TEC-3

GEOTHERMAL RECONNAISSANCE PROGRAM

January through June, 1982

by

William Teplow, Garry Maurath
and
Frank Dellechaie

June 30, 1982

O'Brien Resources Corporation
154 Hughes Road, Suite 4
Grass Valley, California 95945

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Summary

1. O'Brien Resources executed a geothermal reconnaissance program in California, Idaho, Nevada, Oregon, Utah and Washington during the period of January - June, 1982 in compliance with the AMAX-O'Brien Joint Venture.

2. The literature research phase of the program (January through March, 1982) resulted in the identification of 135 geothermal target areas in the aforementioned states.

3. Thirty-six of the 135 targets were examined in the field.

4. Data from field work performed from April through June, 1982 indicate that five targets warrant further assessment work. These targets are:

CA-136	Adobe Hills, Mono County, CA
NV-63	Huntoon Valley, Mineral County, NV
NV-79	Churchill Valley, Lyon County, NV
NV-54	Dayton-Sutro, Storey County, NV
OR-84	Whitehorse Caldera, Harney County, OR

5. The six-month reconnaissance program had a total expenditure of $68,516.61. This figure includes drilling and assessment costs for the Noquez, Rast and Silver Cloud prospects.

Introduction

O'Brien Resources Corporation undertook a geothermal reconnaissance program during the period January - June, 1982 in compliance with the AMAX-O'Brien Joint Venture Agreement. The reconnaissance program covered six western states: California, Idaho, Nevada, Oregon, Utah and Washington.

The program was executed in two stages. The first stage consisted of a literature review to identify promising geothermal target areas. Libraries and personnel affiliated with state geologic agencies, regional U.S. Geological Survey offices and state universities were visited. These literature searches and personal contacts led to the identification of 135 geothermal targets. The basic criteria used to identify target areas were:

1. Young silicic volcanism
2. Tensional faulting
3. Hydrothermal alteration
4. Hg, As, S, or alunite mineralization
5. Records of high thermal gradients or bottom hole temperatures
6. Hot spring activity in areas not currently leased.

In addition, Landsat false color images, composed of bands 4, 5 and 7 at a scale of 1:250,000 were used to locate structural trends or color anomalies that might be indicative of active hydrothermal systems.

The second stage of the reconnaissance program consisted of field examination of these targets. Time and budget constraints necessitated that a

limited number of targets be selected from the 135 potential targets. Probability of success and accessibility were the primary factors used in selecting 36 targets for field checking. Targets were evaluated with an emphasis on the following criteria:

1. Thermal gradient measurements of all available wells and mineral holes
2. Examination of hydrothermal alteration and mineralization
3. Examination of relevant structure
4. Examination of springs and spring deposits
5. Local inquiry with regard to the existence of warm wells and springs
6. Current land status.

Based on these criteria, each prospect was rated on a scale of 1-10, 10 indicating maximum geothermal potential. The rating scale is explained in table 1.

A comprehensive compilation of targets identified during the research phase and a list of all references are included in this report. Targets which were field checked are briefly described and rated. Recommendations for further assessment work are given. A summary of the program budget is given in Appendix A.

Table 1
Observations sufficient for assigned rating

Rating	Heat flow	Current Hydro-thermal activity	Age, Type, extent of mineralization	Age of host rock	Age and type of nearby extrusives	Type of deposit
8,9,10	>5.0 HFU	Hot springs Hot wells Fumaroles	-	Quaternary	-	-
5,6,7	2.5-5.0 HFU	Warm springs Warm wells	Massive or extensive opalite deposits. Intense and extensive argillization. Rating decreases with increasing age.	Pliocene-Pleistocene	Quaternary-Late Tertiary acid volcanics. Rating decreases with age and mafic content.	S and Hg
1,2,3,4	<2.5 HFU	Cold springs	Alteration is non-silicious, local and incomplete.	Tertiary	Early and Middle Tertiary	Hg

Geothermal Targets

Literature research and personal contacts during January - March, 1982 resulted in identification of 135 geothermal targets listed in Table 2. The list is organized by state and gives the target number, location, a brief description and references used in identifying the targets. An asterisk before the target numbers identifies targets which were field checked. Target locations are shown in Plates 1 through 6. A list of all references used in the research begins on page 63.

Table 2: List of Geothermal Targets

California

	No.	Township	Range	County	AMS	Description (references)
*	CA-125	19-21S	37-38E	Inyo	Death Valley	Owens Valley: Pliocene pyroclastics, faulting, seismic area, gravity low. (10,11,13,14,20,21,22,24)
*	CA-126	17-19S	38-40E	Inyo	Death Valley	Talc City Hills: seismic area, Quaternary volcanic centers, minor faulting, intersection of photolinears (24,30,31,15)
*	CA-127	11N 14N 11-13N	16-17E 17-18E 18E	San Bernardino	Kingman	Piute Range/Hackberry Mt./Castle Mt.: gravity low, Hg deposit, Tertiary rhyolite, caldera ?, color anomalies, faulting (15,25,20,21)
*	CA-128	10S	34E	Inyo	Mariposa	Owens Valley: seismic activity, faulting, curvilinear/photolinear intersections, age date = 0.99 m.y. (5,10,11,15,22,24)
*	CA-129	2-4N	20-21E	San Bernardino	Needles	Turtle Mts.: Pliocene basalts, Tertiary rhyolite faulting, gravity low, lineaments (4,11,15,20,21)
*	CA-130	10N	1W-2E	San Bernardino	San Bernardino	Calico Mts.: Hg deposits, gravity low, extensive faulting, Miocene rhyolite (4,11,15,20,21)
*	CA-131	7N	7-9E 5-10E	San Bernardino	San Bernardino	Bristol/Cady Mountains: seismic area, gravity low, faulting, Miocene rhyolite (4,11,15,20,21)
	CA-132	32-35N	2-5E	Lassen	Susanville	Burney Mt. Area: Hg deposit, gravity low, Pleistocene andesite, photolinears (8,10,15,20,21,6,16,17,18)
	CA-133	29-32N	7-8E	Lassen	Susanville	East of Lassen: high seismic activity, gravity low, Hg deposits, Pleistocene pyroclastics (6,16)
*	CA-134	20N	43-44N	Inyo	Trona	Gold Bottom Mine: aeromagnetic low, gravity low, area of high seismic activity, intersection of photolinears (20,21,17,24)
*	CA-135	32S	44-45E	San Bernardino	Trona	Black Mountains: faulting, minor seismic activity, Miocene rhyolite, photolinears (10,11,15)
*	CA-136	2-3N	29-30E	Mono	Walker Lake	Adobe Hills: seismic area, Pliocene rhyolite, faulting, gravity low (15,16,20,21)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
CA-137	45-48N	15-16E	Modoc	Alturas	Warner Mountains: Surprise Valley fault, Hg deposits, recent obsidian flows, gravity low (15)
CA-138	36-38N	3-4E	Lassen	Alturas	Soldier Mountain: seismic activity Pliocene andesite, gravity low, intersection of photolinears & curvilinears (15, 16)
CA-139	42-46N 43N	1W-3E 1-2E	Siskiyou	Alturas	Medicine Lake Highlands/Garner Mt.: NW trending regional structure, age date = 0.08 m.y. youngest volcanics in the Modoc Plateau, rhyolite (6,15,16,17)
CA-140	30S	36E	Kerne	Bakersfield	Jawbone: Miocene rhyolite, faulting, Hg deposit, photolinears, color anomalies (15)
CA-141	18-20S	3-4E	Inyo	Death Valley	Greenwater Range: Pliocene rhyolite, age date = 4-6 m.y., gravity low (15)
CA-142	11-13S	37-39E	Inyo	Death Valley	Saline Range: Hot springs, age date = 3 m.y., extensive faulting, Pliocene basalts, color anomalies (15)
CA-143	17-19S	40-42E	Inyo	Death Valley	Argus Range/Ash Hill: age date = 4 m.y., Pliocene andesite, faulting, photolinear trend intersection (15)
CA-144	11-12S	34-35E	Inyo	Fresno	North Owens Valley/Inyo Mts.: Quaternary volcanic centers, seismic activity (11, 22, 24)
CA-145	18S	35E	Tulare	Fresno	Templeton Mt.: age date = 0.18 m.y., rhyolite dome, seismic activity, (15)
CA-146	9-11S	37-39E	Inyo	Goldfield	Saline Range: Quaternary volcanic centers, seismic activity, Tertiary rhyolite (15)
CA-147	2N-2S	29-31E	Mono	Mariposa	Adobe Valley: age date = 0.69 m.y., Hg deposits, seismic area, caldera ? recent faulting, Pleistocene rhyolite, gravity low (14, 24)
CA-148	1N-2S	31-32E	Mono	Mariposa	Benton Valley: Benton hot spring, Hg deposits, seismic area, recent faulting (14)
CA-149	2-5S	31-33E	Mono	Mariposa	Volcanic Tablelands: age dates = 0.73 - 0.76 m.y., Hg deposits, seismic area, faulting, photolinears (9,14)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
CA-150	6-8N	10-11E	San Bernardino	Needles	Bristol Mts.: Miocene rhyolite, color anomaly (15)
CA-151	6-8N	13-15E	San Bernardino	Needles	Clipper Mts.: Tertiary rhyolite faulting, color anomalies (15)
CA-152	11-13S	20-21E	Imperial	Salton Sea	Trigo Mts.: Clay deposits, gravity low, Tertiary rhyolite (15, 13)
CA-153	7S	12-13E	Riverside	Salton Sea	Orocopia Mts.: seismic activity Tertiary volcanics (15)
CA-154	18-20N	1-3E	San Bernardino	Trona	Black Magic Mines: near Garlock fault zone, seismic area, aeromagnetic low, caldera ?? color anomalies (15,20,21)
CA-155	29S	10-11W	San Bernardino	Trona	El Paso Mts.: Seismic activity, Pliocene andesite, photolinears (15)
CA-156	29-30S	6W	San Bernardino	Trona	SE Randsburg: KGRA, gravity low, hot well, intersection of photolinears and curvilinears, faulting (1,9,14,20, 21,24,26)
CA-157	22-23S	43-44E	Inyo	Trona	Northern Slate Range: gravity low, seismic area, Quaternary-Tertiary andesite, color anomalies, photolinears (15,20, 21,24)
CA-158	3-5N 5N	25-28E 26-27E	Mono	Walker Lake	Bodie: opalite, Hg deposits, Quaternary volcanic centers, seismic activity, Pliocene rhyolite (9,24)
CA-159	9-11N	21-22E	Alpine	Walker Lake	Leviathan Peak: Hg & S deposits, seismic area, Pliocene rhyolite (2,3)
CA-160	5-7N	23-24E	Mono	Walker Lake	Sweetwater Mountains: faulting, Pliocene rhyolite, color anomalies, photolinears (15)
CA-161	43-46N	1-3W	Siskiyou	Weed	Meiss Lake: faulting, Recent andesite, photolinear intersections (9,14)
Idaho					
ID-34	1-4N	41-44E	Bonneville	Driggs	Antelope/Swan Valley: thermal springs, age date = 0.8 m.y., faulting, Pliocene silicic extrusive rocks (38,48)
ID-35	1-4S	38-40E	Brigham	Driggs	Blackfoot Mountains: Pliocene, silicic extrusive rocks (38,45)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
ID-36	3-4S	41-42E	Bonne-ville	Driggs	Little Valley Hills: faulting, Pliocene silicic extrusive rocks, Pleistocene basalt (45, 46)
ID-37	10-13S 13S	25-26E 28E	Cassia	Pocatello	Cotterel Mountains/ Sublet Area: hot springs, faulting, Pliocene silicic volcanics, photolinear intersections (39,40)
ID-38	12-15N	42-46E	Fremont	Ashton	Island Park North: Island Park caldera, upper Pleistocene silicic volcanics (37,40,44)
ID-39	10-22S 13-14S 14-16S	35-36E 37-38E 36-37E	Oneida	Pocatello	Bannock/Portneui Ranges: thermal springs, minor faulting, Pliocene volcanics, Pleistocene basalt (38)
ID-40	5-9S	41-43E	Caribou	Preston	Aspen & Chesterfield Ranges/ Pelican Mts.: seismic area, Pliocene silicic welded tuff, age dates = 0.08 -0.1 m.y. (38)
Nevada					
NV-53	5N	28E	Mineral	Walker Lake	Aurora rhyolite plug 2.5 m.y. (61)
* NV-54	17N	22E	Storey		Rhyolite plug (61)
NV-55			Nye		Hot Creek Valley Reveille Range mafic cone field (61)
NV-56			Lander	Winne-mucca	Quaternary mafic volcanic centers. Buffalo Valley, Fish Creek Mtns. (61) (77)
NV-57	20N 19N	20E 20E	Storey	Reno	Wetekind, Vista - 70°C mine water, steaming fissures, fee play (56)
NV-58	40N	33E	Humboldt	VYA	Hg deposits in late Tertiary volcanics, H.S. deposits (86)
NV-59			Lander	Winne-mucca	Contains Hg and H.S. - leased only at mine site (53)
* NV-60	2N	32E	Mineral	Mariposa	Hg + S - in silicified tuff (53)
* NV-61	13N	31E	Mineral	Reno	Hg in opalized Tertiary tuff (53)
* NV-62	2N	33E	Mineral	Mariposa	45°C water well (58)
* NV-63	3N	31E	Mineral	Mariposa	25.5°C water well @ 19.4 m. (58)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
NV-64	43N	60E	Elko	Elko	61°C H.S. - Mary's River lineament (58) (Landsat 044-031)
NV-65	46N	50E	Elko	Elko	40°C H.S. - several springs (58)
NV-66	39N	50E	Elko	McDermitt	47.0°C Spring w/travertine (58)
NV-67	1S	41E	Esmeralda	Goldfield	60°C H.S. (58)
NV-68			Eureka	Winnemucca Miller	65°C H.S. Sulfur Springs Range, Warm Spring lineament (58)
NV-69			Humboldt	VYA	N.E. arm of Black Rock Desert hot springs lineament (58)
* NV-70			Walker Lake	Mineral	Garfield Flat, shallow seismic center (73)
* NV-71			Mineral	Walker Lake	Teels marsh shallow seismic center (73)
* NV-72			Storey	Reno	Washington - Virginia City shallow seismic center (73)
NV-73			Humboldt	McDermitt Vya	McDermitt Caldera (69)
NV-74			Washoe	Lovelock	Smoke Creek Desert seismic anomaly (67) (87)
NV-75			Washoe	Lovelock	Herlong seismic center (67) (87)
NV-76			Washoe	Reno	Olinghouse Quaternary Fault zone (54)
NV-77			Washoe	Reno	Warm Springs Valley Quaternary faulting (54) seismic center (67) (87)
* NV-78	27N	21E	Washoe	Lovelock	Halloysite deposit - terraced hills (65)
* NV-79	17N	27E	Churchill	Reno	Some Tuesday Kaolinite deposit (65)
NV-80	5S	66E	Lincoln	Caliente	Boyd kaolinite deposit (65) Intersection of two major photolinears (Landsat image 042-038)
* NV-81	37N	40E	Humboldt	McDermitt	Stone corral silica deposit
NV-82	4S 5S	42E 43S	Esmeralda	Goldfield	Cuprite district kaolinite, opalite, S (65)
* NV-83	37N	41E	Humboldt	McDermitt	Color anomaly associated with range front fault (Landsat Image 044-031)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
NV-84	40N	24E	Humboldt	Vya	Soldier Meadow hot springs 123°F (58)
NV-85	40N	28E	Humboldt	Vya	Pinto hot springs 200°F (58)
NV-86	1N 2N	35E 36E	Mineral	Mariposa	Major fault with silica mineralization in Volcanic Hills (Landsat Image 044-034)
NV-87	19N	52E	Eureka	Millet	Circular feature (Landsat Image 044-032)
NV-88			Elko	McDermitt	Bull Run Mtn. range front fault photolinear (Landsat Image 044-031)
NV-89			Eureka	Winne-mucca	Boulder Valley - Sheep Creek Range Photolinear - range front fault (Landsat Image 044-032)
Oregon					
OR-69	24S	37E	Malheur	Burns	H.S. 145°C geothermometry reservoir temp. - Mariner (139) (90)
* OR-70	25S 26S	12E 13E	Lake	Crescent	Aeromagnetic low (125) gravity low (129)
OR-71	26S	11E	Klamath	Crescent	Incipient caldera (117)
OR-72	22S	14,15E	Deschutes	Crescent	Silicic plugs, China Hat, East Butte, 800,000 yrs. (leased) (128)
OR-73	26S	7E	Klamath	Crescent	Burn Butte silicic flow (95)
OR-74	25S 26S	18E 19E	Klamath	Crescent	Walker Rim - major normal fault (130)
OR-75	21S	11E	Deschutes	Crescent	Silicic flow, 0.58 m.y. (144)
OR-76	22S	12E	Deschutes	Crescent	Silicic flow, 0.58 m.y. (144)
OR-77	19S	11E	Deschutes	Crescent	Silicic flow, Benham Falls (117)
OR-78	20S	8E	Deschutes	Crescent	Silicic dome (128)
OR-79			Klamath	Medford	High Cascades - Crater Lake to CA border, abundant Recent cinder cones (128)
OR-80	33S	7E	Klamath	Klamath	Fort Klamath aeromagnetic low, gravity low, seismic (130)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
OR-81	18S 19S 20S	9E	Deschutes	Crescent	Recent mafic cinder cone lineament (128)
* OR-82	37S 38S	22E	Lake	Klamath Falls	Silicic caldera rim between two seismically active grabens (128, 142)
OR-83	24S	5½E	Klamath	Roseburg	Warm springs in Summit Lake Valley (143,98)
* OR-84	37,38, 39S	36,37E	Harney	Adel	Whitehorse Caldera, 3 hot springs 15 m.y. (132)
OR-85			Harney	Adel	Catlow Rim - major Basin and Range structure (95)
* OR-86			Lake	Adel	Guano Valley Basin and Range structure (95)
OR-87	16S	9,10E	Deschutes	Bend	Dacite 0.4 -0.2 m.y. (136)
* OR-88				Adel	McDermitt Caldera (95)
OR-89			Deschutes	Crescent	Caldera structure ? (140, 95)
OR-90	16S	14E	Crook	Bend	37°C @ 166 m, W. side Powell Butte (89,120,107)
OR-91	22S	46E	Malheur	Boise	Hot gradient well 41°C at 275 m, 100°C/km (91)
OR-92	18S	8E	Deschutes	Bend	Holocene dacitic volcanism (135)
OR-93	19S	45E	Malheur	Boise	Vale area - south - high heat flow holes 4.7 to 6.4 HFU - Leased, (97)
OR-94			Lane	Roseburg	Eugene-Denio lineament (90)
* OR-95	27,28, 29S	36,37, 38E	Malheur	Burns	Follyfarm - intersection Brothers Fault Zone with Basin and Range (90,130)
* OR-96	36S	40,41E	Malheur	Jordan Valley	Basque H.F. anomaly, Owyhee Uplift (130)
* OR-97	21S	42E	Malheur	Boise	110°C/km, B.H.T. 24.8 at 140 m, (144) Strong NNE photolinear (Landsat Image 046-029)
OR-98	9S	17E	Jefferson	Bend	Axehandle Hg Mine, orpiment, realgar, native S (137)
* OR-99	37S	19E	Lake	Klamath Falls	White King U, Hg, As, realgar, orpiment in silicified tuff, opalite (137)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
OR-100	37S	10E	Klamath	Klamath Falls	Swan Lake, Swan Rim, escarpment and circular feature (Landsat Image 048-031)
OR-101	41S	18E	Lake	Klamath Falls	Warm wells (93)
OR-102	30S	11E	Klamath	Klamath Falls	Large circular mountain (Landsat Image 048-030)
OR-103	37S	28E	Lake	Adel	Rhyolite plug (Landsat Image 046-031)
OR-104	10S	9E	Jefferson	Bend	Major escarpment on East side of Cascade graben (68) (130) (Landsat Image 049-029)
Utah					
UT-16	33-34S	10-13W	Iron	Cedar City 042-034 042-033	North of Cedar City: Quaternary volcanic centers, seismic activity (152)
* UT-17	11-20S	13-14W	Millard Juab	Delta 041-033 042-033	House/Fish Springs Ranges: recent faulting, hot springs (152, 158)
* UT-18	11-16S	10-12W	Juab	Delta 041-033 041-032	Topaz/Little Drum Mts.: gravity low, Above average heat flow, Recent faulting, Miocene silicic volcanism, photolinear intersections, color anomalies (153, 152,155,158,160,161,164)
* UT-19	11-13S	9-10W	Juab	Delta 041-033	Keg Mountains: Recent faulting, Miocene & Oligocene silicic volcanism, above average heat flow to the N, W, & S (158, 161)
* UT-20	1N	18W	Tooele	Tooele 042-032	Tetzlaff Peak: Miocene andesites, faulting, warm wells, Quaternary rhyolite (158)
UT-21	38-40S	15-18N	Washington	Cedar City	Veyo: Veyo warm springs, seismic activity, Miocene silicic volcanics (157)
UT-22	13-16S	17-19W	Millard Juab	Delta 041-033 042-033	Confusion: recent faulting above average heat flow (158)
UT-23	9-12S	4-7W	Juab	Delta 041-032	Desert & Sheeprock Mountains: Miocene rhyolites, faulting, photolinears (158, 161)

Table 2 (continued)

No.	Township	Range	County	AMS	Description (references)
UT-24	28-30S	12-14W	Beaver	Richfield	White Mountains: Hg & S deposits, hydrothermal alteration, alunite, Tertiary volcanics, intersection of color anomalies and photolinears (158, 167)
UT-25	11W	31S	Iron	Richfield 041-033	Black Mountains: extensive faulting, Miocene volcanics, hydrothermal alteration, high heat flow (167)
Washington					
WA-37	14N	1W-1E	Lewis	Hoquiam 049-028	Mitachell Creek: high heat flow Hg deposits nearby, photolinear inter-sections (170 185)
WA-38	3N	7E	Skamania	The Dalles 049-028	Greenleaf Peak: Opal deposit, gravity low, minor seismic activity Eocene-Oligocene-Miocene, silicic volcanism (174)
WA-39	9-10N	4-5E	Cowlitz	Hoquiam	NW of Mount St. Helens: high seismic activity, gravity low, structural trend? Historic silicic volcanism (175, 176, 178, 184, 185, 187, 188)
WA-40	5-6N	7-9E	Skamania	The Dalles	Mann Butte/Little Huckleberry Mt.: Quaternary rhyolites, faulting, chalce-dony deposits (178)
WA-41	4N	13-14E	Klicki-tat	The Dalles 049-028	Wahkracus: above average heat flow, hot springs, graben? Miocene silicic vol-canics (170, 172)
WA-42	9-11N	9-12E	Lews, Skamania	Yakima 049-028	North of Mount Adams: warm springs, gravity low, Quaternary silicic vol-canism (175, 176)
WA-43	6-9N	7-9E	Skamania	Yakima 049-028	Mt. St. Helens - Mt. Adams: seismic activity, gravity low, Quaternary silicic volcanism (175, 176, 184)
WA-44	14N	12E	Lewis	Yakima 049-028	Spiral Butte: Recent silicic volcanism, Hg deposits, gravity low, high seismic activity (170,178,181,186)

Results of Field Examination

Five prospects of the 36 targets examined were identified as having sufficient geothermal merit to warrant further assessment work. These prospects are listed below (Table 3, Figure 1).

Table 3

Prospect	Name	County	State	Rating
CA-136	Adobe Hills	Mono	CA	4
NV-54	Dayton-Sutro	Lyon	NV	7
NV-63	Huntoon Valley	Mineral	NV	6
NV-79	Churchill Valley	Lyon	NV	7
OR-84	Whitehorse Caldera	Harney	OR	6

The following summaries describe the lithology, structure, alteration, mineralization, thermal data and land status of these prospects. A location map and recommendations for further assessment work are also included.

Adobe Hills, CA-136

The Adobe Hills prospect is 12 km east of Mono Lake in Township 3 North, Range 29 East, Mono County, California (Figure 2). Access is by 10 km of graded road south from State Highway 167, then east on 5 km of unimproved dirt roads. Mono Lake KGRA lies west of the prospect and Phillips Petroleum holds several geo-steam leases north of Highway 167. The area consists of moderately dissected rolling hills and is uninhabited.

