

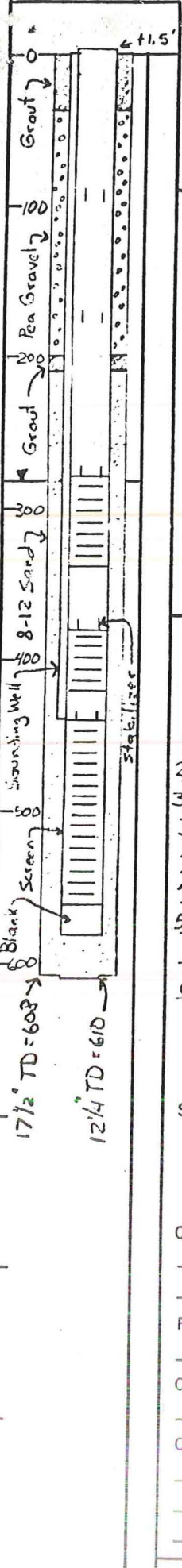
WELL CONSTRUCTION SUMMARY

LOCATION or COORDS: TION, R58E
section 17 BD

ELEVATION: GROUND LEVEL _____
 TOP OF CASING 1.5' above ground

LOCATION Railroad Valley - Currant, MN
 PERSONNEL RAF SLR

PROJECT 1243-80 Fujio - AIX



DRILLING SUMMARY:

TOTAL DEPTH 610'

BOREHOLE DIAMETER 12 1/4" pilot; 17 1/2" ream; 26" surface ream

DRILLER Dean Mitchell
Bert Riedinger
Jerry Mitchell

RIG Chicago Pneumatic RT-1800

BIT(S) 12 1/4" pilot milltooth; bottom;
17 1/2" ream milltooth; 26" surface

DRILLING FLUID Bentone (pilot); V7E
(ream)

SURFACE CASING 38.75' 22" ID

WELL DESIGN:

BASIS: GEOLOGIC LOG GEOPHYSICAL LOG

CASING STRING(S): C=CASING S=SCREEN

+1.5 - 278.66	C1	-
278.66 - 332.57	S1	-
332.57 - 380.27	C2	-
380.27 - 420.17	S2	-
420.17 - 440.53	C3	-
440.53 - 560.37	S3	-
560.37 - 580.43	C4	-

CASING: C1 286.56' - 10" ID / .375" wall
 C2 41.70' - 10" ID / .375" wall
 C3 20.36' - 10" ID / .375" wall
 C4 20.06' - 10" ID / .375" wall

SCREEN: S1 59.91' - 10" ID 60 mesh
 S2 39.90' - 10" ID 60 mesh
 S3 49.84' - 10" ID 60 mesh
 S4 _____

CENTRALIZERS 94'; 175'; 279; 380;
440

FILTER MATERIAL sea gravel; 8-12
fountain sand

CEMENT 10:1 cement; bentone
grout

OTHER _____

CONSTRUCTION TIME LOG:

TASK	START		FINISH	
	DATE	TIME	DATE	TIME
DRILLING:				
<u>pilot hole</u>	<u>9/17/80</u>	<u>1040</u>	<u>9/21/80</u>	<u>1030</u>
<u>conductor ream</u>	<u>9/22/80</u>	<u>2130</u>	<u>9/22/80</u>	<u>2320</u>
<u>ream</u>	<u>9/23/80</u>	<u>2030</u>	<u>9/25/80</u>	<u>2130</u>
GEOPHYS. LOGGING:	<u>9/22/80</u>	<u>1230</u>	<u>9/22/80</u>	<u>1945</u>
CASING:				
<u>surface</u>	<u>9/22/80</u>	<u>2345</u>	<u>9/24/80</u>	<u>0015</u>
<u>10" ID</u>	<u>9/26/80</u>	<u>0730</u>	<u>9/27/80</u>	<u>1400</u>
FILTER PLACEMENT:	<u>9/27/80</u>	<u>2115</u>	<u>9/28/80</u>	<u>0900</u>
CEMENTING: <u>Internal</u>	<u>9/28/80</u>	<u>1000</u>	<u>9/28/80</u>	<u>1045</u>
DEVELOPMENT:	<u>9/28/80</u>	<u>1100</u>	<u>9/28/80</u>	<u>2200</u>
OTHER:				
<u>surface cement</u>	<u>9/28/80</u>	<u>1420</u>	<u>9/28/80</u>	<u>1445</u>

WELL DEVELOPMENT

Air-lift development each section
of screen - raising - lower level
of Kelly (30') for 30 minutes or
until water clear.

