

September 17, 1981

GEOHERMAL BRANCH

CERTIFIED MAIL #1177589
RETURN RECEIPT REQUESTED

Mr. Stanley Green
State of Utah
Department of Natural Resources
Division of Water Rights
442 State Capitol
Salt Lake City, Utah 84114

Re: AMAX Exploration, Inc. Topaz Project (1198)

Shallow temperature gradient drilling program for operations to be conducted by AMAX Exploration, Inc. in Juab County, Utah

Dear Mr. Green:

AMAX Exploration, Inc. would like to conduct a shallow temperature gradient hole drilling program on state land within the jurisdiction of the Division of Water Rights in Juab County, Utah. Drilling operations are anticipated to commence on or about September 20, 1981 and all holes will be drilled to a depth of 500 feet or less. The following information is submitted for your information:

- 1) Exhibit A indicating hole number, serial number, AMAX lease number, location, section, township, range, elevation, and responsible agency
- 2) Project description giving explanation of project and procedures to be used
- 3) Vicinity map showing drill site locations with hole numbers, lease numbers, serial numbers, land status and topography

If I can be of further assistance, please contact me at your earliest convenience.

Sincerely,

Carolyn J Holtgrewe

Carolyn J. Holtgrewe
Permit Assistant

CJH/c
Enclosures
cc: John Deymonaz

EXHIBIT A
 TOPAZ PROJECT INFORMATION
 Juab County, Utah
 Salt Lake Meridian

<u>Hole No.</u>	<u>Serial No.</u>	<u>AMAX Lease No.</u>	<u>Location</u>				<u>Elevation</u>	<u>Responsible Agency</u>
			<u>Description</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>		
1198-101	U-40631	1198-1004	NW/4NE/4	12	12S	13W	4,520'	USGS
1198-102	U-40631	1198-1004	SE/4NW/4	13	12S	13W	4,505'	USGS
1198-103	U-40628	1198-1001	SW/4SW/4	24	12S	13W	4,450'	USGS
1198-104	U-40630	1198-1003	NE/4SW/4	4	12S	12W	4,990'	USGS
1198-105	U-40631	1198-1004	Cen-SE/4	7	12S	12W	4,700'	USGS
1198-106	ML-35847	1198-2001	NE/4SW/4	16	12S	12W	5,600'	DWR
1198-107	U-40629	1198-1002	NW/4NE/4	19	12S	12W	4,550'	USGS
1198-108	U-40629	1198-1002	SE/4SE/4	19	12S	12W	4,710'	USGS
1198-109	U-40628	1198-1001	SW/4SE/4	30	12S	12W	4,640'	USGS
1198-110	ML-35847	1198-2001	SW/4NE/4	32	12S	12W	4,865'	DWR
1198-111	U-40638	1198-1006	SW/4NE/4	9	13S	13W	4,407'	USGS
1198-112	U-40639	1198-1007	NE/4NE/4	14	13S	13W	4,510'	USGS
1198-113	U-40639	1198-1007	NE/4NE/4	15	13S	13W	4,460'	USGS
1198-114	Open	---	NW/4NW/4	21	13S	13W	4,445'	BLM
1198-115	U-45902	(O'Brien)	NE/4NW/4	9	13S	12W	4,980'	BLM
1198-116	U-45902	(O'Brien)	NE/4SW/4	10	13S	12W	5,080'	BLM
1198-117	U-40637	1198-1005	SE/4NE/4	17	13S	12W	4,820'	USGS

EXHIBIT A
 TOPAZ PROJECT INFORMATION
 Juab County, Utah
 Salt Lake Meridian

<u>Hole No.</u>	<u>Serial No.</u>	<u>AMAX Lease No.</u>	<u>Location</u>				<u>Elevation</u>	<u>Responsible Agency</u>
			<u>Description</u>	<u>Section</u>	<u>Township</u>	<u>Range</u>		
1198-118	U-40637	1198-1005	NE/4NW/4	17	13S	12W	4,740'	USGS
1198-119	U-40637	1198-1005	NW/4SW/4	17	13S	12W	4,730'	USGS
1198-120	U-40637	1198-1005	NE/4NW/4	18	13S	12W	4,680'	USGS
1198-121	U-40637	1198-1005	SE/4SW/4	21	13S	12W	4,840'	USGS
1198-122	U-40637	1198-1005	SE/4NE/4	21	13S	12W	4,940'	USGS
1198-123	Open	---	NW/4SE/4	22	13S	12W	5,020'	BLM
1198-124	Open	---	SE/4NW/4	26	13S	12W	4,990'	BLM
1198-125	Open	---	SE/4NW/4	27	13S	12W	4,920'	BLM
1198-126	Open	---	NW/4NE/4	33	13S	12W	4,850'	BLM

PROJECT DESCRIPTION

AMAX Exploration, Inc. will take necessary measures to protect all aspects of the environment. AMAX Exploration, Inc. also agrees that the proposed drilling program will be conducted in accordance with terms and conditions included within the approved permit.

