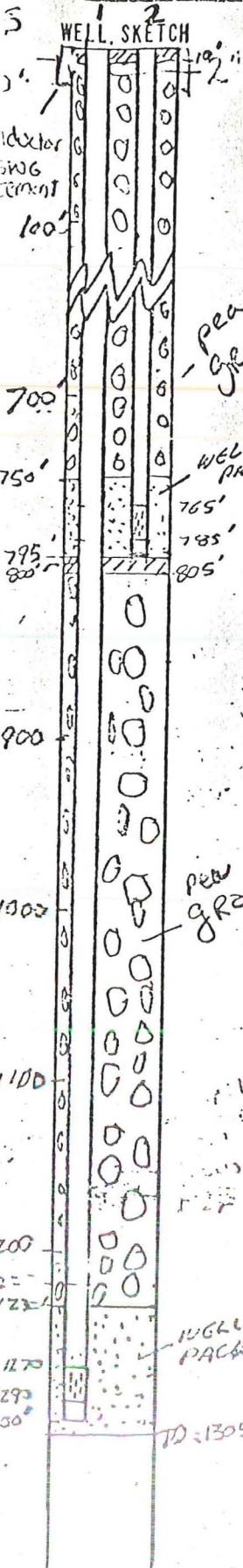




WELL NO. 2-DL OW-2 SHEET 1 OF 1 GL04819
 LOGGED BY JFM+SC+LB PROJECT NO. 79-290-45
 DATE (S) JAN 3-22, 1980 PROJECT NAME MX

ELEVATION +4690'
 GROUND LEVEL
 TOP OF CASING +4692'

LOCATION OR COORDINATES T 35, R 64 E, Sect 12



DRILLING SUMMARY

TOTAL DEPTH DRILLED 1305'
 ROTARY CORE _____
 DRILLING CONTRACTOR BEYLIK
 RIG (S) USED BUCKET AUGER 0' to 40'
40' TO TD REVERSE ROTARY.
 SIZE (S) AND TYPE (S) OF BITES 1 8 5/8"
DRAG AND CLUSTER BITS.
 DRILLING FLUID water and
4 SACKS POLYMER
 SAMPLING METHOD BACKHOG, BUCKET +
SCREEN FROM DISCHARGE PIPE.
 SURFACE CASING 0 to 40' 22" DIA.
 COMMENTS (PROBLEMS, SHUTDOWNS, ETC)

PACKERS none
 CENTRALIZERS none
 SAND OR GRAVEL PACK pea gravel 0'-750'
805'-1230'-WELL PACK 750-785, 1235-1305
 CEMENT (MIX) DEPTH (S) 0 to 40'
& 795-805
 BENTONITE _____
 PELLETS _____
 SLURRY _____

DEVELOPMENT
 TREMIE air lift
 DEPTH 2 ZONES
 TIME _____

TIME LOG

	START	FINISH	ELAPSED TIME	% OF TOTAL
DRILLING	1/3/80	1/22/80	21 hours	77%
LOGGING	1/19/80	1/19/80	2 hours	<1%
CASING	1/23/80	1/23/80	1.5 hrs	5%
GRAVEL PACKING	1/22/80	1/24/80	18 hrs	7%
CEMENTING	1/4/80	1/4/80	2.5 hrs	3%
BENTONITE PELLETS SLURRY	1/23/80	1/23/80		
DEVELOPMENT	1/25/80	1/25/80	19 hours	7%
			CR STRINGS	

DESIGN

BASIS DRILLER'S LOG
 GEOLOGIC LOG _____
 GEOPHYSICAL LOG
 COPIES ATTACHED YES NO

STEEL CASING STRING #1
 FROM 0' TO 1270' BLANK
 FROM 1270' TO 1290' PERF
 FROM 1290' TO 1300' BLANK
 FROM _____ TO _____
 FROM _____ TO _____

STEEL CASING STRING #2
 FROM 0' TO 765' BLANK
 FROM 765' TO 785' PERF
 FROM 785' TO 795' BLANK
 FROM _____ TO _____
 FROM _____ TO _____

