M E M O R A N D U M

TO: Mike Wright

FROM: Debbie Struhsacker

DATE: July 2, 1979

SUBJECT: Utah Roses Meeting

DATE OF MEETING: June 25, 1979

PLACE OF MEETING: Utah Roses, Sandy, Utah

ATTENDEES: Ralph Wright, C. Dick Wright; Utah Roses
Pete Murphy, Ben Everitt; U.G.M.S.
Jay Kunze, Roger Stoker; Energy Services, Inc.
Keith Jones; EG&G
Debbie Struhsacker; ESL/UURI

Energy Services, Inc. has composed a preliminary drilling plan for a production well at Utah Roses:

- -Drilling of a 4000' deep hole should begin in September, 1979.
- -The target is an envisioned hot water aquifer between 3000 and 4000 feet.
- -They hope to produce 122^{o}F water at 600 gpm.
- -They plan to case to the top of the production zone, and drill an open hole to total depth. (They may encounter difficulties with this plan. I mentioned this possible problem to Roger Stoker.)
- -Gamma ray logging and thermal gradient measurements are planned for the hole.

Utah Roses will allow additional studies of the well:

- -UGMS is interested in obtaining core samples for their seismic hazards study.
- -I mentioned that Dave Chapman would probably be interested in obtaining a heat flow measurement from this hole.

I indicated that the Geothermal Sample Library would be an appropriate storage facility for cuttings from the well.

Energy Services is currently making thermal gradient measurements from the nearby Conservancy well.

P. Murphy and I were shown the proposed drill site.

This meeting was a rerun of the discussion held last February. Very little new information was exchanged. I think that Energy Services, Inc. was anxious to cover all bases by showing UGMS and ESL representatives the drill site, and to hear once again that under the circumstances, drilling a hole is probably the most logical step. P. Murphy and I assured them that as far as we know, they have not overlooked any available geologic data in the area, and that they should proceed as planned. We both stressed that this project is a wildcat target; the chances for success are unknown. Given these parameters, they should drill where a production well would be most useful.

Debbie Struhsacker

DS:cw
cc: D. Foley

Utah Roses . . .

Local company gambles on geothermal heating

Imagine a heating bill for the months of December, January and February totalling $95,000. Imagine burning 3,000 gallons of expensive fuel oil each cold winter night to keep your business going. Imagine the price of heating oil going from 48 cents to 80 cents a gallon in one year.

After mulling over the above conditions for a while, it's not hard to imagine why Utah Roses Inc., 9000 S. and 567 W., is looking at some other means of heating its hot houses. And the alternative with the inside track at the moment is geothermal.

With such figures staring him in the face it didn't take a lot of convincing to get company owner Dick Wright interested in researching the idea when Forsgren and Perkins engineer, Jay Kunz, approached him with it two years ago. Wright adds that when made known of possible funding grants from the Department of Energy the idea became even more attractive to him.

However, the company and its consulting engineers could not put together the lengthy and detailed proposals and environmental impact statements in time to meet that deadline and the idea had to be postponed. When the D.O.E. renewed its funding the following year, Wright and the engineers tried again and this time the agency accepted.

"What they are looking for are demonstration types of projects," commented Wright, "to show other private firms that such a system is possible. We were picked primarily due to the geothermal potential of the area, but also because of the nature of our industry."

The federal grant must be matched by the company, with the feds putting up the front money. In all the project, if successful, could cost in the neighborhood of $700,000 to $800,000 to bring on line.

Utah Roses has received bid offerings on the drilling of a test well, but the contract has not yet been awarded. Once that has been done, drilling can begin, hopefully around the first of October. The test well will be drilled down to a level of between three to four thousand feet and will take a month to six weeks of drilling time to complete. It will be located immediately west of the plant.

Although Forsgren and Perkins estimate the companies' chances of hitting hot water at about 78 percent, whether they find it in the quantity, quality, and temperature they need remain question marks that can only be answered at the conclusion of the drilling period. The water must not be too heavily laden with minerals and be, at least, 150 degrees Fahrenheit in temperature for use.

