APPENDIX A

INJECTION WELL SCHEMATICS

FIGURE 1

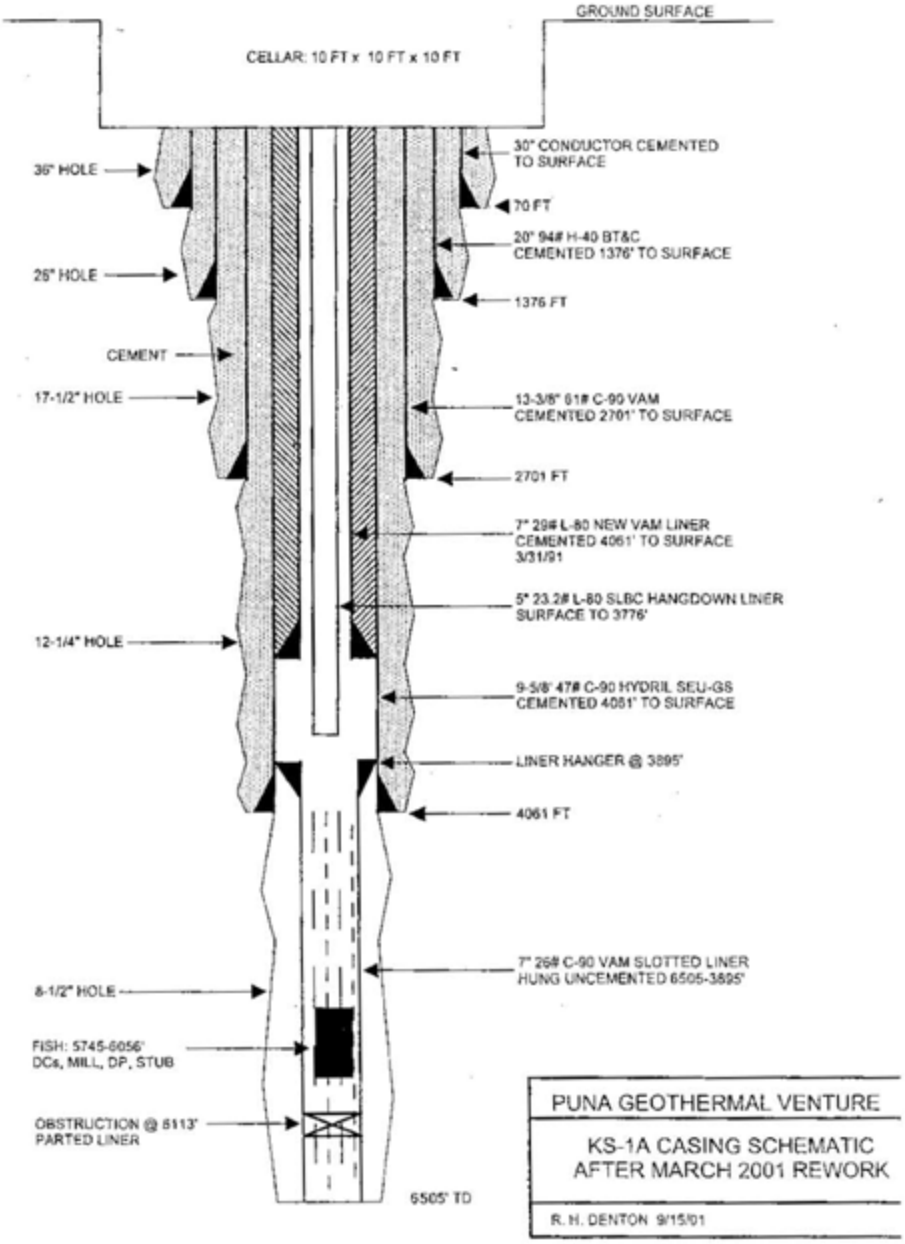

GROUND SURFACE
CELLAR: 10 FT x 10 FT x 10 FT
36" HOLE
30" CONDUCTOR CEMENTED TO SURFACE
70 FT
20" 94# H-40 BT&C CEMENTED 1376' TO SURFACE
26" HOLE
1376 FT
CEMENT
17-1/2" HOLE
13-3/8" 61# C-90 VAM CEMENTED 2701' TO SURFACE
2701 FT
7" 29# L-80 NEW VAM LINER CEMENTED 4061' TO SURFACE 3/31/91
5" 23.2# L-80 SLBC HANGDOWN LINER SURFACE TO 3776'
12-1/4" HOLE
9-5/8" 47# C-90 HYDRIL SEU-GS CEMENTED 4061' TO SURFACE
LINER HANGER @ 3895'
4061 FT
7" 26# C-90 VAM SLOTTED LINER HUNG UNCEMENTED 6505-3895'
8-1/2" HOLE
FISH: 5745-6056' DCs, MILL, DP, STUB
OBSTRUCTION @ 6113' PARTED LINER
6505' TD
PUNA GEOTHERMAL VENTURE
KS-1A CASING SCHEMATIC AFTER MARCH 2001 REWORK
R. H. DENTON 9/15/01