MISCELLANEOUS

A 22" DIAMETER STEEL CONDUCTOR CASING WAS INSTALLED TO 40' BELOW THE

CASING DIMENSIONS 2" ID
 SCREEN DIMENSIONS 2" ID

DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW-2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED 0-40' Bucket Auger/
 90-1300' Reverse Rotary
 COMPANY Beylik
 OPERATOR Jim Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY JM & SC DATE 1-8-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
0	<u>Silt</u> : Tan silt with occasional gravel to 1½".
10	<u>Silt</u> : Tan Silt
20	<u>Silt & Sand with Gravel</u> : Tan silt with \pm 25% med colored, fine to coarse, poorly sorted, subrounded to subangular sand, with \pm 10% med colored subrounded to angular gravel to 1½".
30	<u>Gravel with Cobbles</u> - Med to dark colored, subrounded to subangular ½" gravel up to cobbles to 4".
40	<u>Fine Gravel with Sand</u> : Brown color, well sorted, subrounded gravel with less than 25% coarse sand, gravel up to ¾".
50	<u>Gravel with Coarse Sand</u> : Brown color, subangular, well sorted gravel up to ¾" with coarse, angular sand (less than 25%).
60	<u>Gravel with Sand</u> : Brown color, well sorted, subrounded gravel up to 1½" with less than 25% coarse sand.
70	<u>Gravel with Sand</u> : Same as above (60').
80	<u>Coarse Sand with Gravel</u> : Dark color, well sorted, subrounded sand with less than 25% gravel up to ½".
90	<u>Fine to Medium Gravel with Sand</u> : Brown color, well sorted, subrounded gravel with less than 10% coarse sand.
100	<u>Gravel with Sand</u> : Dark color, well sorted, subangular gravel up to ¾" with less than 30% coarse sand.

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Circulation
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T35, R64E, Sect. 12ca
 LOGGED BY SC & JM DATE 1-8-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
100	<u>Gravel with Coarse Sand</u> : Dark color, well sorted, subangular, max gravel 1" with less than 25% coarse sand.
110	<u>Gravel with Coarse Sand</u> : Same as above (100'-110'). Max size for gravel ½".
120	<u>Gravel with Coarse Sand</u> : Same as above (100'-120'). Max gravel 1½".
130	<u>Gravel with Coarse Sand</u> : Less than 25% sand. Max gravel 1½". Most less than 1".
140	<u>Gravel with Coarse Sand</u> : Less than 10% sand. Same as above (130-140').
150	<u>Gravel with Coarse Sand</u> : Dark, subrounded, well sorted max size 1" gravel with less than 40% very coarse, subangular sand.
160	<u>Gravel with Coarse Sand</u> : Brown, subrounded, well sorted gravel with less than 25% coarse sand. Max size ¾".
170	<u>Gravel with Coarse Sand</u> : Brown, subangular, well sorted gravel with less than 25% coarse sand. Max size ¾".
180	<u>Gravel with Coarse Sand</u> : Much coarser than 170-180', 33% of sample greater than 1" size. Brown subrounded, subangular, well sorted with less than 10% sand.
190	<u>Very Coarse Gravel with Coarse Sand</u> : Dark, well sorted subangular. Greater than 2" sized gravel. Less than 5% coarse sand.
200	