Figure 1. RECOMMENDED TARGET LOCATION MAP

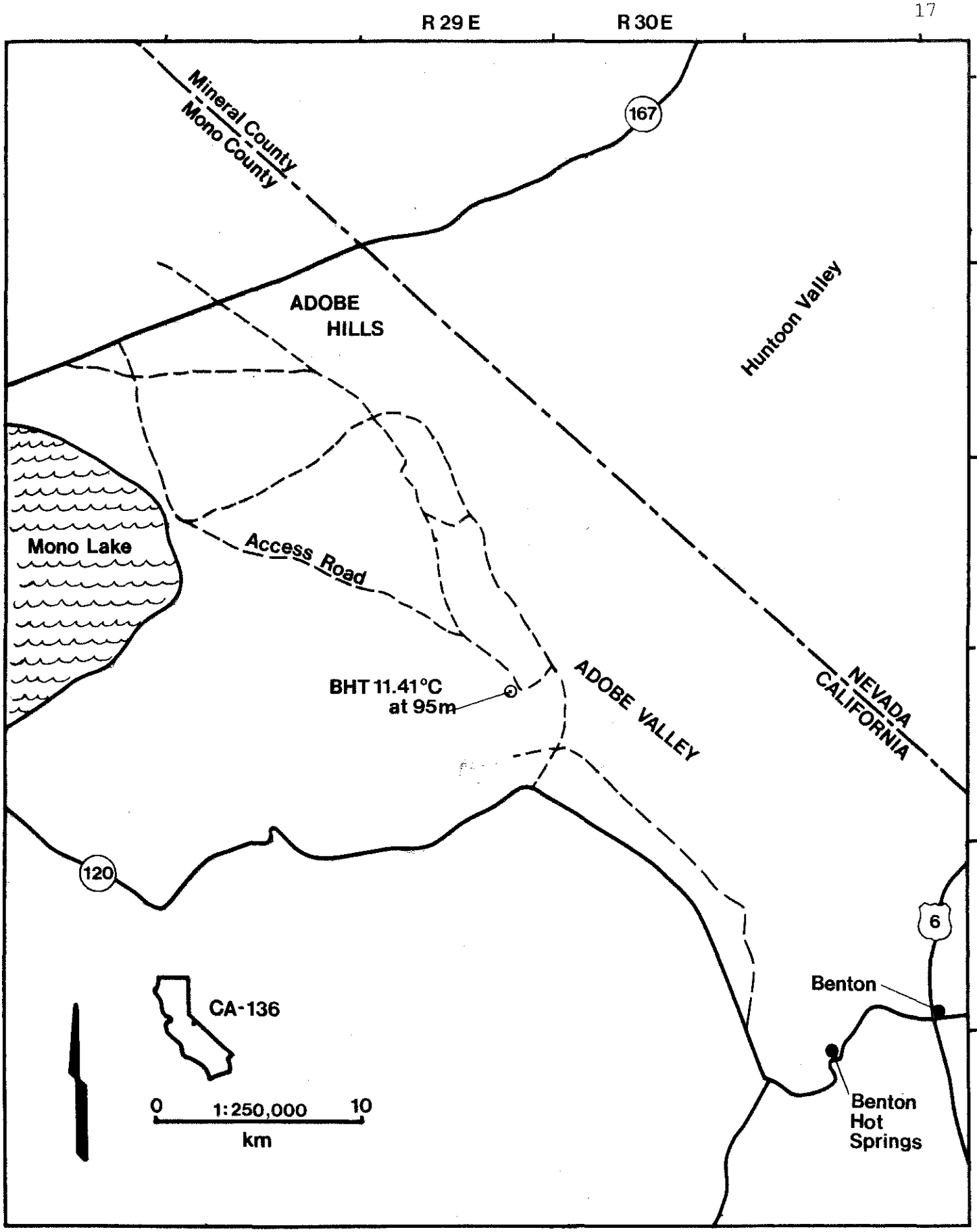

Figure 2. CA-136, ADOBE HILLS LOCATION MAP

The Adobe Hills consist of a series of Middle to Upper Pliocene extrusive volcanic rocks overlain by Quaternary alluvial and lake deposits. The oldest unit exposed in the area is a dark reddish-brown Lower Pliocene andesite flow. This flow is overlain by a Middle to Upper Pliocene porphyritic quartz rhyolite. Upper Pliocene basalt flows overlay Pliocene andesite and dacite units to the south. These flows have been uplifted to form a northeast trending horst block 5 km south of the prospect. The prospect is bounded on the north and west by a northeast trending normal fault. A cursory field examination indicates the rocks gradually become more silicic towards the north. Ages are based upon stratigraphic relationships.

No alteration or silicic mineralization was observed along the normal fault south of the prospect. The only well located in the area was hand dug and had been filled in. Due to the lack of hydrothermal mineralization and heat flow data, a rating of 4 has been assigend to this prospect. The young age of the silicic rocks and the close proximity of the prospect to the Mono Lake KGRA indicate further assessment work is necessary. We recommend age dating a sample of rhyolite, followed by a 150 m gradient hole if the rhyolite is Pleistocene or younger.

Dayton-Sutro Prospect, NV-54

The Dayton-Sutro prospect is in Township 17 North, Range 22 East, Western Lyon County, Nevada (Figure 3). The prospect occupies the northern half of the Carson Plains and is bounded to the north by the Virginia Range, to the west by Flowery Ridge and to the south by the Pine Nut Mountains. The area consists of fee land with a few scattered fragmentary B.L.M. sections. The prospect is reached by Highway 50 from Carson City.

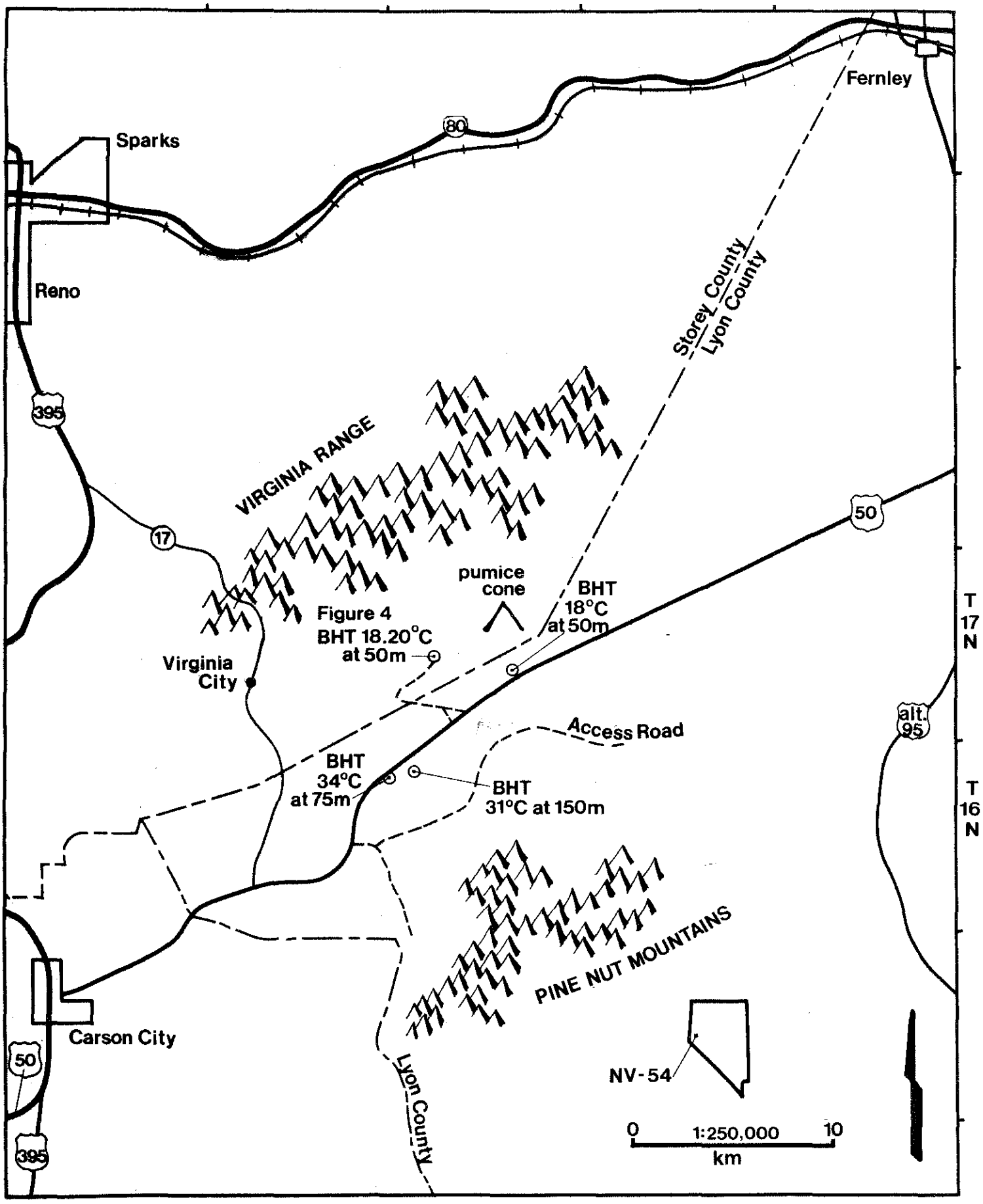

Figure 3. NV-54, DAYTON-SUTRO LOCATION MAP

The ranges bordering the Carson Plains consist primarily of thick sequences of block faulted Middle to Late Tertiary andesites, basalt and interflow breccias. The primary lithologic feature of geothermal significance is a small rhyolitic pumice cone located in Section 16, T17N, R22E. The pumice has a K-Ar date of 1.5 m.y. (61) which makes it one of the few Quaternary occurrences of silicic volcanic rock in Nevada. The cone is well formed and only slightly eroded. A breached summit depression is apparent when viewed from the west. The pumice does not exhibit hydrothermal alteration. The cone is situated on the Flowery Range escarpment and may indicate that tensional faulting along the range front was sufficient to allow leakage of silicic magma from depth.

Shallow water well gradients in the vicinity of the cone are normal (Figure 4). The temperature of Sutro Springs, adjacent to the northwest flank of the cone, is also normal (11^{o}C). Shallow warm wells are found 7 km south-southwest of the cone in Sections 6 and 7 of T16N, R22E. Wells in Section 6 produce 31^{o}C and 24^{o}C water from depths of 150 and 60 meters respectively. A 2000 g.p.m. irrigation well in Section 7 produces 34^{o}C water from a depth of 50 to 75 meters. These warm wells may indicate hydrothermal leakage along the Flowery range front fault.

The Dayton-Sutro prospect was given a rating of 7. The young rhyolite cone and nearby warm wells indicate that further assessment work should be pursued. The initial stage should consist of a systematic logging of the numerous water wells in the area. In addition, permission for access should be obtained from Glass Mountain Block Co., owners of the pumice cone, to facilitate logging of mineral holes and detailed examination of the cone

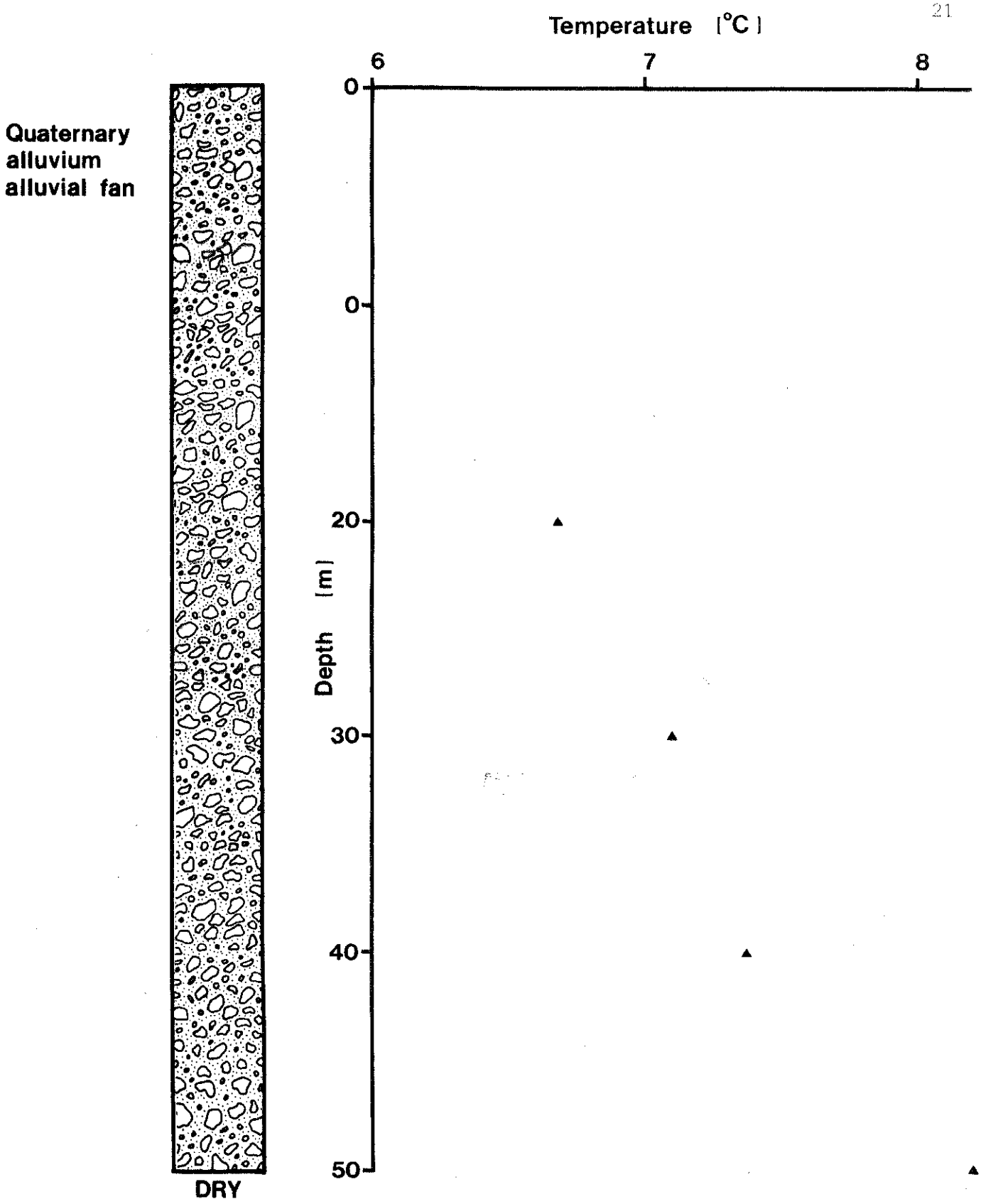

Figure 4. NV-54 Dayton-Sutro Thermal Gradient; NW/4 Sec. 30 T17N, R22E
$\Delta T = 51^{\circ}C/km$ for k = 2 TCU, q = 1.0 HFU (20-50 m)

structure. A 150 meter gradient hole should be drilled adjacent to the cone to penetrate the shallow aquifer and measure heat flow beneath.

Huntoon Valley, NV-63

The Huntoon Valley prospect is in Township 3 North, Range 31 East, south-central Mineral County, Nevada. The prospect is bounded by the Excelsior Range to the northwest and by the Adobe Hills to the south. The valley is an internally drained basin approximately 10 km long and 5 km wide. The prospect occupies unleased B.L.M. and National Forest lands. The prospect is reached from State Route 360 via the Marietta Road and an unmaintained jeep trail west of Teels Marsh (Figure 5).

The ranges surrounding the prospect consist of Triassic and Jurassic clastic and carbonate sediments intruded by Cretaceous granodiorite. This complex is capped by a sequence of andesitic flows and breccias of Late Tertiary age. Quaternary olivine basalt penetrates the Tertiary volcanics as dikes and sills and locally surfaces in the form of thin flows. Late Pleistocene tuffaceous lake sediments outcrop along the southeast margin of Huntoon Valley. The sediments are white to light grey, thinly laminated and slightly uplifted and eroded relative to the present valley floor. They contain numerous horizons of silica concretions. The concretions have a branching lobe shape, 2-5 cm across, with the convex surface facing up and the flat surface down. The shape indictes a sub-aqueous environment of formation in a silica saturated brine.

The Huntoon Valley contains three water wells (Figure 5). Huntoon #1 (Figure 6) is cold with a bottom hole temperature (BHT) of 16.35^{o}C at 75 m.

Huntoon #2 (Government Well, Figure 7) is also cold with a bottom hole temperature of 11.89°C at 19 m. Huntoon #3 (Figure 8) has a measured bottom hole temperature of 19.38°C at 14.5 m and a reported bottom hole temperature of 24.4°C at 19.5 m (58). The three wells are separated by less than a 70 m difference in elevation. The temperature difference of more than 10°C between Huntoon #3 and the cooler wells may be due to the existence of a warm shallow aquifer.

The Huntoon Valley prospect, rated 6, warrants further evaluation. A 150 m gradient hole adjacent to Huntoon #3 and 5 to 10-fifty meter gradient holes along the southwest edge of the valley would provide sufficient data to confirm the existence of a heat anomaly.

Churchill Valley, NV-79

The Churchill Valley prospect is in Township 16 North, Range 25 East, eastern Lyon County, Nevada. The prospect lies south of the Carson River along the southern edge of Churchill Valley formed by the Desert Mountains escarpment (Figure 9). The prospect is on unleased B.L.M. land bordered by fee land 1 to 2 kilometers to the north. A graded gravel road leads from Alternate Highway 95 through the prospect.

The Desert Mountains which bound the prospect to the south consist of Late Tertiary andesite flows and breccias overlain by Late Tertiary basalt flows. The prospect is located on Churchill Valley lake deposits which probably consist of silt and clay interbedded with gravel lenses deposited by the adjacent Carson River. No evidence of hydrothermal alteration was observed in the prospect area.

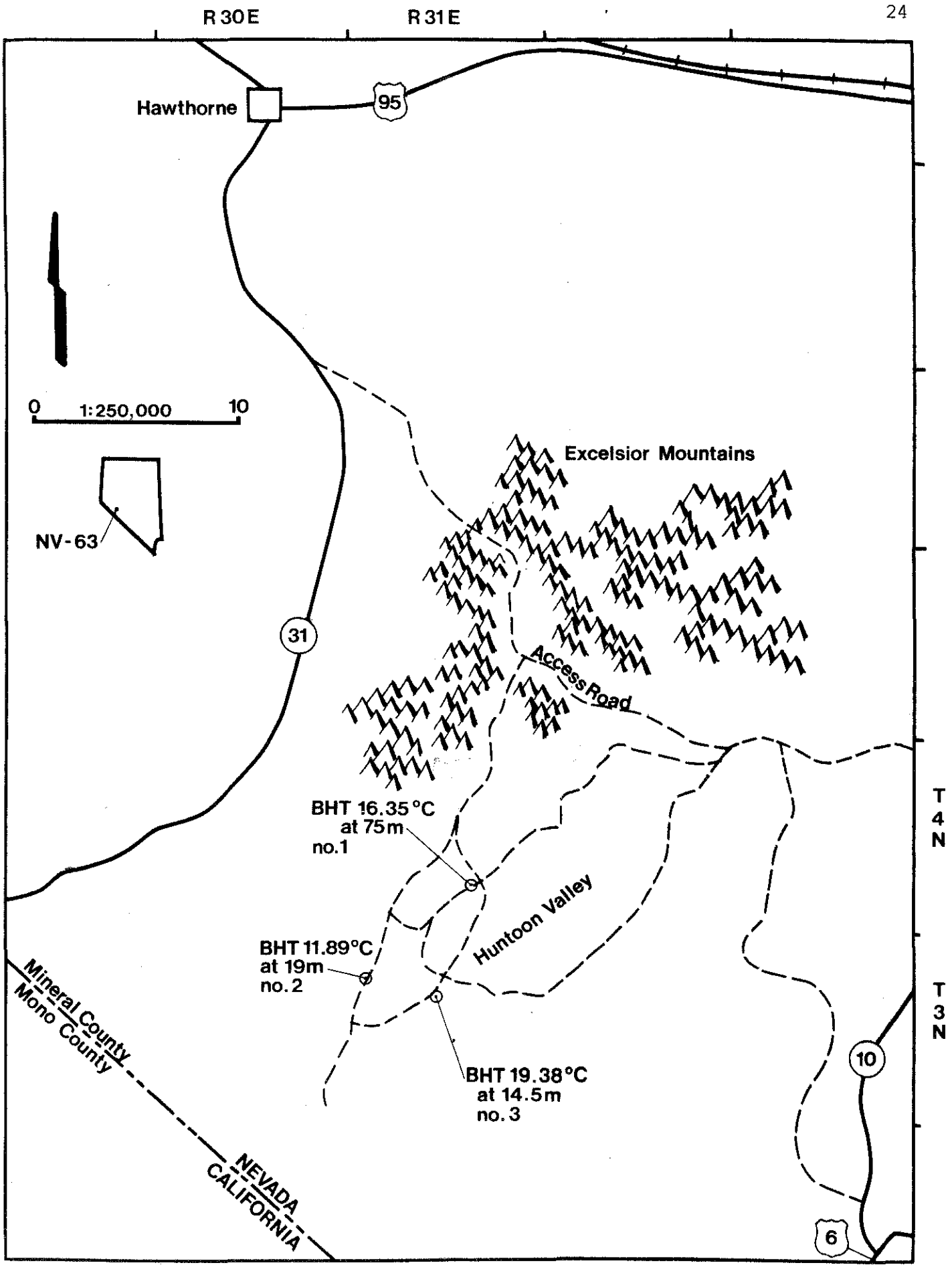

Figure 5. NV-63, HUNTOON VALLEY LOCATION MAP

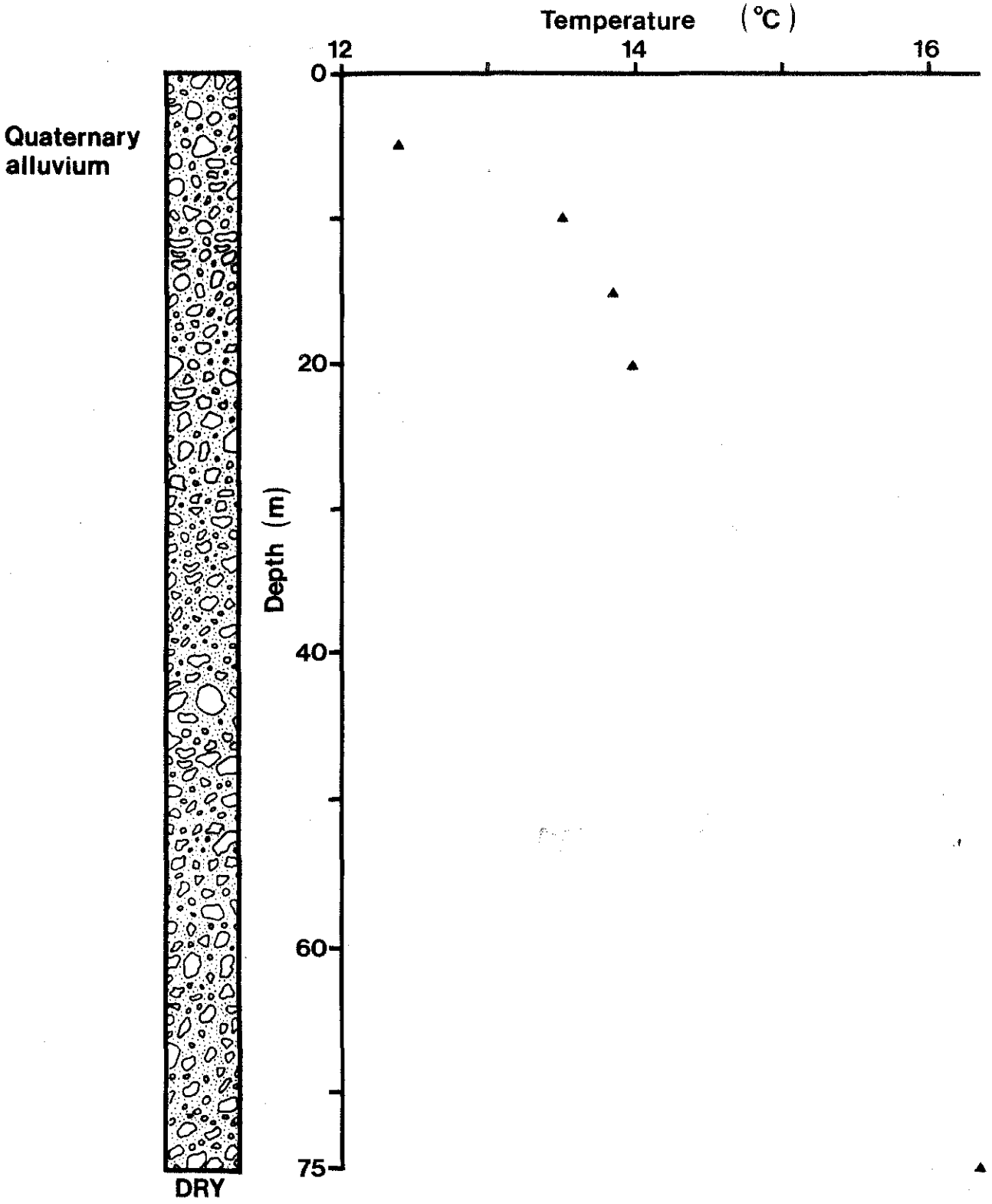

Figure 6. NV-63 Huntoon Valley Thermal Gradient No. 1;
NE/4 Sec. 27 T4N, R31E
$\Delta T = 43^{\circ}C/km$ for k = 2 TCU, q = 0.86 HFU (20-75 m)