FIGURE 2

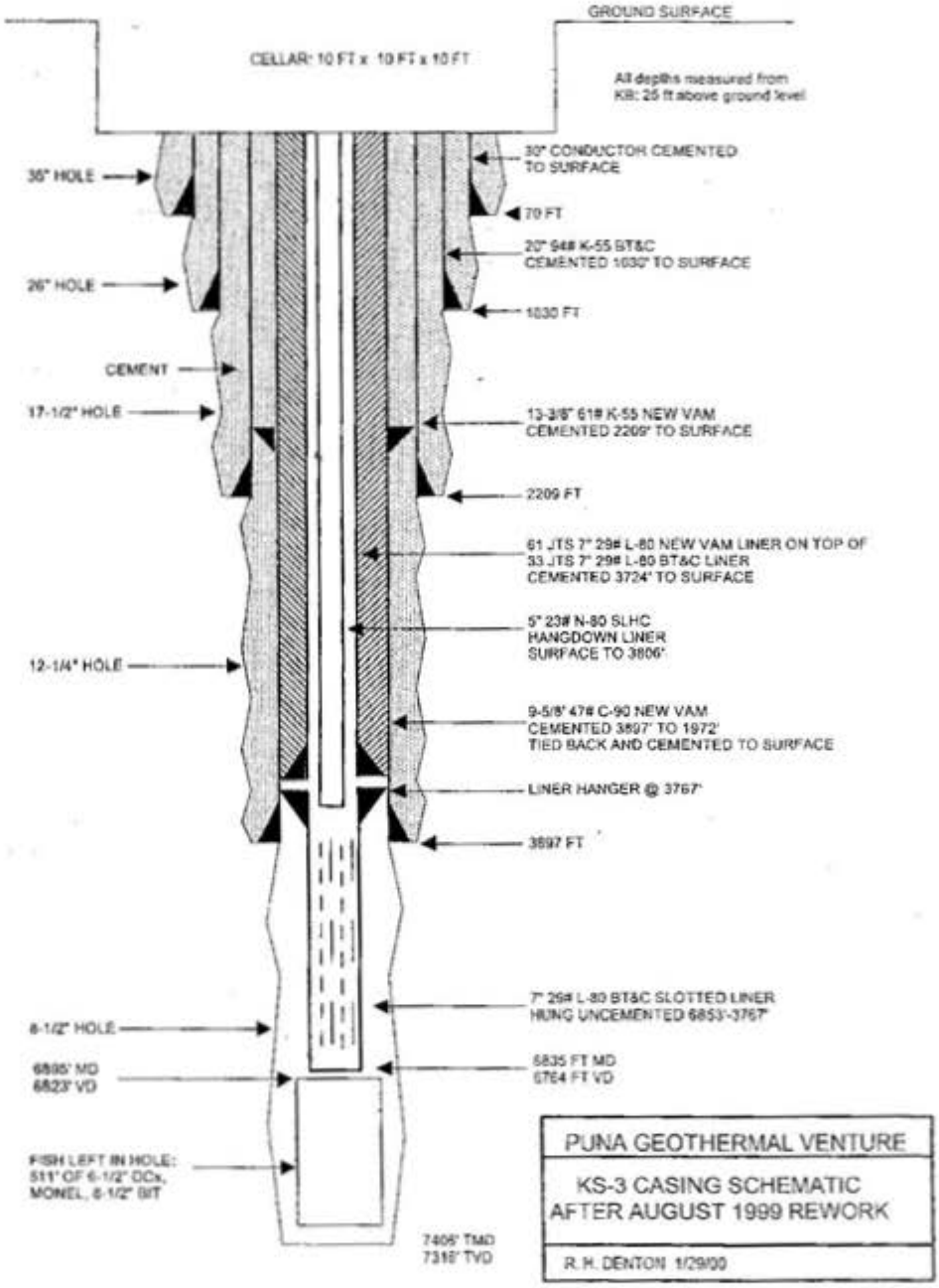
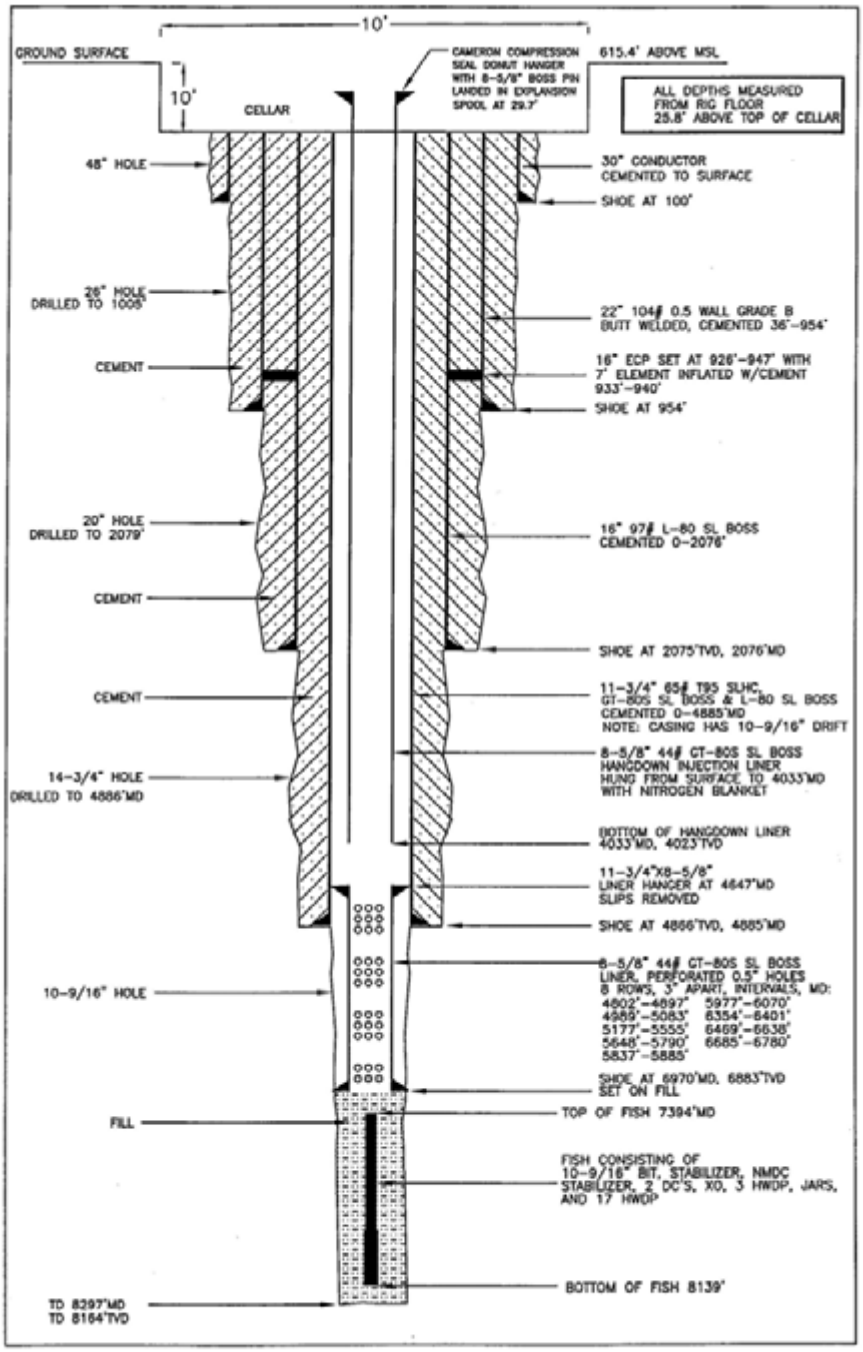

