

WELL HISTORY GEOTHERMAL

Operator: California Energy Company			Well Name & No.: TCH 48-11		
Field: Coso KGRA	County: Inyo	Sec. 11	T. 22S	R. 38E	B&M: MDB&M
DATE	HISTORY				

09/27/93: Move in and rig up Longyear core rig #602.

09/28/93: Complete rig up operation, drill 8½" hole to 116'.

09/29/93: Drill 8½" hole to 206', trip for bit, ream hole to bottom.

09/30/93: Drill 8½" hole to 222', lost circulation at 210' and 222', pumped LCM slugs, POOH from plugged rods, RIH, set cement plugs over loss zones, WOC.

10/01/93: WOC. Drilled out cement, drilled 8½" hole from 222' to 246'.

10/02/93: Drill to 282', twisted off, POOH for fishing tools, RIH with fishing tools, fishing.

10/03/93: Completed fishing operation, drilled 8½" hole to 288'. Twisted off again, fished out twist-off, changed out drill pipe, drilled 8½" hole to 295'.

10/04/93: Drill 8½" hole to 385'.

10/05/93: Drill 8½" hole to 490' (casing point), circulate hole clean, wipe hole, circulate clean.

10/06/93: POOH, lay down drill pipe, run 4½" casing, shoe at 475', nipple up BOP.

10/07/93: Nipple up BOP and test same, RIH to 395' (top of cement), clean out cement to 490', drill from 490' to 574' (cored 82').

10/08/93: Drill with HQ from 574' to 605', trip for washpipe, RIH, pump cement plug, RIH, clean out cement from 575' to 605', drilling from 605' to 636' (62').

10/09/93: Drilling with HQ from 636' to 677', trip for stuck tube, drill to 716', trip for cement loss circulation plug, mix and pump cement, WOC.

10/10/93: WOC to set, RIH tag cement at 526', clean out cement to 716', drilling to 769'.

10/11/93: Drill from 769' to 876' (107').

10/12/93: Drill from 876' to 994' (118').

10/13/93: Drill from 994' to 1010', trip for new HQ bit #5. Repair rig 2 hours. RIH, drill from 1010' to 1096' (102').

10/14/93: Drill from 1096' to 1231' (135').

10/15/93: Drill from 1231' to 1361' (130').

10/16/93: Drill from 1361' to 1458' (97').

10/17/93: Drill to 1524', trip for new HQ bit #6, hit bridge at 1104' on trip in, cleaned out short bridge at 1104', RIH to bottom, drill to 1578'.

10/18/93: Drill from 1578' to 1768' (190').

10/19/93: Drill from 1768' to 1889' (121') POOH for new bit.

10/20/93: RIH with new HQ bit #7, drill from 1889' to 1908', wipe hole five stands, 4" fill on bottom, drill to 1923', POOH to 1100', circulate and condition hole, RIH to 1200', circulate and condition hole, RIH to 1923', drill to 1938', circulate and prepare hole for cement, POOH, RIH with open ended drill pipe.

10/21/93: RIH OEDP, set cement plug (trying to cure tight hole condition) POOH, WOC, repair rig 7 hours, RIH to 1540', washed and reamed sand and cement to 1680', cleaned out hard cement from 1680' to 1708'.

10/22/93: Cleaned out cement to 1728', tube sanded in, POOH clean core barrel, RIH, hit bridge going in at 1610', build mud volume, ream and wash to 1760', trip for open ended drill pipe, mix and pump 168 linear ft. cement plug at 1758', POOH, WOC, RIH tag cement at 860'.

10/23/93: Cleaned out cement from 860' to 1018', RIH to 1728', reamed and washed to 1938', drilled new hole from 1938' to 1940', circ. hole clean, trip for open ended drill pipe, set 310 linear ft. cement plug, POOH, WOC.

10/24/93: RIH, tagged and cleaned out bridge at 900', washed and reamed to 1620', washed to bottom, circ clean, trip tube, drill from 1940' to 1951', pulled tube, pipe stuck, work stuck pipe.

10/25/93: Tried to work stuck pipe free, RIH with NQ pipe to 600'.

10/26/93: Worked stuck pipe, changed drilling line, worked stuck pipe.

10/27/93: Backed off stuck HQ pipe, conditioned hole, POOH, laid down 97 joints HQ pipe, RIH with NQ pipe, drilled out landing ring and bit. Washed and reamed to bottom, drilled from 1951' to 1952'.

10/28/93: Tripped for new NQ bit #10, drilled from 1953' to 2002' (50')

10/29/93: Drilled NQ hole from 2002' to 2078' (76').

10/30/93: Drilled NQ hole from 2078' to 2174' (96').

10/31/93: Drilled NQ hole from 2174' to 2198', trip for new NQ bit #11, drilled NQ hole from 2198' to 2214'.

11/01/93: Drill NQ hole from 2214' to 2225', trip for new NQ bit #12, drill from 2225' to 2274', trip for new NQ bit #13, drill from 2274' to 2275'.

11/02/93: Drill NQ hole from 2275' to 2287', trip for new NQ bit #13, drill from 2287' to 2295', trip for bit #14, drill from 2295' to 2298'.

