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INTER-OFFICE MEMORANDUM

SUBJECT: Gravity Survey around Beulah Hot Springs DATE March 16, 1976

TO: W. M. Dolan, H. J. Olson, H. D. Pilkington, G/T Staff cc: J. Roth

FROM: A. L. Lange

A gravity survey was conducted around Beulah Reservoir by John Deymonaz between 29 November and 4 December 1975. Ninety-seven stations were occupied, primarily along roads and utilizing benchmark elevations where available. Intermediate elevations were determined from altimeter readings tied to a base-station microbarograph. Standard Bouguer corrections were made using a density value of 2.67gm/cm^3 and readings were adjusted to the U.S.G.S. net. Computations were performed by A. Oduolowu, who contoured the results to construct the simple Bouguer plot of Figure 1.

Terrain corrections were computed by hand at two locations, shown in the B-B' profile of Figure 2. From these trials, it appears that terrain corrections are warranted, and that their result will be to subdue the gravity relief along this profile.

From the preliminary map of Figure 1 several features can be seen. On the broad scale, two trends appear: 1) a general NW-SE structure across the north end of the survey, corresponding in its NW region to a mapped syncline in Juntura formation volcanics. A second series of structures run more or less N-S. These show up in gravity highs, and form the expression of the west-bounding fault of the Beulah Reservoir graben.

The two northern negative anomalies seen in the map and profile are of interest. The eastern one encompasses the hot springs at the northeast end of the reservoir. It may be attributable to a thicker section of tuffs contained in the Beulah graben. The northwestern anomaly falls on the mapped synclinal axis and also may express a thicker section of tuffs. Alternatively, alteration (shown very approximately on the map - D. Pilkington, personal communication) may contribute to the low. Alteration at depth around the hot springs might be invoked to explain the northeastern anomaly as well; however, the manifestations have not been seen in that area.

Telluric lows have an evident relationship to the gravity lows. I show the pertinent telluric anomalies on the map in blue (8hz) and green (0.05hz). Telluric lows of both frequencies seem to be associated with the hot springs and the gravity lows. The general telluric trend (NW-SE) parallels that of the gravity. The NW telluric anomalies coincide with the gravity low and the observed alteration. These relationships point to a thermal origin, past and/or present, for the gravity and telluric lows in these portions of the map.

Since a detailed geologic map is presently being constructed, and the complete heat flow data from the AMAX surveys remain to be processed, I defer discussing the relationships further until that information is available. Meanwhile, the map showing the gravity stations reveals a dearth of sites in several areas.

I recommend that additional gravity coverage be undertaken, terrain corrections applied to all the data. A systematic comparison with the geology and other information can then be made.

Arthur L. Lange

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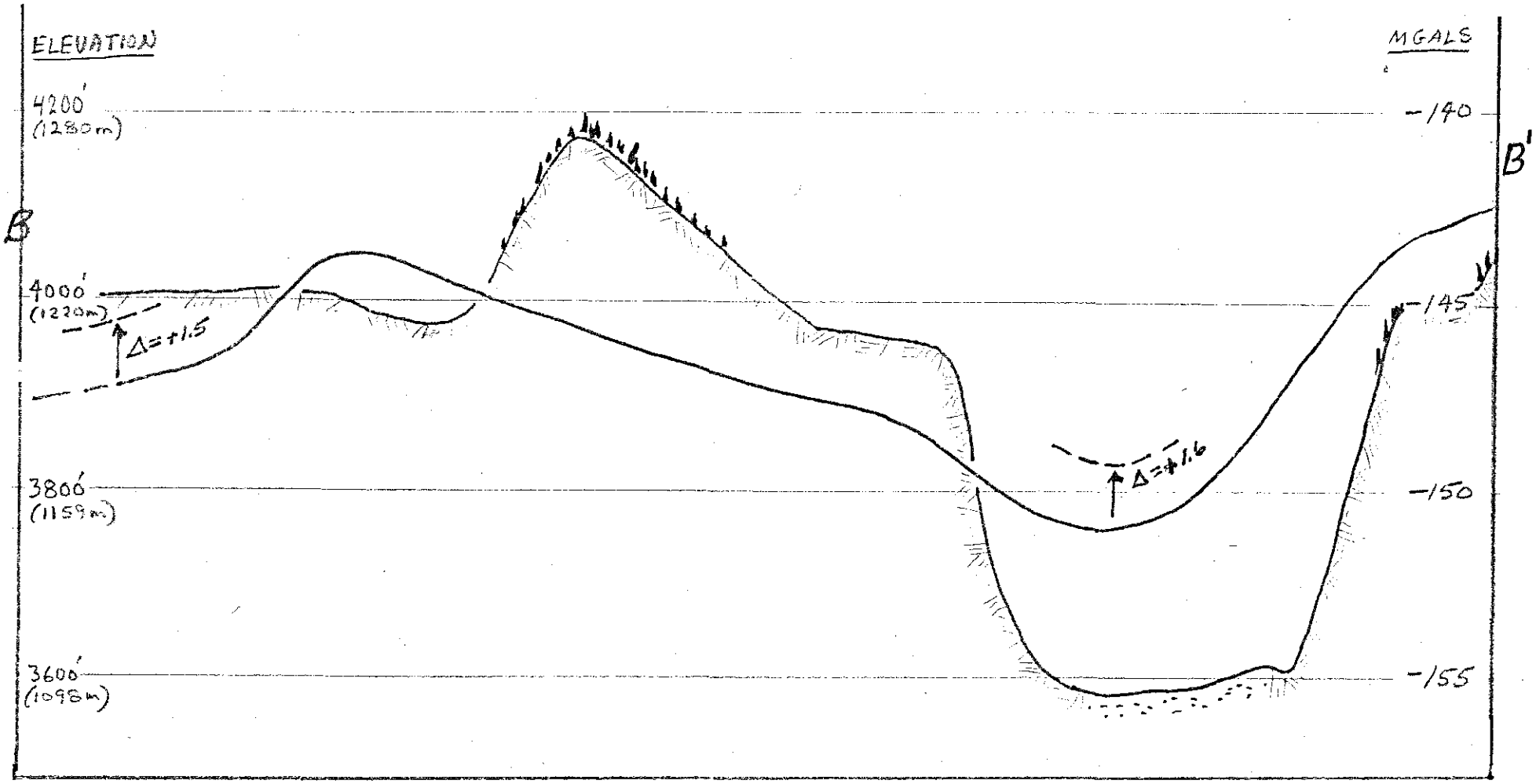