GROUND SURFACE
CELLAR: 10 FT x 10 FT x 10 FT
All depths measured from KB: 25 ft above ground level
30" HOLE
30" CONDUCTOR CEMENTED TO SURFACE
70 FT
20" 94# K-55 BT&C CEMENTED 1030' TO SURFACE
26" HOLE
1030 FT
CEMENT
17-1/2" HOLE
13-3/8" 61# K-55 NEW VAM CEMENTED 2209' TO SURFACE
2209 FT
61 JTS 7" 29# L-80 NEW VAM LINER ON TOP OF 33 JTS 7" 29# L-80 BT&C LINER CEMENTED 3724' TO SURFACE
5" 23# N-80 SLHC HANGDOWN LINER SURFACE TO 3806'
12-1/4" HOLE
9-5/8" 47# C-90 NEW VAM CEMENTED 3897' TO 1972' TIED BACK AND CEMENTED TO SURFACE
LINER HANGER @ 3767'
3897 FT
7" 29# L-80 BT&C SLOTTED LINER HUNG UNCEMENTED 6853'-3767'
6-1/2" HOLE
6895' MD
6823' VD
6835 FT MD
6764 FT VD
FISH LEFT IN HOLE: 511' OF 6-1/2" DCs, MONEL, 6-1/2" BIT
7406' TMD
7316' TVD
PUNA GEOTHERMAL VENTURE
KS-3 CASING SCHEMATIC AFTER AUGUST 1999 REWORK
R. H. DENTON 1/29/00