COMMENTS:

Well originally designed to TD @ 600'
Solid support was encountered @ 580'
Drillers suspect fine sand filled in last
30' of hole (fine sand suspended in water
prior to gravel packing)
SWL = 281.95' @ 745 9/29/80

LOG OF BOREHOLE

BOREHOLE RR-3-T-2
PAGE 1 OF 4

LOC. or COORDS. T10N, R58E, Sec 17
BD
GROUND ELEV. _____
TOTAL DEPTH 610'
BOREHOLE DIAM. 12 1/4"

DRILLER Dean Mitchell
Bert Riedlinger
Jerry Mitchell
RIG Chicago Pneumatic 1800
BIT(S) 12 1/4" tricone
FLUID Bentonite

START 9/15/80 FINISH 9/21/80
DATE _____ TIME 1040 1030
GEOPHYS. LOG YES NO
HOW LEFT Completed

LOCATION Current - Railroad Valley
LOGGED BY KAF / SLR

PROJECT 1243-80 Fugate Mx

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM BOL	DESCRIPTION and COMMENTS
1040	30'			brown clay matrix sands		Unconsolidated alluvium composed of interbedded gravels, sands, and clay of rhyolitic and carbonate origin. Grains are irregularly shaped and rounded. Brown sandy clay matrix comprised 10-15% of sample. Sands range from fine to coarse.
1045	60'					
1050	60'					
1055	50'			white clay matrix sands, gravels		
1101	50'					
1107	50'					
1217	23					
1230	33'			large cobbles		
1239	43'					
1246	25					
1277	17					
1299	N/A					
1500	43			# brown sandy clay matrix - gravel cobbles		
1507	75					
1511	50					
1524	50					
1530	75					
1539	60					
1539	50					
1545	50					
1555	60					
1601	60					
1606	33					
1615	50					
1621	30					
1634	27					
1644	30					
1650	30					
1705	30					
1715	75					
1723	60					
1729	27					
1734	27					
1748	27					
1756	33					
1802	23					
1817						
1820						

changing tools @ 55-60'

LOG OF BOREHOLE

LOC. or COORDS. <u>TION, R58E, sec 17</u> <u>BD</u> GROUND ELEV. _____ TOTAL DEPTH <u>610'</u> BOREHOLE DIAM. <u>12 1/4"</u>	DRILLER <u>Donna Mitchell</u> <u>Bert Riedlinger</u> <u>Jerry Mitchell</u> RIG <u>CP 800</u> BIT(S) <u>12 1/4" tri cone</u> FLUID <u>Bentonite</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">START</td> <td style="text-align: center;">FINISH</td> </tr> <tr> <td>DATE <u>9/18/80</u></td> <td><u>9/21/80</u></td> </tr> <tr> <td>TIME <u>1040</u></td> <td><u>1030</u></td> </tr> <tr> <td colspan="2">GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</td> </tr> <tr> <td colspan="2">HOW LEFT _____</td> </tr> </table>	START	FINISH	DATE <u>9/18/80</u>	<u>9/21/80</u>	TIME <u>1040</u>	<u>1030</u>	GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		HOW LEFT _____	
START	FINISH											
DATE <u>9/18/80</u>	<u>9/21/80</u>											
TIME <u>1040</u>	<u>1030</u>											
GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO												
HOW LEFT _____												

LOCATION Corsant Railroad Valley
 LOGGED BY SAF / SLR

PROJECT 1243-80 Union Mix

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYM-BOL	DESCRIPTION and COMMENTS
1230	27			H. brown clay matrix, coarse sands, gravelly, pebbles	[Symbol]	
1241	33					
185-1906	30					
1916	19					
1932	25					hard drilling
1944	27					
1955-2011	23					
2024	30					
2037	21					coarse sand & gravel
2103	20					
2114	17					
2132	19					
2142	16					
2157	15					
2207	19					
2305	17					
2324	12					
2374	19					
2405	20					
2427	16					
2496	9					
0101	9					
0120	19					
0152	11					
222	12					
249	18					
309	12					
337	14					
403	18					
423	16					
517	17					
537	18					
555	16					
614	17					
736	19					
757	19					

Poorly consolidated alluvium composed of interbedded clays, sands, and gravels of rhyolitic & carbonate origin. Greater percentage of sandy clay matrix between 250' and 400'. Light brown sandy clay matrix comprises 15-30% of sample. Sands and gravels exhibit consistent character consisting of poorly sorted, subangular - subrounded grains. Sands range from fine to coarse.