WORLD WIDE DRILLING, INC.
DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW-2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Circulation
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY JM & SC DATE 1-8-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
200	<u>Gravel with Coarse Sand</u> : Brown, well sorted, subangular gravel. Max size 1" with less than 40% subangular, coarse sand.
210	<u>Gravel with Coarse Sand</u> : Gray, subangular, well sorted. Max size 1½". Less than 10% subangular, coarse sand.
220	<u>Gravel with Coarse Sand</u> : Gray-black, subangular, well sorted. Max size 2½". Less than 10% coarse, subangular sand.
230	<u>Gravel with Coarse Sand</u> : Gray-black, subangular, well sorted. Max size 1". Less than 40% subrounded, coarse sand.
240	<u>Gravel with Sand and Some Clay</u> : Subangular, poorly sorted, max gravel size ¾". Less than 10% sand. Less than 20% silt and clay.
250	<u>Gravel with Coarse Sand</u> : Gray-brown, subangular, well sorted, max size 1". Less than 20% coarse sand.
260	<u>Gravel with Coarse Sand</u> : Gray, subangular, well sorted. Max size 2½" gravel. Less than 20% coarse, subangular sand.
270	<u>Gravel with Sand and Silt</u> : Gray color, subangular, poor to medium sorted, max ½" gravel. Less than 25% fine- to coarse-grained sand. Less than 5% silt.
280	<u>Gravel with Coarse Sand</u> : Gray color, subangular, well sorted. Max ¾" gravel. Less than 20% coarse, subangular sand.
290	<u>Gravel with Coarse Sand</u> : Gray, subangular, well sorted, max size gravel 1". Less than 20% subangular coarse sand.
300	

DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW-2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Circulation
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12 ca
 LOGGED BY JM & SC DATE 1/8/80
 CHECKED BY JAG DATE 4/10/80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
300	<u>Fine Gravel with Coarse Sand</u> : Gray-brown, subrounded, well sorted, max size $\frac{1}{2}$ ". Less than 40% coarse, subrounded sand.
310	
320	<u>Gravel with Coarse Sand</u> : Gray-brown, subrounded, well sorted, max size $\frac{1}{2}$ " gravel, less than 40% coarse, subrounded sand. <u>Gravel with Coarse Sand</u> : Well sorted, brown gray, subrounded, max $\frac{1}{2}$ " gravel with less than 30% coarse, subrounded sand.
330	
340	<u>Gravel with Sand, Silt & Clay</u> : Poorly sorted, gray-black, subangular to subrounded, less than 40% sand. Less than 10% silt and clay, $\frac{1}{2}$ " gravel.
350	<u>Gravel with Sand, Silt & Clay</u> : Poorly sorted, brown subangular-subrounded. 40% sand, 10% silt and clay, $\frac{1}{2}$ " gravel.
360	<u>Gravel with Trace Sand, Silt & Clay</u> : Less than 20% sub-gravel size, gray-black, subangular, poorly sorted $\frac{1}{2}$ " gravel.
370	<u>Gravel with Medium to Coarse Sand</u> : Brown-black, subrounded-subangular well sorted less than 30% sand.
380	<u>Gravel</u> : Poorly sorted, $\frac{1}{2}$ " gravel, subangular, less than 20% coarse sand.
390	<u>Gravel</u> : Medium sorted, gray-black-brown, subangular, less than 10% sand, $\frac{1}{2}$ " gravel.
400	

MINNESOTA STATE GEOLOGICAL SURVEY
DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW-2

PROJECT NUMBER 79-290- 45

VALLEY NAME Dry Lake

PROJECT NAME MX SITING INVESTIGATION

LOCATION NUMBER T3S, R64E, Sect. 12ca

EQUIPMENT USED Reverse Circulation

LOGGED BY JM & SC DATE 1/14/80

COMPANY Beylik

CHECKED BY JAG DATE 4/10/80

OPERATOR J. Clyde

TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
400	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, gray-black, subangular-subrounded, less than 30% sand, 20% silt and clay, ½" gravel.
410	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, subangular to subrounded, gray-black, less than 20% sand, less than 10% silt and clay.
420	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, subangular, brown-gray, less than 40% sand, less than 10% silt and clay, 2½" gravel.
430	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, brown-black, subangular, ¾" gravel, less than 20% sand, less than 10% silt and clay.
440	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, blue-black, subangular, ¾" gravel, less than 15% sand, less than 10% silt and clay.
450	<u>Gravel with Sand, Silt & Clay:</u> Poorly sorted, subangular, gray-black, ½" gravel, less than 40% sand, less than 10% silt and clay.
460	<u>Gravel with Sand, Silt, & Clay:</u> Poorly sorted, subangular, gray-brown, ½" gravel, less than 40% sand, 10% silt and clay.
470	<u>Gravel with Sand, Silt and Clay:</u> Brown-gray poorly sorted subrounded, max 2" gravel, less than 20% sand, less than 10% silt and clay.
480	<u>Gravel with Sand and Clay:</u> Gray-black colored, poorly sorted subangular gravel with less than 30% coarse to fine-grained sand with less than 10% silty clay. Max grain size ¾".
490	<u>Gravel with Sand:</u> White, gray-black colored moderately sorted subangular gravel with less than 20% coarse subangular sand grains. Maximum grain size 1".
500	