Figure 2. Bouguer gravity profile along Line B-B' of Figure 1. Terrain corrections were made at the two points shown, having the effect of subduing the negative anomalies.

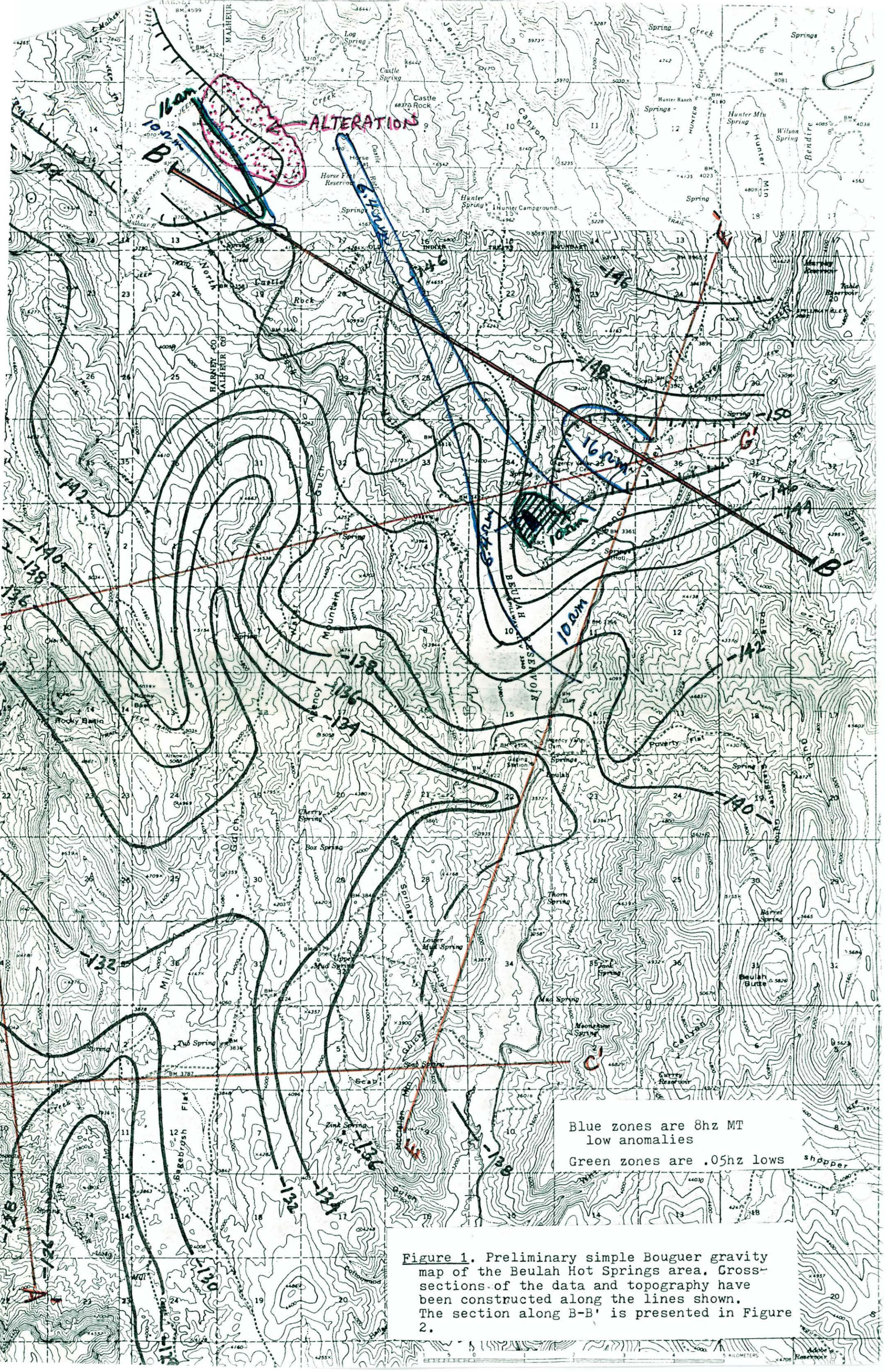

Figure 1. Preliminary simple Bouguer gravity map of the Beulah Hot Springs area. Cross-sections of the data and topography have been constructed along the lines shown. The section along B-B' is presented in Figure 2.