LOG OF BOREHOLE

BOREHOLE RR-S-T-2

PAGE 3 OF 4

LOC. or COORDS. T10N, R58E, sec 17
BD
 GROUND ELEV. _____
 TOTAL DEPTH 610'
 BOREHOLE DIAM. 12 1/4"

DRILLER Dwan Mitchell
Bert Redinger
Jerry Mitchell
 RIG CP 1200
 BIT(S) 12 1/4 tricone
 FLUID Bentinite

START _____ FINISH _____
 DATE 7/15/80 9/21/80
 TIME 1040 1030
 GEOPHYS. LOG YES NO
 HOW LEFT _____

LOCATION Current Railroad Valley
 LOGGED BY RAF / SLR

PROJECT 1243-80 Fossil - Mx

DEPTH	PENE. RATE	CIRC. RET. LOSS	AIRLIFT LOSS (gpm)	MATERIAL	SYMBOL	DESCRIPTION and COMMENTS
300 214	19					
830	19					
840 850 855 0909	33					
0928	13					
956	11					
1022 1147	12					
1214	12					
1241	11					
200 42 1236	12					
1329	13					
42 1200	13					
1422	11					
51 1459	10					rotation speed increased
1513 1522	21					
1530	21					
1625	14					
1657	11					
64 1625	12					change to bottom bit
1701	X					
30 1722	10					
1729	X					
173	8'					
1742 1758	6.5					
181 0143	5.3					
400 2039	7					RPM increased
810 23	8'					
410 413	7.5					
175 455	5					
400 509	7.5					
703	8'					
720 730	?					twisted off
480	?					

11 brown clay matrix sands & gravel

Poorly consolidated alluvium composed of interbedded clays, sands, and gravels of rhyolitic and carbonate origin. light brown sandy matrix comprise 15-30% of sample. Sands and gravels exhibit consistent character consisting of poorly sorted, subangular to subrounded fine to coarse grains

rotation speed increased

change to bottom bit

RPM increased

twisted off

LOG OF BOREHOLE

BOREHOLE RR-S-T-2
PAGE 4 OF 4

LOG of COORDS. <u>T101, R58E, sec 17</u> GRUND ELEV. _____ TOTAL DEPTH <u>610'</u> BOREHOLE DIAM. <u>12 1/4"</u>	DRILLER <u>Dean Mitchell</u> <u>Bert Riedlinger</u> <u>Jerry Mitchell</u> RIG <u>CP 1800</u> BIT(S) <u>12 1/4 tri-cone, buttons</u> FLUID <u>Bentonite</u>	START DATE <u>9/13/80</u> FINISH DATE <u>9/21/80</u> TIME <u>1040</u> <u>1230</u> GEOPHYS. LOG <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO HOW LEFT _____
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LOCATION Cuscut - Railroad Valley
 LOGGED BY KAT / SLR

PROJECT 1243-80 Fugro - MX

DEPTH	PENE RATE	CIRC RET LOSS	AIRLIFT Q (gpm)	MATERIAL	SYMBOL	DESCRIPTION and COMMENTS
490	11					Poorly consolidated alluvium composed of interbedded clays, sands, gravels of rhyolitic and carbonate origin. Light brown sandy clay matrix comprise 30%. Sand and gravel grains exhibit consistent character consisting of poorly sorted, subangular to subrounded fine to coarse grains rough drilling
2020 2037	10			Sand and clay 70% fine to coarse sand, gravels		
2106 2119	13					
2142 2154	10					
2217 2236	11					
2277 2292	10					
2317 2332	9					
2372 2387	8					
2427 2442	13					
2487 2502	17					
2547 2562	16					Rotation increased
2607 2622	10					
2667 2682	19					
2727 2742	11					
2787 2802	?				too many mud pump interruptions for penetration rate	
2847 2862	?				viscosity increasing out of hole	
2907 2922	?				pressure mud pump problems	
2967 2982	20					
3027 3042	18					
3087 3102	20					
3147 3162	19					
3207 3222	17					
3267 3282	16					
3327 3342	25					
3387 3402	23					