FIGURE 3



PUNA GEOTHERMAL VENTURE	GEOTHERMAL WELL KS-13 COMPLETION SCHEMATIC		REV: 3	
		DATE: 11/30/2000	BY: WM. TEPLOW	FIGURE 1

FIGURE 4 -

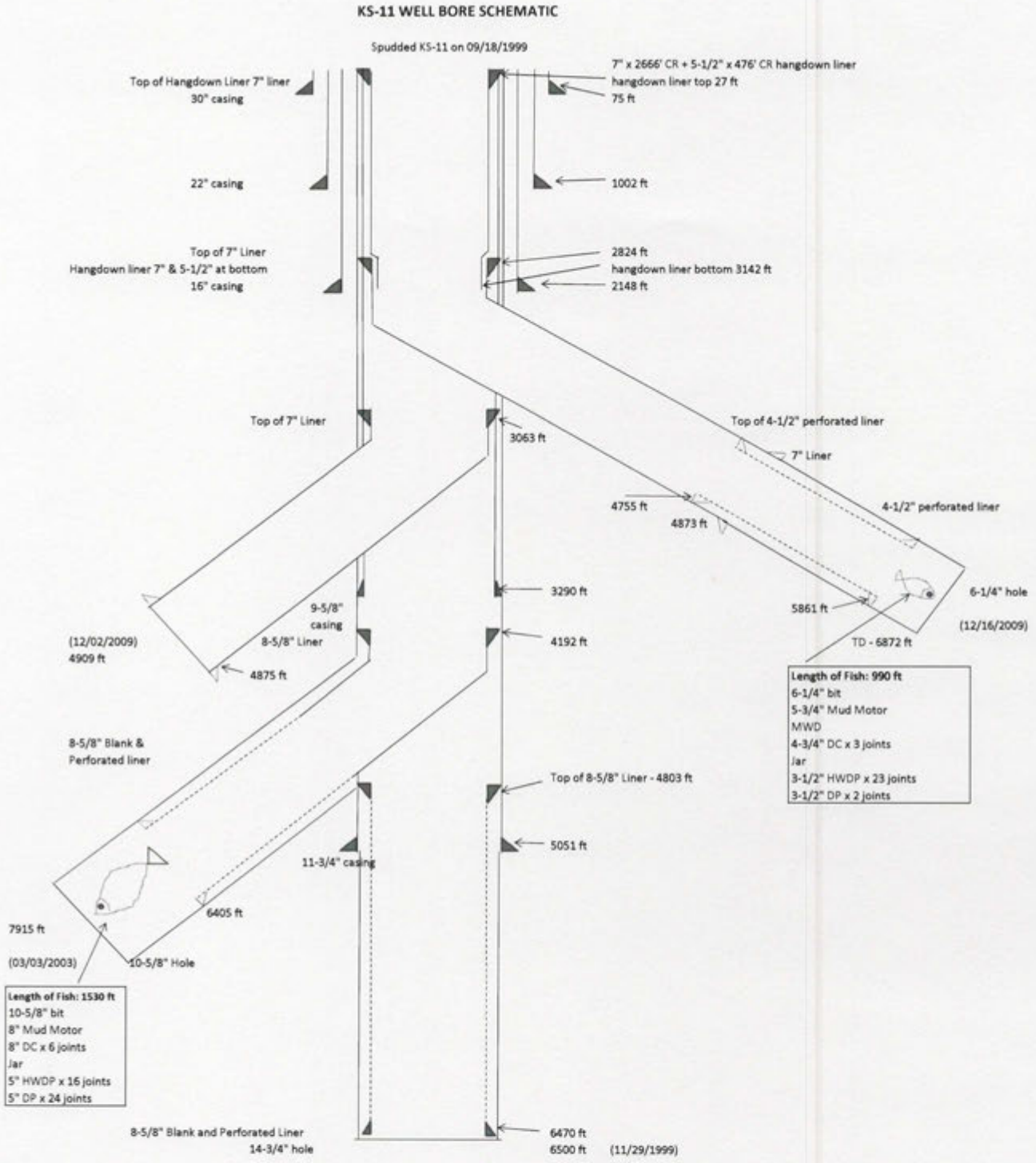
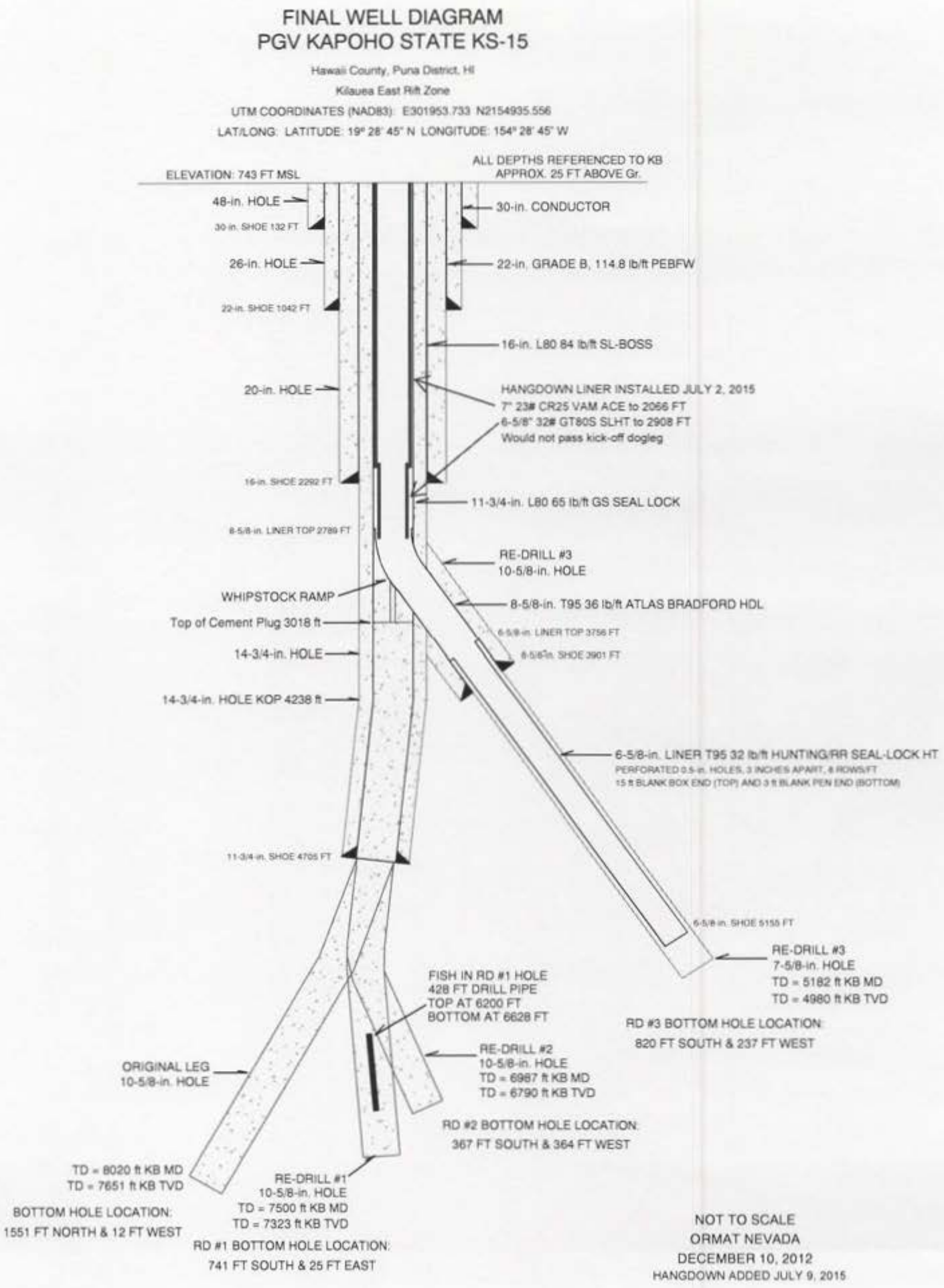

