

GEOHERMAL BRANCH

INTER-OFFICE MEMORANDUM

SUBJECT: Mt. Princeton Test

DATE: July 23, 1980

TO: Harry J. Olson

cc: W. Lodder
H. D. Pilkington ✓
A. E. Shenker
A. P. Wicklund

FROM: Andy Pfaff

Attached are cost estimates for drilling a test well at the Mt. Princeton project. A few general comments on the estimates are in order at this time. In no case have I estimated a contingency. Since this would be wildcat drilling, a contingency of 20% is not unreasonable. It would be the minimum contingency that I'd recommend.

Road and location costs are minimums for the location in Sec. 13, T15S, R79W. If we were to drill in Sec. 25, T15S, R79W, these figures would be 3 to 4 times more (based on conversation with Chris Tower, since I have not been on the ground).

Water will be a major problem from initial indications. A pipeline would be the best solution from an operational standpoint. However, this would not be a small task since we would need to move the water about one mile (line of sight) and make a vertical lift of about 700 ft. At 8000+ feet in elevation such a system would require at least two pumps and probably three. Also if such a line were above ground, operations would be limited to months when temperatures are above freezing. The alternative is to utilize a water truck which would suffice for diamond drilling because of the smaller circulating system capacity. For the slimhole or production test, if circulation is lost we could easily lose 8 hrs/lost circulation zone waiting on water. The problem of availability of water trucks on a 24 hr, 7 days/week will cause additional lost time. The water problem must have a viable solution prior to moving in a rig.

The cost estimates are for July 1980. At the present inflation rate (ref. drilling costs), costs will rise approximately 1.3% per month. This is an initial estimate without contractor's bids, so before money is committed, a second estimate should be made at that time.

A cost for testing is included in all cases. It should be remembered that an open hole test with 2000 ft or more of open hole will probably result in the loss of the hole. If such a test is to be conducted, all possible information should be obtained prior to testing.

Specific designs are as follows:

1) Production Test - Slimhole

<u>Depth</u>	<u>Hole Size</u>	<u>Casing Size</u>
60	17-1/2"	13-3/8"
600	12-1/4"	9-5/8"
6000	8-3/4 - 7-7/8"	None

2) Production Test

<u>Depth</u>	<u>Hole Size</u>	<u>Casing Size</u>
60	26"	20"
2500	17-1/2"	13-3/8"
6000	12-1/4"	9-5/8"

3) Production Test - Diamond

<u>Depth</u>	<u>Hole Size</u>	<u>Casing Size</u>
60' (or through boulders)	9-5/8"	7"
6000'(or as deep as possible)	HQ	NX

Andrew J. Pfaff
Andrew J. Pfaff, Jr.

dm

WELL COST ESTIMATE

Date 7/21/80

AFE No. _____ Lease Name _____ Well PRODUCTION TEST - SCINHOLE

Location _____ County/Parish LA State LA

Project WINDITION Prepared by G. J. ...

Exploration Results: Commercial Producer Dry TO 6000 Date _____

Development Non-Commercial Producer

CATEGORY	Production Well	Dry Hole	Actual	Over (Under)
INTANGIBLE DRILLING COSTS:				
LAND AND ENVIRONMENT				
Land Acquisition/Rental				
Environmental Studies				
Permitting				
Initial Road	80,000			
Initial Location	7,500			
Maintenance of Road	2,500			
Maintenance of Location	2,500			
Reclamation/Surface Damages	15,000			
DRILLING OPERATIONS				
Mobilization	75,000			
Rig Cost: Footage _____ ft @ \$ _____ /ft				
Day Work <u>40</u> days @ \$ <u>6500</u> /day	260,000			
Bits	50,000			
Bottom Hole Assembly	60,000			
Inspection (drillpipe, BHA)	25,000			
Directional Services	5,000			
BOPE - Rental, Repair, Maintenance	15,000			
Fishing Tools & Service	7,500			
Fuel	100,000			
Mud & Chemicals	50,000			
Loss Circulation (LCM, Cement, etc)	15,000			
Water (Trucking, pump, etc)	50,000			
Casing Inspection and Makeup	5,000			
Cement and Services	10,000			
Equipment Rental (list): <u>MASTER VALVE / HYD GATE</u>	5,000			
Miscellaneous <u>TRAILER</u>	1,250			
EVALUATION				
Logging (wireline services)	45,000			
Testing	18,000			
Coring				
Miscellaneous Evaluation (Mud Logger, etc)	20,000			
Rig Cost - Evaluation <u>10</u> DAYS	65,000			
COMPLETION				
Stimulation				
Mud & Completion Fluid				
Perforating				
Gravel Packing				
Rig Cost - Completion				

