SUBSIDIARY OF AMAX INC.

GEOTHERMAL BRANCH

INTER-OFFICE MEMORANDUM

Subject: Summary of McCoy 28–18 Drilling

September 16, 1982

To: H. J. Olson, W. M. Dolan, H. D. Pilkington

From: J E. Deymonaz

Hole 28-18 was a planned 3,500 foot temperature observation hole which was begun in 1981 by Anderson Drilling. In 1981, 408 feet of 9 5/8" casing was cemented and a 6' x 6' x 5' cellar installed. On June 17, 1982, Southwest Drilling and Exploration, Inc. moved a Gardner-Denver 2000 drill rig on the hole and attempted to deepen the hole to 3,500 feet. Below 1,200 feet loss circulation and caving problems were encuntered and drilling had to be suspended at 1,948 feet after twenty days of operations. Paleozoic section were encountered below 1,341 feet. 1,904 feet of 2 7/8" tubing was set and sand packed in the hole.

Attached is a brief summary of the daily drilling operations.

JED/c

attachment

6/16/82	George Mull Construction constructed a 300,000 gallon water storage reservoir five miles south-southwest of hole 28–18. Mull also began leveling the 28–18 site.
6/17/82	Mull completed site preparation. Southwest Drilling moved equipment onto location and began rigging up. Magcobar delivered trailer with mud and other drilling supplies. H&H Oil Tool Co. delivered BOP equipment.

- 6/18/82 Crew completed rigging up.
- 6/19/82 Crew began working two shifts. Drilled out cement and casing shoe. Cement from 218-408 feet.
- 6/20/82 Drilling with 6 1/2" hammer and 100' of 4 7/8" collars. Drilled 408-1,083 feet with penetration rates of 40-10 ft/hr. Penetration decreasing with depth. First water encountered at 600 feet, flowing 40 gpm at 960 feet, and 60 gpm at 1,083 feet. Collected 33°C water sample at 960 feet.
- 6/21/82 Unable to unload water from hole with air/foam, POH at 1,153. Brake failed while pulling out of hole, elevator and block dropped 40 feet into rotary table, five hours repairing equipment. Change to 6 1/4 button bit, RIH.
- 6/22/82 Stuck pipe at 1,140 while RIH, crew spent six hours working pipe free, POH. Remainder of day hauling water and mixing mud.

6/23/82 Mixing mud, condition hole, drill 1,153-1,158 feet.

- 6/24/82 Drilling with mud, drilled 1,158-1,188 feet with 5 feet/hour penetration, POH, put on button finger bit, RIH, drill 1,188-1,333 feet with penetration of 15-20 feet/hour.
- 6/25/82 Drilling 15 feet/hour from 1,333-1,408 feet. At 1,408 encountered hard fractured shales and chert and loss circulation, stuck rods, worked free, POH, mix mud. RIH and unload hole in stages with air/foam, unable to control water and caving, change back to mud. Considerable LC and caving.
- 6/26/82 Haul water, mix mud, attempt to condition hole and regain circulation. Numerous bridges below 1,160 feet and difficult to keep hole open from 1,250-1,408 feet. Severe loss circulation at 1,408 feet.
- 6/27/82 Crew on standby most of day, rig up to ream hole to 8 3/4" in preparation to running 7" casing.

6/28/82	Reaming hole to 8 3/4" from 323–963 feet, plugged bit twice, some caving problems. Losing approximately 10,000 gallons of drilling fluid/day.
6/29/82	Reaming hole to 8 3/4" from 963–1,263 feet, large wash out from 1,128–1,143 feet. Losing approximately 10,000 gallons of drilling fluids/day. H&H Oil Tool Co. delivered 7" elevators.
6/30/82	Reaming hole to 8 3/4" from 1,263–1,303 feet, lost all fluids at 1,303 feet, stuck pipe for four hours, POH. Run 7" casing to 1,165 feet.
7/1/82	RIH and clean hole below 7" casing to 1,290 feet, POH, set casing to 1,303 feet. 2 7/8" tubing arrived on location.
7/2/82	Drilling 1,408–1,448 feet with 6 1/4" button bit and air/foam. Crew having problems with severe vibrations in booster compressor.
7/3/82	Drilling 1,448–1,768 feet with 6 1/4" button bit and air/foam. Lost all returns at 1,620 feet, drill ahead blind. POH at end of shift.
7/4/82	Change bits, RIH, reamed hole from 1,460–1,768 feet and drilled blind from 1,768–1,948. Hole began sluffing in at 1,948 feet, stuck drill pipe, mixed mud, broke pipe free, POH.
7/5/82	RIH, hit bridge at 1,315 feet. Down for repair to booster compressor 0100–0800. Attempt to wash down with mud, unable to clean 1,320–1,328 feet section after six hours of conditioning. POH.
7/6/82	Run 1,904 feet of 2 7/8" tubing, remove BOPE, unable to remove 7" casing. Sand pack hole with 4 yards of sand slurry, release rig at 1430.