KS-11 WELL BORE SCHEMATIC
Spudded KS-11 on 09/18/1999
Top of Hangdown Liner 7" liner
30" casing
7" x 2666' CR + 5-1/2" x 476' CR hangdown liner
hangdown liner top 27 ft
75 ft
22" casing
1002 ft
Top of 7" Liner
Hangdown liner 7" & 5-1/2" at bottom
16" casing
2824 ft
hangdown liner bottom 3142 ft
2148 ft
Top of 7" Liner
3063 ft
Top of 4-1/2" perforated liner
7" Liner
4755 ft
4873 ft
4-1/2" perforated liner
3290 ft
6-1/4" hole
5861 ft
9-5/8"
casing
(12/16/2009)
(12/02/2009)
4909 ft
8-5/8" Liner
4192 ft
TD - 6872 ft
4875 ft
Length of Fish: 990 ft
6-1/4" bit
5-3/4" Mud Motor
MWD
4-3/4" DC x 3 joints
Jar
3-1/2" HWDP x 23 joints
3-1/2" DP x 2 joints
8-5/8" Blank &
Perforated liner
Top of 8-5/8" Liner - 4803 ft
5051 ft
11-3/4" casing
6405 ft
7915 ft
(03/03/2003)
10-5/8" Hole
Length of Fish: 1530 ft
10-5/8" bit
8" Mud Motor
8" DC x 6 joints
Jar
5" HWDP x 16 joints
5" DP x 24 joints
8-5/8" Blank and Perforated Liner
14-3/4" hole
6470 ft
6500 ft
(11/29/1999)