"It may be that there won't be enough of the water to heat all of our operation or heat it all of the time," explained Wright, "but, even if we just had to supplement it with some form of conventional heating, it still produce a big savings."

Those savings could be as large as $150,000 a heating season to start Wright estimates, though he doesn't expect to see the project in operation this winter. By the time drilling, testing, installing, and adjusting have been completed, it could well be the fall of 1980 before any heat could be supplied to the over 100,000 rose bushes and other flowering plants the company caters to.

The hope for success is bolstered, reports Klane Forsgren of Forsgren and Perkins, by the knowledge that just across the street the Water Conservancy District hit water at 76 degrees at a depth of 800 feet and just a few miles to the south Sandy City struck water of 90 degrees at 1,200 feet. Still there remains the possibility they will not find the amount, quality, and temperature of water they need. Even so, attempts to save precious fuel oil and natural gas would go on.

"We'd have to continue to raise our prices, but there's a question of how high you can go before you out price yourself," Wright stated. "We'd have to look at using coal for heating or polyethylene insulation or heat blankets to reduce the heating area in the hot houses or something else. It wouldn't put us out of business."

According to Wright, the six acres of hot houses must be kept heated to between 70 and 80 degrees during the day and 60 to 65 at night. No mean feat when the pre-dawn temperatures can drop to zero or below.

But, without the heat the twice a day, seven days a week, cuttings of up to 8,000 red roses would come to a halt and so would the shipments of roses to wholesalers nationwide. Utah Roses ships 75 percent of what it grows to such wholesalers, 40 percent of those locally, the rest as far away as Texas and Washington. The operation, in its tenth year of business, is the largest between Denver and the west coast.

Already, the project has attracted the interest of several nationwide trade magazines and Wright adds that a neighboring business has expressed a desire to purchase some of the hot water, if found, for its heating purposes.

"We're tremendously excited by the potential of this project," conclujded Wright, "now if we can just find the water."

Six week course features infant parenting workshop

A six week course on infant parenting will be offered at two area libraries beginning in October.

Sponsored by the Governor's Commission on the Status of Women, the class is especially designed for mothers, fathers, and their newborn babies. Topics will include: Building baby's self-esteem, A cup of love, Why baby cries, Developing a sleep routine, Fathering, Handling stress and Increasing your baby's I.Q.

The classes will be taught at the Whitmore Library, 2197 E. 7000 S., beginning Oct. 2 and running each Tuesday through Nov. 6 and at the Peterson Library, 9340 S. 700 E., starting Oct. 31 and continuing Wednesdays through Dec. 5. Class time will be from 7:00 p.m. to 8:45 p.m.

Westland parents invited to school

Back to school night for Westland Elementary will be held Sept. 19, 20 and 27 at 7 p.m. at the school.

Parents of kindergarten and first grade students will meet on Sept. 19; second and third grades on Sept. 20; and on Sept. 27, fourth and fifth grade teachers will meet with parents.

A short business meeting for the PTA will be held prior to the conferences on Sept. 27. Items to be discussed include budget approval, playground improvement plans and a needs assessment survey.

Marching band parents, students given schedule

MIDVALE — Parents of the Hillcrest High School marching band and the members were informed of the September and October schedule.

The band will play at the following games: Hillcrest and Bonneville, Friday, Sept. 14, at 5 p.m.; and Friday, Oct. 5 at 3 p.m. between Hillcrest and Kearns. They will march on Wednesday, Oct. 10, at 3 p.m. at the game between Hillcrest and Layton; and Wednesday, Oct. 24 at 3 p.m. between Hillcrest and Brighton.

The band is having 7 a.m. rehearsals on Mondays, Wednesdays, and Fridays.

