

INTER-OFFICE MEMORANDUM

SUBJECT: Land acquisition and the results of recent gradient drilling on the Tuscarora (860) and McCoy (864) geothermal prospects, Nevada DATE December 21, 1977

TO: R. A. Barker, W. M. Dolan, H. J. Olson, H. D. Pilkington, A. L. Lange, P. D. Parker, W. P. Long

FROM: Frank Dellechiaie

This memo will discuss land acquisition and subsequent exploration on the Tuscarora and McCoy geothermal prospects which were recognized during the 1977 geothermal reconnaissance program.

A ten year lease at \$2.00 per acre annual rental was signed with Stanley Ellison on October 21, 1977. AMAX will pay ten percent royalties on geothermal steam and ten percent on extractable minerals. The Tuscarora lease covers 3679.63 acres located approximately 70 miles northwest of Elko, Nevada, at the north end of the Independence Valley. The lease lies totally in Elko County.

AMAX made application for 34 sections of federal acreage on September 1, 1977. The 21,625.07 acres of the McCoy prospect are in the Augusta Mountains approximately 60 miles west north west of Austin in both Churchill and Lander Counties.

Tuscarora Prospect

Geochemistry:

The Tuscarora prospect exhibits a narrow three mile zone of thermal activity which includes no less than six warm springs, 20 hot springs, one geyser and one low pressure fumerole. This zone of thermal water is also marked by abundant deposition of sulfur, calcium carbonate and silica sinter. The following is an analysis of the geyser:

W10649
Hot Sulphur HS #1
NESE 5 T41N R52E

Lat 41.4604
Long. 116.1526
State Nv
County Elko

Temp (C)	91
Flow (gpm)	100
pH	9.23
Cl	15
F	7.6
SO ₄	60
HCO ₃	201.8
CO ₃	92.8
SiO ₂	170
NA	150
K	21
Ca	1
Mg	.2
Li	.8
OH	0
Cu	0
B	1
Mo	2
NH ₃	.899
TDS	704.1
TSiO ₂	167
TNa/K	227
TNa-K-Ca	228
Cl/F	2.0
Cl/SO ₄	0.3
Cl/HCO ₃	0.1
Cl/Li	18.8

The springs produce sodium-bicarbonate water which may have last equilibrated at temperatures in excess of 220°C. Low chloride indicates a granitic crystalline reservoir.

Heat Flow:

Four gradient observation holes were drilled at the Tuscarora Prospect during November. The gradients and heat flows are as follows:

	Gradient	Heat Flow	Conductivity	Depth (m)
TU-3	73	4.9	6.7	61
4	130	5.9	4.5	62
7	455	27	6.0	57
8	604	30	5.0	50

The five remaining holes are inaccessible with present road conditions. The National Weather Service in Elko along with Stanley Ellison indicate that precipitation rates have increased. Roads were impassable for heavy equipment as of December 17. The five remaining holes should be drilled during the summer of 78 after extensive road repairs have been made.

Total drilling expenses including PVC pipe, cement, road work and the disbursements of Dellechaie and Masterson total \$8060.50.

McCoy Prospect

Geochemistry:

The McCoy prospect contains one hot well located in the center of a now quiescent mercury mine. The age of mineralization is assumed to be late-Cretaceous or early-Tertiary because the host rocks are Triassic and are overlain by unmineralized Tertiary acid volcanics. An analysis of the hot water is shown below:

W10981	
McCoy HW	
T23N R40E	
Lat. 39.8688	
Long. 117.4946	
State NV	
County Churchill	
Temp (C)	39
Flow (gpm)	
PH	7.05
Cl	22
F	4.4
SO ₄	54
HCO ₃	611.6
CO ₃	0
SiO ₂	44
Na	260
K	15
Ca	43
Mg	9
Li	.3
OH	0
Cu	0
B	1.3
Mo	0
NH ₃	.74
TDS	1065.3
TSiO ₂	96
TNA/K	127
TNA-K-Ca	153
Cl/F	5.0
Cl/SO ₄	0.4
Cl/HCO ₃	0.0
Cl/Li	73.3

The well produces a sodium-bicarbonate water which may be strongly diluted by cold groundwater. Minimum subsurface temperature is approximately 150°C. Mixing calculations and further geochemical work will be continued.

Heat Flow:

Fifteen gradient observation holes were drilled at the McCoy prospect during November and December. The gradients and heat flows are as follows:

	Gradient	Heat Flow	Conductivity	Depth (m)
MC-2	38	1.5	4.0	39
3	161	8.0	5.0	39
4	263	11.8	4.5	38
5	46	3.0	6.5	48
6	62	2.8	4.5	39
7	149	18.1	6.5	39
8	183	8.2	4.5	39
9	114	7.4	6.5	44
10	63	4.1	6.5	43
11	209	13.6	6.5	38
13	56	2.5	4.5	39
14	213	9.6	4.5	37
15	140	9.1	6.5	39
16	96	4.8	5.0	39
17	174	7.0	4.0	39
△83	136	8.8	6.5	149

Two preexisting BLM holes were cased with PVC and probed. Data for one of these is shown as △83 (Hole in the Wall Well #1) above.

Total drilling expenses including PVC pipe, cement, water and the disbursements of Dellechaie and Masterson total \$13,899.62.

The total cost for both the Tuscarora and McCoy prospects is \$21960.12. The cost per foot drilled was \$5.74. Money allocated for both drilling projects was \$30,000.

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