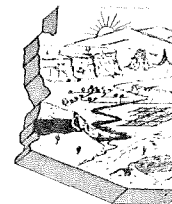


State of Arizona
 Bureau of Geology and Mineral Technology



Geological Survey Branch
 Geothermal Group

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May 30, 1979

Dr. Clayton Nichols
 Department of Energy
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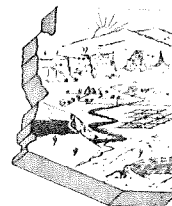
Dear Clay,

The following are my comments concerning a seismic program at Williams Air Force Base in Maricopa County, Arizona.

I will admit to having a bias against geophysics as the panacea of an exploration program. Geophysics is a useful exploration tool and when properly applied can be of great assistance to the geologist in target definition. My personal feelings are that a seismic program to determine structure at eight to ten thousand feet in the Higley basin would be a waste of time and money in view of the constraints placed upon the geothermal exploration program by the Air Force. As I stated in my report of May 24, 1979, all wells, production and reinjection, must be drilled on the base, and the land within the base has had maximum utilization and development. In other words, there are very few places on the base proper where wells may be sited. Also, I do not feel that a seismic survey looking for fault structure at eight to ten thousand feet in the Higley basin will have the resolution necessary to do the job. At the above-mentioned depths I feel the results, at their very best, would be strictly marginal. After much thought, I feel and did state in my report of May 24, 1979, that the most logical approach would be siting WP-1 as reasonably close to GKI's holes as possible. This would be a two to three thousand foot stepoff to the northeast, just inside the southwest corner of the base, and on one of the few undeveloped sites on the air base. GKI's drilling has established that high temperatures in excess of 150°C exist at depth in that southwestern corner area. The only remaining question is will the reservoir produce? Whether a reservoir will produce from a specific hole is part of the normal exploration risk inherent with any exploration and development program of this type and will only be proven "yes" or "no" by drilling. It is my professional opinion that WP-1 should be drilled without additional work as there is nothing more to be reasonably done to insure its success.

Finally, in support of my argument against the seismic survey, I wish to cite Exxon's petroleum geophysical exploration and drilling program as reported by Eberly, L.D. and Stanley, Jr., T.B., 1978, Cenozoic stratigraphy and geologic history of southwestern Arizona,

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G.S.A. Bulletin, Vol. 89, pp. 921-940, page 934, third column, second paragraph, third sentence: "Because the quality of seismic data below the unconformity is very poor, evidence relating to pre-late Miocene structuring is, on the other hand, restricted to the exposed remnants of Unit 1 in the mountain ranges." The point being here is that the drilling target zone lies beneath the unconformity mentioned above and that a seismic survey will be essentially useless in resolving structure below the unconformity in the Higley basin, or, for that matter, in most of the deep basins in southern Arizona.

I thank you very much for the opportunity to comment on the seismic exploration program proposed by UURI for Williams Air Force Base, Arizona.

Sincerely yours,

W. Richard Hahman, Sr., CPG
Senior Geologist

WRH:ls

Ccs: Dr. Gus Gertsch
EG&G Idaho, Inc.

Dr. Howard Ross,
UURI

Dr. A. W. Laughlin,
LASL