FIGURE 5 -


FINAL WELL DIAGRAM
PGV KAPOHO STATE KS-15
Hawaii County, Puna District, HI
Kilauea East Rift Zone
UTM COORDINATES (NAD83): E301953.733 N2154935.556
LAT/LONG: LATITUDE: 19° 28' 45" N LONGITUDE: 154° 28' 45" W
ALL DEPTHS REFERENCED TO KB
APPROX. 25 FT ABOVE Gr.
ELEVATION: 743 FT MSL
48-in. HOLE
30-in. CONDUCTOR
30 in. SHOE 132 FT
26-in. HOLE
22-in. GRADE B, 114.8 lb/ft PEBFW
22-in. SHOE 1042 FT
16-in. L80 84 lb/ft SL-BOSS
20-in. HOLE
HANGDOWN LINER INSTALLED JULY 2, 2015
7" 23# CR25 VAM ACE to 2066 FT
6-5/8" 32# GT80S SLHT to 2908 FT
Would not pass kick-off dogleg
16-in. SHOE 2292 FT
11-3/4-in. L80 65 lb/ft GS SEAL LOCK
8-5/8-in. LINER TOP 2789 FT
RE-DRILL #3
10-5/8-in. HOLE
WHIPSTOCK RAMP
8-5/8-in. T95 36 lb/ft ATLAS BRADFORD HDL
Top of Cement Plug 3018 ft
6-5/8-in. LINER TOP 3756 FT
14-3/4-in. HOLE
6-5/8-in. SHOE 3901 FT
14-3/4-in. HOLE KOP 4238 ft
6-5/8-in. LINER T95 32 lb/ft HUNTING/RR SEAL-LOCK HT
PERFORATED 0.5-in. HOLES, 3 INCHES APART, 6 ROWS/FT
15 ft BLANK BOX END (TOP) AND 3 ft BLANK PIN END (BOTTOM)
11-3/4-in. SHOE 4705 FT
6-5/8-in. SHOE 5155 FT
RE-DRILL #3
7-5/8-in. HOLE
TD = 5182 ft KB MD
TD = 4980 ft KB TVD
FISH IN RD #1 HOLE
428 FT DRILL PIPE
TOP AT 6200 FT
BOTTOM AT 6628 FT
RD #3 BOTTOM HOLE LOCATION:
820 FT SOUTH & 237 FT WEST
RE-DRILL #2
10-5/8-in. HOLE
TD = 6987 ft KB MD
TD = 6790 ft KB TVD
ORIGINAL LEG
10-5/8-in. HOLE
RD #2 BOTTOM HOLE LOCATION:
367 FT SOUTH & 364 FT WEST
TD = 8020 ft KB MD
TD = 7651 ft KB TVD
RE-DRILL #1
10-5/8-in. HOLE
TD = 7500 ft KB MD
TD = 7323 ft KB TVD
BOTTOM HOLE LOCATION:
1551 FT NORTH & 12 FT WEST
RD #1 BOTTOM HOLE LOCATION:
741 FT SOUTH & 25 FT EAST
NOT TO SCALE
ORMAT NEVADA
DECEMBER 10, 2012
HANGDOWN ADDED JULY 9, 2015