

COREHOLE SUMMARY  
AND  
GEOLOGICAL REPORT  
UTAH STATE 42-34

Prepared by  
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## Utah State 42-34

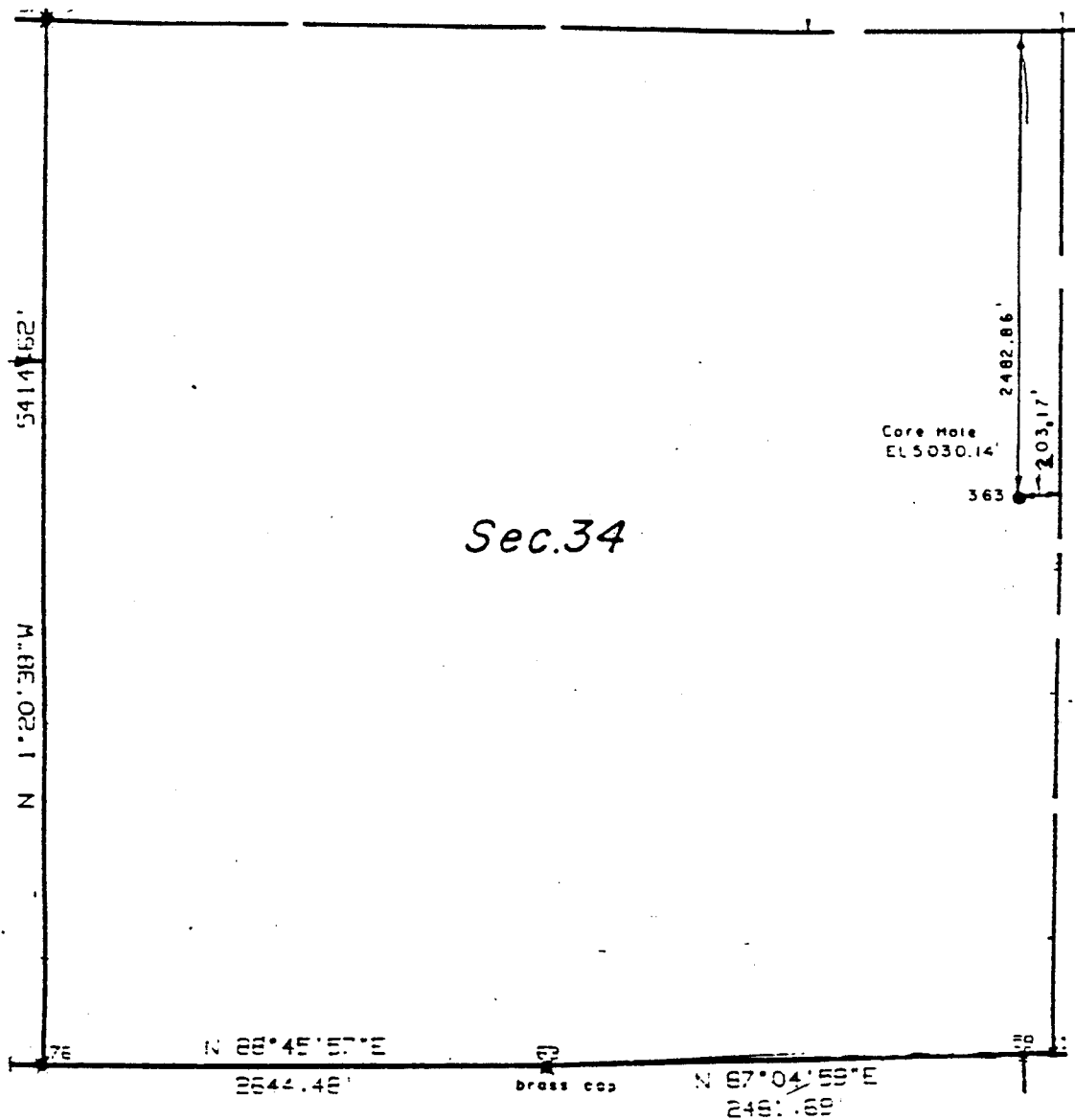
### Introduction

The corehole Utah State 42-34, in sec. 34, T.9 S., R.21 E., Uintah County, Utah (figure 1.), was drilled by Tosco Corporation as a pilot hole at the mine-shaft site on the Sand Wash A Block. The primary purpose was to obtain core for lithologic and rock properties evaluation of the Uinta and Green River Formations. Secondary purposes included monitoring and evaluating gas, hydrologic, and drilling conditions at the site.

The hole was drilled to 14 feet with tricone bits, and then diamond cored continuously to 2683 feet, 403 feet below the mine zone. The daily drilling record is included in Appendix 1.

The core was examined in detail at the drill site and a log prepared which records lithology, rock properties, hydrologic, and drilling data. A reduced-scale log was prepared because of the extended length of the detailed field log. Copies of both logs are included in this report. In addition, the entire core was photographed in color as soon after recovery as possible to provide a permanent record. The core is stored intact at the meteorology station in the field for future examination by consultants and contractors.

Figure 1



LOCATION PLAT  
TOSCO  
UTAH STATE 42-34

COREHOLE SUMMARY

UTAH STATE 42-34

1. Operator:	Tosco Corporation
2. Location:	SE/4 SE/4 NE/4 Sec. 34, T.9 S., R. 21 E., SLBM, Uintah County, Utah
3. Elevation:	5030 G. L.
4. Contractors:	1. Sweetwater Drilling Casper Wyoming Mayhew 1000, Rig #3, surface hole 2. Himes drilling Co. Grand Junction, Colo. Longyear 44, CR-3
5. Supervisor	J. L. Moyer, Tosco
Geologist	D. Colburn, Ammeralda Resources
6. Spud date	26 Oct. 1980
Temporarily abandoned	29 Oct. 1980
Restarted	18 Aug. 1981
7. Casing:	40.0', 6 5/8"
8. Bit size	6" Tricone 0'-14' 4.875" Diamond 14-40' 4.250" Diamond 37.7'-1710.5' 3.032" Diamond 1710.5'-2683.0'
9. Drilling Fluid	Airmist 14.0'-1710.5' Water and mud 1710.5'-2683.0'
10. Geophysical Logs	Density Temperature Sonic Neutron Porosity Verticality
11. Total Depth	2683' Driller, 2681' Logger
12. Completion Date	21 Oct. 1981

## Rock Structure and Physical Properties

### Markers and Zones

The following marker beds and lithologic zones were identified in the Utah State 42-34 core hole based on lithology of the cores and characteristics of the geophysical logs:

	<u>Log Depth</u>	<u>Datum</u>
Uinta Formation	Surface	+5030
Top of Core	14	+5016
Green River Formation	1466C	+3564
Top Mineralized Zone	1550C	+3450
Upper Bird's nest Zone	1632C	+3398
	1663C	+3367
Base Mineralized Zone	1980C	+3050
Four Senators Zone	2054L	+2976
	2080L	
Top A-Groove	2196L	+2834
Top Mahogany Zone	2209L	+2821
Mahogany Marker	2233L	+2797
Mine Zone	2236L	+2794
	2272L	+2758
Top B-Groove	2303L	+2727
Top R-6 Zone	2392L	+2638
Total Depth	2683C	+2347

C-core, L-geophysical logs

## Stratigraphy and Lithology

Rocks penetrated by the Utah State 42-34 corehole belong to the Uinta Formation, a transition zone, and the upper part of the Green River Formation. The Uinta Formation is typically coarser-clastic fluvial and deltaic sediment as compared to the very-fine-grained lacustrine deposits of the Green River Formation. The transition zone is not as well-defined in this corehole as in corehole 13-2, but includes rocks of both types and may represent tongues of the two formations.