FIELD LOG OF WELL NUMBER OW-2

PROJECT NUMBER 79-290-45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Circulation
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY JM & SC DATE 1-14-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
500	<u>Gravel with Sand:</u> Gray, black colored moderately sorted subrounded to subangular gravel with less than 15% coarse subangular sand. Maximum gravel size approximately 2".
510	<u>Gravel with Trace Coarse Sand:</u> Brown, subangular, well sorted, gravel to 1½", less than 10% sand.
520	<u>Gravel with Trace Sand and Silt:</u> Same as 510' with less than 10% sand and silt.
530	<u>Gravel with Trace Coarse Sand:</u> Same as 510'.
540	
550	<u>Gravel with Sand and Silt:</u> Brown-gray, subangular, moderate sorting. Less than 25% sand and silt.
560	<u>Gravel with Trace Coarse Sand:</u> Same as 510'.
570	
580	
590	
600	

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Mud Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY SC & JM DATE 1/15/80
 CHECKED BY JAG DATE 4/10/80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
600	
610	<u>Gravel with Trace Coarse Sand:</u> Brown, subangular, well sorted, gravel to 1½", less than 10% sand.
620	
630	<u>Gravel with Trace Coarse Sand:</u> Same as 610', but max size ½".
640	<u>Gravel with Sand and Silt:</u> Brown, subangular, poorly sorted, less than 30% sand, less than 10% silt, gravel size to ½".
650	
660	
670	
680	
690	
700	

GENERAL INVESTIGATIONAL, INC.
DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW2

PROJECT NUMBER 79-290-45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Mud Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12 ca
 LOGGED BY SC DATE 1/17/80
 CHECKED BY JAG DATE 4/10/80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
700	<u>Gravel with Some Coarse Sand:</u> Brown, subangular, well sorted gravel size to 3/4", less than 20% sand.
710	<u>Gravel with Some Coarse Sand:</u> Same as 700' but with gravel to 2".
720	<u>Gravel with Some Coarse Sand:</u> Same as 700'.
730	<u>Gravel with Sand, Silt, & Clay:</u> Brown, subangular gravel to 1/2" size with 20% sand, 20% silt & clay.
740	<u>Gravel with Some Coarse Sand:</u> Same as 700'.
750	<u>Gravel with Trace Coarse Sand:</u> Same as 700' but less than 10% sand, & gravel to 3".
760	<u>Gravel with Trace Coarse Sand:</u> Same as 750'.
770	<u>Gravel with Some Coarse Sand:</u> Same as 700'.
780	
790	
800	

DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

PAGE 1 OF 1
 VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY SC & JM DATE 1-18-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
800	<u>Coarse Sand Trace Gravel & Silt:</u> Brown subangular, well sorted, coarse sand, less than 10% gravel, less than 10% silt.
810	<u>Gravel with Some Coarse Sand:</u> Brown, subangular, well sorted, gravel size to 1", 20% sand.
820	
830	
840	
850	
860	
870	
880	
890	
900	

FIELD LOG OF WELL NUMBER OW2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12 ca
 LOGGED BY JM & SC DATE 1-19-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
900	<u>Sand with Some Gravel & Silt:</u> Brown subangular, poorly sorted, sand with 10% silt & clay, 20% gravel.
910	
920	
930	
940	<u>Gravel with Trace Coarse Sand:</u> Brown subangular, well sorted, gravel to 3/4", 10% sand.
950	
960	
970	
980	
990	
1000	