11/03/93: Drill NQ hole from 2298' to 2306', hole sloughing, raise VIS to 45, POOH from OEDP, RIH pump cement, POOH, WOC 7 hours, RIH to casing shoe, WOC.

11/04/93: RIH tag cement at 2161', clean out cement to 2306', drill to 2322', POOH, repair rig 4½ hours, RIH, drill from 2322' to 2337'.

11/05/93: Drill to 2348', trip for new bit, drill from 2348' to 2361', trip for new bit, drill from 2361' to 2365', trip for new bit.

11/06/93: Drill from 2365' to 2381', trip for new bit #21, drill from 2381' to 2406'.

11/07/93: Drill NQ hole from 2406' to 2440', POOH, RIH with washpipe, circ., mix and pump 13.2# cement at 2389', POOH, WOC.

11/08/93: RIH, circulate and condition mud at 2238', RIH tag cement at 2245', clean out cement, wash to bottom, drill NQ hole from 2440' to 2479' (39').

11/09/93: Drill NQ hole from 2479' to 2506', trip for new bit #23, repair rig, RIH to 2506', drill from 2506' to 2516'.

11/10/93: Drill NQ hole from 2516' to 2527', wiped hole 8 stands, circulate and condition hole, Drill to 2552' (36').

11/11/93: Drill NQ hole from 2552' to 2614' (62').

11/12/93: Drill from 2614' to 2648', pipe stuck at 2648', work stuck pipe free, back reamed from 2648' to 2140'.

11/13/93: Washed back to bottom, drill from 2648' to 2707' (57').

11/14/93: Drill NQ hole from 2707' to 2747', wipe hole to casing shoe, hit bridge on trip in at 2500' and 2580', drilled from 2747' to 2751' (44').

11/15/93: Drill NQ hole from 2751' to 2776', trip for new NQ bit #26, drilled from 2776' to 2782', POOH checked tools, RIH, drill from 2782' to 2788'.

11/16/93: Drill NQ hole from 2788' to 2808', trip for new bit, drill to 2845' (57').

11/17/93: Drill NQ hole from 2845' to 2886', trip for new bit, drill to 2900'.

11/18/93: Drill NQ hole from 2900' to 2938', trip for new bit, drill to 2960'.

11/19/93: Drill NQ hole from 2960' to 3033' (73').

11/20/93: Drill NQ hole from 3033' to 3038', trip for new bit, drill to 3055'.

11/21/93: Drill NQ hole from 3055' to 3065', wiped hole twice, circulate and condition hole, POOH laying down NQ rods, ran 3040' of 1½" TBG, tagged bottom at 3065', pulled back and hung TBG at 3040' (25' off bottom), circ. water through TBG, tear out rig.

11/22-11/23/93: Stack out rig, rig released.

CALIFORNIA ENERGY COMPANY, INC.
900 N. Heritage Dr., Bldg. D
Ridgecrest, CA 93555

By: John Gastineau
Title: Drilling Manager

(619) 764-2551

Signature:



Date:

1/27/94

BML LEASE CA11403 - COREHOLE 48-11 GEOLOGIC SUMMARY

In 1993, CECI drilled corehole 48-11 in the mid section along the eastern boundary of lease CA11403. This corehole was sited to test the axis of an east-northeast trending belt of surface thermal features, high shallow temperature gradients and low bedrock resistivities. This feature appears to extend westward from the Navy I and northern Navy II geothermal producing areas, under Sugarloaf Mountain and continue on to lease CA11403. Reinterpretation by CSAMT Survey Inc., in 1992, of CSAMT resistivity data collected in the mid 1980's defined the lobe of low resistivity which overlaps the area of highest temperature gradients. Comparison of wellbore resistivity logs with hydrothermal alteration observed in drill core and cuttings indicates the low resistivities are caused by a clay-rich cap over shallow portions of the geothermal system. At the drillsite, the 20 ohm-meter bedrock resistivity contour roughly overlies the 9 degree F/100' isogradient contour derived from shallow temperature gradient hole surveys.

On November 22, 1993, Corehole 48-11 was completed at a total depth of 3065' with tubing hung at 3040'. Final cost of the hole was \$302,398. Post-drilling temperature and pressure results are still pending while the hole recovers and stabilizes from the thermal effects of drilling and stabilized measurements can be obtained.

During drilling, bottom hole temperatures were measured every 50' using a maximum recording thermometer (MRT). The maximum recorded temperature during drilling was 188 degrees at a depth of 3000'. Based on data from other coreholes at comparable depths, these MRT temperatures should be within 20 degrees F of stabilized temperatures in the lower portions of the hole. MRT results from the upper portions of the hole, indicate a 9 degree F/100' gradient, which is well above regional gradients for the Mesozoic basement rocks. At depths starting below 1200', MRT readings indicate a decrease in the temperature gradient to 2 to 3 degrees F/100' to TD. Projecting a 3 degree F/100' from 3000' to 10000' would result in a temperature of 400 degrees. The abrupt change in gradient along with a decrease in hydrothermal veining and clay alteration below 1900', probably indicates a shallow zone of lateral outflow of fluids from the hydrothermal system to the east. This clay rich zone identified in the core from 1100' to 1900' is the likely source of the low resistivity interpreted from the CSAMT surveys.