### Uinta Formation

The Uinta Formation, from surface to 1466.5 feet is predominantly sandstone and siltstone with minor amounts of shale, claystone, and some marlstone. The sandstones, which make up 45 percent of the section, are light- to medium-gray, mostly fine grained and silty. They are occasionally medium- to coarse-grained, and are generally massive and well sorted. They are mostly well cemented, hard, and competent, varying from slightly to highly calcareous. There are a few intervals, mainly in some of the coarser-grained material, where the sand is poorly cemented and friable. Porosity and permeability are mostly low.

The siltstones, comprising 43 percent of the section above 1466.5, also vary from light- to medium-gray, are variably argillaceous to very-fine-grained sandy, slightly to moderately calcareous, and uniformly hard and competent. Bedding is massive with occasional shaly partings. Contact with other rock types is generally gradational though occasionally abrupt.

Shale, minor amounts of claystone, and traces of marlstone make up the remaining 12 percent of the interval. The shales are various shades of red, green, brown, and dark grey. They are mostly argillaceous, though occasionally calcareous, and tend to break fairly easily.

#### Transition Zone

Identification of a transition zone is questionable in this corehole. There were three marlstone beds that contained traces of kerogen between 1040 and 1466 feet. Two, about two feet thick, were at 1040 and 1270 feet, and one about 16 feet thick was at 1160. The rest of the interval to 1466 is comprised of sandstone and siltstone typical of the Uinta.

## Green River Formation

The top of the Green River Formation is at 1466.5 feet, and the interval from that depth to total depth comprises oil shale and marlstone, with minor tuff beds. The oil shale is mostly light- to medium-brown with occasional darker, richer streaks and, except for the Mahogany zone, is of relatively low kerogen content. It is even-bedded to massive, occasionally with looped, irregular, and streaked bedding. The rock is predominantly very hard and competent.

The mineralized zone between 1550 and 1980 feet contains moderate amounts of nahcolite, calcite, and other saline minerals occurring in pods, thin beds, bands, streaks, stringers, blebs, and in fine- to medium-sized crystals disseminated through the oil shale. In most of the interval the nacholite is fresh and unleached. However, several vugs and cavities ranging from 0.3 feet to 1.6 feet were encountered between 1632 and 1663 feet. Substantial flows of poor quality water came from this interval which constitutes the upper Bird's nest aquifer.



### Mahogany Zone

The Mahogany zone in this corehole is generally comparable to that found in other holes in the area, although the Mahogany bed appeared to be somewhat less rich than in many of the others. The A-groove is 13 feet thick and composed of thin bedded, platy, low grade to barren marlstone. The rich part of the Mahogany zone is 94 feet thick. It is composed of dark-brown to black, even-to irregular-bedded rich zones alternating with light- to medium-brown, even-bedded to massive, occasionally marly, leaner zones. B-groove, 89 feet thick, consists predominantly of light grey, massive, barren marlstone, with occasional zones of light grey-brown, marly, very-low-grade oilshale.

### R-6 Zone

The R-6 zone, from the base of B-groove to total depth, consists predominantly of light grey marlstone containing traces of kerogen, and several medium-brown, low- to medium-grade oilshale beds. Several silty and very-fine-grained sandy intervals were also encountered. The rock throughout is fairly hard and competent.

## Rock Quality Designation (RQD)

Rock Quality Designation is a quantitative evaluation of the rock based on identification of the natural rock discontinuities including partings, joints and faults, and consideration of the general weathered or altered condition of the rock. All breaks in the core are examined and assigned to one of five classes as outlined in the log heading. The information is quantified by summing the lengths of all pieces of unaltered core longer than 0.35 foot between natural breaks, and dividing by run length. The values derived expressed as percentages, determine the rock classification according to the following grouping:

<u>Percentage</u>	<u>RQD</u>
0-25%	Very poor
26-50%	Poor
51-75%	Fair
76-90%	Good
91-100%	Excellent

## Partings And Joints

Natural breaks, on which RQD is based, are classed as partings if they occur on planes of weakness parallel to the sedimentary bedding, or as joints if they cross the bedding at any angle. The angle of dip of bedding and joints is measured from a plane normal to the core axis. Bedding, with a few localized exceptions, was essentially normal to the core axis. Dips of 10 to 20 degrees were observed, but these occurred in short intervals and probably reflect post-depositional slumping or possibly cross bedding.

Natural partings occurred with spacings that varied from less than one inch to several feet. Mechanical breaks (Class 1) and Class 2 partings were the most common breaks found in the Uinta Formation. Generally, the Class 2 partings did not reduce the RQD by any substantial amount. In the upper 800 feet many of these partings were probably mechanically induced. However, they tended to be more frequent in certain rock types, such as the softer, friable sandstones, suggesting that these rocks are substantially weaker. Class 3 partings were predominant in the Green River Formation. As in the Uinta Formation, these breaks varied in spacing, mostly widely spaced, with zones of closer spacing occurring in marlstones and lower grade oil shales which tend to be more brittle.

A total of 124 joints was logged in the entire cored interval. Of this total 43 joints were vertical or nearly so, 23 dipped between  $55^{\circ}$  and  $80^{\circ}$ , and 58 were between  $25^{\circ}$  and  $50^{\circ}$ . Of the observed joints, 22 percent were logged as Class 5 (sealed or recemented) and 78 percent as Class 3 and 4. Most were a few inches to a foot length, the longest extended just over seven feet. Approximately 41 percent occurred in four groups in the interval between 1598 feet and 1681 feet. They were all logged as Class 3 (smooth and unweathered) and dipped at  $45^{\circ}$ .

Very few of the joints and partings contained mineral coatings or showed evidence of alteration; however, high pour-point, asphaltic crude oil was commonly present in open joints and partings.

#### Rock Quality

Excellent overall core recovery, amounting to 99 percent, (2645 feet recovered of 2669 feet cored) is suggestive of good quality rock. Only three out of 146 runs had less than 95 percent recovery, one loss was due to a large cavity, and the other two due to mechanical problems with the core spring. The core record is in Appendix II.

RQD-1, based on run length and recorded on the field log, gives an overall picture of very-good quality rock. Over 2500 feet of core (94 percent) was rated as excellent quality, 96 feet were classed as good, about 36 feet were fair and only about 18 feet were poor quality or worse.

All of the rock rated fair or worse was between 1624 feet and 1678 feet in an interval of numerous parallel fractures, intersecting partings, and leached out nahcolite vugs and cavities. This zone is water bearing and constitutes the upper Bird's nest aquifer. Minor quality reductions noted elsewhere in the core were largely the result of local increases in parting frequency. In general these will have little effect on mine or shaft stability; however, such a zone could reduce the strength of the roofstone if it occurred above a larger opening.

#### Mining Zone

Based on the core depths the mine interval at this location will probably extend from 2238.0 feet to the base of the richer shale at about 2275 feet. True depths of these horizons as determined from the density log are 2236 and 2273 feet. There are two bedding plane partings in the 10-foot section above the roof. One is at 2227.1 feet and the other is at 2233.6 feet. There were 11 partings noted in the rib zone. The upper 10 of

these occurred in the Mahogany bed and it is possible that several of these might have been mechanically induced. The 11th parting was at 2258.2 feet. No joints were observed in the Mine zone. Except for these discontinuities, the rock is hard, unaltered, and of excellent competence throughout the rib and roofstone sections.

### Hydrology

The hole was drilled with air mist to 1710 feet; a point deep enough below the Bird's nest aquifer that casing could be set to eliminate the problems associated with large quantities of poor quality water and to avoid lost circulation difficulties. The hole was then drilled to total depth using water and bentonite mud.

