

AMAX EXPLORATION, INC.
 4704 HARLAN STREET • DENVER, COLORADO 80212

INTER-OFFICE MEMORANDUM

SUBJECT: 1977 Thermal Gradient Drilling Data, Utah

DATE June 28, 1977

TO: H. J. Olson

cc: C. Caywood

W. Dolan

L. Hall

FROM: H. D. Pilkington

M. Hegge

A. Lange

| <u>Project Hole #</u> | <u>"B" Hole #</u> | <u>Location</u> | <u>Depth (m)</u> | <u>4T</u> | <u>K</u> | <u>Q</u> |
|-----------------------|-------------------|---|------------------|-------------------|----------|----------|
| 755-1 | B-289 | NW $\frac{1}{4}$ SW $\frac{1}{4}$ S34 T30S R11W | 68 | 72 | 4.5 | 3.2 |
| 2A | 290 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ S9 T30S R11W | 20 | 195 | 4.0 | 7.8 |
| 2 | 291 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ S9 T30S R11W | 68 | 190, 167 | 4.5 | 7.5 |
| 3 | 279 | SE $\frac{1}{4}$ SW $\frac{1}{4}$ S7 T31S R11W | 68 | 47 | 6.5 | 3.1 |
| 4 | 274 | SW $\frac{1}{4}$ NE $\frac{1}{4}$ S32 T30S R11W | 68 | 153, 87 | 5.0 | 4.4 |
| 5 | 278 | SE $\frac{1}{4}$ SE $\frac{1}{4}$ S33 T31S R12W | 68 | 58 | 4.5 | 2.6 |
| 6 | 419 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S32 T30S R10W | 100 | 90 | 3.5 | 3.2 |
| 8 | 280 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S25 T31S R12W | 68 | 58 | 5.0 | 2.9 |
| 9 | 281 | SE $\frac{1}{4}$ SW $\frac{1}{4}$ S2 T32S R12W | 90 | 89 | 5.0 | 4.5 |
| 11 | 288 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ S14 T31S R11W | 100 | 127, 100, 119 | 4.5 | 5.4 |
| 12 | 420 | SW $\frac{1}{4}$ SE $\frac{1}{4}$ S28 T30S R10W | 100 | 88, 97 | 3.5 | 3.4 |
| 13 | 421 | SW $\frac{1}{4}$ SE $\frac{1}{4}$ S13 T30S R10W | 100 | 65, 49 | 4.5 | 2.2 |
| <u>777-1</u> | B-262 | NW $\frac{1}{4}$ NE $\frac{1}{4}$ S36 T24S R7W | 50 | 348, 250 | 9.1 | 22.8 |
| 2 | 257 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S31 T24S R6W | 68 | 354, 277 | 7.0 | 19.4 |
| 3 | 261 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S6 T25S R6W | 68 | 280 | 6.0 | 16.8 |
| 4 | 423 | NW $\frac{1}{4}$ SW $\frac{1}{4}$ S13 T25S R7W | 68 | 102, 84 | 5.5 | 8.6 |
| 5 | 272 | SE $\frac{1}{4}$ SE $\frac{1}{4}$ S7 T25S R6W | 68 | 189, 174 | 5.4 | 9.4 |
| 6 | 273 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S30 T25S R6W | 68 | 380, 281 | 5.4 | 15.2 |
| 7 | 271 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S1 T26S R7W | 100 | 343, 413, 0, -131 | 3.5 | NVD |
| 8 | 270 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S19 T25S R6W | 68 | 433, 282, 211 | 6.0 | 12.7 |
| 9 | 269 | SW $\frac{1}{4}$ NE $\frac{1}{4}$ S13 T26S R7W | 68 | 172, 348, 446, 28 | 5.0 | NVD |