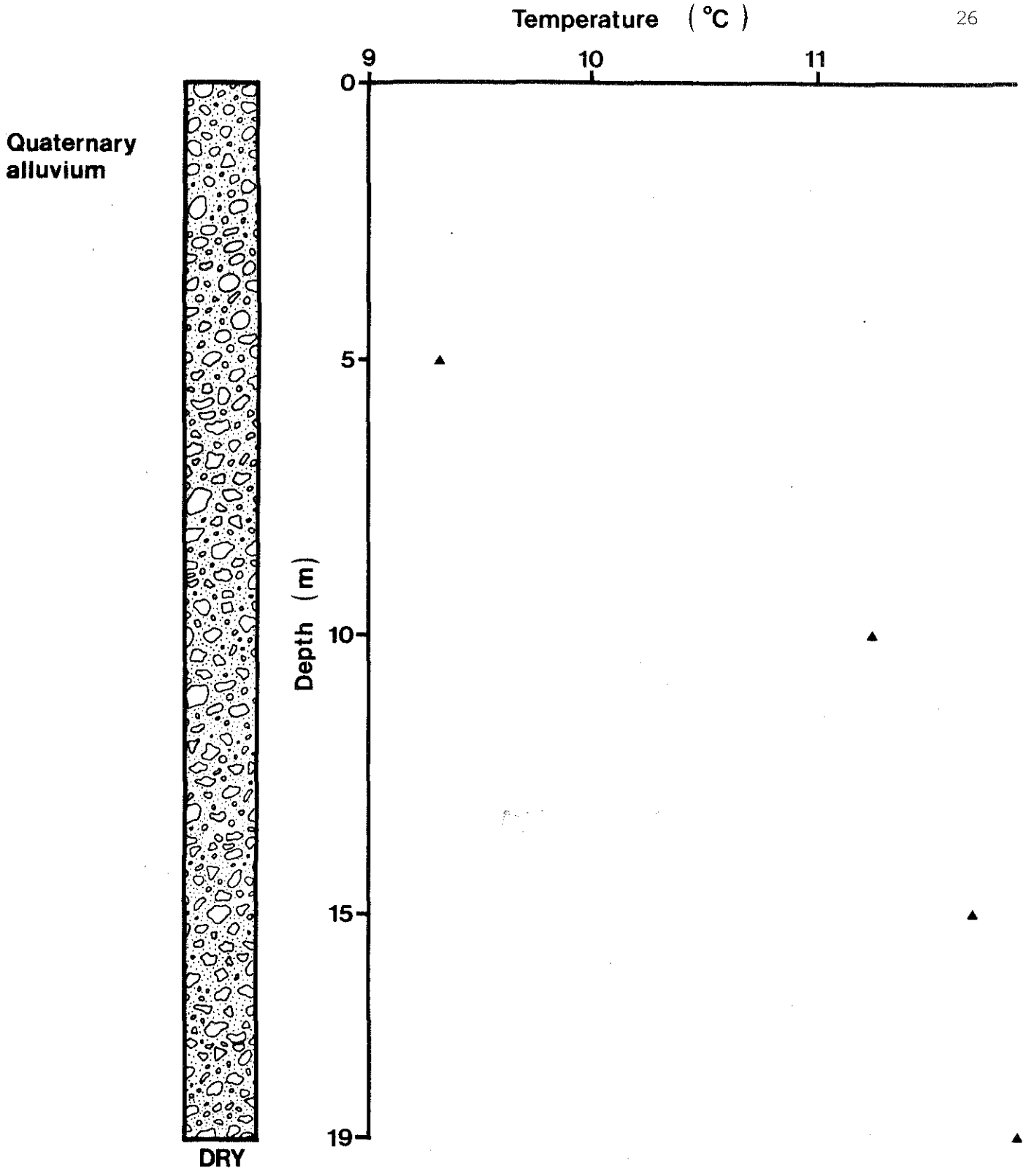

Figure 7. NV-63 Huntoon Valley Thermal Gradient No. 2;
NW/4 Sec. 7 T3N, R31E
$\Delta T = 71^{\circ}C/km$ for k = 2 TCU, q = 1.4 HFU (10-19 m)

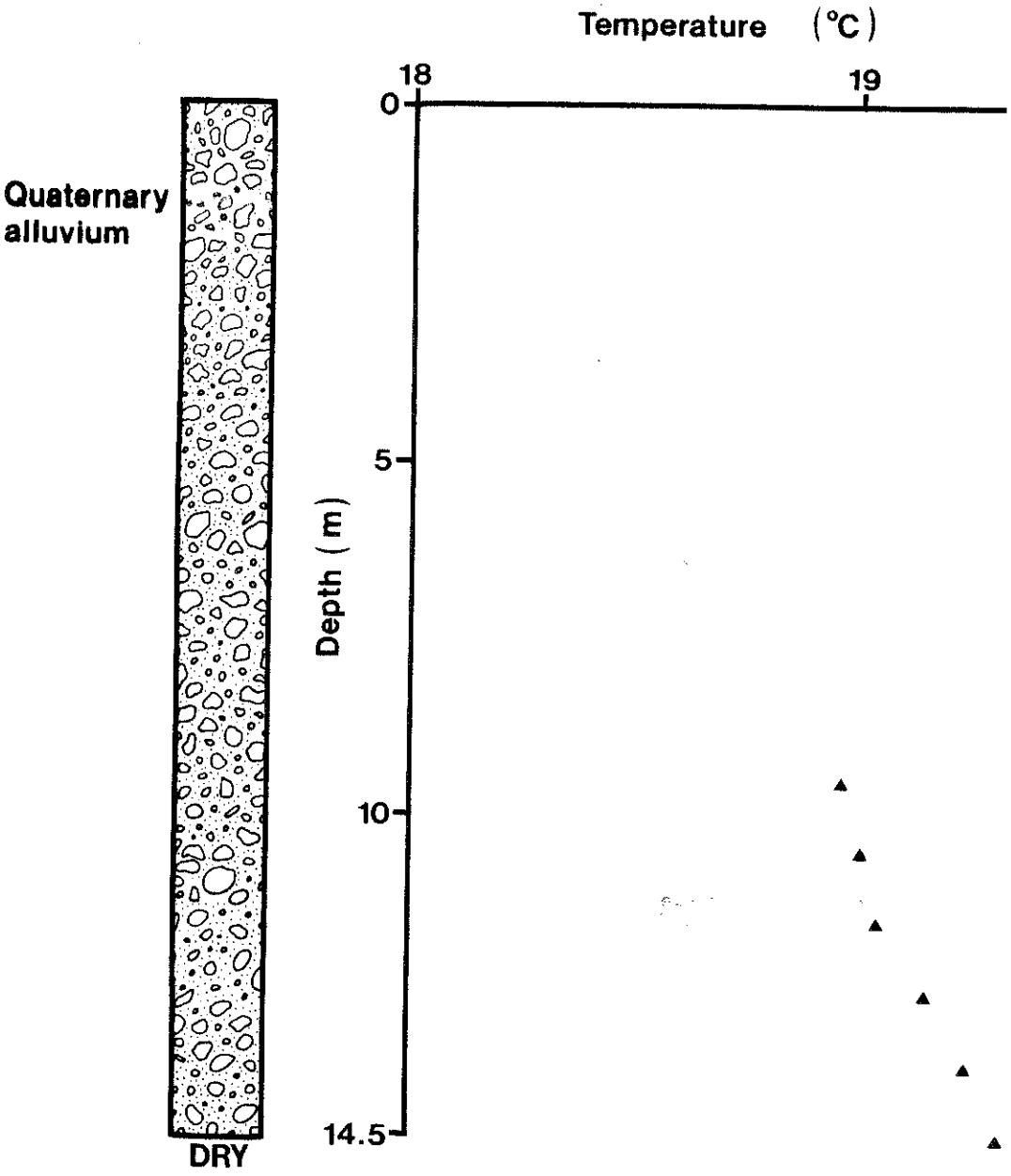

Figure 8. NV-63 Huntoon Valley Thermal Gradient No. 3;
NW/4 Sec. 16 T3N, R31E
$\Delta T = 43^{o}C/km$ for k = 2 TCU, q = 0.86 HFU (20-75 m)

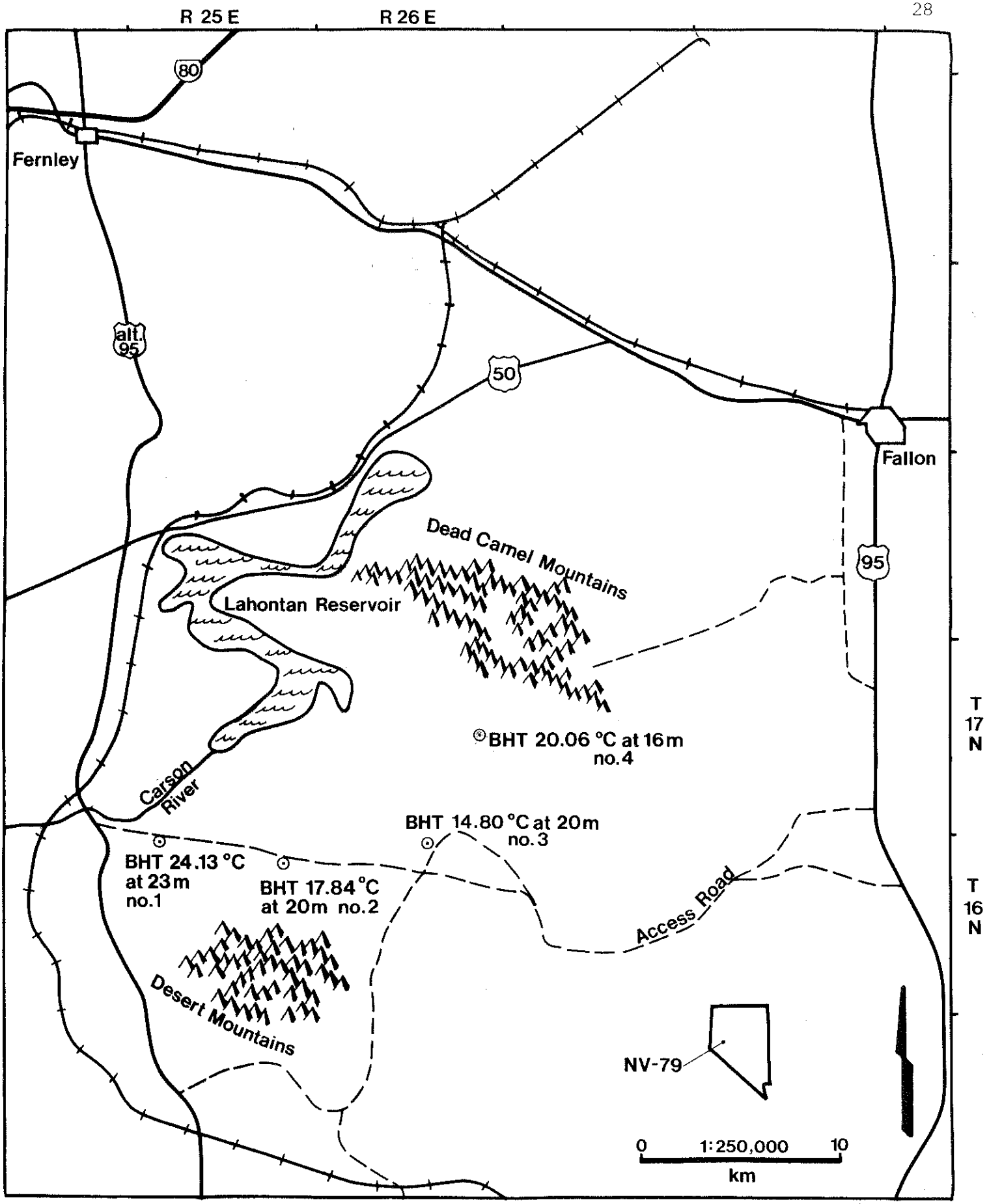

Figure 9. NV-79, CHURCHILL VALLEY LOCATION MAP

An anomalous water well, Churchill #1 (Figure 10), has a bottom hole temperature of 24.13°C at 23 m. This temperature is 6°C to 10°C higher than two other water wells of similar depths located at the same elevation along the Desert Mountain escarpment (Figure 9). The roughly linear gradient is 300°C/km over the 11 to 23 meter interval. In addition, water well Churchill #4 in Section 24, T17N, R26E has a bottom hole temperature of 20.06°C at 16 meters which may also be anomalously high.

The Churchill Valley prospect, rated 7, contains two thermal anomalies. A 150 m gradient hole adjacent to Churchill #1 and 5 to 10-fifty meter gradient holes surrounding the well would indicate the extent, intensity and shape of the anomaly. A 100 m gradient hole adjacent to Churchill #4 would verify the existence of the second thermal anomaly on the eastern edge of the Churchill Valley.

Whitehorse Caldera, OR-84

The Whitehorse Caldera prospect is in Township 37-39 South and Range 37 and 38 East in southeastern Harney County, Oregon (Figure 12). The caldera, approximately 10 km wide, is bounded to the south and east by the Trout Creek Mountains and to the north and west by volcanic uplands of moderate topography. The caldera contains B.L.M. acreage surrounded by fee land. Geothermal leases have been taken along the southern rim of the caldera including one of three hot springs in the caldera basin. Two thermal springs in the central and northern part of the caldera are on unleased federal land. The prospect is reached by graded county road from Denio, Nevada.

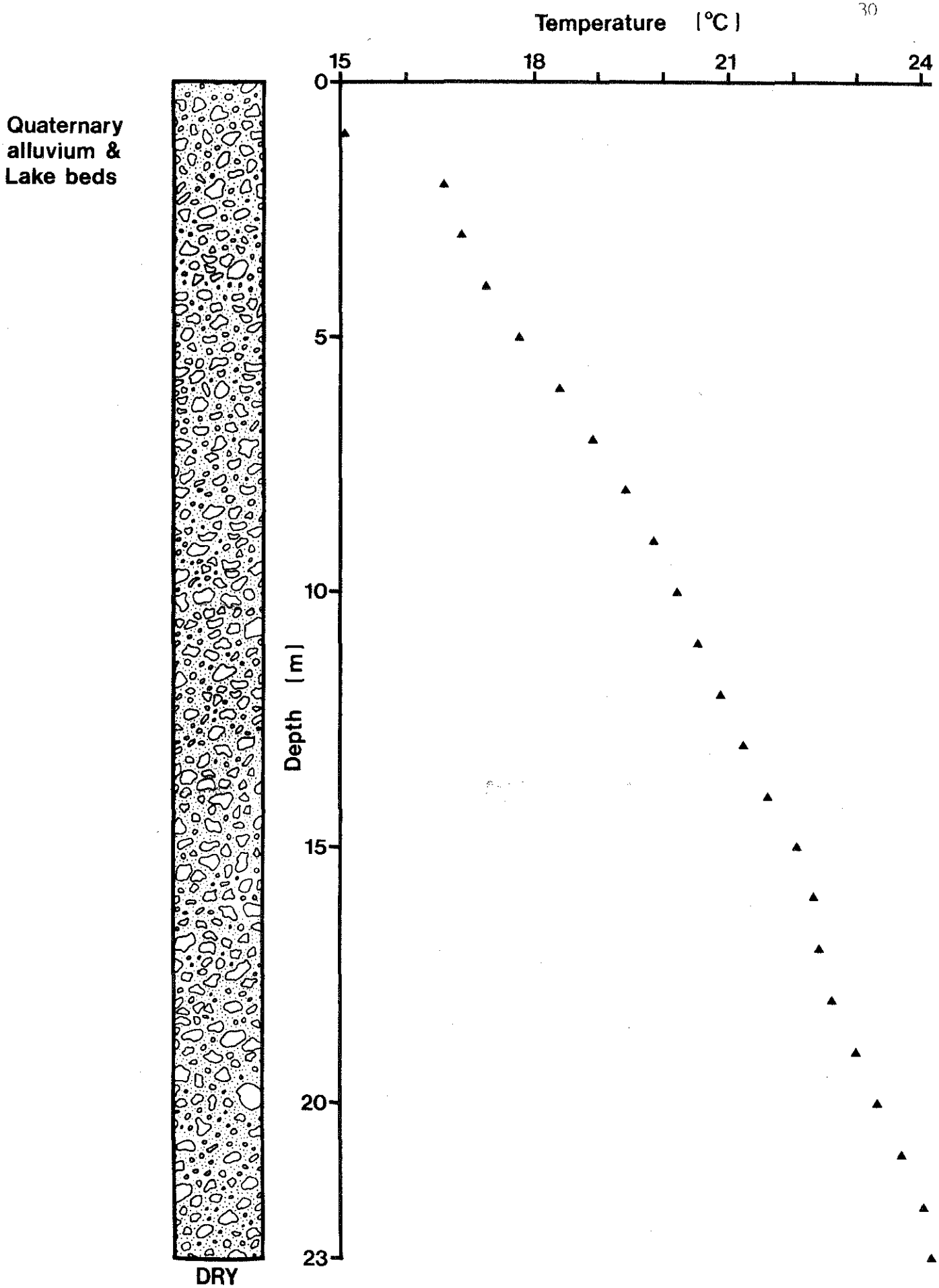

Figure 10. NV-79 Churchill Thermal Gradient No. 1; SE/4 Sec. 5 T16N R25E
$\Delta T = 300^{\circ}C/km$ for k = 2 TCU, q = 6 HFU (11-23 m)

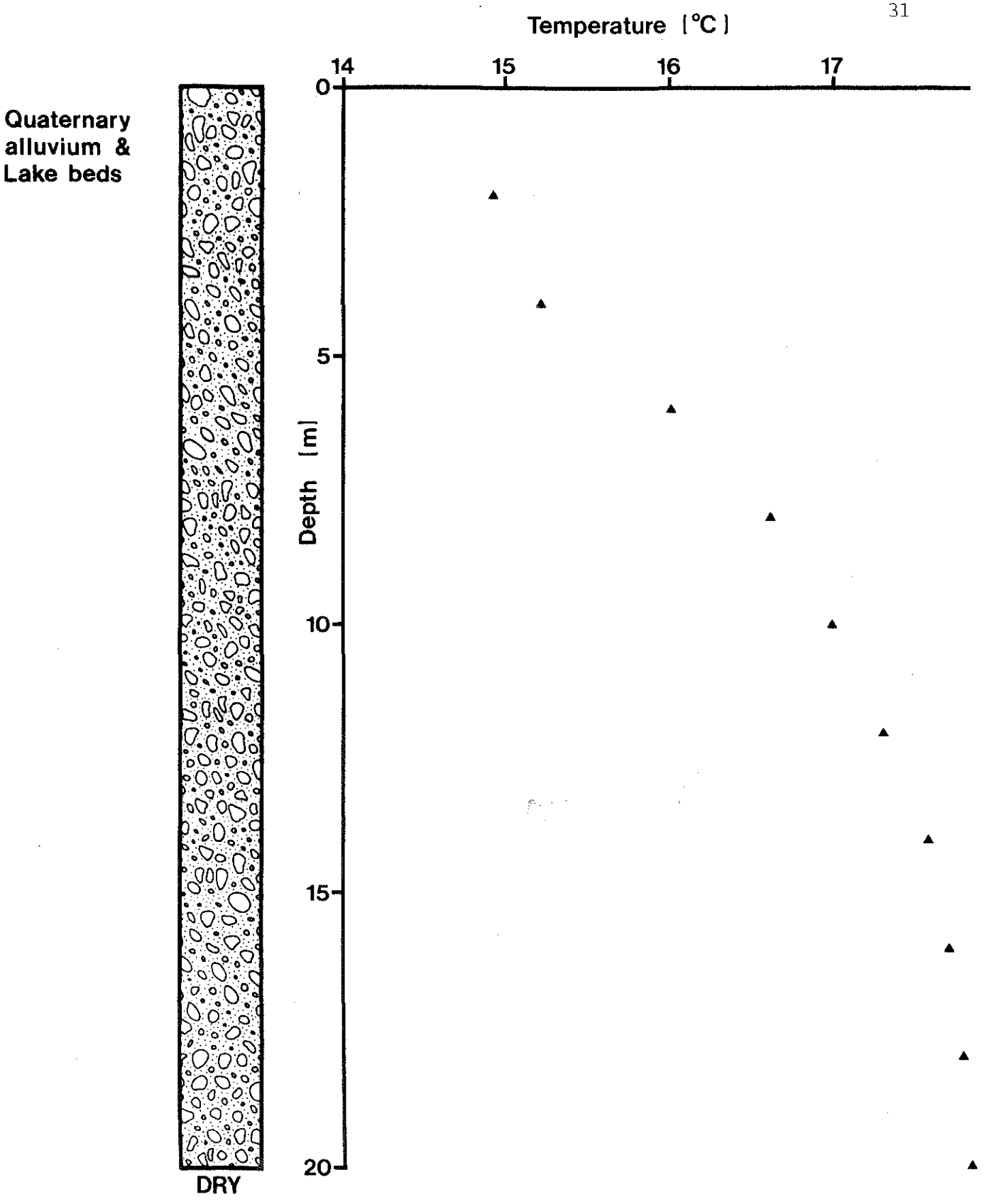

Figure 11. NV-79 Churchill Thermal Gradient No. 2;
NW/4 Sec. 12 T16N, R26E
$\Delta T = 35^{\circ}C/km$ for k = 2 TCU, q = 0.7 HFU (16-20 m)

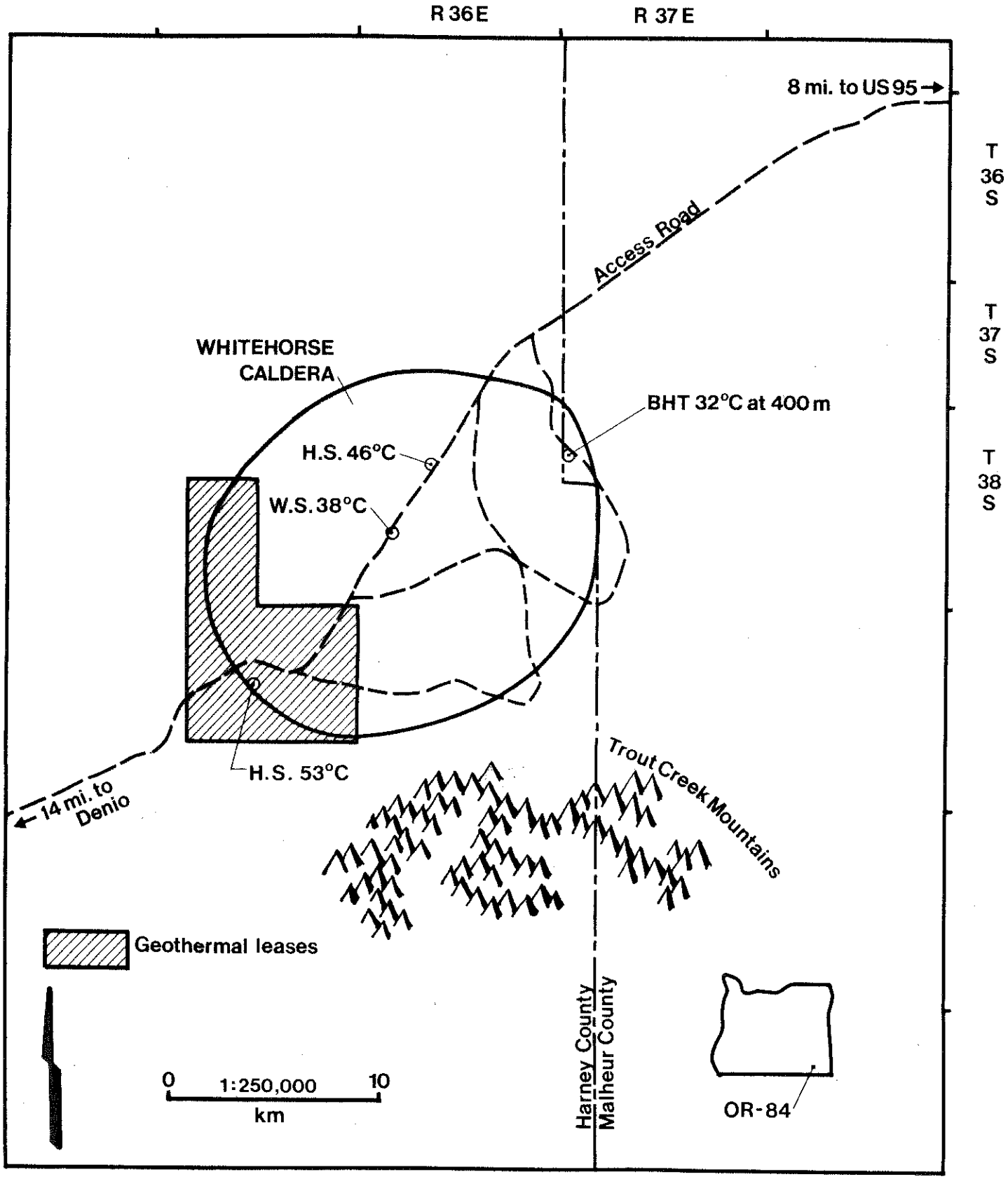

Figure 12. OR-84, WHITEHORSE LOCATION MAP

The caldera rim is formed by Miocene andesite and basalt flows overlain by rhyolitic welded ashflow tuffs. Silicic dome complexes form prominent cones within the caldera including Whitehorse, Lookout and Flagstaff Buttes. The caldera basin contains tuffaceous, fluvial and lacustrine deposits dated 15 m.y. (132).