The water injection rate during mist drilling was about three gallons per minute (gpm). The measured return was essentially equal to the injected quantities during drilling of the interval above 1632 feet. This suggests that no significant aquifers were penetrated in the Uinta Formation at this location. However, after reaching 700 feet the hole would fill about 200-250 feet overnight, indicating minor seepage somewhere in the interval between 600 and 700 feet, and the static water level was found at 267.3 feet after a five day break. A rate of approximately 0.2 gpm would be sufficient to provide these fills.

Water production increased abruptly at 1632, approximately 166 feet below the top of the Green River Formation, when the upper Bird's nest aquifer was penetrated. Measured flow rose to about 70 gpm, then stabilized at about 40 gpm. Table 1 is the record of measurements. Drilling continued to 1710.5 feet where casing would be set. The HQ drill pipe was tripped out of the hole and NX drill pipe run in to 1000 feet for a jet pumping test. The hole was blown for 100 minutes. Water flow, temperature and conductivity were measured every ten minutes, and a water sample collected after 90 minutes of jetting. The water analysis is in Appendix IIIa. Conductivity averaged 22,400 micro-mhos at 25<sup>0</sup> C, and temperature measured during pumping was 77<sup>0</sup>F. While drilling with HQ rods (3.50" O.D., annulus 4.5 in.<sup>2</sup>), air pressure was about 600-650 psi and water flow stabilized at approximately 47 gpm. During the test, through open ended NX rods (2.75" O.D., annulus 8.247 in.<sup>2</sup>) air pressure was 300 psi and water flow averaged 175 gpm. Excessive amounts of highly conductive foam below 100 feet prevented measurements of recovery. An injection test was attempted, but because the water level was surging following the pump test, measurements of decline were unobtainable. After a four day break the injection test was attempted again. The initial static water level was 229.85 feet. About 750 gallons of water were injected into the hole

Table 1. Water Measurements

OPERATOR TOSCO CORP WELL UTAH STATE 42-34  
 LOCATION SESENE 34-95-21E COUNTY UINTAH STATE UTAH  
 ELEVATION 5030 G.L.

1981 DATE	TIME	DEPTH	AIR PRESSURE	FLUME SIZE	FLUME READING	GROSS PRODUCTION GPM	INJECTION RATE GPM	PIT LOSS GPM	NET PRODUCTION GPM	WATER TEMP °F	CONDUCTIVITY MICROMHOS	REMARKS
18/8	1530	73	—	3"	0	0	≈ 3	—	—	—	—	DRY
19/8	1830	173	—	"	"	"	"	—	—	—	—	"
1/9	1800	773		"	0.04	3.2	"	—	0.2	—	—	VERY SLIGHT SEEP
4/9	1315	913		"	0.03	2.0	"	—	-1.2	—	—	1/9-Static @ 267. after 5 days
5/9	1200	970		"	0.04	3.2	"	—	0.2	—	—	
6/9	1330	1013		"	0.035	2.6	"	—	-0.4	—	—	
7/9	1330	1090		"	0.04	3.2	"	—	0.2	—	—	
8/9	1230	1130		"	0.04	3.2	"	—	0.2	—	—	
9/9	1230	1233		"	0.04	3.2	"	—	0.2	—	—	
15/9	1600	1262		"	0.04	3.2	"	—	0.2	—	—	
16/9	1400	1312		"	0.04	3.2	"	—	0.2	—	—	poss. incr. @ 1350 flows by heads, 12hr static 3641
17/9	1500	1420		"	0.04	3.2	"	—	0.2	—	3500	
19/9	1315	1564		"	0.04	3.2	"	—	0.2	—	—	
22/9	0940	1632		"	0.15	23.8	"	—	20.8	—	—	BIRD'S NEST
22/9	0956	1634	600-650	"	0.24	72.7	0	—	72.7	—	—	
23/9	1620	1704	"	"	0.21	43.5	≈ 3	—	40.5	75	24,000	DRILLING w/ HQ RODS
24/9	1207	1710	300	6"	0.35	175	0	—	175	77	22,000	JET TEST w/ NX RODS
SET	CASING -	—	NO FURTHER	READINGS								



in 30 minutes (rate approx. 25 gpm) the water level rose to 222.0 feet and remained constant at that level. Injection of an additional 750 gallons raised the level to 213.80 where it again remained constant. Since the fillup represents only about 12 gallons, the formation took practically all of the injected water. HQ casing was set to seal off the aquifer. No additional leached zones were observed and no water entry was detected until a five-inch sandstone at 2347 feet produced gas and some very-poor-quality water. Flow measurements could not be made because of drilling with mud; however, a water sample was collected when the hole was unloading water by gas lift (analysis in appendix II Ib).

#### Hydrocarbons

A hot-wire gas detector was used throughout the drilling to monitor the return flow for indications of hydrocarbon gasses. Shows were recorded regularly while reestablishing circulation after tripping the core barrel. These were transient and probably due to slight accumulations of alcohol from the foamer used in air drilling. A strong gas show was recorded at 762 feet. The gas came from an interval of soft, friable, coarse-grained sandstone between 762.0 and 767.5 feet. Estimated rate of flow was approximately 60,000 cu. feet per day. This appeared to be a low volume reservoir because the

gas ceased flowing after a day or so.  $H_2S$  gas released from the water in the Bird's nest aquifer also recorded a show at 1632 feet. Slight kicks were observed more or less continuously while drilling with water below 1710 feet. A relatively large gas kick occurred at 2347 feet, coming from a thin, fine grained, sandstone band which was bubbling gas when the core reached the surface. This and probably other zones continue producing gas several weeks after drilling was finished.

Observed solid and liquid hydrocarbons included gilsonite and black, high pour-point, asphaltic crude oil. The gilsonite occurs as irregular streaks and stringers, and as thin coatings on partings. The first occurrence was noted at 616 feet and others were logged randomly through the rest of the hole. Asphaltic crude oil is present almost everywhere that there is any porosity below 1430 feet. It permeates a few sandstone intervals in the lower part of the Uinta Formation and most porous tuff beds in the Green River Formation. It commonly coats the sides of vugs, and is observed on open joints and partings throughout the balance of the hole. It oozes into the hole and floats to the top of the water where it hardens into a tar plug because of lower temperature.

# APPENDIX I

## DAILY LOG

## UTAH STATE 42-34

14 Aug. 1981	0530-1300 1300-1430	Moving on location from Grand Junction Rig up, unload HQ rods, hauled water
15-17 Aug. 1981		Days off
18 Aug. 1981	0800-1000 1000-1200 1200-1500 1500-1530 1530-1630	Finish rigging up Wait on water, trip in hole Cut and pull cores 1-3; 37 7'-73.2' Helper smashed finger, pull rods back Lock up tools and trucks 73.2' T.D.
19 Aug. 1981	0730-0830  0830-0945 0945-1130 1130-1700 1700-1800 1800-1900 1900-1930	Trip out rods, change bit (NM-2884), 4.25" Adjust inner tube for pressure Ream from 37.7'-73.2' Cut and pull cores 4-8, 73.2'-153.2' Adjust swivel Cut and pull core 9, 153.2-173.1' Pull rods back, lock up, 173.1' T.D.
20 Aug. 1981	0730-0815 0815-0945 0945-1015 1015-1130 1130-1630  1630-1800	Trip in hole, fuel up Cut and pull core 10, 173.1'-193.2' Work on inner tube Cut and pull core 11, 193.2'-212.1' Replace core spring, cut and pull cores 12-14 212.1 - 253.2' Drive helper to hospital, food poisoning. 253.2' T. D.
21 Aug. 1981	0730-0845  0845-1330 1330-1430 1430-1815 1815-1900	Wait on lightning storm, fuel up, trip in hole Cut and pull cores 15-16, 253.2'-293.2' Work on overshot Cut and pull cores 17-18, 293.2'-333.2' Blow hole, pull rods back, 333.2' T.D.
22 Aug. 1981	0845-0900 0900-1045  1045-1515 1515-1545 1545-1730 1730-1800	Fuel up, warm up Trip in hole, tube would not release, pull out, adjust Cut and pull cores 19-21, 333.2'-393.2' Blow hole, clean out cuttings Cut and pull core 22, 393.2'-413.2' Pull rods back, dump core, grease rig. 413.2' T.D.