| Project Hole # | "B" Hole # | Location | Depth(m) | ΔT | K | Q |
|----------------|------------|--|----------|-----------------|-----|------|
| 777-10 | B-268 | SE $\frac{1}{4}$ SE $\frac{1}{4}$ S23 T26S R7W | 68 | 98 | 5.0 | 4.9 |
| 11 | 267 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S29 T25S R6W | 68 | 254,434,192 | 6.1 | 11.7 |
| 778- 1 | B-412 | NW $\frac{1}{4}$ NE $\frac{1}{4}$ S21 T29S R9W | 68 | 32 | 6.8 | 2.2 |
| 2 | 410 | NW $\frac{1}{4}$ NE $\frac{1}{4}$ S19 T29S R9W | 68 | 26 | 5.5 | 1.4 |
| 3 | 411 | NW $\frac{1}{4}$ SW $\frac{1}{4}$ S20 T29S R9W | 68 | 28 | 5.5 | 1.5 |
| 779- 1 | B-297 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ S34 T23S R8W | 100 | 169,140 | 5.5 | 7.7 |
| 2 | 266 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S15 T27S R8W | 100 | 37,20,11,38 | 3.5 | 1.3 |
| 3 | 298 | NE $\frac{1}{4}$ SW $\frac{1}{4}$ S3 T24S R8W | 65 | 56,90,50 | 5.5 | 2.8 |
| 4 | 295 | SE $\frac{1}{4}$ NW $\frac{1}{4}$ S35 T23S R8W | 100 | 43,49 | 3.5 | 1.7 |
| 5 | 277 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S26 T23S R8W | 70 | 45,32 | 3.5 | 1.1 |
| 6 | 260 | NW $\frac{1}{4}$ SE $\frac{1}{4}$ S27 T23S R6W | 100 | 37,32 | 5.0 | 1.6 |
| 7 | 282 | SE $\frac{1}{4}$ NW $\frac{1}{4}$ S21 T23S R6W | 100 | 31,58,28,12 | 3.5 | 1.0 |
| 8 | 258 | NW $\frac{1}{4}$ NE $\frac{1}{4}$ S8 T23S R6W | 100 | 80,0,89,47 | 3.5 | 1.6 |
| 9 | 424 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S23 T22S R6W | 100 | 68,32,44 | 3.5 | 1.5 |
| 10 | 264 | SE $\frac{1}{4}$ SW $\frac{1}{4}$ S30 T22S R5W | 45 | 23,9 | 2.2 | NVD |
| 11 | 263 | NW $\frac{1}{4}$ SE $\frac{1}{4}$ S32 T22S R5W | 100 | 20,42,25 | 3.5 | 0.9 |
| 12 | 259 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S1 T22S R6W | 100 | 34,29,35 | 3.5 | 1.2 |
| 13 | 415 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S10 T30S R8W | 100 | 39,15 | 2.2 | 0.9 |
| 14 | 416 | NE $\frac{1}{4}$ NE $\frac{1}{4}$ S3 T30S R8W | 100 | 19,44,32 | 3.5 | 1.1 |
| 15 | 417 | SW $\frac{1}{4}$ NE $\frac{1}{4}$ S26 T29S R8W | 100 | 56,33,64,43 | 3.5 | 1.5 |
| 16 | 414 | NE $\frac{1}{4}$ NE $\frac{1}{4}$ S3 T30S R7W | 70 | 68,54,92 | 3.5 | 3.2 |
| 17 | 413 | SW $\frac{1}{4}$ NW $\frac{1}{4}$ S19 T29S R6W | 100 | 45 | 3.5 | 1.6 |
| 19 | 418 | NW $\frac{1}{4}$ NE $\frac{1}{4}$ S10 T26S R9W | 68 | 33 | 5.5 | 1.8 |
| 20 | 276 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S5 T26S R8W | 150 | 39 | 4.5 | 1.8 |
| 21 | 296 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S31 T24S R7W | 68 | 247,390,218,159 | 3.7 | 8.1 |
| 22 | 425 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S36 T26S R7W | 32 | 11.5 | 5.5 | NVD |
| 23 | 287 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S35 T26S R7W | 100 | 31 | 3.5 | 1.1 |
| 802- 1 | B-294 | NE $\frac{1}{4}$ NE $\frac{1}{4}$ S26 T24S R8W | 68 | 124,57,218,73 | 5.0 | 3.7 |
| 2 | 293 | NE $\frac{1}{4}$ SE $\frac{1}{4}$ S25 T24S R8W | 68 | 155,110 | 3.7 | 4.1 |
| 3 | 292 | NW $\frac{1}{4}$ NW $\frac{1}{4}$ S21 T24S R7W | 100 | 70 | 5.5 | 3.9 |
| 4 | 275 | SE $\frac{1}{4}$ SW $\frac{1}{4}$ S27 T24S R7W | 75 | 346,260,227 | 3.4 | 7.7 |