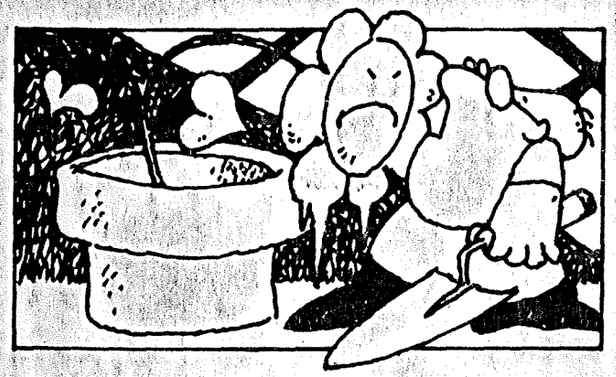
Region 2 marching band competition will be held during school hours on Oct. 17.

Invitations have been extended to march at the University of Utah marching band competition on Friday, Oct. 24, at Rice Stadium, and at the Utah State University homecoming at Logan on Saturday, Nov. 3, at 10 a.m.

Melodrama part of Butler West outing for group

COTTONWOOD — Butler West Stake Special Interests and Young Special Interests had an evening out, attending the Melodrama in Park City Sept. 8.

Greenhouse Heating

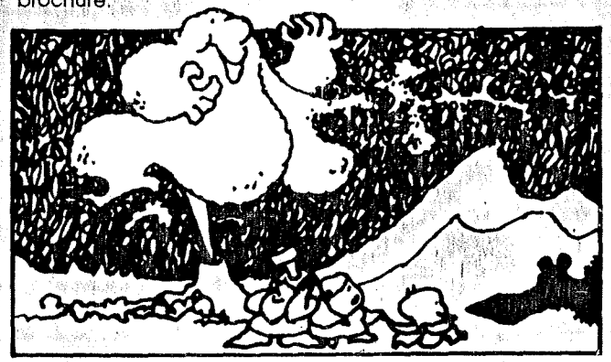


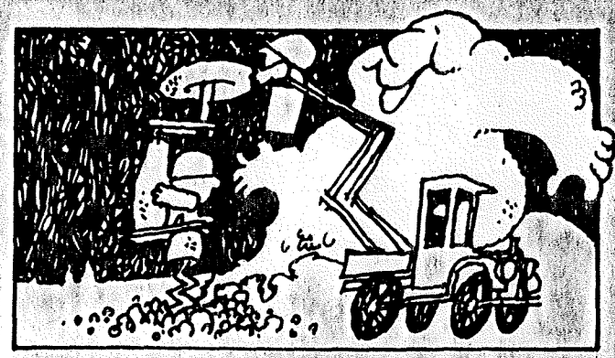
Greenhouse Heating

Ralph Wright, a Sandy, Utah commercial cut flower grower depends on geothermal energy to protect his roses and to give him a year-round growing season. Unlike most greenhouse users, however, Ralph doesn't worry much about spiraling energy costs, because his heat source isn't gas, coal, or electricity -- it's geothermal energy. For many greenhouse operators, as well as other people who are concerned with space heating, geothermal energy is a practical, economical heating source.

Geothermal Energy

Geothermal energy is simply the earth's internal heat available near the surface as heated groundwater or steam. At many locations in the United States geothermal water is an economically competitive and environmentally sound heat source. Such locations include both natural hot springs and hot water accessible by well drilling. Sources of information on resource locations in your region are listed at the end of this brochure.





Geothermal Energy Can Save

Factors which determine the economics of geothermal heating are water temperature, water mineral content, required well depth, and difficulty of waste water disposal. Where these factors exist in favorable combinations, geothermal energy can provide the greenhouse operator reliable and affordable heating energy. In many instances, initial costs of a geothermal heating system, particularly those costs associated with well drilling for geothermal energy, are higher than for conventional heating systems. But these costs are offset by the absence of ongoing fuel costs.