23 Aug. 1981	0730-0815 0815-1415 1415-1500 1500-1745 1745-1815	Fuel up, warm up, trip in, blow hole Cut and pull cores 23-25, 413.2'-471.6' Re-adjust inner tube Cut and pull cores 26-27, 471.6'-493.2' Dump core, pull rods back, 493.2' T.D.
24 Aug 1981	0700-0800 0800-0930 0930-1000 1000-1130 1130-1630 1630-1800 1800-1930 1930-2000	Fuel up, warm up, trip in, blow hole Cut and pull out core 28, 493.2'-513.2' Cutting core 29, 513.2'-520.0' Shut down for lightning Cut & pull cores 29-31, 520.0'-573.2' Shut down for lightning Cut & pull core 32, 573.2'-593.2' Dump core, pull rods back, 593.2' T. D.
25 Aug 1981	0730-0845 0845-1800 1800-1900	Fuel up, warm up, trip in, blow hole Cut & pull cores 33-36, 593.2'-673.2' Dump core, pull rods back 673.2' T. D.
26 Aug 1981	0730-1100  1100-1930 1930-2000	Warm up, fuel up, trip in, try to blow hole, pull rods back to 500' to stage hole Cut & pull cores 37-40, 673.6'-753.2' dump core, pull rods back 753.2' T. D.
27 Aug 1981	0715-0830  0830-1000 1000-1100 1100-1230 1230-1400	Fuel up, warm up, pull rods back, stage hole Cut core 41, 573.2'-773.2' Gas @ 763', wait one hour, still blowing Trip out of hole Clean up location 773.2' T. D.
28-31 Aug 1981		Days off
1 Sept 1981	0900-1230 1230-1345 1345-1700  1700-1800	Service rig Change reamer shell (NM 2844) Trip in hole - slow because reamer shell slightly oversize Blow hole, no gas, 773.2' T. D.
2 Sept 1981	0800-1030  1030-2000 2000-2030	Fuel up, warm up, pull rods back, stage hole Cut & pull cores 42-44 773.2'-833.2' Dump core, pull rods back, 833.2' T. D.
3 Sept 1981	0730-1000 1000-1145 1145-1400 1400-2000 2000-2030	Fuel up, warm up, stage hole Cut core 45, 833.2'-841.9' Trip out to adjust tube, trip in hole Cut & pull cores 46-48, 841.9'-893.2' Dump core, pull rods back 120' 893.2' T.D.

4 Sept 1981	0800-1115	Warm up fuel up, pull rods back to 220' & blow hole, trip back in
	1115-1830	Cut & pull cores 49-51, 893.2'-953.2'
	1830-1915	Dump core, pull rods back 220, 953.2' T.D.
5 Sept 1981	0800-1015	Warm up, fuel up, hook up booster, blow hole
	1015-1315	Cut & pull cores 52-53, 953.2'-993.2' pull rods back 120', stop drilling for hard rains. 993.2' T. D.
6 Sept 1981	1030-1115	Late start because of rain, warm up, fuel up
	1115-1200	Trip in, blow hole
	1200-1730	Cut & pull cores 54-55, 993.2'-1033.2'
	1730-1815	Dump core, pull rods back 100.0', fuel up. 1033.2' T. D.
7 Sept 1981	0830-0930	Warm up, blow hole
	0930-2000	Cut & pull cores 56-60, 1033.2'-1133.2'
	2000-2030	Dump core, pull rods back 100.0' 1133.2' T. D
8 Sept 1981	0730-0915	Warm up, fuel up, trip in hole, blow hole
	0915-1815	Cut & pull cores 61-64, 1133.2'-1213.2'
	1815-1845	Dump core, pull rods back 100.0'; 1213.2' T. D.
9 Sept 1981	0800-0900	Blow hole
	0900-1230	Cut & pull core 65, 1213.2-1233.2
	1230-1400	Getting core out of tube; core spring slid up causing mismatch
	1400-1530	Bearings froze on wireline pulling tube
	1530-1800	Drive to phone to call shop, pull wireline, put away tools
	1800-2000	Trip rods out to retrieve core, lock up equipment 1233.2' T. D.
10 Sept 1981	0700-1900	Shut down for repairs
11-14 Sept 1981		Days off
15 Sept 1981	0700-1000	Warm up, fuel up, install wireline, trip in hole
	1000-1045	Retrieve dropped core
	1045-2045	Cut & pull out cores 66-68, 1233.2'-1293.2', 1293.2' T. D.

16 Sept 1981	0800-1100	Fuel up, warm up, replace swivel rubber, unload hole
	1100-1930	Cut & pull cores 69-72, 1293.2'-1364.2'
	1930-2000	Dump core, pull rods back, 1364.2' T. D.
17 Sept 1981	0745-0845	Warm up, fuel up, unload hole
	0845-0930	Cutting core 73, 1364.2'-1377.0'
	0930-1045	Fix swivel, keeps blowing rubbers out
	1045-1930	Cut & pull cores 73-77, 1377.0'-1464.2'
	1930-2000	Dump core, pull rods back 40'
		464.2' T. D.
18 Sept 1981	0730-0815	Warm up, fuel up, unload hole
	0815-1915	Cut & pull out cores 78-82, 1464.2'-1542.5'
	1915-1945	Dump core, pull rods back 40.0'
		1542.5' T. D.
19 Sept 1981	0815-0900	Warm up, fuel up, trip in hole, blow hole
	0900-1400	Cut & pull cores 82-83, 1542.5'-1564.2' hitting asphalt & vugs, pressuring up
	1400-1600	Core stuck in inner tube because of asphalt had to soak in gasoline to get core out
	1600-1730	Filters on booster plugged up, pull rods back 55', fuel up, check oil, wait on filters.
		1564.2' T. D.
20 Sept 1981	0830-0945	Replace filters, unload hole
	0945-1830	Cut & pull cores 84-85, 1564.2'-1593.5' had to shut down to repair motor mounts on booster
	1830-1900	Trip out, dump core. 1593.5 T. D.
21 Sept 1981	0815-1200	Fuel up, warm up, clean asphalt out of tube, weld motor mounts, unload hole
	1200-1545	Cut & pull cores 86-87, 1593.5'-1616.2'
	1545-1645	Install new wireline cable
	1645-1830	Cut & pull core 88, 1616.2'-1624.2'
	1830-1915	Pull rods back, dump core; 1624.2' T. D.
22 Sept 1981	0715-0815	Warm up, fuel up, unload hole
	0815-0945	Cut & pull core 89, 1624.2'-1634.2'
	0945-1000	Measuring water flow
	1000-1545	Cut & pull cores 90-92, 1634.2'-1674.2'
	1900-2000	Dump core. 1674.2' T. D.

