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INTER-OFFICE MEMORANDUM

SUBJECT: Historic Earthquakes and Microearthquake Findings
in the Vicinity of the Best Project, Utah

DATE March 9, 1976

TO: W. M. Dolan, H. J. Olson, H. D. Pilkington, GT staff

cc: Jerry Roth

FROM: A. L. Lange

Earthquakes reported from the area of the Richfield, Utah, AMS map between 1873 and 1975 (not including 1975) are plotted as squares in Figure 1. These epicenters were supplied by U. S. Department of Commerce, NOAA, Boulder, Colorado. Where magnitudes were determined, they are shown after the date by "M = ". If felt intensities were reported, these are shown by a Roman numeral after the date. In addition, epicenters and approximate depths determined from a microearthquake survey conducted during an unspecified 25 days in September 1974 by the University of Utah are shown by circles¹. The larger circles represent the shallower focal depths I have superimposed on these seismic data, fault patterns supplied by James Koenig.

Several salient features show in the plot:

1. A paucity of activity in the vicinity of Roosevelt Hot Springs; namely, one microearthquake in 25 days. This and two events farther north, seem to define the range fault bounding the Milford graben on the east. Scattered events give a crude suggestion of the bounding faults on the west side of the graben.
2. Three microearthquakes form a line crossing the Mineral Range between Wildhorse and North Twin Flat Mountains. A fourth event 2 km northwest of Milford falls on the western extension of this line.
3. Major earthquakes have occurred around the perimeter of the south end of the Mineral Range between Beaver and Thermo suggesting active structure at depth. Bear in mind that these events were located from distant stations and are mapped to within only about 0.1 degree, or about 5 to 10 km. The zone seems to be confirmed, however, by a microearthquake southwest of Beaver.

4. Six earthquakes occurred during 1973 around the western end of the Black Mountains, in the vicinity of Thermo Hot Springs. This area is probably beyond the range of the Utah microearthquake survey. Thermex Co., however, reports that they logged about 40 microearthquakes on the northern flank of the Black Mountains, during a recording period of, I believe, 10 days. The seismicity prompted them to take leases on the lands (W. Westphal, personal communication).

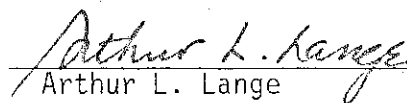
5. A zone of microearthquakes occurs along the Black Rock Road between Cove Fort and the northern end of the Minerals. This is the locale of a Magnitude 4.6 earthquake in June, 1971. Thermex has also reported (personal communication) the prevalence of seismicity in the area.

Conclusions

The immediate vicinity of Roosevelt Hot Springs is not a prominent locus of microearthquake activity. Evidently, prevalent seismicity is not an essential ingredient to the type of reservoir occurring at that location. Alternatively, there may exist more substantial reservoirs and/or heat sources towards the extremities of the Mineral Range; specifically, in the Cove Fort area, in an east-west zone running through Minersville, and in the western part of the Black Mountains.