Cost Comparison

In the accompanying table, we compare typical costs for either gas or coal with a geothermally heated greenhouse of 43,000 square feet. We assumed a well depth of 1,000 feet, pumping 435 gallons per minute from a depth of 300 feet. If the ground water is of high quality, as is often the case, it will be used for irrigation after it is used for heating. Federal and many state tax laws offer significant tax advantages to geothermal users. A 10% investment tax credit, in addition to the existing credit, may be applied to geothermal equipment. Use of interruptable fuel supplies is also avoided.

HEATING SYSTEM COSTS ($)

Conventional	Natural Gas	Coal	**Geothermal**
Boiler (no emission control)	$22,500	$160,000	(well and pump) $105,000
Piping Systems	12,000	12,000	15,000
Equipment	45,000	45,000	45,000
Annual Amortized Cost*	9,300	24,200	19,300
Fuel, Operation and Maintenance**	60,000	55,000	12,600
Annual Cost	$69,300	$79,200	$31,900

* 20-year lifetime, 10% interest.

** Electricity for motor driven equipment @ 3¢/kWh.
Natural gas (75% burner efficiency) @ 30¢/therm.
Coal (60% burner efficiency) @ $40/ton.

levels of other fuels, geothermal
mically competitive. In the future,
osts will make geothermal heating
more attractive, plus geothermal
ble and reliable, and they are not
hortages. Geothermal sources exist
f the United States. You may obtain
n about geothermal greenhouse
other application of geothermal
references below.

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20461

xtension Service

f Energy - Idaho Operations Office
Director for Geothermal Energy

83401

gineering Laboratory (INEL)

gy Commercialization Program

83401

Research Institute (UURI)
oratory
Suite 120
84108

Geothermal Greenhouse Heating

w/: P. Murphy, Ben Everitt } UGMS
Ralph Wright, C. Dick Wright } Utah Roses

J. Kunze
R. Stoker
Keith Jones - EG+G - Technical Advisor

6/25/79

→ should try to get a copy

UGMS Basin Fill Map
based on gravity ($P \approx 2.4$) · well logs etc. ·

→ P.M. - hole should be billed as test well
to possibly heat greenhouse

P.M. - hot spots related to bedrock highs
best water - along margins of basin

→ UGMS - seismic study
wants to monitor Utah Roses hole(s) to contribute
to seismic hazards study of the valley
tests + sample collection
during or after drilling if possible
need cores from bottom of hole
piston cores

UGMS → would pay for

UGMS will detail their needs →

Utah Roses plans for hole:
T.D.
Natural Gamma - for correlation purposes

→ A.I. Possibility of USL getting the samples
unclear who should get

Projecting encountering seds ± volcanics at T.D.
use Tricone bit for coring / not diamond

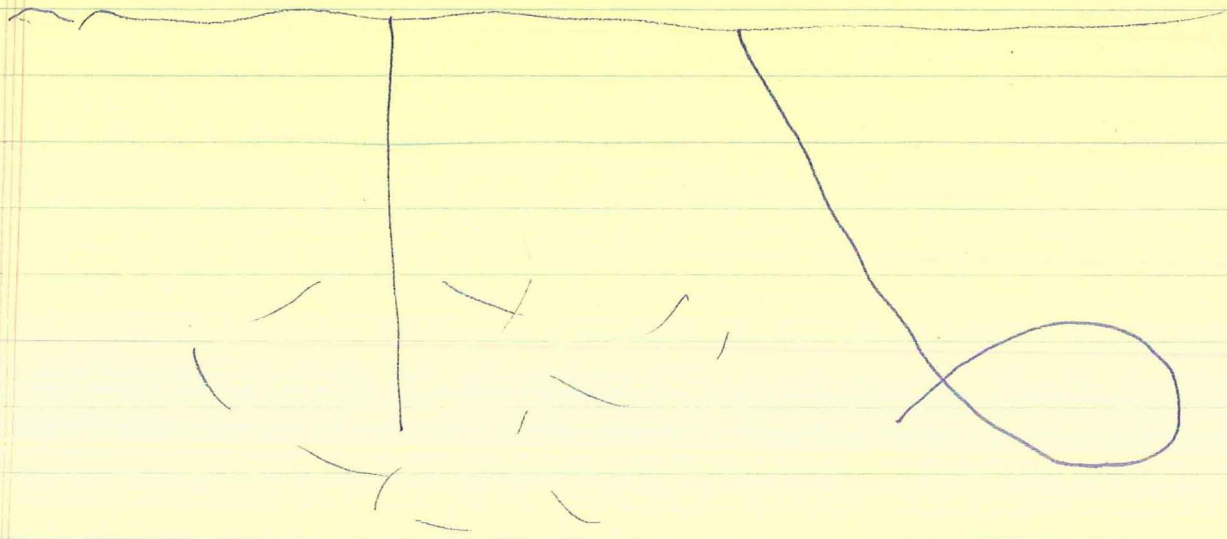
→ Discussed Chapman's need for heat flow measurements
probably won't have much time to equilibrate
(unless dry hole)
hole will be cased