23 Sept 1981	0800-1000	Warm up, fuel up, adjust tube, unload hole
	1215-1800	Cut & pull out cores 93-96, 1674.2'-1710.5'
	1800-2000	Dump core, trip out 1080' of drill rods 1710.5' T. D.
24 Sept 1981	0800-0900	Trip out rest of HQ rods
	0900-1015	Trip in NX rods for jet test
	1015-1430	Running jet, injection tests 1710.5' T. D.
25-28 Sept 1981		Days off
29 Sept 1981	0800-0830	Fill water truck
	0830-1015	Running injection tests
	1015-1100	Trip NX rods out of hole
	1100-1330	Trip HQ rods in hole
	1330-1545	Unload hole, set HQ casing
	1545-1845	Trip NX rods in hole
	1845-1930	Cut & pull core 97, 1710.5'-1712.8' 1712.8' T. D.
30 Sept 1981	0800-0945	Fuel up, warm up, mix mud
	0945-1345	Cut & pull core 98, 1712.8'-1732.8' core stuck in tube
	1345-1415	Work on pump
	1415-1845	Cut & pull cores 99-100, 1732.8-1772.8 1772.8' T. D.
1 Oct 1981	0745-1030	Warm up, fuel up, running too much pressure, trip out to bottom of casing. Trip in and wash hole
	1030-1900	Cut & pull cores 101-104, 1772.8'-1852.8' pull back 80', 1852.8' T. D.
2 Oct 1981	0745-0845	Fuel up, warm up, trip in hole
	0845-1915	Cut & pull cores 105-109, 1852.8'-1952.8', pull back 80'; 1952.8' T. D.
3 Oct 1981	0745-0815	Fuel up, warm up
	0815-1900	Cut & pull cores 110-114, 1952.8'-2052.8' pull back 60'; 2052.8' T. D.
4 Oct 1981	0800-0830	Fuel up, warm up
	0830-1800	Cut & pull cores 115-118, 2052.8'-2132.8', pull rods back 60' 2132.8' T. D.

5 Oct 1981	0830-1000	Warm up, fuel up, dig out mud pits, trip in hole
	1000-1715	Cut & pull cores 119-122, 2132.8'- 2174.8' running high pressure, blew hydraulic hose
	1715-1730	Shut down, repairs 2174.8' T. D.
6 Oct 1981	0900-0915	Installed hydraulic hose
	0915-1730	Cut & pull cores 122-125, 2174.8'- 2252.8'
	1730-1845	Pump down tube, didn't go down, pull tube and rods back 80', 2252.8' T. D.
7 Oct 1981	0815-0845	Warm-up, fuel up
	0845-1930	Cut & pull cores 126-130, 2252.8'- 2352.8', hit gas @ 2347', pull back 60' 2352.8' T. D.
8 Oct 1981	0845-1045	Trip in hole, retrieve core that slipped off previous night, pull tube dump core
	1045-1200	Pull rods back 200', lock up tools & equipment 2352.8 T. D.
	1200-1630	Drive from location to Grand Junction
9-12 Oct 1981		Days off
13 Oct 1981	0700-1030	Mix mud to shut off gas, circulate hole, lose half pit of mud pull
	1030-1400	Cut & pull core 131, 2352.8'-2372.8, slipped off
	1400-1900	Trip out rods to recover core, fuel up 2372.8' T. D.
14 Oct 1981	0800-1100	Trip in hole
	1100-1900	Cut and pull cores 132-135, 2372.8'- 2439.0', pull rods back; 2439.8' T. D.
15 Oct 1981	0700-0800	Trip in hole, fill with mud, core 2439.0-2442.8
	0800-1100	Try to recover core, pump engine quit
	1100-1900	Get new pump engine, mounts won't match
16 Oct 1981	0700-1900	Shut down repairs 2442.8' T.D.
17 Oct 1981	0730-1000	Mix mud, try to recover core, mismatched
	1000-1630	Trip out, change latch collar and bit (#L02747), trip in hole
	1630-1830	Cut & pull core 136, 2442.8'-2452.8', pull rods back, 2452.8' T. D.



18 Oct 1981	0800-0930 0930-1830	Pump tube down, mix mud Cut & pull cores 137-141, 2452.8'- 2552.8', pull rods back; 2552.8' T. D.
19 Oct 1981	0730-0800 0800-1900	Trip rods in hole, pump tube down Cut & pull cores 142-146, 2552.8'- 2652.8' pull rods back; fuel up 2652.8' T. D.
20 Oct 1981	0730-0830 0830-1200  1200-1830	Pump tube down Cut & pull cores 147-148, 2652.8'- 2683.0' T. D. Trip and lay down NX rods and pull HQ casing, fuel up, ready to log 2683.0' T. D.
21 Oct 1981	1030-2400	Running geophysical logs, slowed by tar plug
22 Oct 1981	0001-0300 0800-1200 1200-2130	Complete logging Rig down, clean location, load equipment Demobilize to Grand Junction

Project No. 8101

## AMMERALDA RESOURCES

## APPENDIX II

## Core Record

Company Tosco CorporationWell Name Utah state 42-34Lease UTAH STATELocation SE/4 NE/4Sec. 34 Twnshp. 9S Range 21E County Uintah State Utah

Run	From	To	Cut	Rec.	%	Loss	Box No.	Nah. (✓)	Geologist
1	41.0 C.P.	46.9	5.9	5.9	100	0	1		D. Colburn
2	46.9	53.2	6.3	6.3	100	0	2-3		"
3	53.2	73.2	20.0	20.0	100	0	3-6		"
4	73.2	93.2	20.0	20.0	100	0	6-9		"
5	93.2	113.2	20.0	20.0	100	0	10-13		"
6	113.2	133.2	20.0	20.0	100	0	13-16		"
7	133.2	149.5	16.3	16.3	100	0	17-19		"
8	149.5	153.2	3.7	3.7	100	0	19-20		"
9	153.2	173.1	19.9	19.9	100	0	20-23		"
10	173.1	193.2	20.1	20.1	100	0	24-27		"
11	193.2	212.1	18.9	18.9	100	0	27-30		"
12	212.1	213.2	1.1	1.1	100	0	30		"
13	213.2	233.2	20.0	20.0	100	0	30-34		"
14	233.2	253.2	20.0	20.0	100	0	34-37		"
15	253.2	273.2	20.0	20.0	100	0	37-41		"
16	273.2	293.2	20.0	20.0	100	0	41-44		"
17	293.2	313.2	20.0	20.0	100	0	44-47		"
18	313.2	333.2	20.0	20.0	100	0	48-51		"
19	333.2	353.2	20.0	20.0	100	0	51-54		"
20	353.2	373.2	20.0	20.0	100	0	54-58		"
21	373.2	393.2	20.0	20.0	100	0	58-61		"
22	393.2	413.2	20.0	20.0	100	0	61-65		"
23	413.2	433.2	20.0	20.0	100	0	65-68		"
24	433.2	453.2	20.0	20.0	100	0	68-71		"
25	453.2	471.6	18.4	18.4	100	0	72-75		"
26	471.6	473.2	1.6	1.6	100	0	75		"
27	473.2	493.2	20.0	20.0	100	0	75-78		"
28	493.2	513.2	20.0	20.0	100	0	78-82		"
29	513.2	533.2	20.0	20.0	100	0	82-85		"
30	533.2	553.2	20.0	20.0	100	0	85-88		"
31	553.2	573.2	20.0	20.0	100	0	89-92		"
32	573.2	593.2	20.0	20.0	100	0	92-95		"