The caldera contains three thermal springs (Figure 12) in Section 3, T37S, R36E, Section 24, T38S, R37E, and Section 16, T36S, R37E with temperatures of 46°C, 38°C and 53°C respectively (93). The south and central springs appear to have low to moderate dissolved mineral content and exhibit abundant NaCl efflorescence. The northernmost spring was not examined due to washed out roads. The Whitehorse Ranch well (Figure 12) on the northeast rim of the caldera produces 32°C water from a depth of 400 m indicating a thermal gradient of 55°C/km. No wells or drillholes were found within the caldera.

The Whitehorse Caldera, rated 6, has sufficient thermal manifestations to justify further investigation. We recommend hydrogeochemical analysis of the thermal springs as the first step in evaluating the prospect. In addition, a drilling program should be executed which would include a 150 m hole near both of the unleased thermal springs and 10-fifty meter holes surrounding the springs at 1 km intervals to determine the size, shape and intensity of the thermal anomaly.

Targets with Low Ratings

The remaining targets are briefly described in the following section. These targets yielded unfavorable thermal data or lacked sufficient thermal,

lithologic or mineralogic evidence to warrant further investigation at this time. They all received ratings less than 4.

CALIFORNIA (Figure 13)

Owens Valley, CA-125, Rating 2

The Owens Valley north of Coso Hot Springs consists of Plio-Pleistocene intermediate volcanic rocks associated with high seismic activity and Quaternary volcanic centers. Measured and reported temperatures in wells and springs in the area were normal. Hydrothermal alteration was not observed in unleased areas.

Talc City Hills, CA-126, Rating 1

The Talc City Hills is a thick sequence of Middle Paleozoic marine sediments overlain by intermediate Pliocene volcanics. The entire area has been extensively faulted and is seismically active. No heat flow data was observed. No hydrothermal alteration was observed along Quaternary faults within the volcanic sequence.

Piute Range, CA-127, Rating 2

The Hart mining district contains cinnabar which is unevenly distributed throughout a thinly bedded tuff. A clay pit (T11N, R17E) southwest of the mining district exhibits intense hydrothermal alteration along remnants of bedding plains of the host tuff. Wells in Lanfair Valley were normal (Figure 14), with BHTs ranging from 12° to 21°C at depths less than 300 meters. Ten Mile well, located in Nevada east of the Piute Range, produces 5 gpm of 30°C water with low total dissolved solids from a depth of 247 m.

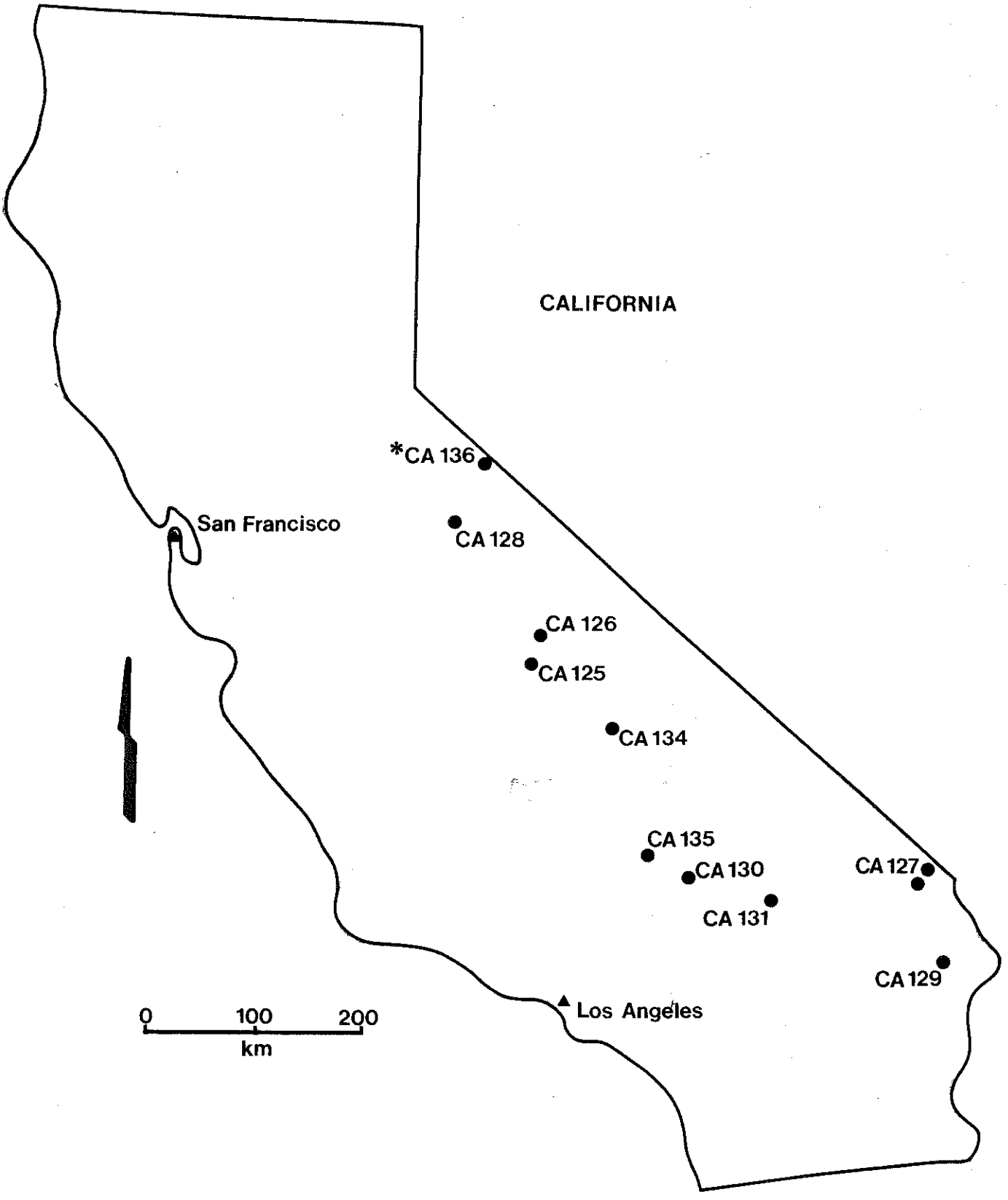

Figure 13. CALIFORNIA TARGET LOCATION MAP
* = recommended target

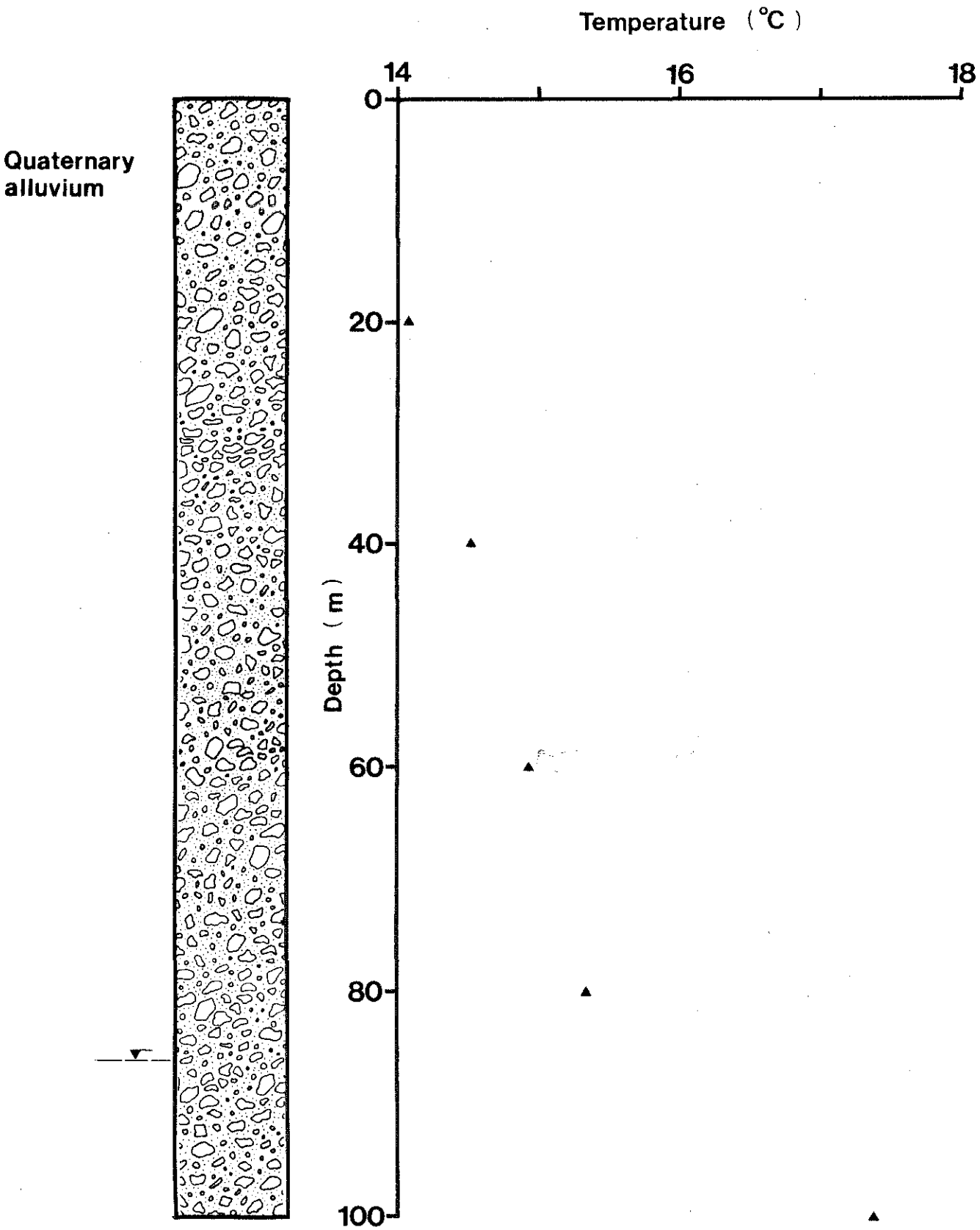

Figure 14. CA-127 Early Morning Thermal Gradient;
NESE 17, T12N, R17E
$\Delta T = 21.2^{\circ}C/km$ (20-80m)
$\Delta T = 101.5^{\circ}C/km$ for k = 2 TCU, q = 2.0 HFU

Owens Valley, CA-128, Rating 2

Recent faulting, seismic activity, photolinear analysis and a radiometric age date of 0.99 m.y. characterize this prospect. No thermal waters were reported west of the Owens Valley fault in this area. Springs discharging from the base of Red Mountain (0.99 m.y.) measured 14°C. No drilling or hydrothermal alteration were observed.

Turtle Mountains, CA-129, Rating 1

The northern Turtle Mountains are composed of Tertiary intermediate volcanic rocks which have been intensely faulted. Several Landsat color anomalies were observed. One BHT of 21.4°C at 9.1 meters was measured and a 250 m well (plugged) was reported to produce water less than 25°C. No mercury mineralization or hydrothermal alteration was observed.

Calico Mountains, CA-130, Rating 2

Miocene rhyolite and Pliocene pyroclastics comprise the majority of the volcanic rocks making up the Calico Mountains. The southern portion of the mountains is essentially closed to geothermal development due to the existence of state recreational areas and an archeological dig. A mine tunnel measured 21.6°C at 60 m. A BHT of 18.79°C was measured in a 26 m mineral hole. Only minor amounts of alteration were observed along fault contacts in Sections 4, 5, 8 and 9, T10N, R1E.

Bristol/Cady Mountains, CA-131, Rating 1

The Bristol and Cady Mountains consist of Miocene rhyolite and Pliocene basalt overlying Mesozoic granite. There are numerous photolinears in this area of high seismic activity, bisected by the Ludlow fault.

Mineralization and alteration is pre-Cretaceous in age and confined to fissures and dike contacts in the granite. Several low BHTs, and the Old Pete and Finally thermal gradients (Figures 15 and 16) indicate normal heat flow for the area.

Gold Bottom Mine, CA-134, Rating 1

The Gold Bottom and Ophir mines are in diabase dikes which cut Paleozoic limestone and quartzite. High amplitude, short wavelength aeromagnetic and gravity anomalies are associated with this area of high seismic activity and Quaternary basalt flows. One tunnel measurement of 18.2°C at 250 m was obtained.

Black Mountains, CA-135, Rating 1

Several Pliocene andesite plugs, Miocene rhyolites, seismic activity and mercury deposits occur in the Black Mountains target area. Minor opalite veining was observed in a partially silicified, rhyodacitic breccia. One questionable spring measurement of 18.5°C was obtained.

NEVADA (Figure 17)

Montgomery Pass, NV-60, Rating 2

The Montgomery Pass prospect is located in Township 1 North, Range 32 East, western Mineral County, Nevada. Lithology of the prospect consists of Late Tertiary dacitic tuff overlain by Quaternary olivine basalt. Mineralization includes massive chalcedony and opalite replacement in the tuff. Cinnabar is sporadically dispersed throughout the silicic alteration. The overlying basalt does not appear altered or mineralized, indicating a pre-

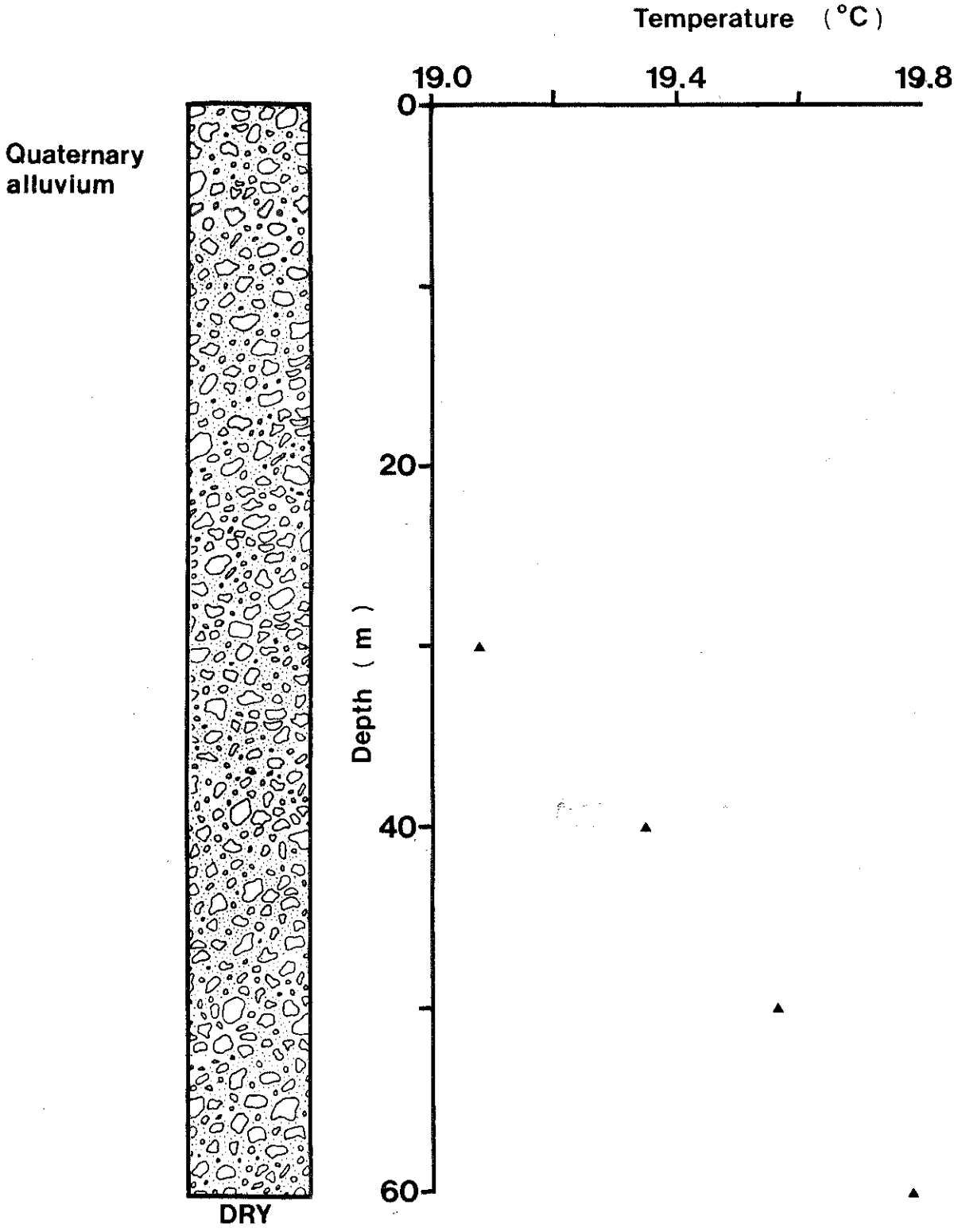

Figure 15. CA-131 Old Pete Thermal Gradient
SWSW 33, T7N, R8E
$\Delta T = 21^{\circ}C/km$ for k = 4, q = 0.8 HFU

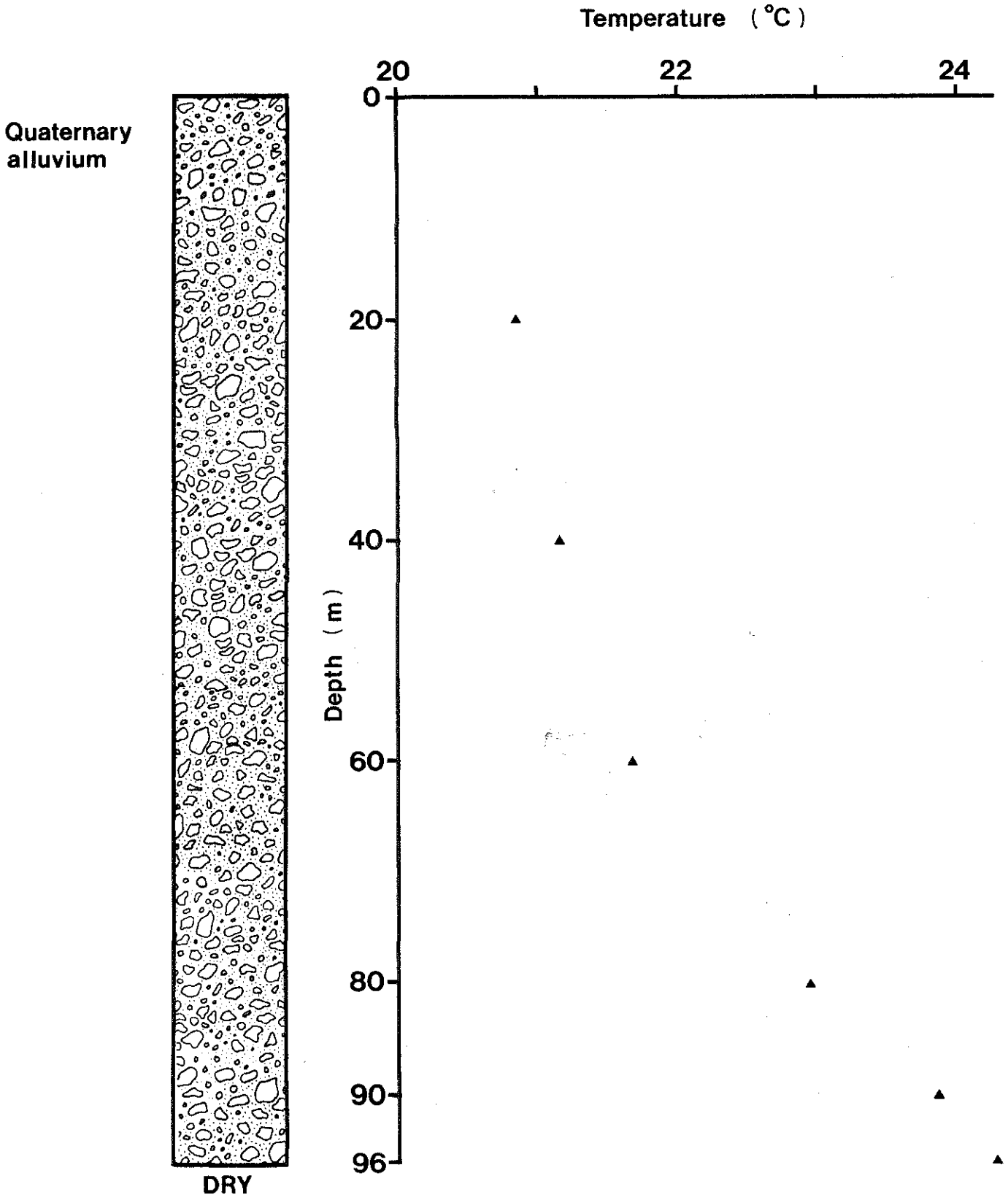

Figure 16. CA-131 Finally Thermal Gradient;
SESW 1, T8N, R5E
$\Delta T = 83^{o}C/km$ for k = 2.3 TCU, q = 1.9 HFU

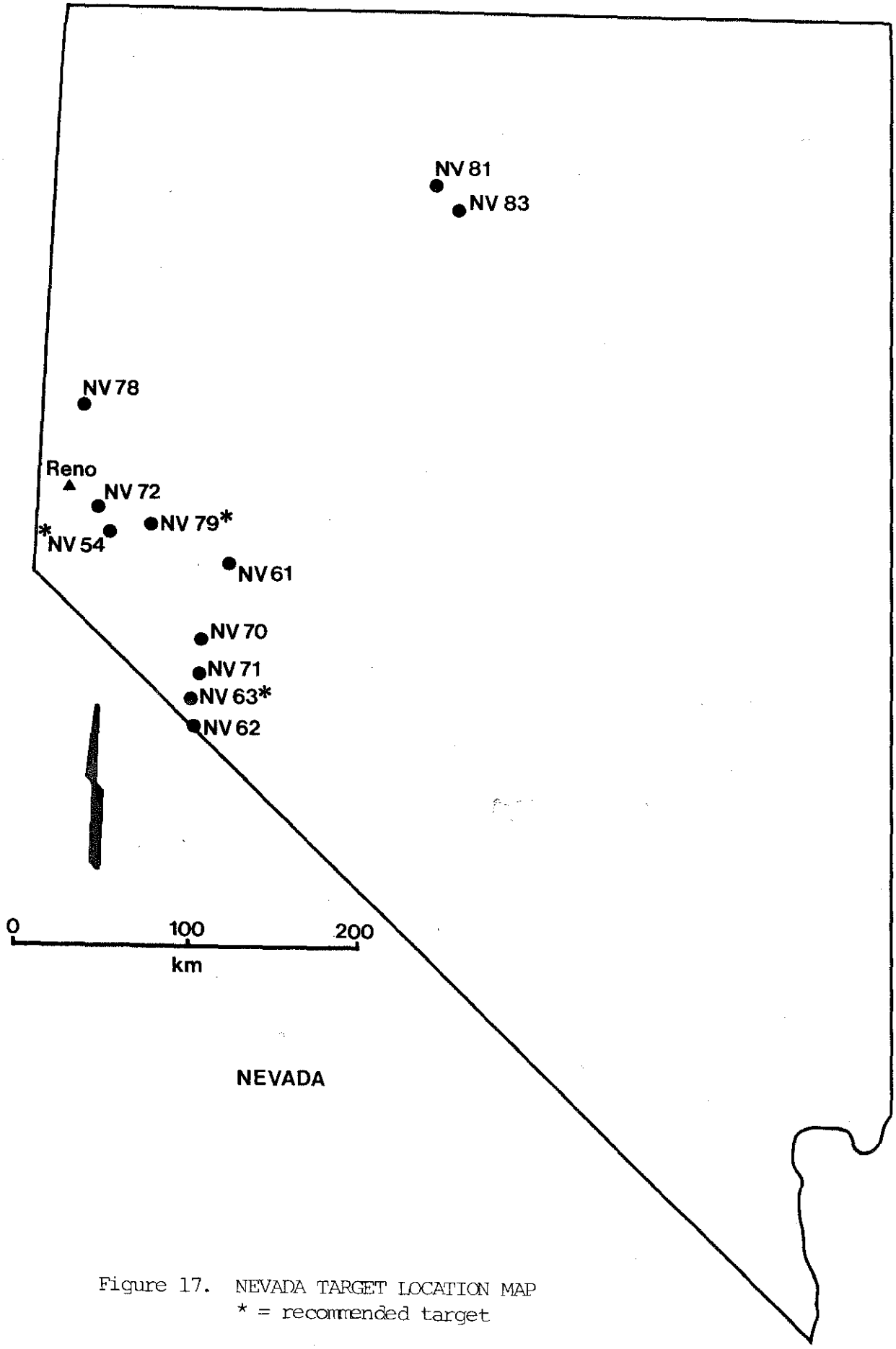

Figure 17. NEVADA TARGET LOCATION MAP
* = recommended target

Quaternary age for mineralization. No wells or mineral holes were found.