Planning on 6 week drilling time
Utah Roses can be flexible ± 1-2 weeks for logging
Hole Gradient - nearby hole
→ Conservancy Well: 87 °F / 60° at top
may be isothermal at 300' (perforated at 318')
probe may have been hung up

P.M. Feels east-west-trending "sandy" fault on geologic map
probably compiled from Cook's gravity map

DOE is pushing for drilling

→ Hope to start drilling 9/1/79



→ Visual inspection of proposed drill site behind greenhouse on North side

→ Visited Conservancy Well
J. Kunze - t.g. logging procedure

→ D.S. - stated that w/ given parameters of limited land holdings, need well nearby to be useful, lack of detailed geologic knowledge to pin point a drill site, Utah Rose should drill where a well will be most useful.
should probably visit K. Jones indicating this + outlining lack of certainty + guarantees involved

1/8/79

Utah Roses POW Proposal

Ralph Wright - Utah Roses
Jay Kunze - Forsgren Perkins & Assoc. (consultants)
Ed D. Bello - EG&G
Pete Murphy - UGMS
Mike Wright

On 7 acres

Utah Roses doesn't want to spend money on geophysics-
feels that would be inconclusive
would rather put the $ in a drill hole

Problems w definition of POW program
how much risk should govt take
is the program intended for known resources - how to develop them

gradients to the south near Crystal Hot Springs (Prison Sit)
≈ 32 °C/km = approx. B+R. gradient
J. Kunze is aiming for 2 x normal gradient !

seismic survey would be best way to determine fault location

Kunze is planning thermal gradient + lithology logs using SLJ

PM Wright suggested hitting DOE for more logging $/$ do gamma ray etc.

Conclusions

Conduct gradient studies on nearby Waren wells
Do geochemistry on well on Utah Roses property

Ask Regina → Mercury Soil Survey suggested by PMW might help delineate fault

Deepening of pre-existing Conservancy Well?
as production well would have to pipe fluids as gradient test hole.

Possibility of infrared survey - to detect subtle T° changes ⇒ Structural info

Detection of fault through the gravels by looking closely at the air - aerial photography etc.

Pete Murphy + I agreed to visual inspection of the area

* For the amount of money at stake, ($459,000) there are no geophysical programs that could effectively

yield any more useful data than a drill hole would. Especially if confined to drill on Utah Roses property. (From the point of view of learning more about the area + its resources in general, a big geophysical survey would be great - especially active seismic.

E-W trending Fault problem

There's an inferred E-W trending fault on the State Geologic map at about the Utah Roses Location. The ultimate source of data which resulted in the mapping of this fault is unknown.

The effect of this fault on any nearby thermal springs is debateable. Allows for deeper/hotter circulation??