Project No. 8107

## AMMERALDA RESOURCES

Date \_\_\_\_\_

## Core Record

Company Tosco CorporationWell Name Utah State 42-34

Lease \_\_\_\_\_

Location SE/4 NE/4Sec. 34 Twnshp. 9S Range 21E County Uintah State Utah

Run 3	From	To	Cut	Rec.	%	Loss	Box No.	Nah. (✓)	Geologist
33	593.2	613.2	20.0	20.0	100	0	95-99		D. Colburn
34	613.2	633.2	20.0	20.0	100	0	99-102		"
35	633.2	653.0	19.8	19.8	100	0	102-106		"
36	653.0	673.2	20.2	20.2	100	0	106-109		"
37	673.2	693.2	20.0	20.0	100	0	109-112		"
38	693.2	713.2	20.0	20.0	100	0	112-116		"
39	713.2	733.2	20.0	20.0	100	0	116-119		"
40	733.2	753.2	20.0	20.0	100	0	119-123		"
41	753.2	773.2	20.0	20.0	100	0	123-126		"
42	773.2	793.2	20.0	20.0	100	0	126-130		"
43	793.2	813.2	20.0	20.0	100	0	130-133		"
44	813.2	833.2	20.0	20.0	100	6	133-136		"
45	833.2	841.9	8.7	8.7	100	0	136-138		"
46	841.9	853.2	11.3	11.3	100	0	138-140		"
47	853.2	873.2	20.0	20.0	100	0	140-143		"
48	873.2	893.2	20.0	19.3	97	0.7	143-146		"
49	893.2	913.2	20.0	20.0	100	0	146-150		"
50	913.2	933.2	20.0	20.0	100	0	150-153		"
51	933.2	953.2	20.0	20.0	100	0	153-157		"
52	953.2	973.2	20.0	20.0	100	0	157-160		"
53	973.2	993.2	20.0	20.0	100	0	160-163		"
54	993.2	1013.2	20.0	20.0	100	0	163-167		"
55	1013.2	1033.2	20.0	20.0	100	0	167-170		"
56	1033.2	1053.2	20.0	20.0	100	0	170-174		"
57	1053.2	1073.2	20.0	20.0	100	0	174-177		"
58	1073.2	1093.2	20.0	20.0	100	0	177-180		"
59	1093.2	1113.2	20.0	20.0	100	0	181-184		"
60	1113.2	1133.2	20.0	20.0	100	0	184-187		"
61	1133.2	1153.2	20.0	20.0	100	0	187-191		"
62	1153.2	1173.2	20.0	20.0	100	0	191-194		"
63	1173.2	1193.2	20.0	20.0	100	0	194-197		"
64	1193.2	1213.2	20.0	20.0	100	0	197-201		"

Project No. 8107

## AMMERALDA RESOURCES

Date \_\_\_\_\_

## Core Record

Company Tosco Corporation Well Name Utah State 42-34Lease \_\_\_\_\_ Location SE/4 SE/4 NE/4Sec. 34 Twnshp. 9S Range 2/E County Uintah State Utah

Run	From	To	Cut	Rec.	%	Loss	Box No.	Nah. (✓)	Geologist
65	1213.2	1233.2	20.0	20.0	100	0	201-204		D. Colburn
66	1233.2	1253.2	20.0	20.0	100	0	204-208		"
67	1253.2	1273.2	20.0	20.0	100	0	208-211		"
68	1273.2	1293.2	20.0	20.0	100	0	211-214		"
69	1293.2	1313.2	20.0	20.0	100	0	214-218		"
70	1313.2	1324.2	11.0	11.0	100	0	218-220		"
71	1324.2	1344.2	20.0	20.0	100	0	220-223		"
72	1344.2	1364.2	20.0	20.0	100	0	223-226		"
73	1364.2	1384.2	20.0	20.0	100	0	226-230		"
74	1384.2	1404.2	20.0	20.0	100	0	230-233		"
75	1404.2	1424.2	20.0	20.0	100	0	233-237		"
76	1424.2	1444.2	20.0	20.0	100	0	237-240		"
77	1444.2	1464.2	20.0	20.0	100	0	240-243		"
78	1464.2	1484.2	20.0	20.0	100	0	243-247		"
79	1484.2	1504.2	20.0	20.0	100	0	247-250		"
80	1504.2	1514.2	10.0	10.0	100	0	250-252		"
81	1514.2	1524.2	10.0	10.0	100	0	252-254		"
82	1524.2	1544.2	20.0	20.0	100	0	254-257		"
83	1544.2	1564.2	20.0	18.3	92	1.70	257-260		"
84	1564.2	1574.2	10.0	10.0	100	0	260-262		"
85	1574.2	1593.5	19.3	19.3	100	0	262-265		"
86	1593.5	1604.2	10.7	10.7	100	0	265-267		"
87	1604.2	1616.2	12.0	12.0	100	0	267-269		"
88	1616.2	1624.2	8.0	8.0	100	0	269-270		"
89	1624.2	1634.2	10.0	10.0	100	0	270-271		"
90	1634.2	1654.2	20.0	19.55	98	0.45	271-274		"
91	1654.2	1658.4	4.2	3.8	90	0.40	274-275		"
92	1658.4	1674.2	15.8	15.4	97	0.40	275-277		"
93	1674.2	1678.4	4.2	4.2	100	0	277-278		"
94	1678.4	1694.2	15.8	15.8	100	0	278-281		"
95	1694.2	1709.6	15.4	15.4	100	0	281-283		"
96	1709.6	1710.5	0.9	0.9	100	0	283		"
97	1710.5	1712.8	2.3	2.3	100	0	284		"

Project No. 8107

## AMMERALDA RESOURCES

Date \_\_\_\_\_

## Core Record

Company Tosco CorporationWell Name Utah state 42-34

Lease \_\_\_\_\_

Location SE1/4 SE1/4 NE1/4Sec. 34 Twnshp. 9S Range 21E County Uintah State Utah

Run	From	To	Cut	Rec.	%	Loss	Box No.	Nah. (✓)	Geologist
98	1712.8	1732.8	20.0	20.0	100	0	284-286		D. Colburn
99	1732.8	1752.8	20.0	20.0	100	0	286-288		"
100	1752.8	1772.8	20.0	20.0	100	0	288-291		"
101	1772.8	1792.8	20.0	20.0	100	0	291-293		"
102	1792.8	1812.8	20.0	20.0	100	0	293-295		"
103	1812.8	1832.8	20.0	20.0	100	0	295-297		"
104	1832.8	1852.8	20.0	20.0	100	0	297-300		"
105	1852.8	1872.8	20.0	20.0	100	0	300-302		"
106	1872.8	1892.8	20.0	20.0	100	0	302-304		"
107	1892.8	1912.8	20.0	20.0	100	0	304-306		"
108	1912.8	1932.8	20.0	20.0	100	0	306-308		"
109	1932.8	1952.8	20.0	20.0	100	0	308-311		"
110	1952.8	1972.8	20.0	20.0	100	0	311-313		"
111	1972.8	1992.8	20.0	20.0	100	0	313-315		"
112	1992.8	2012.8	20.0	20.0	100	0	315-317		"
113	2012.8	2032.8	20.0	20.0	100	0	318-320		"
114	2032.8	2052.8	20.0	20.0	100	0	320-322		"
115	2052.8	2072.8	20.0	20.0	100	0	322-324		"
116	2072.8	2092.8	20.0	20.0	100	0	324-326		"
117	2092.8	2112.8	20.0	20.0	100	0	327-329		"
118	2112.8	2132.8	20.0	20.0	100	0	329-331		"
119	2132.8	2144.2	11.4	11.4	100	0	331-332		"
120	2144.2	2152.8	8.6	8.6	100	0	332-333		"
121	2152.8	2172.8	20.0	20.0	100	0	333-335		"
122	2172.8	2192.8	20.0	20.0	100	0	336-338		"
123	2192.8	2212.8	20.0	20.0	100	0	338-340		"
124	2212.8	2232.8	20.0	20.0	100	0	340-342		"
125	2232.8	2252.8	20.0	20.0	100	0	342-344		"
126	2252.8	2272.8	20.0	20.0	100	0	345-347		"
127	2272.8	2292.8	20.0	20.0	100	0	347-349		"
128	2292.8	2312.8	20.0	20.0	100	0	349-351		"
129	2312.8	2332.8	20.0	20.0	100	0	351-353		"
130	2332.8	2352.8	20.0	20.0	100	0	354-356		"