Rawhide, NV-61, Rating 2

The Rawhide-Black Eagle Hill prospect is located in Township 13 North, Ranges 31½ and 32 South, northeastern Mineral County, Nevada. The region consists of Tertiary dacitic tuffs which have been replaced by massive opalite and chalcedony deposits. Cinnabar is disseminated throughout the opalite bodies. Mineral holes exhibit normal gradients (Figures 18 and 19). The altered rocks have undergone considerable post-mineralization uplift and erosion.

Basalt, NV-62, Rating 2

The Basalt prospect is located in Township 2 North, Range 34 East in southern Mineral County, Nevada. The region is comprised of Late Tertiary silicic and intermediate welded ashflow tuffs overlying a Paleozoic marine clastic and carbonate basement. Late-Pliocene diatomaceous lake beds overlie the tuff. Three water wells in the vicinity of Montgomery Pass are currently pumping cold water ($<15^{o}C$) from depths of up to 70 meters.

Garfield Flat, NV-70, Rating 2

Garfield Flat is located in Township 6 North, Range 33 East in central Mineral County, Nevada. This enclosed basin is surrounded by block faulted ranges of Paleozoic marine sediments intruded by Cretaceous granodiorite. The area is the center of intense shallow seismic activity. Wells in the basin have normal temperature gradients (Figures 20 and 21). No recent hydrothermal alteration was observed.

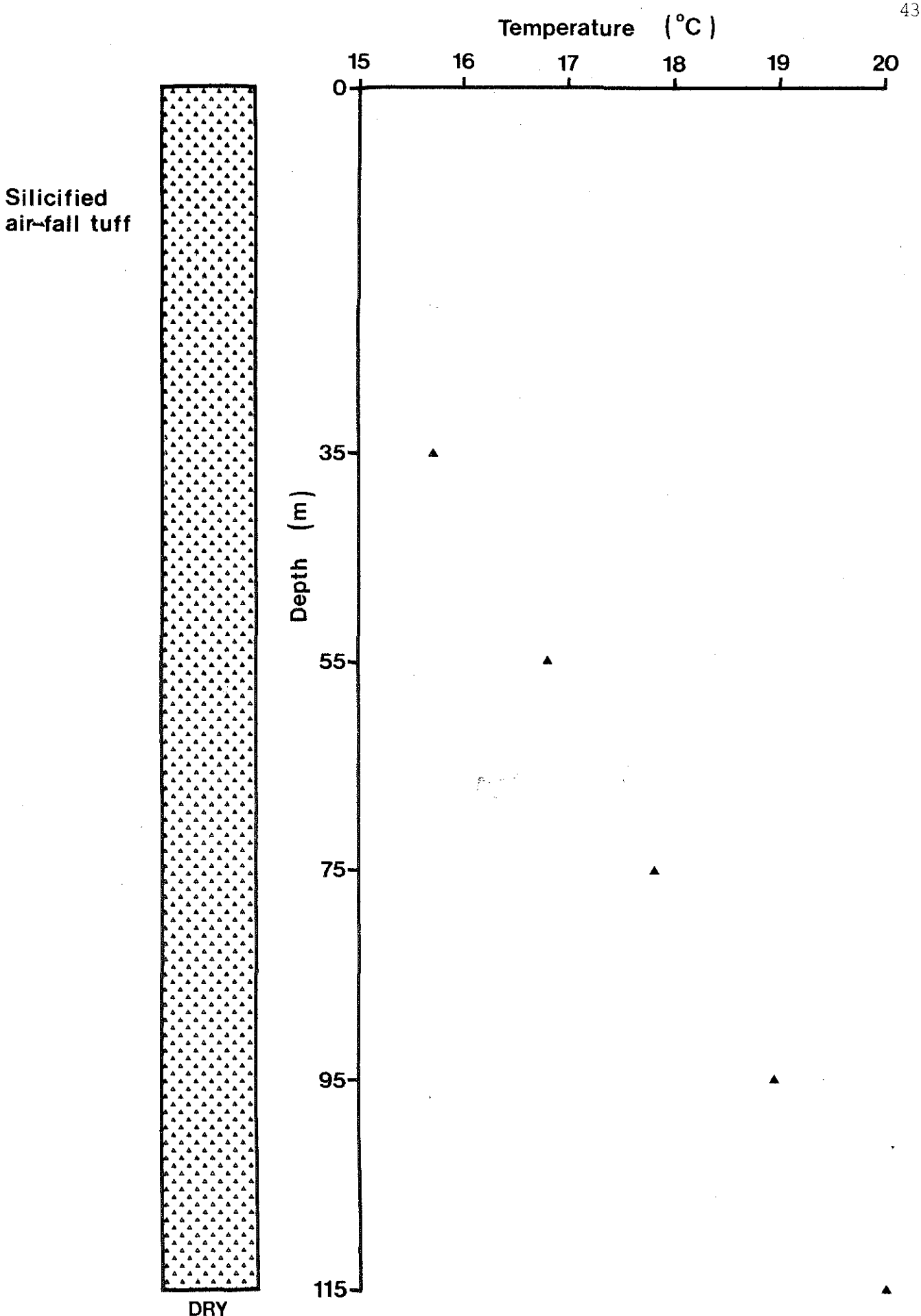

Figure 18. NV-61 Rawhide Thermal Gradient No. 1; SE/4 Sec. 9 T13N, R32E
ΔT = 39 C/km for k = 4 TCU, q = 1.56 HFU (80-120 m)

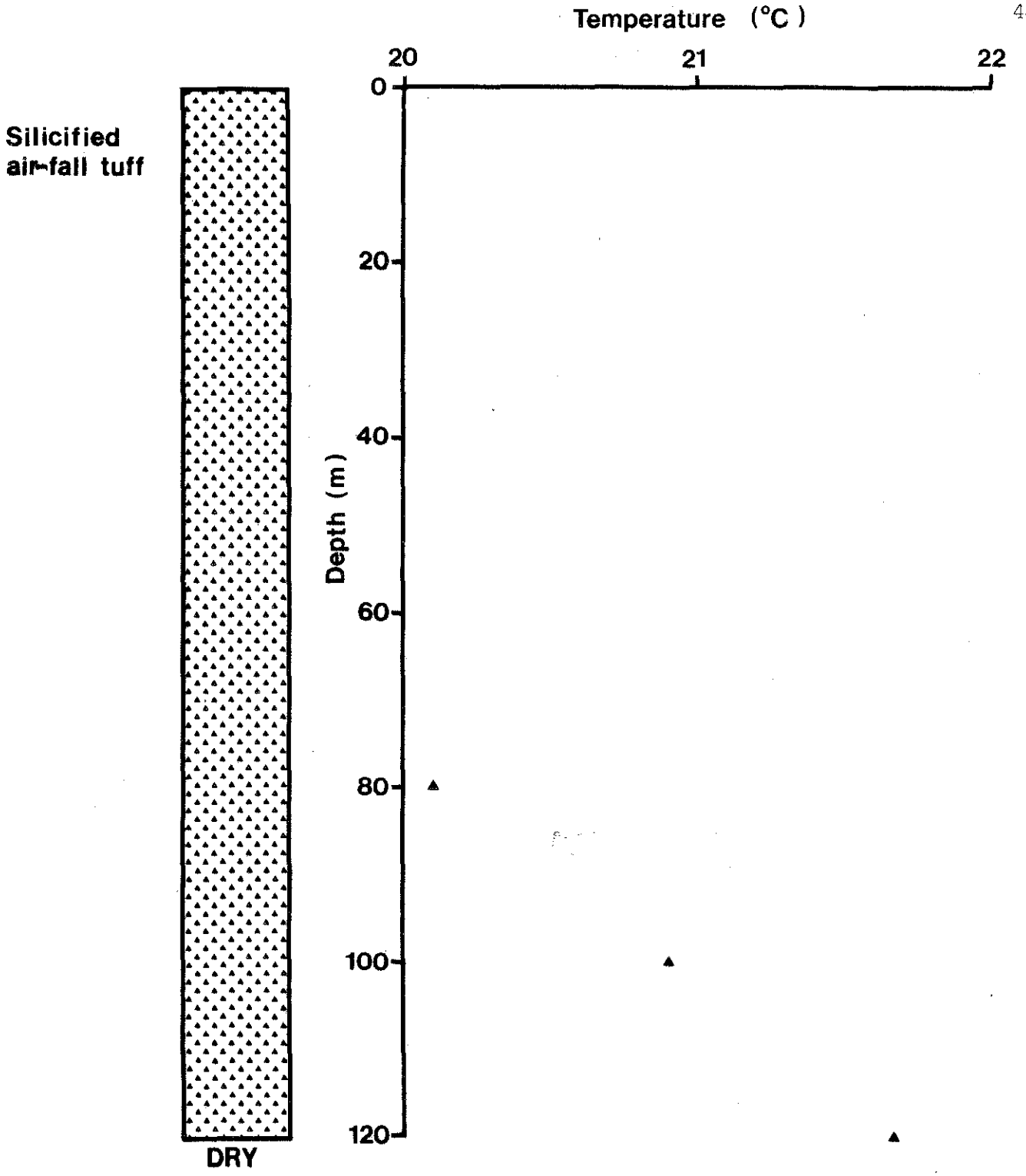

Figure 19. NV-61 Rawhide Thermal Gradient No. 2;
NW/4 Sec. 9 T13N, R32E
△ T= 53°C/km for k = 4 TCU, q = 2.1 HFU (35-115 m)

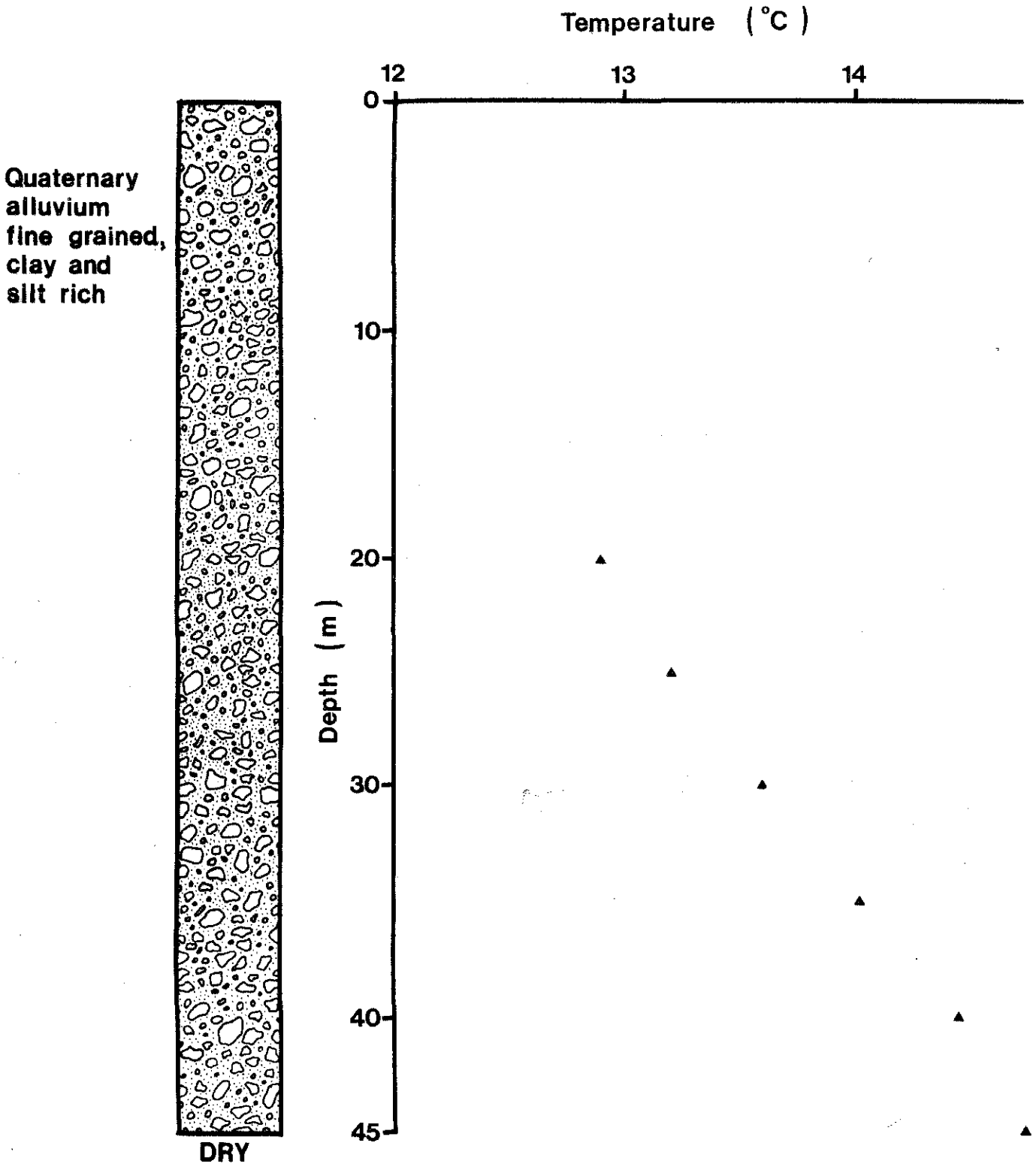

Figure 20. NV-70 Garfield Flat Thermal Gradient No. 1;
Sec. 20 T6N, R33E
$\Delta T = 83^{\circ}C/km$ for k = 2 TCU, q = 1.6 HFU (20-45m)

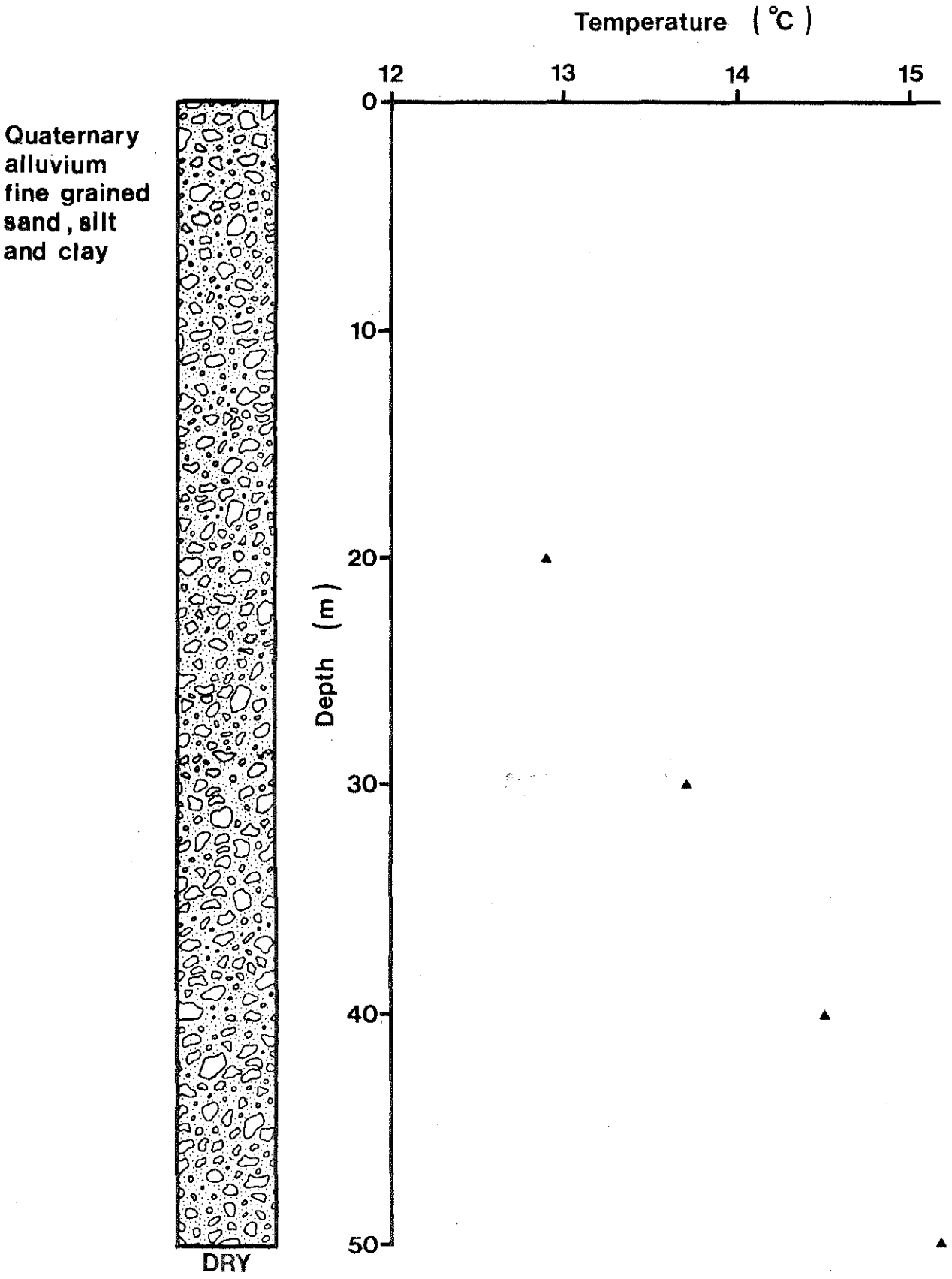

Figure 21. NV-70 Garfield Flat Thermal Gradient No. 2;
Sec. 20, T6N, R33E
$\Delta T = 76^{\circ}C/km$ for k = 2 TCU, q = 1.5 HFU (20-50 m)

Teels Marsh, NV-71, Rating 2

The Teels Marsh prospect is located in Township 4 North, Range 33 East, south-central Mineral County, Nevada. The prospect occupies a closed basin with Paleozoic marine sediments intruded by granodiorite to the north and Late Tertiary silicic and intermediate welded ashflow tuffs to the south. The basin exhibits intense shallow seismicity. Large travertine mounds of apparently Recent age are located along the southern margin of Teels Marsh. Water temperature in an 8 m well at Marietta is 15°C.

Washington, NV-73, Rating 2

The Washington prospect is located in Township 19 North, Range 21 East, Storey County, Nevada. The prospect occupies the central plateau of the Virginia Range which consists of Middle to Late Tertiary welded tuffs and andesite flows. The region is a center of shallow seismic activity. The Washington mining district is characterized by massive chalcedony replacement of volcanic rock. A mineral hole at the mine site is cold with a bottom hole temperature of 14.82°C at 33 meters.

Terraced Hills, NV-78, Rating 2

The Terraced Hills prospect is in Township 27 North, Range 21 East, Washoe County, Nevada at the north end of Pyramid Lake. The prospect consists of flat lying Pliocene basalt flows overlying tuffaceous lake sediments. The lake sediments contain deposits of halloysite. Water wells in the area have normal heat flows (Figure 22 and 23).

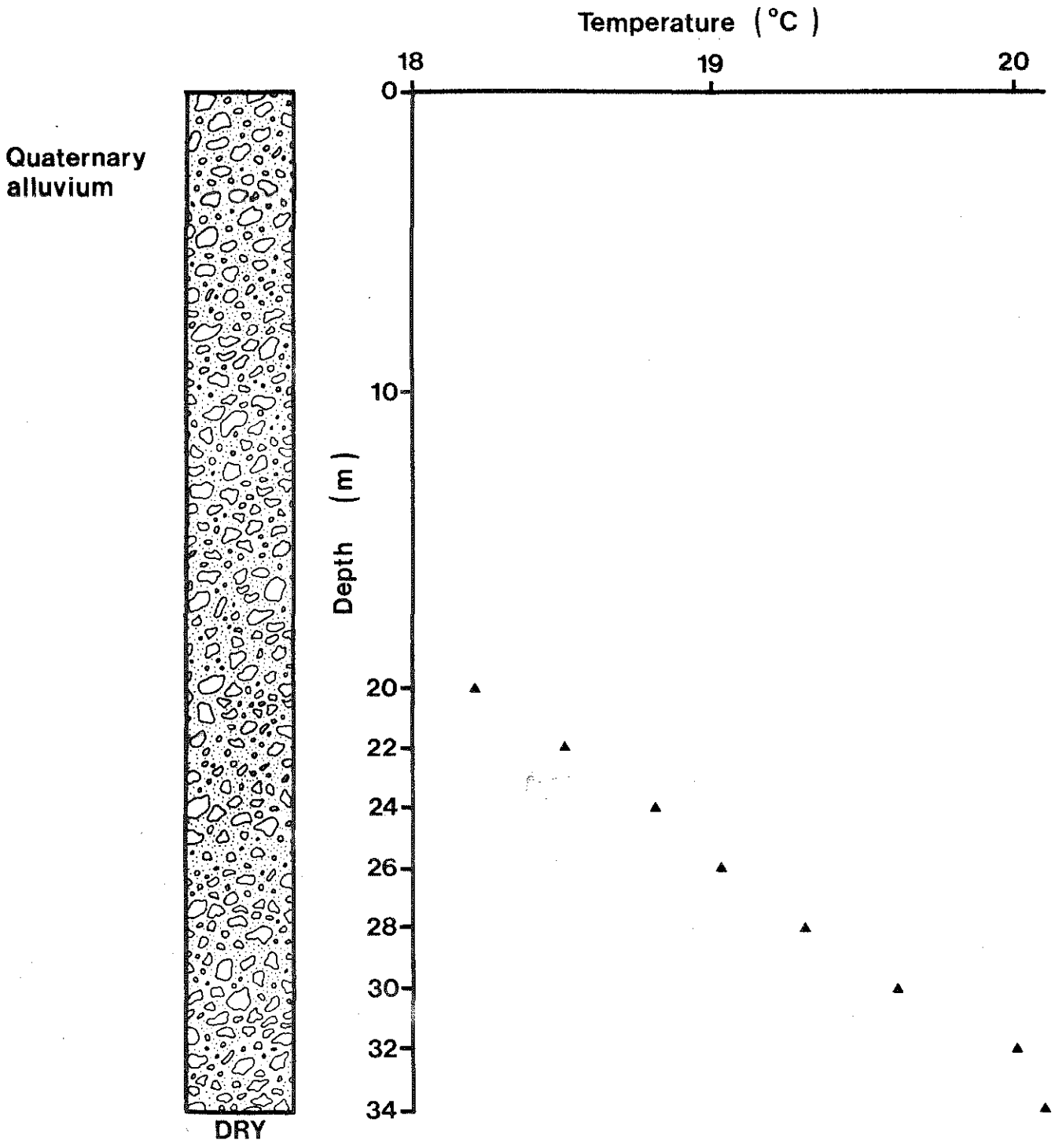

Figure 22. NV-78 Terraced Hills Thermal Gradient No. 1; Sec. 3 T27N, R18E
$\Delta T = 130^{\circ}C/km$ for k = 2 TCU, q = 2.6 HFU (30-45m)

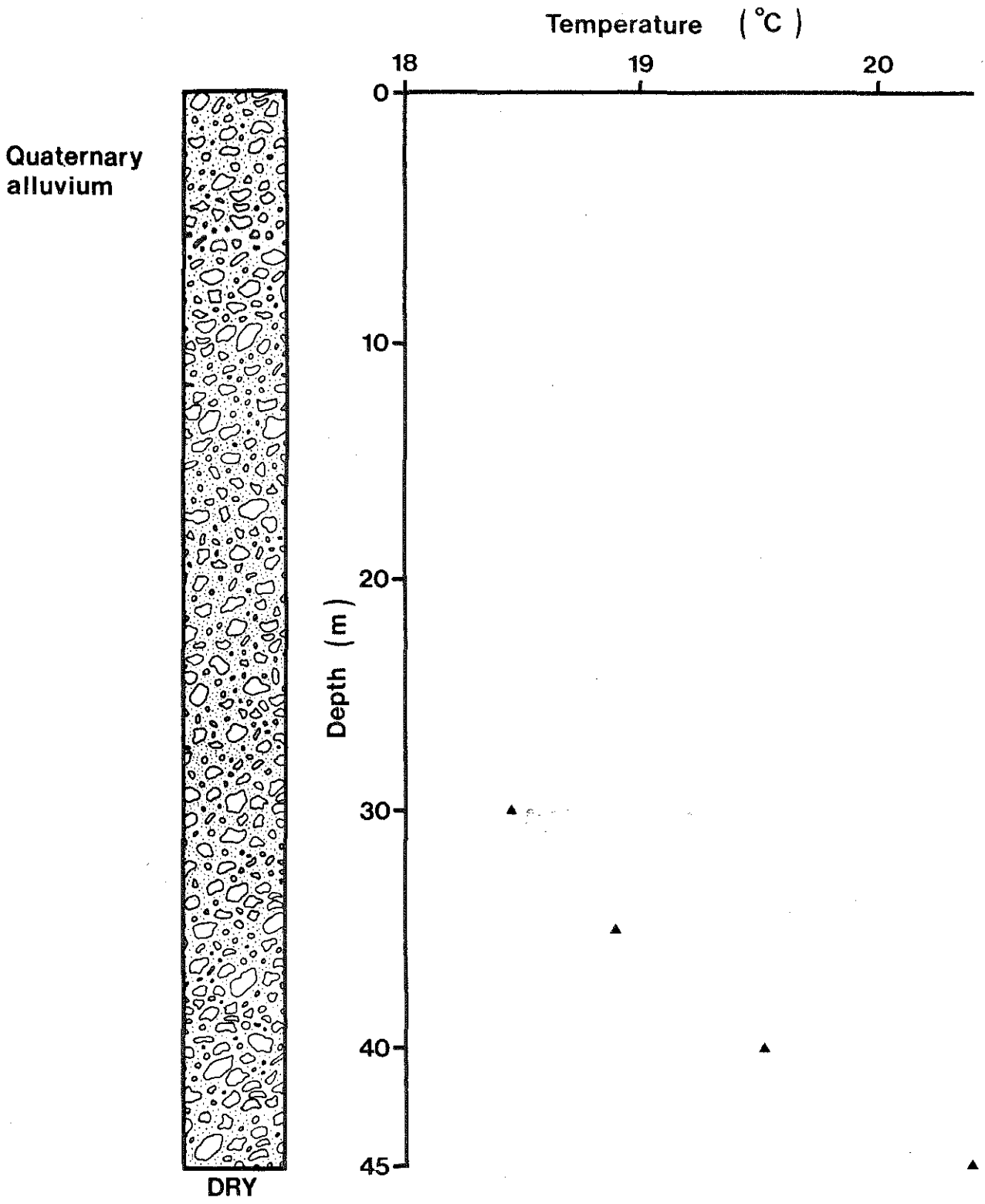

Figure 23. NV-78 Terraced Hills Thermal Gradient No. 2; Sec. 14 T27N, R19E
$\Delta T = 134^{o}C/km$ for k = 2 TCU, q = 2.7 HFU (20-34m)

Stone Corral, NV-81, Rating 1

The Stone Corral prospect is in Township 37 North, Range 40 East, Humboldt County, Nevada. The prospect consists of a Paleozoic quartzite which was reported in the literature as a silica deposit. No hydrothermal manifestations were evident. An adjacent spring had a temperature of 13°C.