1/25/79

Ed Dibellot 583-9521

Ask Mike: call back RE: cost/time of Hg survey

Meeting w/ L.L. Mink.
see if Applegate would recommend
1 line seismic N-S
get cost from Applegate

DOE would buy ≈ 50K

L.L. Mink interested in Low T° area

1/8/79

W/ Regnier
Re: Possible Hg Soil Survey near Utah Roses

the purpose of said survey would be to determine the presence(?) of an E-W-trending fault.

This would be a bigger deal than initially envisioned
Would require:

4-6 weeks
calibration w/ known E-W trending faults to the
depth calibration
$1,1! ~$8,000

EG&G Idaho

NOTEGRAM

FORM EG&G-460
(Rev. 9-76)

Date 1/12/79

→ to Deb for file

To Mike Wright Dept. UURI Address

From Ed DiBello Dept. EG&G Address 583-9521

REQUEST your review of the ATTACHED Summary of the UTAH Rosas meeting. I will be glad to modify ANY STATEMENTS or recommendations.

To reduce the letter writing, I could mention in a cover letter that you have reviewed the Summary and concur.

I'll call during the week to get your comments.

Ed

PUT IT IN WRITING — WRITTEN MESSAGES SAVE TIME, PREVENT ANNOYING INTERRUPTIONS AND ERRORS

E. G. DiBello of this office met with the following individuals on January 8, 1979:

Dr. P. M. Wright, Associate Director, UURI
D. Struhsacker, Geologist, UURI
P. J. Murphy, Geologist, UGMS
R. M. Wright, Principal Investigator, Utah Roses
Dr. J. F. Kunze, Manager, Energy Services, Forsgren, Perkins & Associates

The purpose of the meeting was to resolve the final scope of the resource assessment program for the Utah Roses demonstration project.

The following comments were made by UURI and UGMS personnel:

a) General area gravity and magnetic surveys of the Utah Roses property have been previously performed. These surveys are not detailed, site-specific surveys. It is unlikely that any additional survey results other than drillers logs are available.

b) The normal Basin and Range thermal gradient is 32°C/kilometer. A 3,000-ft well with a normal temperature gradient would imply a resource temperature of 50°C (122°F). The Conservancy Well (approximately 150 yds southeast of the Utah Roses' property) is reported to have a temperature gradient of 1.8°C/100 ft (approximately 60°C/kilometer). This would imply a resource temperature of approximately 70°C (158°F) at 3,000 ft. However, it was generally agreed that those extrapolations were, in fact, only extrapolations, and the actual resource temperature could vary considerably.

c) A fault is not readily visible in the area. The inferred fault referenced in the Utah Roses, Inc. proposal was probably drawn on state geological survey maps as a result of the area surveys listed in paragraph (a).

d) Permeability at depth may, in fact, be a problem and result in low well productivity. The sedimentary zones in the Salt Lake area have not historically produced large quantities of water.

e) No recommendations could be made on disposal by reinjection, since insufficient data is available.

f) Resistivity surveys will probably not provide any readily interpretable data, due to the high degree of cultural development in the area.

g) The drilling of new thermal gradient holes could probably not be financially justified, since the results may be inconclusive. The recharge waters resulting from the Wasatch Range canyons to the east may mask the gradient.

h) Neither UURI nor UGMS personnel could commit to any in-depth involvement in the project, using existing program funds. The representatives indicated they would require DOE direction in order to commit resources that are presently committed to other DOE investigations.

i) Radon gas or standard commercial infrared surveys will probably not provide sufficient information to justify the cost of the survey.

Dr. J. F. Kunze and R. M. Wright made the following points:

a) A drilling site in the west or south ~~gradients~~ quadrants of the property may be feasible. Easement problems would be minimized if the well was sited in one of these ~~gradients~~ quadrants.

b) For adequate heating system water temperature, the well temperature gradient must be approximately twice the normal gradient.

c) The Utah Roses well may be a reasonable technical and exploratory DOE investment, since no wells over 1,000 ft exist nearby in the Jordan Valley.

d) Utah Roses might consider moving the well one to two miles off the property, but careful consideration of easement, pipeline and pumping costs will be necessary.