Project No. 8107

AMMERALDA RESOURCES

Date \_\_\_\_\_

## Core Record

Company Tosco Corporation

Well Name Utah State 42-34

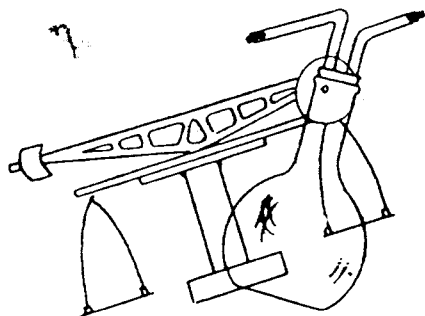
Lease \_\_\_\_\_

Location SE/4 SE/4 NE/4

Sec. 34 Twnshp. 9S Range 21E County Uintah State Utah

State Utah

[illegible]



*Ford Chemical*  
**LABORATORY, INC.**  
*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 466-8761

APPENDIX III a

**RECEIVED**

OCT 23 1981

**TOSCO - VERNAL**

DATE: 10/22/81

CERTIFICATE OF ANALYSIS

TOSCO CORPORATION  
BOX 814  
VERNAL, UTAH  
84078

81-007497

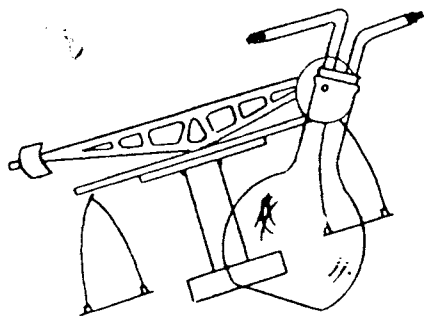
SAMPLE: WATER SAMPLE TAKEN 9-24-81, SHAFT PILOT HOLE #42-34 RECEIVED  
9-28-81.

**BIRD'S NEST AQUIFER**

RESULTS

Alkalinity as CaCO <sub>3</sub> mg/l	15,000.00
Aluminum as Al mg/l	.030
Ammonia as NH <sub>3</sub> -N mg/l	<.01
Arsenic as As mg/l	.030
Barium as Ba mg/l	.650
Beryllium as Be mg/l	.014
Bicarbonate as HCO <sub>3</sub> mg/l	14,005.60
Boron as B mg/l	.188
Cadmium as Cd mg/l	<.001
Calcium as Ca mg/l	.80
Carbonate as CO <sub>3</sub> mg/l	2,112.00
Chloride as Cl mg/l	286.30
Chromium as Cr mg/l	<.001

OCT 30 1981



# Ford Chemical

LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115  
PHONE 466-8761

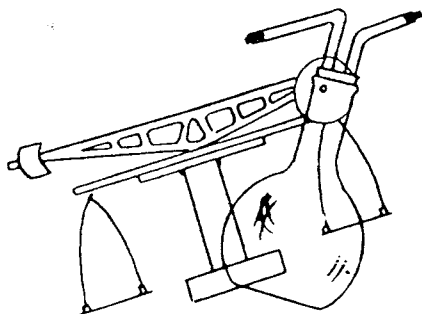
PAGE: 2

CERTIFICATE OF ANALYSIS  
81-007497

## RESULTS

Cobalt as Co mg/l	.002
Conductivity umhos/cm	25,900
Copper as Cu mg/l	<.001
Cyanide as Cn mg/l	.337
Dissolved Oxygen mg/l	3.5
Fluoride as F mg/l	37.10
Gross Alpha pci/l	<.2
Gross Beta pci/l	<.5
Hardness as CaCO <sub>3</sub> mg/l	2.0
Iron as Fe mg/l	.215
Lead as Pb mg/l	.095
Magnesium as Mg mg/l	<.01
Manganese as Mn mg/l	.012
Mercury as Hg mg/l	<.00020
Molybdenum as Mo mg/l	.037
Nickel as Ni mg/l	.025
Nitrate as NO <sub>3</sub> -N mg/l	<.01





# Ford Chemical

LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

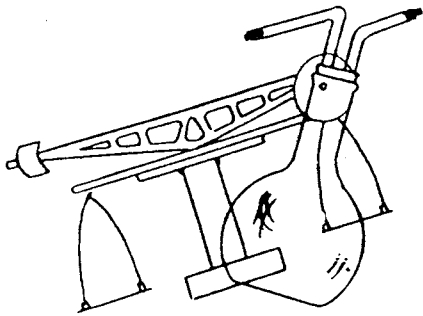
PHONE 466-8761

PAGE: 3

CERTIFICATE OF ANALYSIS  
81-007497

## RESULTS

=====	
Nitrite as NO <sub>2</sub> -N mg/l	<.01
Oil and Grease mg/l	.40
Phenol as mg/l	<.001
Phosphate PO <sub>4</sub> -P Ortho mg/l	.114
Phosphate as PO <sub>4</sub> -P Total mg/l	1.300
Potassium as K mg/l	12.50
Selenium as Se mg/l	<.001
Silica as SiO <sub>2</sub> Diss. Mg/l	25.40
Silver as Ag mg/l	.002
Sodium as Na mg/l	7,180.00
Sulfate as SO <sub>4</sub> mg/l	250
Sulfide as S Mg/l	1.33
Total Diss. Solids Mg/l	16,880
Total Kjeldahl Nitrogen mg/l	<.01
Vanadium as V mg/l	.130
Zinc as Zn mg/l	.035
pH Units	9.40



# Ford Chemical

## LABORATORY, INC.

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 466-8761


PAGE: 4

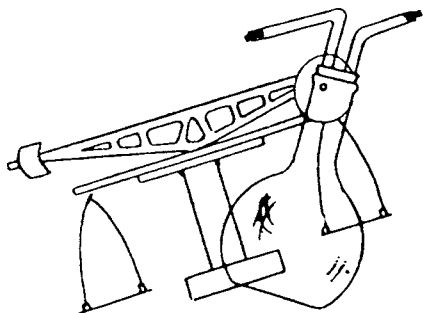
CERTIFICATE OF ANALYSIS

81-007497

RESULTS

=====

  
FORD CHEMICAL LABORATORY, INC.



# Ford Chemical

LABORATORY, INC.