Osgood Mountains, NV-83, Rating 1

The Osgood Mountain prospect is centered around a barite deposit in Hogshead Canyon, Township 37 North, Range 41 East, Humboldt County, Nevada. The deposit appears as a distinct color anomaly on Landsat imagery. Drill-holes at the mine site intersect the water table at approximately 30 meters. Water temperature is 13.48°C at 40 meters.

OREGON (Figure 24)

Stams Peak, OR-71, Rating 2

The Stams Peak prospect is in Township 25 to 27 South, Ranges 11 and 12 East, northwestern Lake County, Oregon. The prospect is located on a Plio-Pleistocene basaltic and andesitic volcanic plateau of moderate relief. No gradient holes were found. Antelope Well in Section 33, Township 28 South, Range 12 East, was blowing 12°C air. Springs within the prospect had temperatures of 5°C to 6°C.

Drake Peak, OR-82, Rating 2

The Drake Peak prospect is in Township 37 and 38 North, Range 22 East, south-central Lake County, Oregon. The prospect consists of an arcuate range of rhyolite and rhyodacites with K-Ar date of 13-16 m.y. (142). Springs within the range are cold with temperatures varying between 5 and 8°C.

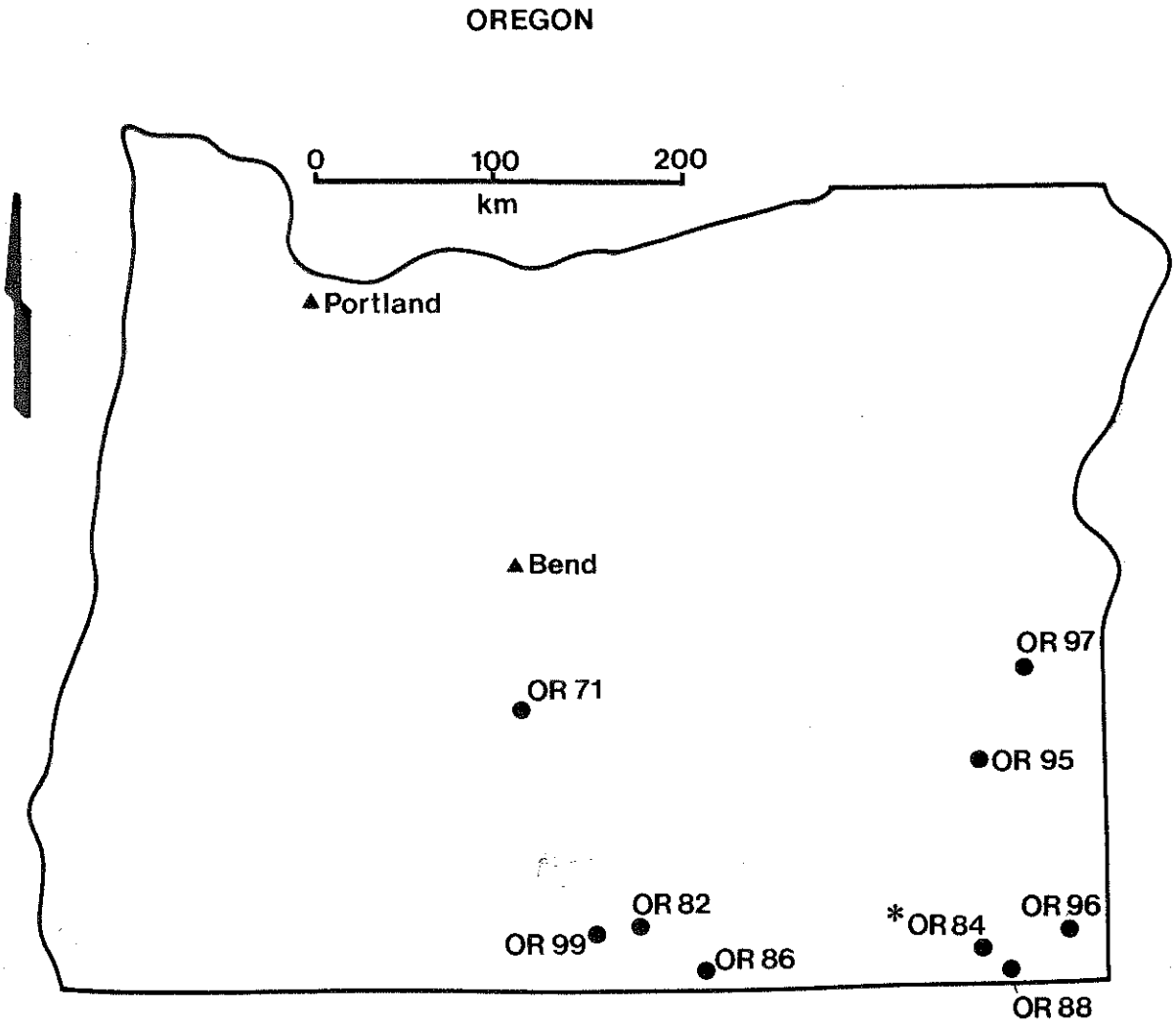

Figure 24. OREGON TARGET LOCATION MAP
* = recommended target

No wells were encountered in the area.

Guano Valley, OR-86, Rating 2

The Guano Valley is located in Townships 37 to 41 South, Ranges 27 and 28 East, southern Lake County, Oregon. The valley has a north trending graben structure similar to adjacent valleys that contain numerous areas of hydrothermal activity. The valley is terminated to the north by a Pliocene rhyolite dome. A bottom hole temperature of 11.50°C was observed in a water well in Section 27, Township 40 South, Range 27 East.

Opalite, OR-88, Rating 2

The Opalite prospect is in Townships 40 and 41 South, Ranges 40 and 41 East, southern Malheur County, Oregon. The prospect consists of Miocene and Pliocene rhyolitic and intermediate flows, welded tuffs and tuffaceous lake sediments. Mineralization at the Opalite and Bretz mercury mines and numerous propsects in the region consists of massive argillization and opalite and chalcedony replacement of lakebeds and volcanic rocks. Bottom hole temperatures were low throughout the district indicating that the hot mineral hole at the Opalite Mine (30°C at 45 m, T = 818°C/km, q = 32.7 H.F.U.) is an isolated anomaly. No wells or drillholes were found outside the leased and overfiled area associated with the Opalite anomaly.

Follyfarm, OR-95, Rating 2

The Follyfarm prospect is in Township 29 South, Range 37 East, western Malheur County, Oregon. It is located within the intersection of the Brothers Fault Zone and Basin and Range Province. The northern end of the Steens-Pueblo Range is offset several kilometers to the northwest

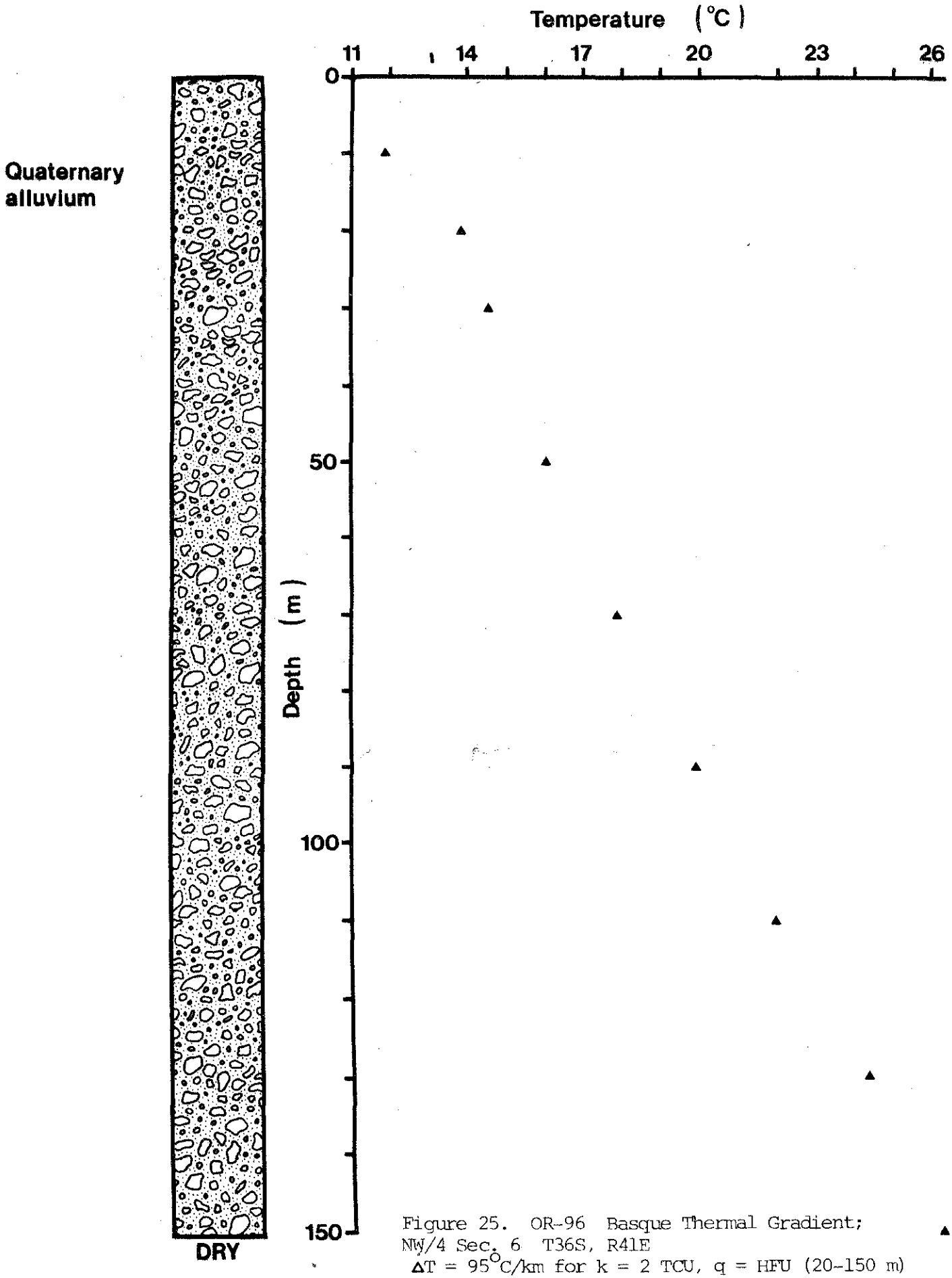

Figure 25. OR-96 Basque Thermal Gradient;
NW/4 Sec. 6 T36S, R41E
$\Delta T = 95^{\circ}C/km$ for k = 2 TCU, q = HFU (20-150 m)

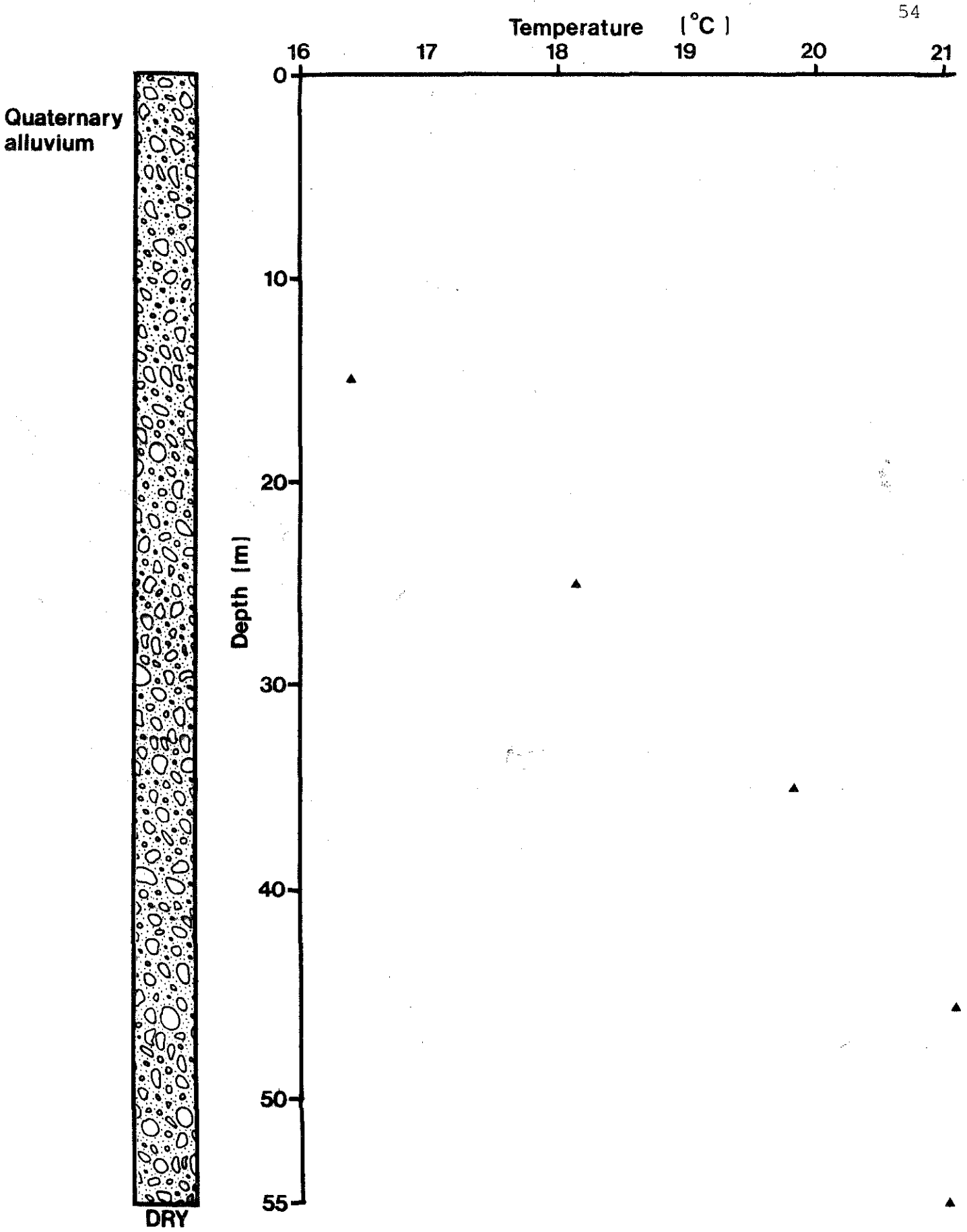

Figure 26. OR-96 Cherry Well Thermal Gradient;
Sec. 16 T35S, R41E
$\Delta T = 123^{o}C/km$ for k = 2 TCU, q = 2.5 HFU (15-45 m)

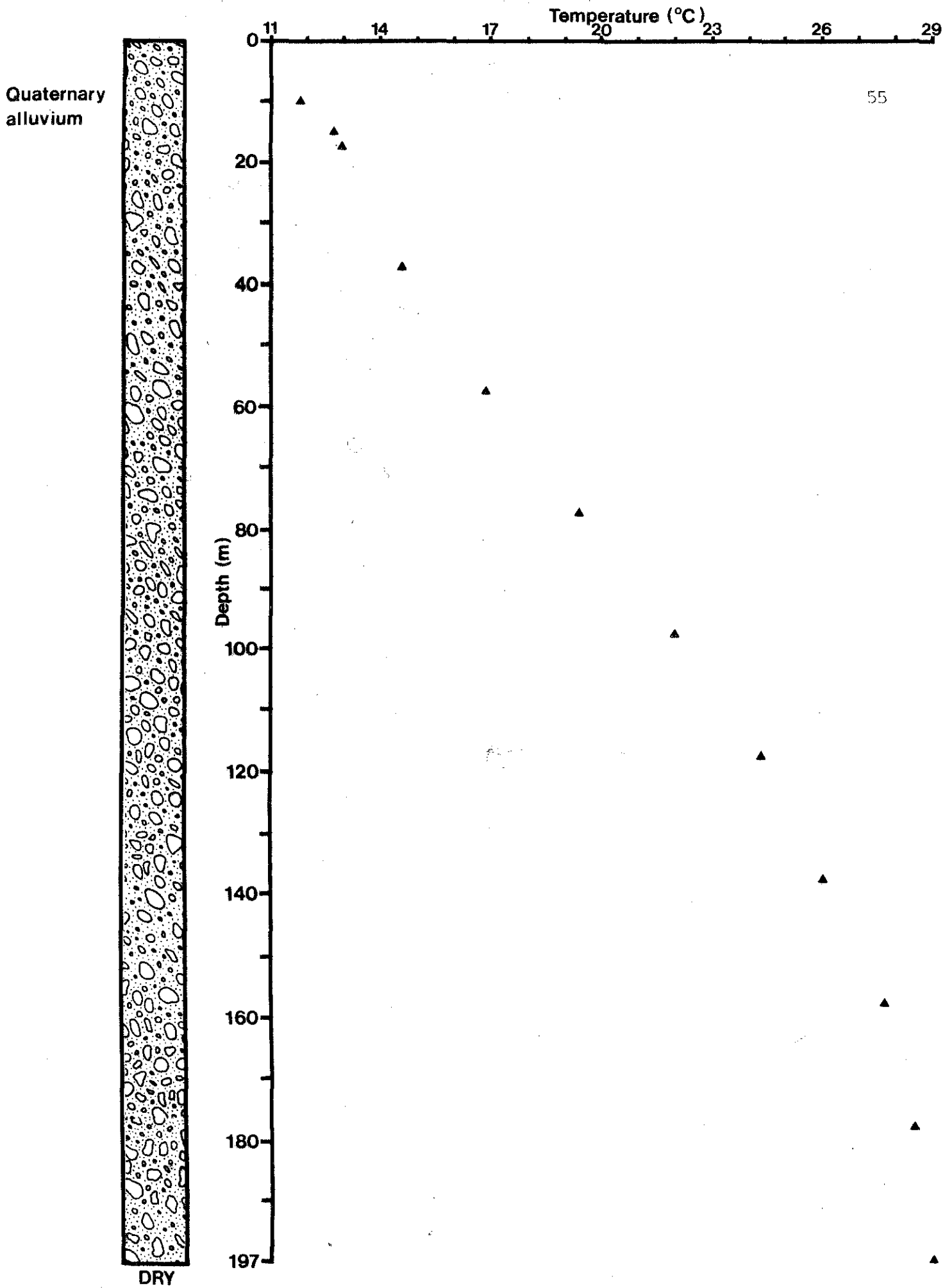

Figure 27. OR-96 Overshoe Well Thermal Gradient; Sec. 21 T35S, R43E
$\Delta T = 89.5^{\circ}C/km$ for k = 3.0 TCU, q = 2.7 HFU (37-197 m)

as it crosses the Brothers Fault Zone at Follyfarm. Rocks in the area consist of basalts and andesites with K-Ar age dates of 13 to 16 m.y. (142). All water wells found within the prospect were cold. No hydrothermal alteration was observed.

Basque-Owyhee Uplift, OR-96, Rating 3

The Basque-Owyhee Uplift prospect occupies the southeastern corner of Oregon from just west of Highway 95 to the Owyhee River Canyon. The region consists of flat-lying to gently dipping rhyolite flows and welded ashflow tuffs. The main structural feature in the area is the McDermitt-Basque graben. Four water wells within 30 km of Basque Station exhibit slightly anomalous bottom hole temperatures of up to 28.91°C at 197 m (Figure 25, 26 and 27).

Harper, OR-97, Rating 2

The Harper prospect is in Townships 21 and 22 North, Ranges 42 and 43 East, northern Malheur County, Oregon. The prospect is located in gently dipping Middle Pliocene tuffs and welded ashflows capped by olivine basalt. A warm well with a gradient of 110°C/km and a bottom hole temperature of 24.8°C at 140 m was reported in Section 11, Township 21 South, Range 42 East (144). This well could not be located for verification. Nearby wells have low bottom hole temperatures.

White King, OR-99, Rating 2

The White King and Lucky Lass mercury mines are in Township 37 North, Ranges 18 and 19 East, southern Lake County, Oregon. The mineralization in the mines consists of massive chalcedony and opalite replacement of

Miocene rhyolitic and dacitic tuffs. No mineral holes or wells were found. Overlying Pliocene basalts do not appear to be altered, indicating that hydrothermal alteration was pre-Pliocene.

UTAH (Figure 28)

House Range, UT-17, Rating 2

The House Range consists of a thick sequence of Paleozoic sedimentary and meta-sedimentary rocks. Several thermal springs have been located on both sides of the range. The Tertiary quartz rhyolite of Crystal Peak (T23S R16W) and other rocks in the area are unaltered. One BHT of 9.8°C at 5.3 meters and several normal spring temperature measurements were obtained.

Little Drum Mountains, UT-18, Rating 2

The Little Drum Mountains are a massive silicic-intermediate volcanic center. In the northern portion of the range small areas of hydrothermally altered rhyolite have been partially silicified. The area has been thoroughly drilled for geothermal and gold (most holes plugged). Three heat flow measurements were obtained (Figures 29, 30 and 31).

Keg Mountains, UT-19, Rating 2

The Keg Mountains are composed of Upper Tertiary silicic volcanic rocks. Several normal temperature springs and wells in the area were measured. One well currently being drilled had 13°C cuttings from a depth of 61 m (T11S R10W). The promising areas have been leased.