INSERT

g) While Utah Roses would like to have more resource data, they are not interested in performing sophisticated geophysics, due to the cost of such surveys. It is assumed that DOE would be more interested in the geophysical data, and thus should be responsible for the survey costs.

h) The cost of extensive geophysical surveys approaches the estimated cost of the production well. There is no guarantee that these surveys will provide a better idea of resource location or potential than has already been theorized. The drilling of the production well may be the overall least expensive method of determining the adequacy of the resource.

i) An acceptable strategy may be to drill the production well and perform resource studies independent of the demonstration project schedule of funding.

j) While geological samples would be taken during the well drilling operation, any research-oriented data collection should be funded by the applicable research organization requiring the data. As an example, the best possible geological strata log will be assembled from the borehole cuttings; however, if core samples are requested, separate funding will be required.

It was generally agreed that the resource assessment/drilling plan for the Utah Roses demonstration project should contain the following elements:

a) Gradient-temperature surveys should be conducted on the Sandy City and Conservancy wells. (to will be done by Utah Roses)

b) A geochemical survey should be conducted on the Conservancy well.

c) A mercury survey could be performed, in an attempt to ascertain the extent of the faulted area. However, the amount of alluvial material and groundwater movement could negate the effectiveness of this survey. P. M. Wright indicated that UURI could perform the survey at no charge to the project, if it was considered worthwhile. D. Strusacker will investigate the advisability of performing this survey.

d) A relatively sophisticated and expensive seismic survey would have to be performed to obtain meaningful data. The cost of the survey was estimated at $100,000 to $150,000.

e) Other surveys that could be considered and the estimated costs are:

Survey	Cost
Gravity	$30,000 - $40,000
Aeromagnetic	$10,000
*Infrared	$10,000 - $20,000

* P. J. Murphy agreed to discuss the feasibility of an infrared survey with EG&G, Las Vegas personnel.

f) UURI and UGMS personnel agreed to perform a visual inspection of the area. J. F. Kunze requested that the visual inspection be made with R. Stoker, Forsgren-Perkins and Associates.

g) The feasibility of deepening the Conservancy well for a thermal gradient or production well was discussed. This alternative should be investigated further.

INSERT → See next page for H & I

J) It was generally agreed that considerable funds ($200,000 to $250,000) would be needed to provide "adequate" resource data. However, if the funds are expended on the resource assessment,

the results may not provide any better idea of the resource potential. In addition, if the inferred fault is defined, the existence of sufficient water or temperature at depth would not be guaranteed.

INSERT previous page

h) A rotational sugar crystal survey may be useful in determining the integrated reservoir temperature. This test will require 3 to 4 months.

i) The feasibility of drilling the production well in a manner such that total depth is reached and the reservoir potential determined at minimum cost should be investigated.

UTAH GEOLOGICAL AND MINERAL SURVEY

606 BLACK HAWK WAY
SALT LAKE CITY, UTAH 84108
(801) 581-6831

DONALD T. McMILLAN
Director

SCOTT M. MATHESON
Governor

GORDON E. HARMSTON
Executive Director
Department of Natural Resources

August 28, 1979

Mr. Keith Jones
E.G.& G. Idaho, Inc.
P.O. Box 1625
Idaho Falls, ID 83401

Dear Keith,

At your request I have reviewed Energy Services' report to Utah Rose, Inc. titled "Geothermal Evaluation of the Sandy, Utah Area" and dated July, 1979. I have many serious doubts about the validity of many of the assumptions used to arrive at the conclusion that the Utah Roses site is "an excellent geothermal prospect."