*Bacteriological and Chemical Analysis*

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 466-8761

DATE: 10/22/81

CERTIFICATE OF ANALYSIS

81-007497-01

## FORD CHEMICAL LABORATORIES

### BALANCE SHEET FOR SAMPLE: (1) RESULTS

#### CATIONS

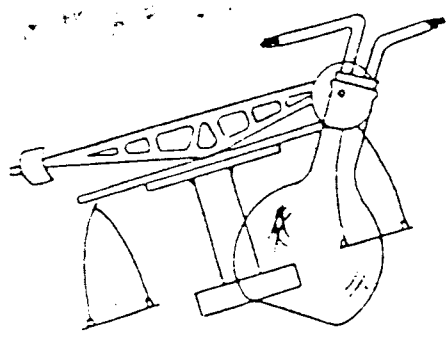
	mg/l	meq/l
Calcium as Ca mg/l	.800	.040
Magnesium as Mg mg/l	.000	.000
Sodium as Na mg/l	7180.000	312.330
Potassium as K mg/l	12.500	.320

#### ANIONS

	mg/l	meq/l
Carbonate as CO <sub>3</sub> mg/l	2112.000	70.393
Bicarbonate as HCO <sub>3</sub> mg/l	14005.600	229.692
Sulfate as SO <sub>4</sub> mg/l	250.000	5.205
Chloride as Cl mg/l	286.300	8.077
Nitrate as NO <sub>3</sub> -N mg/l	.000	.000

### BALANCE INFORMATION

CATIONS: 312.690  
ANIONS: 313.367  
TOTAL: 626.057  
DIFFERENCE: .677  
SIGMA: .001



*Ford Chemical*  
LABORATORY, INC.  
*Bacteriological and Chemical Analysis*  
40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115  
PHONE 466-8761

DATE: 11/18/81

WATER BELOW PINE ZONE CERTIFICATE OF ANALYSIS

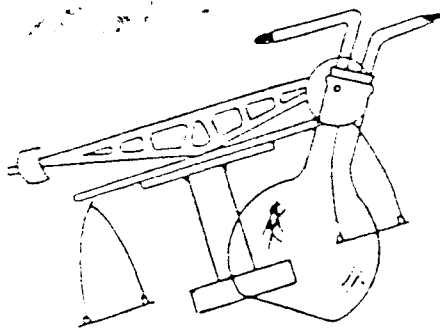
TOSCO CORPORATION  
BOX 814  
VERNAL, UTAH  
84078

81-007916

SAMPLE: WATER SAMPLES RECEIVED 10-22-81.

✓ 42-34 ✓  
TOSCO S  
SPH W  
10-8-81 N  
SHAFT M  
PILOT 1  
HOLE  
=====

Alkalinity as CaCO3 mg/l	25,870.00
Aluminum as Al mg/l	45.900
Ammonia as NH3-N mg/l	37.88
Arsenic as As mg/l	.520
Barium as Ba mg/l	4.130
Beryllium as Be mg/l	.005
Bicarbonate as HCO3 mg/l	22,216.00
Boron as B mg/l	6.250
Cadmium as Cd mg/l	.014
Calcium as Ca mg/l	12.00
Carbonate as CO3 mg/l	4,596.00
Chloride as Cl mg/l	33.00
Chromium as Cr mg/l	.002



# Ford Chemical

LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE

SALT LAKE CITY, UTAH 84115

PHONE 466-8761

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## CERTIFICATE OF ANALYSIS

81-007916

42-34

T8600

SPH

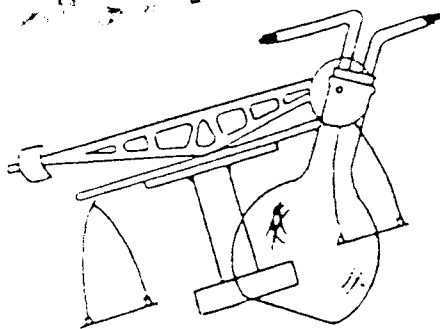
10-8-81

SHAFT

PILOT

HOLE

=====	
Cobalt as Co mg/l	<.001
Conductivity umhos/cm	44,000
Copper as Cu mg/l	.150
Cyanide as Cn mg/l	<.001
Dissolved Oxygen mg/l	2.1
Fluoride as F mg/l	135.00
Gross Alpha pci/l	2.0
Gross Beta pci/l	3.0
Hardness as CaCO3 mg/l	30.0
Iron as Fe mg/l	.450
Lead as Pb mg/l	.148
Magnesium as Mg mg/l	<.01
Manganese as Mn mg/l	.060
Mercury as Hg mg/l	<.00020
Molybdenum as Mo mg/l	<.001
Nickel as Ni mg/l	<.001
Nitrate as NO3-N mg/l	9.30



# Ford Chemical

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Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
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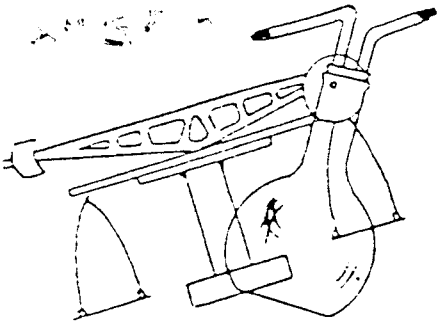
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### CERTIFICATE OF ANALYSIS 81-007916

TUSCO  
SFH 92-34  
10-8-81  
SHAFT  
PILOT  
HOLE  
=====

=====	
Nitrite as NO <sub>2</sub> -N mg/l	.80
Oil and Grease mg/l	29.40
Phenol as mg/l	<.001
Phosphate PO <sub>4</sub> -P Ortho mg/l	.039
Phosphate as PO <sub>4</sub> -P Total mg/l	.150
Potassium as K mg/l	220.00
Selenium as Se mg/l	.003
Silica as SiO <sub>2</sub> Diss. Mg/l	28.00
Silver as Ag mg/l	<.001
Sodium as Na mg/l	12,000.00
Sulfate as SO <sub>4</sub> mg/l	570
Sulfide as S Mg/l	4.00
Suspended Solids mg/l	458
Total Diss. Solids Mg/l	28,600
Total Kjeldahl Nitrogen mg/l	40.80
Total Organic Nitrogen mg/l	2.92
Vanadium as V mg/l	<.001



*Ford Chemical*  
LABORATORY, INC.  
*Bacteriological and Chemical Analysis*

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PAGE: 4

CERTIFICATE OF ANALYSIS  
81-007916

T0800  
SPH 42-34  
10-8-81  
SHAFT  
PILOT  
HOLE  
=====

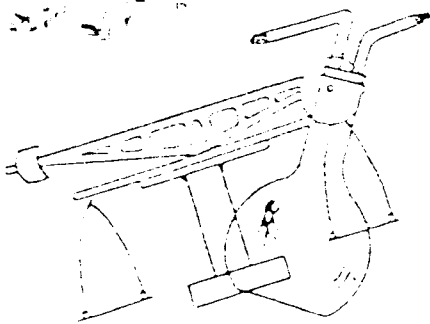
=====

Find as Zn mg/l

.006

as Units

8.80



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LABORATORY, INC.

Bacteriological and Chemical Analysis

40 WEST LOUISE AVENUE  
SALT LAKE CITY, UTAH 84115

PHONE 466-8761

DATE: 11/18/81

CERTIFICATE OF ANALYSIS

81-007916-03

FORD CHEMICAL LABORATORIES

ANALYSIS SHEET FOR SAMPLE: (8) 10800 PF- 10-E-81

SHAW PILOT HOLE 42-34

CATIONS

	mg/l	meq/l
Calcium as Ca mg/l	12.000	.599
Magnesium as Mg mg/l	.000	.000
Sodium as Na mg/l	11000.000	522.000
Potassium as K mg/l	220.000	5.625

ANIONS

	mg/l	meq/l
Carbonate as CO <sub>3</sub> mg/l	4596.000	183.185
Bicarbonate as HCO <sub>3</sub> mg/l	22216.000	364.342
Sulfate as SO <sub>4</sub> mg/l	570.000	11.867
Chloride as Cl mg/l	33.000	.931
Nitrate as NO <sub>3</sub> -N mg/l	9.300	.152

BALANCE INFORMATION

CATIONS:	528.224
ANIONS:	530.477
TOTAL:	1058.701
DIFFERENCE:	2.253
SIGMA:	.002



Tosco Visit, Lila Boyles 11-24-86

Additional info not duplicated

Core hole 42-34

① Core Logs

① 12 porosity/permeability tests between 356.15 and 1420.27'

② Young's modulus & Poisson's ratio tests 1? To 96 samples - to 2574.6 ft