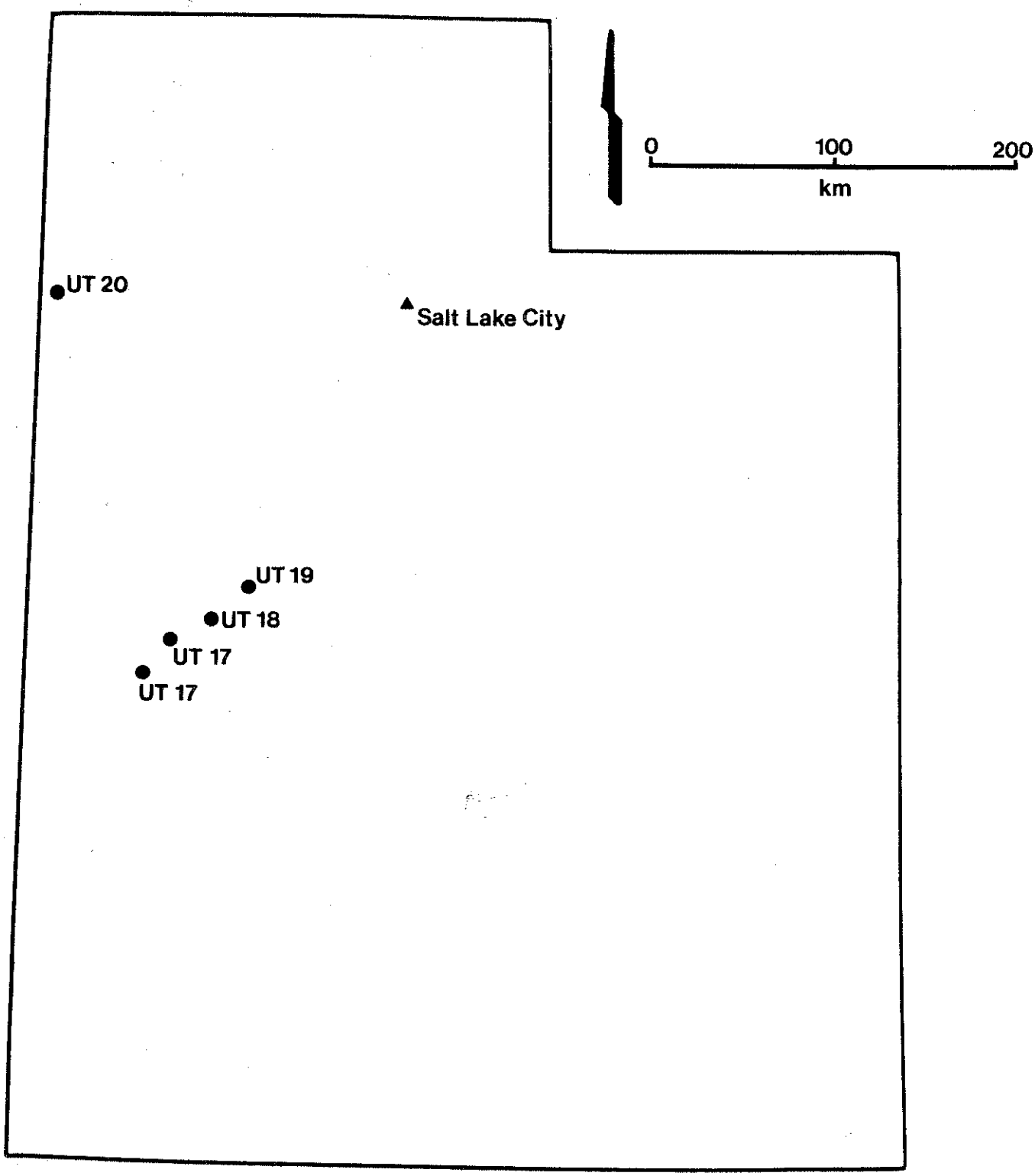

Figure 28. UTAH TARGET LOCATION MAP

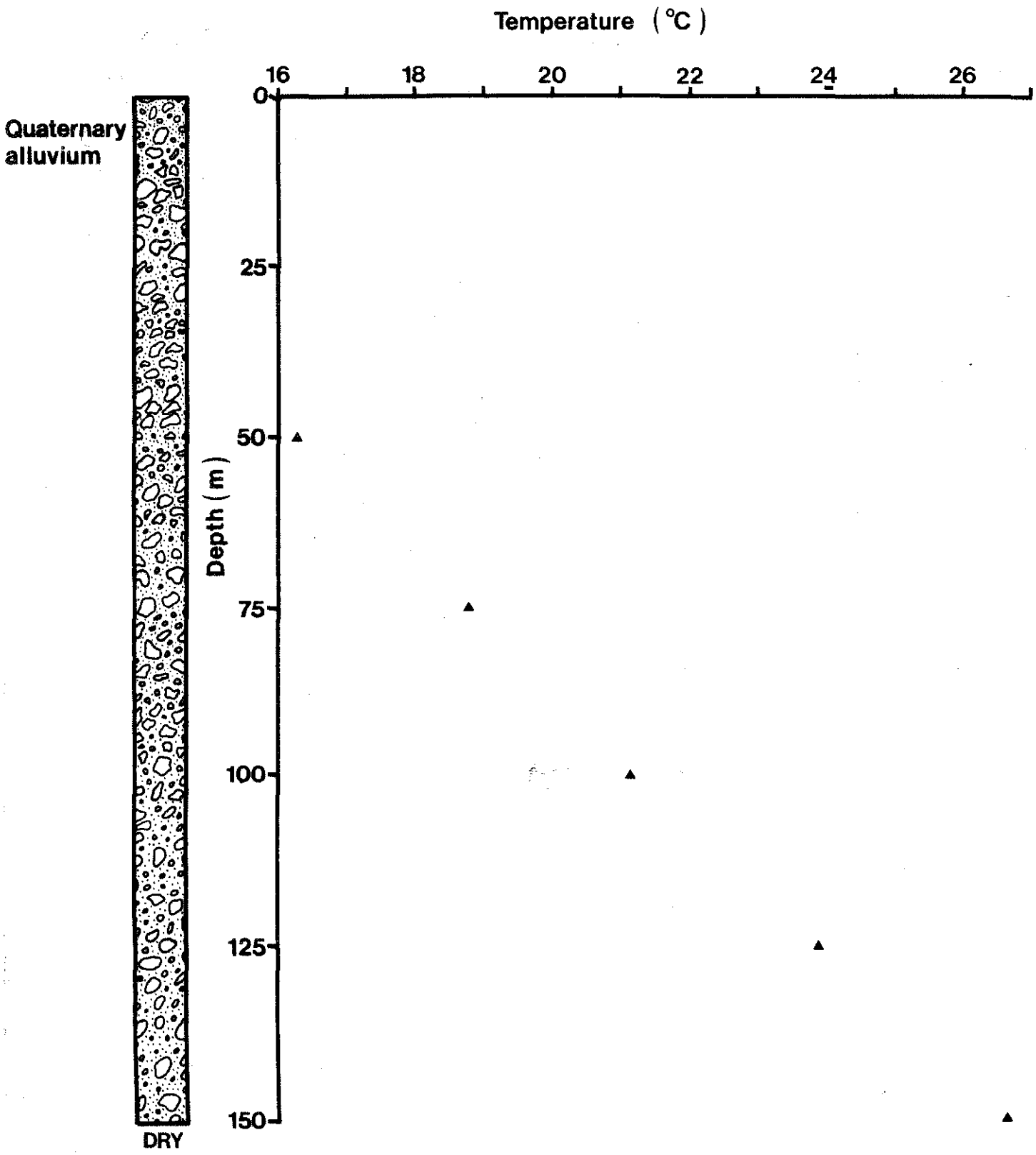

Figure 29. UT-18 Welded Thermal Gradient
SENE 19, T15S, R12W,
$\Delta T = 104^{o}C/km$ for k = 2 TCU, q = 2.1 HFU

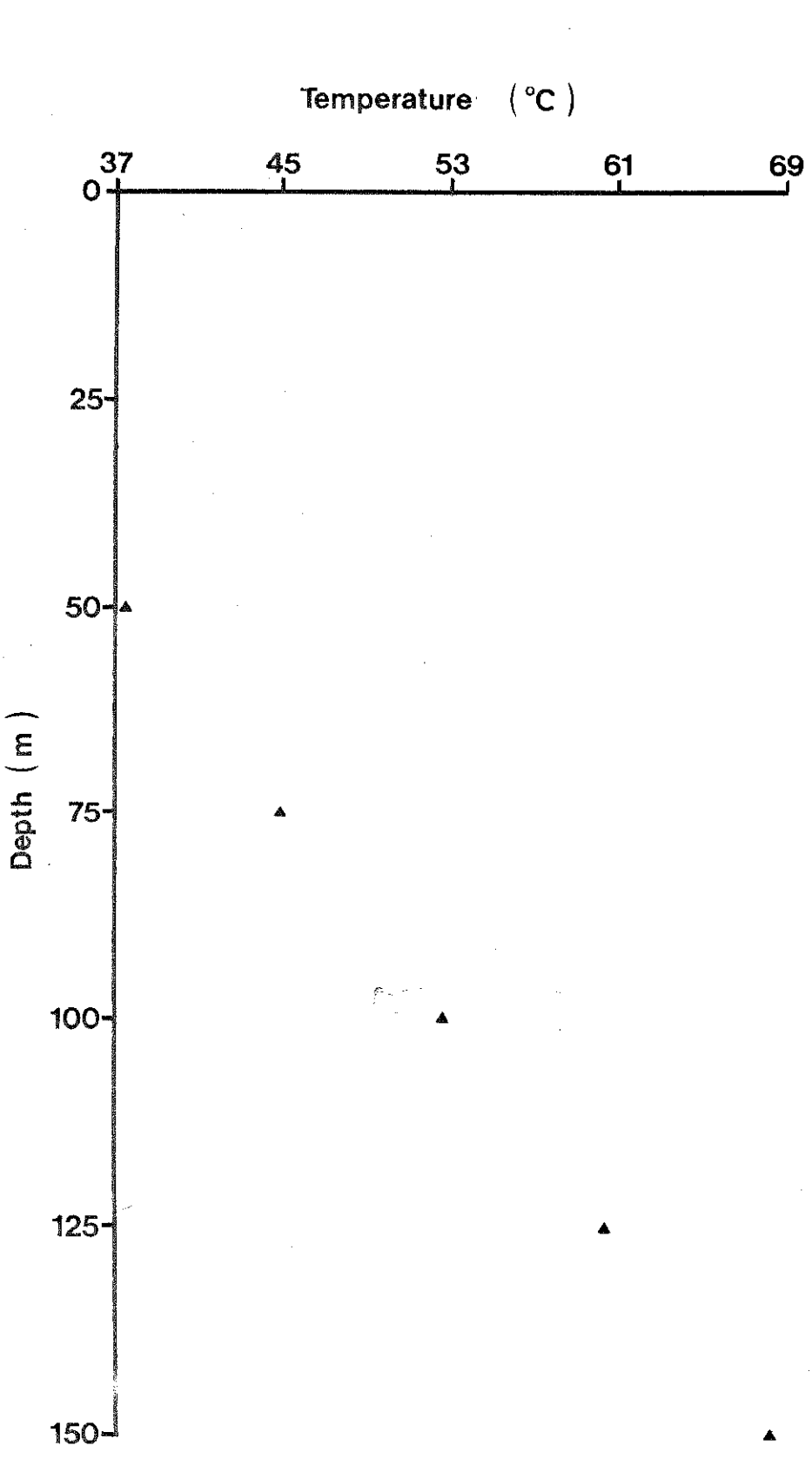

Figure 30. UT-18 Black Point Thermal Gradient,
NWNW 30, T15S, R11W,
$\Delta T = 310^{O}C/km$ for k = 3 TCU, q = 9.3 HFU (50-150m)

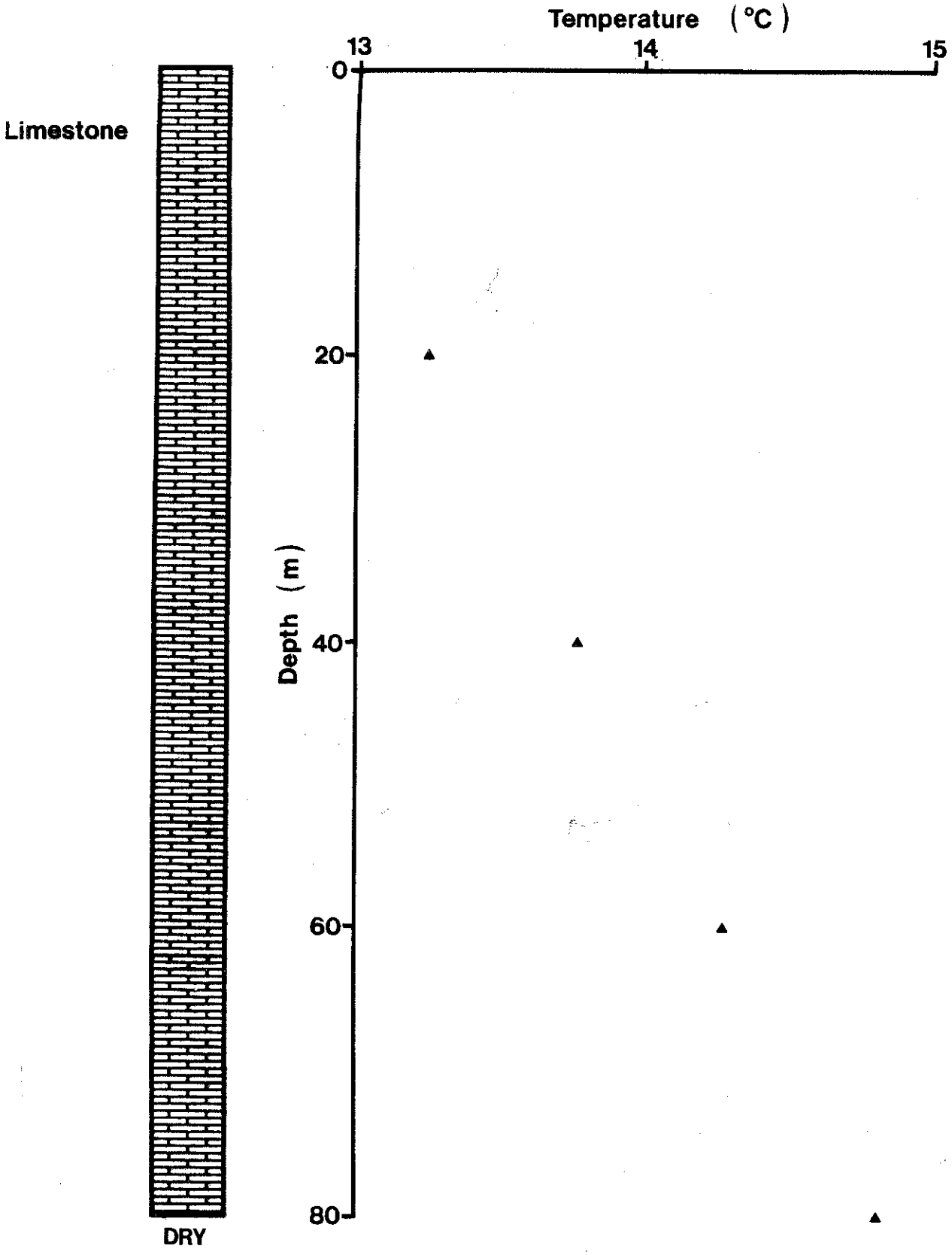

Figure 31. UT-18 Limestone Thermal Gradient
SESE 1, T15S, R11W
$\Delta T = 26^{o}C/km$ for k = 7, q = 1.8 HFU

Tetzlaff Peak, UT-20, Rating 1

Tetzlaff Peak, on the western edge of the Bonneville salt flats, is composed of Upper Paleozoic carbonate and clastic sediments overlain by Miocene andesite and Quaternary rhyolite. There is extensive calcite veining throughout the Paleozoic section, however, no significant alteration or mineralization was observed in the Cenozoic rocks.

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APPENDIX A

BUDGET

B U D G E T

January 1982 - June 1982
Proposed Budget (Nov. 1981)

	January	February	March	April	May	June	Totals
Salaries	5,250.00 (5,800.00)	5,670.00 (5,800.00)	5,670.00 (5,800.00)	5,670.00 (5,800.00)	5,670.00 (5,800.00)	5,670.00 (5,800.00)	33,600.00 (34,800.00)
Drafting	400.00 (400.00)	200.00 (250.00)	200.00 (400.00)	150.00 (250.00	200.00 (250.00)	450.00 (450.00)	1,600.00 (2,000.00)
Room & Board	166.97 (250.00)	540.09 (1,000.00)	467.45 (250.00)	602.44 (1,000.00)	743.91 (1,000.00)	440.07 (1,000.00)	2,960.93 (4,500.00)
Phone, equipment, travel, etc.	742.90 (600.00)	2,202.49 (600.00)	553.00 (600.00)	601.05 (600.00)	880.22 (600.00)	500.00 (600.00)	5,479.66 (3,600.00)
Vehicles	816.00 (800.00)	816.00 (800.00)	816.00 (800.00)	816.00 (800.00)	816.00 (800.00)	816.00 (800.00)	4,896.00 (4,800.00)
Gas	387.44 (250.00)	187.90 (1,000.00)	485.85 (100.00)	430.48 (250.00)	674.13 (1,000.00)	517.80 (1,000.00)	2,683.60 (3,600.00)
Drilling	0.00 (0)	0.00 (14,700.00)	254.72 (0)	14,976.22 (0)	0.00 (0)	2,065.48 (0)	17,296.42 (14,700.00)
Airplane	0.00 (0)	0.00 (0)	0.00 (0)	0.00 (4,500.00)	0.00 (3,500.00)	0.00 (0)	0.00 (8,000.00)
Totals	7,763.31 (8,100.00)	9,616.48 (24,150.00)	8,447.02 (7,950.00)	23,246.19 (13,200.00)	8,984.26 (12,950.00)	10,459.35 (9,650.00)	68,516.61 (76,000.00)

APPENDIX B

FIELD NOTES

DATE: May 5-6, 1982 GEOLOGIST: G. Maurath MAP NO. CA-125

AMS MAP: Death Valley TOPO MAPS (7.5) (15): Keeler, Haiwee Reservoir

SAMPLES:

PHOTOS: Landsat false-color composit 044-035

DISTRICT NAME: Owens Valley MINES VISITED:

LOCATION: ¼ SEC: T 20-21N (S) R 37-38 (E) W COUNTY: Inyo STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: seismic activity, gravity low, Quaternary volcanic centers.

ROCK UNITS: Plio-Pleistocene intermediate to basic extrusive volcanic rocks. Tertiary rhyolite.

ALTERATION/MINERALIZATION: There are numerous pumice mines in T21S R38E, Tertiary in age, which are overlain by basic rocks. The McCloud mine and others in the Cactus flat area consist of quartz veining (gold?) in Cretaceous granite and pre-Cretaceous metamorphic rocks (mostly granite gneiss and metaquartzite). A water well (NENE S4 T20S R37E) is reported to produce 200+ gpm of 12.7°C water from 95 m. The USGS drilled numerous test holes on both sides of the Haiwee Reservoir (1980-81) in conjunction with a uranium ~~HEAT FLOW DATA~~ exploration program. Denied access to holes (reportedly plugged), however no warm or hot holes were reported. Lower Centennial Spring (S18 T19S R39E) 13.5°C.

~~REMARKS/FURTHER ASSESSMENT WORK~~ Dirty socks H.S. (S34 T18S R37E) is apparently fault controlled and not associated with Tertiary volcanism to the east.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 6, 1982 GEOLOGIST: G. Maurath MAP NO. CA-126

AMS MAP: Death Valley TOPO MAPS (7.5) (15): Keeler, Darwin

SAMPLES:

PHOTOS: Landsat false-color composit 044-035

DISTRICT NAME: Talc City Hills MINES VISITED:

LOCATION: ¼ SEC: T 17-19 N (S) R 39-40 (E) W COUNTY: Inyo STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Seismic area, Pliocene andesite, intersection of photolinears.

ROCK UNITS:

ALTERATION/MINERALIZATION: The area consists of a thick sequence of Middle Paleozoic marine rocks overlain by intermediate to basic, extrusive Pliocene volcanics. These flows have been extensively faulted. Talc mines are located in metaquartzite and banded dolomite of Paleozoic age. No heat flow data could be obtained. No hydrothermal alteration was observed along Quaternary faults within the volcanic sequence.

HEAT FLOW DATA:

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10
Poor Good

O'Brien Resources: Mine Evaluation Report

DATE: May 12-13, 1982 GEOLOGIST: G. Maurath MAP NO. CA-127

AMS MAP: Kingman TOPO MAPS (7.5) (15): Crescent Peak, Searchlight, Lanfair Valley, Homer Mtn.

SAMPLES:

PHOTOS:

DISTRICT NAME: Piute Range MINES VISITED: California, Hackberry, True Blue, Hart, Piute Spring

LOCATION: ¼ SEC: T 11-14 (N) S R 16-18 (E) W COUNTY: San Bernardino STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Tertiary rhyolite, andesite, basalt, mercury deposit, color anomaly, Quaternary faulting, gravity low

ROCK UNITS:

ALTERATION/MINERALIZATION: Hart mining district - thinly bedded rhyolitic tuff. Cinnabar was unevenly distributed throughout the tuff unit and is generally associated with small displacement faults. Hackberry mining district - silver occurs in quartz veins and was staked by First Mississippi Corp., Lakewood Co. in 1982.

Clay pit (S19 T11N R17E): highly altered, thinly bedded tuff - overlain by unaltered dacite. Alteration is most intense along bedding planes and contains minor amounts of Hg and chloride. No native sulfur. Total area is approximately 0.3 $mi.^2$. All wells measured in Lanfair Valley were normal, having BHT's ranging from 12° - 21°C at depths < 300 m. Early morning ΔT attached. Bottom hole temperatures indicate a regional thermal gradient of 51°C/K. All springs and wells in the Piute range were measured or reported to be normal. Groundwater in the Piute Valley, east of the Piute Range, is approximately 5-10°C warmer than in the Lanfair Valley. Tenmile well was producing 5gpm of 30°C, very low TDS water from 247 m.

~~HEAT FLOW DATA~~

~~REMARKS/FURTHER ASSESSMENT WORK~~

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

O'Brien Resources: Mine Evaluation Report

DATE: May 5, 1982 GEOLOGIST: G. Maurath MAP NO. CA-128

AMS MAP: Mariposa TOPO MAPS (7.5) (15) : Big Pine, Waucoba Mtn.

SAMPLES:

PHOTOS: Landsat false-color composit 044-034

DISTRICT NAME: Owens Valley MINES VISITED: Cleveland mines (S17, 18 T10S R34E)
Perlite mine (S30 T10S R34E)

LOCATION: ¼ SEC: T 10 N (S) R 34 (E) W COUNTY: Inyo STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Quaternary volcanic centers, hot springs, faulting, seismic activity, age date 0.99 m.y., photolinear/curvilinear intersection.

ROCK UNITS: mostly Pliocene basalt

ALTERATION/MINERALIZATION: Red Mountain (S31, 32 T10S R34E) is an andesitic-basaltic cinder cone ,(age date 0.99 m.y.o.) springs to the north of Red Mountain (S30 T10S R34E), discharge from the base of a Pleistocene pumiceous perlite unit at a temperature of 14°C. No wells were located, however the temperature of water in some plugged test holes was reportedly normal. No thermal waters have been reported west of the Owens Valley fault zone in this area. The youngest rocks in the area are basic Pleistocene lava flows and ~~HEAT FLOW DATA~~ pyroclastic deposits with no evidence of post depositional hydrothermal alteration. The Cleveland mines (gold) are in dacite dikes intruding Cretaceous granite.

~~REMARKS/FURTHER ASSESSMENT WORK:~~ Minor quartz veining is associated with the dikes, however the gold is dispursed throughout the dacite as small irregular bodies.

OWNERSHIP (BLM) (NF) (STATE) (FEE) :

RATING: 1 (2) 3 4 5 6 7 8 9 10
Poor Good

DATE: May 11, 1982 GEOLOGIST: G. Maurath MAP NO. CA-129

AMS MAP: Needles TOPO MAPS (7.5) (15): Turtle Mts., Savahia Peak; Savahia Peak SW (7.5)

SAMPLES:

PHOTOS: Landsat false-color composit 042-036

DISTRICT NAME: Turtle Mountains MINES VISITED:

LOCATION: ¼ SEC: T 3-4 (N) S R 20-21 (E) W COUNTY: San Bernardino STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: photolineaments, color anomalies, Tertiary rhyolite, faulting

ROCK UNITS:

ALTERATION/MINERALIZATION: The northern Turtle mountains are composed of Tertiary intermediate to basic volcanic rocks which have been extensively faulted. The Mohawk Spring area (T4N R20E) consists of unaltered silicified rhyolite interbedded with dark red andesite and olivine basalt. One BHT of 21.4°C @ 9.1 m was measured in a hand dug well. A 250 m deep water well (plugged - T4N R20E) was reported to produce water < 25°C. Mineral deposits in the area are Cu, Ag and Au. No mercury mineralization or hydrothermal alteration was observed.

