


INTER-OFFICE MEMORANDUM

SUBJECT: Water Well Site for Alum TFD Drilling, Esmeralda County, Nevada (5019A).      DATE: August 15, 1984  
TO: J. J. King      cc: H. J. Olson  
FROM: J. E. Deymonaz      H. D. Pilkington

---

Strat test hole 56-29 drilled during December 1981 was drilled at approximately the same location we propose to drill the water well at Alum. Attached is the portion of my April 1982 summary of the hole pertaining to lithology, temperatures and water chemistry.

  
\_\_\_\_\_  
J. E. Deymonaz

JED/c

attachment

**INTER-OFFICE MEMORANDUM**

SUBJECT: Summary of Alum Temperature Observation Hole 56-29      DATE: April 14, 1982  
TO: H. J. Olson      cc: H. D. Pilkington  
W. M. Dolan  
FROM: J. E. Deymonaz

Temperature observation hole 56-29 near the old Alum Mine was spudded on December 8, 1981 and completed to 1,490 feet (454m) on December 21, 1981. Total cost of the hole was approximately \$50,000.

The hole was drilled at the same location as O'Brien hole 3-A. Hole 3-A was drilled to a depth of 325 feet (100m) and had a gradient of 438°C/km with a bottom hole temperature of 64.75°C.

Lithology

The upper 350 feet (107m) was drilled in sediments of the Esmeralda Formation consisting of gray, greenish-gray, white and brown tuffaceous siltstones and sandy siltstones. Minor disseminated pyrite and sporadic hard silicified zones were encountered throughout this interval.

From 350-365 feet clay and hard dark-gray siltstones were encountered, apparently the upper weathered portion of the Paleozoic section.

Below 365 feet is a fairly uniform sequence of dark gray, to dark greenish-gray silicic siltstones with considerable pyrite both disseminated and filling fractures. The amount of pyrite decreased with depth with some zones between 365 to 1,000 feet containing over 10%. The siltstones are similar to the Lower Cambrian Harkless Formation which is widely exposed nine miles east of the drill site in Paymaster Canyon. The Harkless is composed of approximately 3,500 feet of siltstones and quartzitic siltstones with minor limestones in the lower portion of the section.

INTER-OFFICE MEMORANDUM

Alum Temperature Observation Hole 56-29  
April 14, 1982  
Page 2

Hydrogeochemistry and Hydrology

The upper 785 feet (239m) of the hole was air drilled and the first fluids were encountered at 630 feet (192m). Water volume increased with depth to approximately 60 gpm at 785 feet. The maximum flow line temperature of the water at the surface was 80°C although measured temperatures at this depth are in excess of 105°C. The difference is due to cooling by the air lifting the fluids to the surface and conductive cooling along the borehole.

At 785 feet seals in the downhole hammer failed, apparently due to the high temperatures. The water was air lifted from the hole for two hours without injecting foam prior to pulling the hammer and a water sample was collected. The sample temperature was 80°C and had a salty (NaCl) taste.

Analysis of the samples reveal a water (Table 1) high in Na, Cl, Mn, Mg and Li. Silica geothermometers indicate minimum temperatures in excess of 165°C. The high lithium, and high salinity are chemically similar to waters in Clayton Valley to the south rather than to waters in Big Smokey Valley to the north.