SUPERVISION/PROFESSIONAL SERVICES	Production Well	Dry Hole	Actual	Over (Under)
Geologist/Geological Services				
Engineer/Engineering Services				
Geophysicist/Geophysical Services				
Company Labor & Expenses				
Other (Specify)				
MISCELLANEOUS				
Transportation/Shipping	10,000			
Safety				
Other (Specify)				
TOTAL INTANGIBLES	646,000			
TANGIBLE DRILLING COSTS				
Drill Pipe				
Conductor Pipe 60 ft @ \$ 12 /ft	720			
Surface Casing _____ ft @ \$ _____ /ft				
Intermediate Csg. _____ ft @ \$ _____ /ft				
Production Casing 6000 ft @ \$ 18 /ft	108,000			
Tubing _____ ft @ \$ _____ /ft				
Wellhead Equipment				
Float equipment, centralizers, etc.	2500			
Packers, anchors, seating nipples				
Subsurface equipment (pumps, etc)				
Line Pipe _____ ft @ \$ _____ ft				
Other (specify) _____				

TOTAL TANGIBLES	111,220			
CONTINGENCY _____ %				
TOTAL WELL COST				

WELL COST ESTIMATE

Date 7/21/50

AFE No. _____ Lease Name _____ Well Production Test - DIAMOND

Location _____ County/Parish _____ State COLO

Project Mr PRINCETON Prepared by [Signature]

Exploration Results: Commercial Producer Dry TD 6000 Date _____

Development Non-Commercial Producer

CATEGORY	Production Well	Dry Hole	Actual	Over (Under)
INTANGIBLE DRILLING COSTS:				
LAND AND ENVIRONMENT				
Land Acquisition/Rental				
Environmental Studies				
Permitting				
Initial Road	40,000			
Initial Location	4,000			
Maintenance of Road	1,500			
Maintenance of Location	1,500			
Reclamation/Surface Damages	10,000			
DRILLING OPERATIONS				
Mobilization	20,000			
Rig Cost: Footage <u>6000</u> ft @ \$ <u>60</u> /ft	360,000			
Day Work <u>3</u> days @ \$ <u>3000</u> /day	9,000			
Bits	30,000			
Bottom Hole Assembly				
Inspection (drillpipe, BHA)				
Directional Services	5,000			
BOPE - Rental, Repair, Maintenance	12,000			
Fishing Tools & Service				
Fuel				
Mud & Chemicals	15,000			
Loss Circulation (LCM, Cement, etc)	3,000			
Water (Trucking, pump, etc)	40,000			
Casing Inspection and Makeup				
Cement and Services	10,000			
Equipment Rental (list):				
Miscellaneous				
EVALUATION				
Logging (wireline services)	45,000			
Testing	10,000			
Coring				
Miscellaneous Evaluation (Mud Logger, etc)	5,000			
Rig Cost - Evaluation <u>5</u> DAYS	15,000			
COMPLETION				
Stimulation				
Mud & Completion Fluid				
Perforating				
Gravel Packing				
Rig Cost - Completion				