| <u>Project Hole #</u> | <u>"B" Hole #</u> | <u>Location</u> | <u>Depth(m)</u> | <u>ΔT</u> | <u>K</u> | <u>Q</u> |
|-----------------------|-------------------|---|-----------------|------------------------------|----------|----------|
| 819- 1 | B-265 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec 11 T22S R6W | 18 | 112 | 2.2 | NVD |
| 2 | 422 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec 11 T22S R6W | 100 | 54,141,173,123 | 3.5 | 4.3 |
| 821- 4 | B-284 | SE $\frac{1}{4}$ NE $\frac{1}{4}$ S18 T29S R13W | 68 | 46 | 4.0 | 1.8 |
| 6 | 285 | SW $\frac{1}{4}$ NE $\frac{1}{4}$ S7 T29S R13W | 68 | 82 | 4.0 | 3.3 |
| 7 | 286 | NE $\frac{1}{4}$ SW $\frac{1}{4}$ S6 T29S R13W | 68 | 18 | 5.0 | 0.9 |
| 8 | 402 | SW $\frac{1}{4}$ SE $\frac{1}{4}$ S36 T28S R13W | 68 | 60 | 3.5 | 2.1 |
| 9 | 283 | NE $\frac{1}{4}$ NE $\frac{1}{4}$ S8 T29S R13W | 70 | 22 | 5.0 | 1.1 |
| 10 | 401 | SE $\frac{1}{4}$ NE $\frac{1}{4}$ S4 T29S R13W | 68 | 33 | 5.5 | 1.8 |
| 11 | 400 | SE $\frac{1}{4}$ SE $\frac{1}{4}$ S32 T28S R13W | 68 | 28 | 5.5 | 1.5 |
| 12 | 403 | NW $\frac{1}{4}$ SE $\frac{1}{4}$ S26 T27S R13W | 68 | 161 | 5.0 | 8.1 |
| 13 | 409 | NE $\frac{1}{4}$ NE $\frac{1}{4}$ S30 T27S R12W | 100 | 62 | 5.0 | 3.1 |
| 14 | 405 | NE $\frac{1}{4}$ SW $\frac{1}{4}$ S7 T28S R12W | 68 | 59 | 5.0 | 3.0 |
| 15 | 408 | SE $\frac{1}{4}$ SE $\frac{1}{4}$ S5 T28S R12W | 150 | 47 | 4.5 | 2.1 |
| 16 | 404 | SW $\frac{1}{4}$ SE $\frac{1}{4}$ S15 T28S R12W | 100 | 36 | 3.5 | 1.3 |
| 17 | 407 | SE $\frac{1}{4}$ NW $\frac{1}{4}$ S34 T27S R12W | 100 | 43 | 4.0 | 1.7 |
| 18 | 406 | SW $\frac{1}{4}$ SW $\frac{1}{4}$ S13 T28S R13W | 100 | 47 | 4.1 | 1.9 |

Drill holes 777-7 and 777-9 have gradients which reflect lateral heat flow associated with leakage of warm waters along the mountain front fault bounding the west side of the Tushar Mountains. No valid heat flow calculations can be made on the basis of the shallow gradients. In drill holes 779-10 and 779-22 cold water aquifers were encountered which concealed the true gradients and no reliable heat flow calculation can be made.

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