TABLE 1

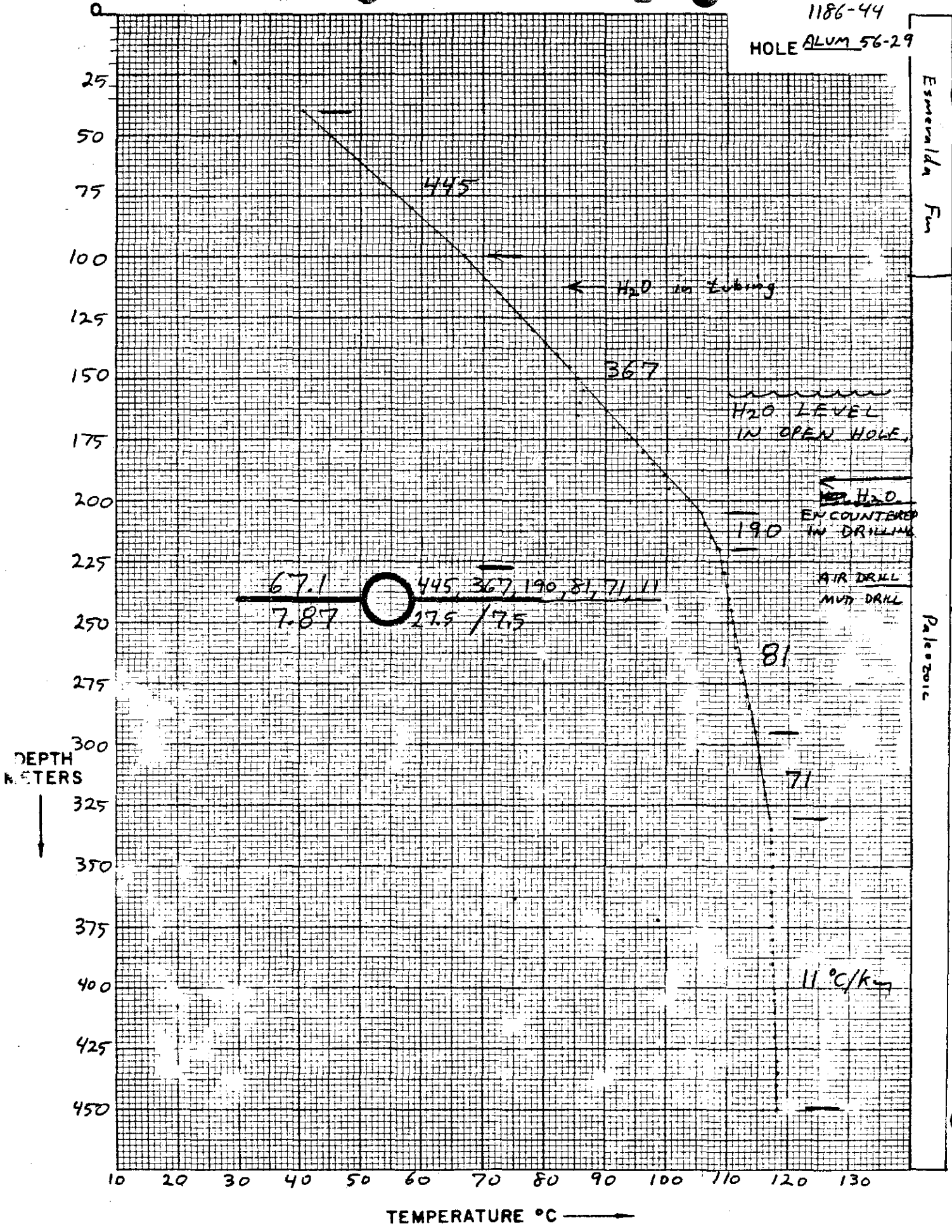
Analysis of water sample collected from Alum hole 56-29. Sample W-14298.

Temperature	80°C
Discharge	60gpm
Depth	665-775 feet
Taste	Strong NaCl
Odor	Moderate H <sub>2</sub> S
SiO <sub>2</sub>	190ppm
Na	2700
K	320
Ca	87
Mg	20
Li	10.0
Cl	4600
F	5.3
HCO <sub>3</sub>	12.3
B	33
Mn	150
Mo	15ppb
pH	8.5
Conductivity	13,000mmho/cm
Tqtz no steam loss	176.5°C
Tqtz max steam loss	165.3°C
T chalcedony	154.8°C
TNa-K-Ca	231.7°C
TNa-K-Ca-Mg	149.9°C
TDS	8338

1186-44  
HOLE ALUM 56-29

Esmeralda Fan

Paleozoic



DEPTH METERS

TEMPERATURE °C