In my opinion, the report is a collection of generalities supported only remotely by extremely limited data. The generalized model of a fault related geothermal system leaking thermal waters into near surface aquifers is a realisitic model for the Basin and Range Province. However, in the case of the Utah Roses site the presence of a fault is questionable, and the nature of valley fill sediments at a depth of 3000 to 4000 feet is unknown. The presence of warm water in area water wells is encouraging evidence that tends to support the hypothesis that a fault system might be supplying thermal water to near surface aquifer but the location and strike of the fault are unknown and, fault related secondary permiabilities should not be expected to improve "estimated production rates and temperatures..." (p.23). Geochemical thermometers have proven unreliable estimates of the temperatures available at reasonable drilling depths in low and moderate temperature resources. The best example of the discrepency between predicted and encountered temperatures is that found at Monroe Hot Springs. Although the geochemical temperatures indicated on page 22 of the report seem entirely reasonable for a fault controlled deep circulation system, there is no reason to assume that these temperatures are available at depths of 3000 to 4000 feet at the Sandy site.

There are also a number of errors in technique and calculation that weaken the reliability of the report. The temperatures reported in the table on the bottom of page 20 are predicted on the basis of the 45^{o}C/km (2.5^{o}F/100 ft.) geothermal gradient. The gradient was arrived at by averaging gradients measured in the Conservancy well before and after pumping. This is not standard practice; the elevated gradient after pumping does not reflect the geothermal gradient and under no circumstances should be used to predict temperatures at depth. To worsen matters, the gradient calculated for after pumping conditions is miscalculated and reported as 56^{o}C/km (3.1^{o}F/100 ft.) when the actual thermal gradient would have been approximately 33^{o}C/km (1.8^{o}F/100 ft.).

If the gradient must be projected to depth, the pre-pumping gradient of 31°C/km (1.7°F/100 ft.) should be used. A rough estimate of the temperature at 4000 feet (using 31°C/km) is 36°C (96°F). Even though this too is an estimate, it is a more realistic estimate than the temperatures presented in the report. The project can not depend on the geothermal gradient alone to provide the necessary temperatures, the presence of a nearby fault leaking water into the alluvial aquifer seems to be a necessity for the project to succeed.

Apart from the technical aspects of the report, I am also disturbed by the implications of the acknowledgements as written. In my opinion, by not specificly stating the UGMS position within the report, the implication is made that UGMS agrees with the conclusion that the site is an "excellent geothermal prospect." I have always been of the opinion that there is considerable risk a production hole at the Sandy site will not produce the volumes and/or temperature of water needed for successful completion of the Utah Roses PON. However, given the present limited level of knowledge of subsurface conditions, and the constraints of the PON, there is only one possible means of definitively determining the presence or absence of a resource. If DOE and Utah Roses are willing to take the risk, then the drilling should proceed as planned. I do resent the implication that myself or UGMS has given any indorsement to either the report, or to the chances of success.

If there are any questions concerning the above comments please feel free to contact me at any time.

Sincerely,

Peter J. Murphy

PETER J. MURPHY
Geologist

PJM/af

8/29/79

Comments on Utah Roses Report by Energy Services

PMW + DWS - most helpful in reviewing the assessment + gathering the data

Steep mag gradient north of Traverse mtns = fault

pg. 10

pg. 10 EW Steep aeromag anomaly s. of Utah Roses = fault counting on horizontal movement of hot H2O from this fault zone to Utah Roses.

"If the fault zone ~~~~. it can be considered a good geothermal exploration area

pg. 16 Utah State Forestry Well No. 1.

This well indicates the importance of ~~~ it verifies that 167°F geothermal water is present in the area at shallow depths + can be easily recovered.

6.5 miles away
30 gpm on pumping

pg 22 Lower Mercy Well
Geothermo up to 158

"This well is the most definitive evidence for viable geothermal reserve in area. It indicates that the minimum temp. required (180°F) is present + can be recovered at reasonable depth

Also assumes permeability in Utah Resources well
22 "should not result in less than half of those
in Conservency well"

p. 24 "The possibility that a fault zone may exist w/in
>600' of Utah Resources property + the borehole
T° in Conservency (430°F) + Sandy City well >100°F
(over 2 miles away!) make Utah Resources property
an excellent geothermal prospect
only flowed 90°F