale, Gray-Green with Very Minor Red-Brown, Minor Gypsum, Significant Carbonate Fraction.
1/25/02	310	Coring Begins