AMAX Exploration, Inc. is currently permitting 25 drill site locations for the Topaz Project in Juab County, Utah. Seven of these holes are located on lands under the jurisdiction of the Bureau of Land Management. Seventeen holes are located on lands with issued leases and under the jurisdiction of the U. S. Geological Survey. Two holes are located on lands under the jurisdiction of the Department of Water Rights, State of Utah. AMAX Exploration, Inc. will notify each agency concerning the specific site locations and necessary access improvements prior to commencing operations.

Exhibit A - Topaz Project Information indicates:

- (1) Hole Numbers
- (2) Lease Serial Numbers
- (3) AMAX Lease Numbers
- (4) Location
- (5) Section
- (6) Township
- (7) Range
- (8) Elevation
- (9) Responsible Agency

Shallow exploratory thermal gradient drill holes are usually drilled to depths of 30 to 500 feet. The holes which AMAX Exploration, Inc. proposes to drill will have a maximum depth of 500 feet.

Thermal gradient holes generally are drilled with bits 4-3/4" to 6-3/4" in diameter. Water wells, by contrast, frequently are drilled with bits 8" to 12" in diameter. Consequently, the drilling of a thermal gradient hole usually has less overall impact than the drilling of a water well of comparable depth.

The equipment used to drill shallow thermal gradient drill holes consist of a light truck mounted rotary drill rig and a water truck. The truck mounted drill is usually set up on level ground as close as possible to existing roads. No bulldozing or leveling is required. Nor is the drill dug in. The water truck is parked adjacent to the drill.

Air is used to remove drill cuttings from the holes when drilling above the water table. Water mixed with drilling mud and circulated through a portable mud tank, accomplishes the same in drilling below the water table or in areas where the water table is relatively shallow. Drill cuttings from the holes are used to back-fill the holes.

A 300-foot hole generally would require approximately 20 hours to drill depending on rock hardness and other drilling conditions. A 500-foot hole would require between 35 and 40 hours to drill. Therefore, depending upon shift length, a maximum of five days might be required to complete a 500-foot well.

After the drill hole is completed and the drill rods removed from the hole, a PVC or iron pipe of approximately 1" in outside diameter is inserted into the hole. The pipe is capped on the bottom and is filled with water. The drill hole is then backfilled with drill cuttings. Approximately one week later, after the hole has had a chance to reach near thermal equilibrium with the surrounding rocks, a thermister probe is lowered into the hole and temperature measurements are made at intervals down the hole. A second and final temperature survey is made about a month after completion of the well.

Drilling operations will take approximately 30 days. Temperature observation measurements will require an additional 60 days. Thus, total project operations will require approximately 90 days. Each hole will be used for temperature observation purposes for approximately 8 weeks.

Upon completion of operations, the pipe will be cut off at ground level and the top 10' filled with cement.

Since the area in which drilling operations are to occur is relatively uninhabited, no foreseeable problems should be created concerning air and noise pollution. The casing program is designed to prevent any possible contamination of ground water from drilling fluids or produced fluids. AMAX Exploration, Inc. does not plan to conduct activities which might cause pollution to surface water or erosion of the soil. There should not be any hazards to public health or safety. The presence of a water truck and drilling mud will provide fire protection if needed.

Mr. H. Dean Pilkington, Chief Geologist, AMAX Exploration, Inc. will be in charge of the overall operation. Mr. John Deymonaz, Field Geologist, AMAX Exploration, Inc., will be responsible for drilling activities. Ms. Wendy E. Merrill, Supervisor, Land Records and Permits, AMAX Exploration, Inc. will be responsible for regulatory and environmental matters. All personnel can be contacted at the letterhead address. Prior to commencement of drilling operations, AMAX Exploration, Inc. will notify each agency concerning:

- (1) Actual rig size and capacity
- (2) Name of drilling contractor
- (3) Name of responsible on site field geologist
- (4) Anticipated commencement date