GEORGE HAZARD, INC.
DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12 ca
 LOGGED BY JM & SC DATE 1-20-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
1000	
1010	<u>Gravel with Cobbles</u> : Dark colored, poorly sorted subangular to angular (predominantly angular) gravel with less than 5% broken cobbles up to 3".
1020	<u>Gravel with Cobbles</u> : As above (1010'), more darker rocks, medium to dark color.
1030	<u>Gravel with Sand</u> : Medium color, poorly sorted, subangular to angular gravel up to 1", with less than 20% fine- to coarse-grained, angular to subangular sand.
1040	<u>Gravel</u> : Medium color, poorly sorted, subangular to angular gravel with 20% cobbles up to 2½", with 20% medium to coarse, subangular to angular sand.
1050	<u>Gravel</u> : Light to dark colored, poorly sorted, subrounded to angular gravel up to 1½".
1060	<u>Gravel with Sand</u> : Light to dark color, medium sorted, subangular to angular gravel up to ¾".
1070	<u>Gravel</u> : Medium to dark color, well sorted, angular to subangular fine-grained gravel up to ¼".
1080	<u>Gravel with Sand</u> : Medium to dark color, poorly sorted, subangular to angular gravel up to 1" with less than 25% coarse- to medium-grained, subangular to angular sand.
1090	
1100	<u>Gravel</u> : as above (1080'), but medium sorted.

DRILL CUTTINGS LOG

FIELD LOG OF WELL NUMBER OW2

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

VALLEY NAME Dry Lake Valley
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY JM & LB DATE 1-21-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
1100	
1110	<u>Gravel:</u> Dark colored, well sorted, angular gravel up to 3/8".
1120	<u>Gravel:</u> Medium color, poorly sorted, subrounded to angular gravel up to 1/2" with less than 20% sand.
1130	<u>Gravel with Sand:</u> Light to dark color, poorly sorted, subrounded to rounded gravel up to 1" with 20% coarse to fine sand.
1140	<u>Gravel with Sand:</u> As above (1130') with occasional broken cobbles up to 4".
1150	<u>Gravel with Sand:</u> Medium to dark color, medium sorted subangular to angular gravel up to 1" with less than 20% medium to coarse sand.
1160	<u>Gravel with Sand:</u> Light to dark color, well sorted angular to subangular, fine gravel with 20% coarse sand.
1170	<u>Gravel:</u> Medium color, poorly sorted, subangular to angular, fine to 1 1/2" gravel.
1180	
1190	<u>Gravel:</u> Dark colored, poorly sorted, angular to subangular fine up to 2" gravel.

PROJECT NUMBER 79-290- 45
 PROJECT NAME MX SITING INVESTIGATION
 EQUIPMENT USED Reverse Rotary
 COMPANY Beylik
 OPERATOR J. Clyde

FIELD LOG OF WELL NUMBER OW2
 VALLEY NAME Dry Lake
 LOCATION NUMBER T3S, R64E, Sect. 12ca
 LOGGED BY JM & LB DATE 1-22-80
 CHECKED BY JAG DATE 4-10-80
 TOTAL WELL DEPTH 1300 feet

DEPTH (FEET)	DESCRIPTION OF CUTTINGS OR SAMPLE
1200	
1210	<u>Gravel</u> : Medium to dark color, poorly sorted angular to subangular, fine up to 1½" gravel.
1220	<u>Gravel</u> : Medium to dark color, medium sorted, subrounded to subangular, fine to ½" gravel.
1230	
1240	<u>Sand with Gravel</u> : Light to medium color, medium sorted, subrounded to subangular, medium to coarse sand with less than 10% gravel up to ½".
1250	<u>Sand and Gravel</u> : Light to dark color, well sorted, angular to subangular, fine gravel with 50% coarse sand.
1260	<u>Gravel with Sand</u> : Light to medium colored medium sorted, subangular to angular gravel with less than 25% coarse sand.
1270	<u>Gravel</u> : Light to dark colored, well sorted, angular to subangular gravel up to 3/8".
1280	<u>Sand & Gravel</u> : Light to dark colored, well sorted, angular to subangular, fine gravel with 50% coarse sand.
1290	<u>Gravel with Sand</u> : Medium to dark colored, poorly sorted, angular to subangular gravel up to 3/4" with 25% coarse sand.