Recommendations

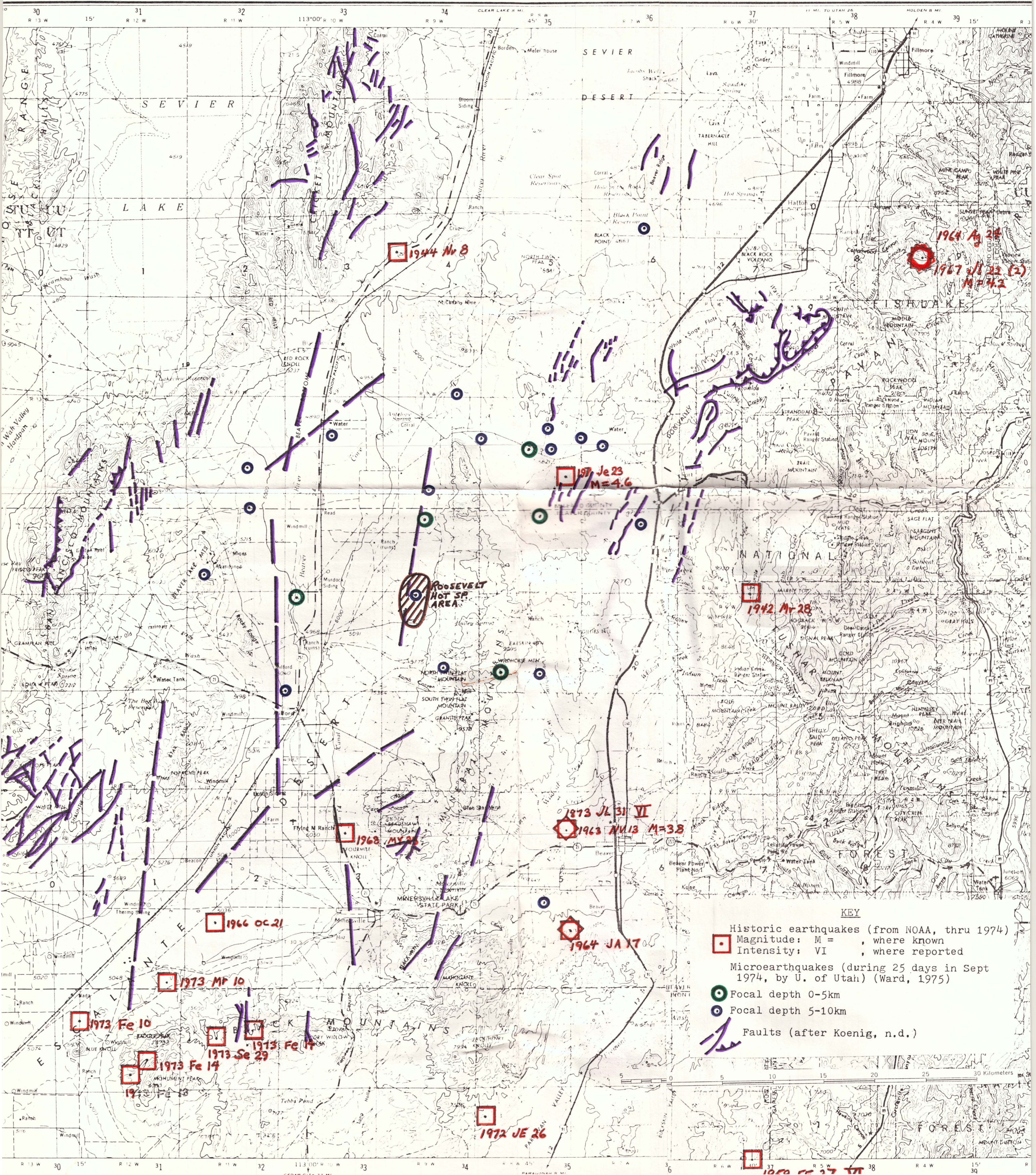
Exploration emphasis should be placed on the three zones cited in the previous paragraph, as well as in the Roosevelt Hot Springs area. The dual seismograph should be operated continuously for at least two weeks at selected sites, preferably underground, in order to establish levels of seismicity. When the active areas have been determined, microearthquake surveys should be conducted for the purpose of mapping the hypocenters and determining fault planes to depth.


Arthur L. Lange

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Reference

1. WARD, S. (no date). No title (progress report to National Science Foundation). University of Utah; Dept. of Geology and Geophysics.



1944 Nr 8

1964 Ag 24
1967 11 23 (2)
M=4.2

197 Je 23
M=4.6

ROOSEVELT
HOT SP AREA

1942 My 28

1973 JL 31 VI
1963 Nu 13 M=3.8

1968 MY 21

1966 Oc 21

1964 JA 17

1973 MF 10

1973 Fe 10

1973 Se 29

1973 Fe 17

1973 Fe 14

1973 Fe 13

1972 JE 26

1970 SE 27 VI

KEY

- Historic earthquakes (from NOAA, thru 1974)
- Magnitude: M = , where known
- Intensity: VI , where reported
- Microearthquakes (during 25 days in Sept 1974, by U. of Utah) (Ward, 1975)
- Focal depth 0-5km
- Focal depth 5-10km
- Faults (after Koenig, n.d.)