SUPERVISION/PROFESSIONAL SERVICES	Production Well	Dry Hole	Actual	Over (Under)
Geologist/Geological Services				
Engineer/Engineering Services	25,000	25,000		
Geophysicist/Geophysical Services				
Company Labor & Expenses				
Other (Specify)				
MISCELLANEOUS				
Transportation/Shipping	20,000	20,000		
Safety				
Other (Specify)				
TOTAL INTANGIBLES	1,171,250	1,118,250		
TANGIBLE DRILLING COSTS				
Drill Pipe				
Conductor Pipe 60 ft @ \$ 20 /ft	1200	1200		
Surface Casing 2500 ft @ \$ 32 /ft	80,000	80,000		
Intermediate Csg _____ ft @ \$ _____ /ft				
Production Casing 3500 ft @ \$ 35 /ft	122,500			
Tubing _____ ft @ \$ _____ /ft				
Wellhead Equipment	4000	4,000		
Float equipment, centralizers, etc.	4000	2,000		
Packers, anchors, seating nipples				
Subsurface equipment (pumps, etc)				
Line Pipe _____ ft @ \$ _____ ft				
Other (specify) _____				

TOTAL TANGIBLES	211,700	87,200		
CONTINGENCY _____ %				
TOTAL WELL COST				

WELL COST ESTIMATE

Date 7/21/80

AFE No. _____ Lease Name _____ Well PRODUCTION TEST

Location _____ County/Parish _____ State _____

Project MT PRINCETON Prepared by [Signature]

Exploration Results: Commercial Producer Dry TD 10,000 Date _____

Development Non-Commercial Producer

CATEGORY	Production Well	Dry Hole	Actual	Over (Under)
INTANGIBLE DRILLING COSTS:				
LAND AND ENVIRONMENT				
Land Acquisition/Rental				
Environmental Studies				
Permitting				
Initial Road	80,000	80,000		
Initial Location	7,500	7,500		
Maintenance of Road	2,500	2,500		
Maintenance of Location	2,500	2,500		
Reclamation/Surface Damages	15,000	15,000		
DRILLING OPERATIONS				
Mobilization	75,000	75,000		
Rig Cost: Footage _____ ft @ \$ _____ /ft				
Day Work <u>40</u> days @ \$ <u>6500</u> /day	260,000	260,000		
Bits	75,000	75,000		
Bottom Hole Assembly	75,000	75,000		
Inspection (drillpipe, BHA)	25,000	25,000		
Directional Services	5,000	5,000		
BOPE - Rental, Repair, Maintenance	15,000	15,000		
Fishing Tools & Service	7,500	7,500		
Fuel	110,000	110,000		
Mud & Chemicals	55,000	55,000		
Loss Circulation (LCM, Cement, etc)	20,000	20,000		
Water (Trucking, pump, etc)	55,000	55,000		
Casing Inspection and Makeup	20,000	20,000		
Cement and Services	75,000	35,000		
Equipment Rental (list): _____				

Miscellaneous <u>TRAILER</u>	1250	1250		

EVALUATION				
Logging (wireline services)	45,000	45,000		
Testing	15,000	15,000		
Coring				
Miscellaneous Evaluation (Mud Logger, etc)	20,000	20,000		
Rig Cost - Evaluation <u>8 DAYS</u>	52,000	52,000		
COMPLETION				
Stimulation				
Mud & Completion Fluid				
Perforating				
Gravel Packing				
Rig Cost - Completion <u>2 DAYS</u>	13,000			

SUPERVISION/PROFESSIONAL SERVICES	Production Well	Dry Hole	Actual	Over (Under)
Geologist/Geological Services				
Engineer/Engineering Services	25,000			
Geophysicist/Geophysical Services				
Company Labor & Expenses				
Other (Specify)				
MISCELLANEOUS				
Transportation/Shipping	20,000			
Safety				
Other (Specify)				
TOTAL INTANGIBLES	1,034,250			
TANGIBLE DRILLING COSTS				
Drill Pipe				
Conductor Pipe 60 ft @ \$ 20 /ft	1200			
Surface Casing 600 ft @ \$ 35 /ft	21,000			
Intermediate Csg. ft @ \$ /ft				
Production Casing ft @ \$ /ft				
Tubing ft @ \$ /ft				
Wellhead Equipment	4000			
Float equipment, centralizers, etc.	1500			
Packers, anchors, seating nipples				
Subsurface equipment (pumps, etc)				
Line Pipe ft @ \$ ft				
Other (specify)				
TOTAL TANGIBLES	27,700			
CONTINGENCY %				
TOTAL WELL COST				