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10
Poor Good

DATE: May 15, 1982 GEOLOGIST: G. Maurath MAP NO. CA-130

AMS MAP: San Bernardino TOPO MAPS (7.5) (15): Nebo, Yerma

SAMPLES:

PHOTOS:

DISTRICT NAME: Calico Mts. MINES VISITED: Silver Bow, Burcham, Russ, Kramer

LOCATION: ¼ SEC: T 10 (N) S R 1W- 2 (E) W COUNTY: San Bernardino STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Hg deposit, extensive faulting, Miocene rhyolite, gravity low, Pliocene pyroclastics.

ROCK UNITS:

ALTERATION/MINERALIZATION: The southern portion of the Calico mountains is essentially closed to geothermal development. The area has been set aside as state parks, recreation areas and the Calico Early Man archeological dig. The silver mines in the northwestern portion of the range are staked and operating. The silver is associated with secondary barite (?) and calcite in dacite breccia. Deposits are low grade and very irregular. Very minor alteration was observed along several fault contacts in sections 4, 5, 8 and 9 T10N R1E. One tunnel measurement (21.6°C @ 180') and one BHT - 18.79°C @ 26m support the low rating.

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 14, 1982 GEOLOGIST: G. Maurath MAP NO. CA-131

AMS MAP: San Bernardino TOPO MAPS (7.5) (15): Cady Mts., Broadwell Lake, Ludlow; Ludlow, Ash Hill (7.5)

SAMPLES:

PHOTOS: Landsat false-color composit 042-036

DISTRICT NAME: Bristol/Cady Mts. MINES VISITED:

LOCATION: ¼ SEC: T 7-11 (N) S R 6-10 (E) W COUNTY: San Bernardino STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: seismic area, Ludlow fault, Miocene rhyolite, photo-linears, Pliocene basalt.

ROCK UNITS:

ALTERATION/MINERALIZATION: The Bristol and Cady mountains are composed of Mesozoic granite and monzonite which is unconformably overlain by Miocene basalt, andesite and rhyolite flows. The volcanic rocks have been along northerly and northwesterly trends. Minor alteration was observed along faults in Miocene rocks in a few areas. Most post-depositional mineralization and alteration occurs in the Mesozoic granite which has been intruded by diorite dikes. Cu and Au (?) mineralization is concentrated along fissures near these dike contacts. The relatively low BHTs and the Old Pete and Finally thermal gradients (attached) justify the low rating.

~~HEAT FLOW DATA:~~

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

O'Brien Resources: Mine Evaluation Report

DATE: May 17, 1982 GEOLOGIST: G. Maurath MAP NO. CA-134

AMS MAP: Trona TOPO MAPS (7.5) (15): Trona, Manly Peak

SAMPLES:

PHOTOS: Landsat false-color composit 044-035

DISTRICT NAME: Gold Bottom Mine MINES VISITED: Gold Bottom Mine

LOCATION: ¼ SEC: T 20 (N) S R 43-44 (E) W COUNTY: Inyo STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: aeromagnetic and gravity lows, high seismic activity, faulting, intersection of photolinears, Quaternary basalt.

ROCK UNITS:

ALTERATION/MINERALIZATION: The Gold Bottom and Ophir mines are in diabase dikes which cut limestone, limy siltstone, and quartzite. These dikes have extensive calcite and silica fracture fillings which were deposited in at least three separate episodes. Minor azurite deposition was observed along fault contacts above 2400'. A small Quaternary basalt flow overlies the pre-Cretaceous sequence north of Copper Queen Canyon. One tunnel measurement of 18.2°C at 785' supports the low rating.

HEAT FLOW DATA:

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

DATE: May 16, 1982 GEOLOGIST: G. Maurath MAP NO. CA-135

AMS MAP: Trona TOPO MAPS (7.5) (15) : Fremont Peak, Opal Mtn.

SAMPLES:

PHOTOS:

DISTRICT NAME: Black Mountains MINES VISITED: Opal Mountain, Pumice Pit

LOCATION: ¼ SEC: T 32 N (S) R 44-45 (E) W COUNTY: San Bernardino STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Miocene rhyolite, photolinears, seismic activity, Pliocene andesite, Blackwater fault, Hg deposit.

ROCK UNITS:

ALTERATION/MINERALIZATION: Several Pliocene andesite plugs are the most prominent features in the area. Opal Mountain consists of a thick sequence of poorly welded rhyolite and pumice beds overlain by a partially silicified rhyo-dacite breccia with chalcedony veins. One questionable spring measurement (18.5°C) was obtained (NE11 T32S R4W). Lack of alteration and heat flow data justify the low rating.

HEAT FLOW DATA:

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

DATE: May 4, 1982 GEOLOGIST: G. Maurath MAP NO. CA-136

AMS MAP: Walker Lake TOPO MAPS (7.5) (15): Huntoon Valley, Trench Canyon

SAMPLES:

PHOTOS:

DISTRICT NAME: Adobe Hills MINES VISITED:

LOCATION: ¼ SEC: T 3 (N) S R 29 (E) W COUNTY: Mono STATE: CA

TYPE OF DEPOSIT/MODE OF OCCURRENCE: seismic area, faulting, gravity low

ROCK UNITS: Pliocene basalt, andesite and rhyolite

ALTERATION/MINERALIZATION: The rocks become more silicic towards the north. The northern most volcanic flow, a porphyritic quartz rhyolite, appears to be the youngest flow in the area and is unaltered. No alteration was observed along the major N-S dip-slip fault running from section 10 to 27 T2N R29E. There are several shallow wells (T1N R30E) in the Adobe Valley. One well (center S7 T1N R30E) had a BHT of 11.41°C @ 9.5 m. The "deep well" in S34 T3N R29E was a hand dug well which has been filled in. The rating

HEAT FLOW DATA: is based upon the supposedly young age of the rhyolite flow. No heat flow or mineralogic data was obtained to support this rating.

REMARKS/EXPLORATION ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 2 3 (4) 5 6 7 8 9 10

Poor Good

DATE: May 10, 1982 GEOLOGIST: W. Teplow MAP NO. NV-54

AMS MAP: Reno TOPO MAPS (7.5) (15) : Virginia City, Churchill Butte

SAMPLES: B30670

PHOTOS:

DISTRICT NAME: Sutro-Dayton MINES VISITED: Glass Mountain Block

LOCATION: NW ¼ SEC: 16 T 17 (N) S R 22 (E) W COUNTY: Storey STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Pumice - age 1.5 m.y.

ALTERATION/MINERALIZATION: No hydrothermal alteration of pumice

HEAT FLOW DATA: Warm wells 34°C/250 ft., 2000 gpm Sutro Ranch NW/4 Sec. 7 T16N R22E: 31°C/500 ft. SE/4 Sec. 6 T16N R22E; Travertine Mound Sec. 36 T16N R21E

REMARKS/FURTHER ASSESSMENT WORK: The pumice dome appears well formed and only mildly eroded. A K-Ar age of 1.5 m.y. makes it one of the youngest rhyolites in Nevada. One partial BLM section lies at southern base of dome - otherwise the area is all fee. Shallow wells in vicinity are normal but a high volume warm aquifer (34°C) at a depth of 50-75m is found 7 km to the south. Heat could be masked by high run-off from the Flowery Range and Sutro Springs adjacent to the dome. The dome is owned by Glass Mountain Block Co. of Carson City. A 150m' hole in the Federal section may indicate presence of heat.

Tel. 702 882-9336

OWNERSHIP (BLM) (NF) (STATE) (FEE) :

RATING: 1 2 3 4 (5) 6 7 8 9 10

Poor Good

DATE: May 3, 1982 GEOLOGIST: W. Teplow MAP NO. NV-60

AMS MAP: Mariposa TOPO MAPS (7.5) (15): Benton

SAMPLES: B30667

PHOTOS:

DISTRICT NAME: Montgomery Pass MINES VISITED:

LOCATION: NE ¼ SEC: 1 T 1 (N) S R 32 (E) W COUNTY: Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Hg in opalized tuff

ROCK UNITS: Tertiary dacitic tuff overlain by Quaternary vesicular olivine basalt and tuff breccias.

ALTERATION/MINERALIZATION: Opalization along breccia zone; complete replacement of tuff by silica.

HEAT FLOW DATA: None

REMARKS/FURTHER ASSESSMENT WORK: Mineralization appears to be pre-Quaternary, does not affect overlying basalts of Pleistocene age.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 5, 1982 GEOLOGIST: W. Teplow MAP NO. NV-61

AMS MAP: Reno, Walker Lake TOPO MAPS (7.5) (15): Rawhide

SAMPLES: B30666, B30669

PHOTOS:

DISTRICT NAME: Black Eagle Hill, Rawhide MINES VISITED: Black Eagle Hill

LOCATION: ¼ SEC: 1 T 13 (N) S R 31½ (E) W COUNTY: Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Hg in opalite

ROCK UNITS:

ALTERATION/MINERALIZATION: Opalization of Tertiary tuff. Massive and complete opalization of Tertiary dacitic welded tuffs forming tabular bodies 3-5 meters thick.

HEAT FLOW DATA: HF = 2.5. See Rawhide gradients #1, 2

REMARKS/FURTHER ASSESSMENT WORK: Uplift and erosion of opalite bodies along with relatively low heat flows measured in the adjacent Rawhide district indicate that there is no current hydrothermal activity.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 3, 1982 GEOLOGIST: W. Teplow MAP NO. NV-62

AMS MAP: Mariposa TOPO MAPS (7.5) (15): Basalt NV

SAMPLES: B30674

PHOTOS:

DISTRICT NAME: Montgomery Pass MINES VISITED: Grefco Dikalite (diatomite)

LOCATION: ¼ SEC: 29 T 2 (N) S R 34 (E) W COUNTY: ~~Esmeralda~~ Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Diatomaceous lake beds

ROCK UNITS: Paleozoic basement overlying Tertiary dacites and andesites capped by Quaternary basalts. Quaternary lake beds.

ALTERATION/MINERALIZATION: none

HEAT FLOW DATA: No open drill holes

REMARKS/FURTHER ASSESSMENT WORK: Water well at 38°00'N 118°17'30"W 13°C water pumping at 55 gpm from 220 ft. 2 wells at Montgomery Pass - both ~90 ft., both cold (<15°C). Mine shaft Sec. 22 T2N R34E 12.45°C at 45m', sample quartz vein in fault gauge in Paleozoic calcareous siltstone. Abundant malachite.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

DATE: May 4, 1982 GEOLOGIST: W. Teplow MAP NO. NV-63

AMS MAP: Walker Lake TOPO MAPS (7.5) (15): Huntoon Valley

SAMPLES:

PHOTOS:

DISTRICT NAME: Huntoon Valley MINES VISITED:

LOCATION: ¼ SEC: T 3 (N) S R 31 (E) W COUNTY: Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: South side of valley bounded by Tertiary andesites and Quaternary basalts. Tuffaceous lake beds slightly uplifted and eroded along south edge of valley.

ALTERATION/MINERALIZATION: Chalcedony concretions abundant on several horizons in lake beds.

HEAT FLOW DATA: Cow camp well cold 16.35°C at 75m in water. Well on SE side of valley 19.05°C at 12m in water - flagged hole. 11.30°C at 19m - Government Well

REMARKS/FURTHER ASSESSMENT WORK: Anomalous well on S.E. edge of valley. If reported temperature of 25.5 at 19.4m is correct, then heat flow is extremely high and should be verified with a 100m gradient hole.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Wildlife refuge adjacent to anomalous well on south side.

RATING: 1 2 3 4 5 6 (7) 8 9 10

Poor Good

DATE: May 5, 1982 GEOLOGIST: W. Teplow MAP NO. NV-70

AMS MAP: Walker Lake TOPO MAPS (7.5) (15): Moho Mtn., Camp Douglas, Mina N.W. Mable Mtn., Rattlesnake Flat.

SAMPLES: B30668, B30672, B30671

PHOTOS:

DISTRICT NAME: Garfield MINES VISITED:

LOCATION: ¼ SEC: T 6 (N) S R 33 (E) W COUNTY: Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Skarn and altered fault zone. Cu, Au(?), Ag(?)

ROCK UNITS: Paleozoic limestone intruded by Cretaceous granodiorite

ALTERATION/MINERALIZATION: (2)-SW/4 Sec. 3 T6N R34E, (3) NW/4 T36N R34E, Paleozoic limestone intruded by granodiorite - abundant Cu carbonates and limonite vein filling.

HEAT FLOW DATA: Garfield Well #1 HF = 1.6 HFU, #2 HF = 1.5

Rattlesnake well BHT 13.04°C at 32 m.

REMARKS/FURTHER ASSESSMENT WORK: Low well temperatures and apparent old age of alteration are contra-indicative of current hydrothermal activity.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 5, 1982 GEOLOGIST: W. Teplow MAP NO. NV-71

AMS MAP: Walker Lake TOPO MAPS (7.5) (15): Teels Marsh

SAMPLES:

PHOTOS:

DISTRICT NAME: Marietta MINES VISITED:

LOCATION: ¼ SEC: T 4 (N) S R 33 (E) W COUNTY: Mineral STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Paleozoic carbonates and clastics overlain by Tertiary dacites and tuffs. Quaternary basalt dikes and sills intrude Tertiary volcanics.

ALTERATION/MINERALIZATION: Extensive travertine mounds of apparent Recent age located on south margin of valley at Rock House and German Springs, Sec. 1 T3N R32E and Sec. 4, T3N R33E.

HEAT FLOW DATA: 15.3°C in water well at 8 m' (measured in water). Well located in center of Marietta SW/4 Sec. 32 T5N R33E.

REMARKS/FURTHER ASSESSMENT WORK: Shallow seismicity and travertine indicative active fault system. Lack of heat flow data precludes further examination unless a random 50 m' hole program is undertaken.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 6, 1982 GEOLOGIST: W. Teplow MAP NO. NV-72

AMS MAP: Reno TOPO MAPS (7.5) (15): Virginia City

SAMPLES: B30665

PHOTOS:

DISTRICT NAME: Washington MINES VISITED: Washington Hill mine

LOCATION: ¼ SEC: T 19 (N) S R 21 (E) W COUNTY: Storey STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Silicic replacement - Au, Ag

ROCK UNITS: Tertiary volcanics

ALTERATION/MINERALIZATION: Silicic

HEAT FLOW DATA: Very low bottom hole temperature (14.82°C) at 33 m near mine

REMARKS/FURTHER ASSESSMENT WORK: Cold mineral hole indicates lack of current hydrothermal activity

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 14, 1982 GEOLOGIST: W. Teplow MAP NO. NV-78

AMS MAP: Lovelock TOPO MAPS (7.5) (15): Terraced Hills

SAMPLES:

PHOTOS:

DISTRICT NAME: Terraced Hills MINES VISITED:

LOCATION: ¼ SEC: T 27 (N) S R 21 (E) W COUNTY: Washoe STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Lake beds - Pleistocene

ROCK UNITS: Tuffaceous lake sediments

ALTERATION/MINERALIZATION: None

HEAT FLOW DATA: Water wells in the area are cold

REMARKS/FURTHER ASSESSMENT WORK: Lack of hydrothermal alteration and low temperatures of water wells indicate a lack of current hydrothermal activity.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Pyramid Lake Indian Reservation

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 14, 1982 GEOLOGIST: W. Teplow MAP NO. NV-79

AMS MAP: Reno TOPO MAPS (7.5) (15): Silver Springs

SAMPLES:

PHOTOS:

DISTRICT NAME: Churchill Valley MINES VISITED:

LOCATION: SE ¼ SEC: 5 T 16 (N) S R 25 (E) W COUNTY: Lyon STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Holocene lake beds bounded by Tertiary volcanics to the south

ALTERATION/MINERALIZATION:

HEAT FLOW DATA: Water well 24.13°C at 23 m, ΔT (23-15 m) 277°C/km in saturated lake beds.

REMARKS/FURTHER ASSESSMENT WORK: Recommend 100 m gradient adjacent to well to verify observed high heat flow.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Well on unleased BLM land. Adjacent to fee land to the north

RATING: 1 2 3 4 5 6 (7) 8 9 10

Poor Good

DATE: May 19,1982 GEOLOGIST: W. Teplow MAP NO. NV-81

AMS MAP: McDermitt TOPO MAPS (7.5)(15): Osgood Mountains

SAMPLES:

PHOTOS:

DISTRICT NAME: Stone Corral MINES VISITED: Stone Corral

LOCATION: SE ¼ SEC: 10 T 37 (N) S R 40 (E) W COUNTY: Humboldt STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Paleozoic quartzite

ALTERATION/MINERALIZATION: None

HEAT FLOW DATA: 13°C cold spring at base of deposit

REMARKS/FURTHER ASSESSMENT WORK: Very pure orthoquartzite quarried as source of silica - not of hydrothermal origin. No further action recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

DATE: May 19, 1982 GEOLOGIST: W. Teplow MAP NO. NV-83

AMS MAP: McDermitt TOPO MAPS (7.5) (15): Osgood Mountains

SAMPLES:

PHOTOS:

DISTRICT NAME: Osgood Mountains MINES VISITED: Barite mine in Hogshead Canyon

LOCATION: E ¼ SEC: 12 T 37 (N) S R 41 (E) W COUNTY: Humboldt STATE: NV

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Barite in limestone

ROCK UNITS: Paleozoic limestone

ALTERATION/MINERALIZATION: Barite mineralization in fractured and sheared limestone.

HEAT FLOW DATA: 13.48°C at 40 m in mineral hole. Water table approximately 30 m deep.

REMARKS/FURTHER ASSESSMENT WORK: Property actively drilled and mined. No further action recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Current mineral claims

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good

DATE: June 10, 1982 GEOLOGIST: W. Teplow MAP NO. OR-71

AMS MAP: Klamath Falls TOPO MAPS (7.5)(15): Fremont National Forest Map

SAMPLES:

PHOTOS:

DISTRICT NAME: Stams Peak MINES VISITED:

LOCATION: ¼ SEC: T 25-27N (S) R 11,12 (E) W COUNTY: Lake STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Plio-Pleistocene basalts and andesite, breccias and welded tuffs

ALTERATION/MINERALIZATION: None observed

HEAT FLOW DATA: Antelope well Sec. 33 T28S R12E blowing cold air 12°C from unknown depth. Other wells are very shallow, 1-3 meters deep. Springs have temperatures of 5-6°C.

REMARKS/FURTHER ASSESSMENT WORK: No gradient holes were found. Lack of thermal data, lack of hydrothermal alteration and cold spring temperatures indicate that further assessment is not warranted.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Fremont National Forest intermixed with fee land.

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: June 8, 1982 GEOLOGIST: W. Teplow MAP NO. OR-82

AMS MAP: Klamath Falls TOPO MAPS (7.5) (15): Crook Peak, Drake Peak NE, Little Honey Creek, Drake Peak

SAMPLES:

PHOTOS:

DISTRICT NAME: Drake Peak MINES VISITED:

LOCATION: ¼ SEC: T37, 38 N (S) R 22 (E) W COUNTY: Lake STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Rhyolite and dacite K-Ar age dates range from 13 m.y. to 16 m.y.

ALTERATION/MINERALIZATION:

HEAT FLOW DATA: Spring temperatures: SW/4 Sec. 22 T38S R21E 6°C (Stairstep Spring); N/2 Sec. 7 T37S R22E 6°C (Can Spring).

REMARKS/FURTHER ASSESSMENT WORK: Lack of hydrothermal alteration, lack of well or mineral hole data and low spring temperatures indicate no further assessment work should be undertaken.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Fremont National Forest

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 17, 1982 GEOLOGIST: W. Teplow MAP NO. OR-84

AMS MAP: Adel TOPO MAPS (7.5)(15):

SAMPLES:

PHOTOS:

DISTRICT NAME: Whitehorse Caldera MINES VISITED:

LOCATION: ¼ SEC: T 38 N (S) R 38 (E) W COUNTY: Harney STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE: 3 hot springs in Tertiary caldera

ROCK UNITS: Rhyolitic welded tuffs with tuffaceous lake beds filling central portion of caldera.

ALTERATION/MINERALIZATION: Abundant chalcedony concretions in lake beds. Hot springs have low mineral content but deposit Na Cl efflorescence.

HEAT FLOW DATA: 3 hot springs lie along N.E. trending line bisecting caldera; 53°C, 39°C and 46°C respectively from South to North. No wells or mineral holes were found.

REMARKS/FURTHER ASSESSMENT WORK: Whitehorse Ranch irrigation well produces 32°C water from 400 m which gives a gradient of 55°C/km. A 10-15 hole 50 meter drilling program would be necessary to show evidence of a localized heat anomaly in the caldera.

OWNERSHIP (BLM) (NF) (STATE) (FEE): The central part of the caldera is open BLM land. It is surrounded by fee land and geothermal leases.

RATING: 1 2 3 4 5 (6) 7 8 9 10

Poor Good

DATE: June 7, 1982 GEOLOGIST: W. Teplow MAP NO. OR-86

AMS MAP: Adel TOPO MAPS (7.5) (15): Alger Lake, Lone Grave Butte, Guano Butte, Rocky Canyon, Paiute Reservoir

SAMPLES:

PHOTOS:

DISTRICT NAME: Guano Valley MINES VISITED:

LOCATION: ¼ SEC: T37-41 N (S) R 27,28 (E) W COUNTY: Lake STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Miocene and Pliocene tuffs and tuffaceous sediments intruded by and overlain by silicic and mafic domes and flows.

ALTERATION/MINERALIZATION: No hydrothermal alteration was observed.

HEAT FLOW DATA: Bottom hole temperature of 11.50°C at 42 m in Sec. 27 T40S R27E. Wells at ranch in Sec. 15 T40S R27E reported cold. No other gradient holes were

REMARKS/FURTHER ASSESSMENT WORK: found in Guano Valley. Graben structure of valley is similar to adjacent Warner, Lakeview and Alvord Valleys which all contain hot water. Low bottom hole temperature and Pliocene age of silicic domes indicates that no further assessment is warranted.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 20, 1982 GEOLOGIST: W. Teplow MAP NO. OR-88

AMS MAP: Adel, Jordan Valley TOPO MAPS (7.5)(15):

SAMPLES:

PHOTOS:

DISTRICT NAME: Opalite MINES VISITED:

LOCATION: ¼ SEC: T 40,41 N (S) R 40,41 (E) W COUNTY: Malheur STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Hg in opalite

ROCK UNITS: Tertiary rhyolitic and intermediate flows, tuffs and tuffaceous lake sediments.

ALTERATION/MINERALIZATION: Massive opalization and argillization of lake beds with accompanying cinnabar mineralization.

HEAT FLOW DATA: Bottom hole temperatures of 17.60°C at 105 m, 14.30°C at 70 m and 12.10°C at 30 m within a 6 mile radius of the Opalite Mine anomaly indicates that the

REMARKS/FURTHER ASSESSMENT WORK: anomaly is isolated and that high heat flow is not associated with silica mineralization throughout the district. No further action recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: June 6, 1982 GEOLOGIST: W. Teplow MAP NO. OR-95

AMS MAP: Burns TOPO MAPS (7.5) (15) : Folly Farm

SAMPLES:

PHOTOS:

DISTRICT NAME: Folly Farm MINES VISITED:

LOCATION: ¼ SEC: T 29 N (S) R 37 (E) W COUNTY: Malheur STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Basalts and andesites. K-Ar dates range from 13 m.y. to 16 m.y.

ALTERATION/MINERALIZATION: None

HEAT FLOW DATA: Bottom hole temperatures: Turnbull Well, Sec. 17 T29S R38E 11.72°C at 87 m; Windmill Sec. 33 T29S R37E, 12.64°C at 45 m; Folly Farm well Sec. 17 T29S R37E, 11.93°C at 41 m. Very low bottom hole temperatures indicate a lack of near surface hydrothermal activity. No further assessment work recommended.

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE) :

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: May 19, 1982 GEOLOGIST: W. Teplow MAP NO. OR-96

AMS MAP: Jordan Valley TOPO MAPS (7.5)(15):

SAMPLES:

PHOTOS:

DISTRICT NAME: Basque MINES VISITED:

LOCATION: NW ¼ SEC: 6 T 36 N (S) R 41 (E) W COUNTY: Malheur STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Tertiary rhyolites and dacites

ALTERATION/MINERALIZATION:

HEAT FLOW DATA: Heat flows of 1.9 and 2.5 measured in two water wells.

REMARKS/FURTHER ASSESSMENT WORK: Diffuse nature of anomaly would make further investigation difficult. No action recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 2 (3) 4 5 6 7 8 9 10

Poor Good

DATE: June 3, 1982 GEOLOGIST: W. Teplow MAP NO. OR-96

AMS MAP: Jordan Valley TOPO MAPS (7.5) (15): Bowden Ranch, Jackie's Butte, Caviatta Ridge, Squaw Flat, Three Forks, Brewster Reservoir

SAMPLES:

PHOTOS:

DISTRICT NAME: Owyhee Uplift MINES VISITED:

LOCATION: ¼ SEC: T 32-39 N (S) R 42-48 (E) W COUNTY: Malheur STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Silicic volcanic plateau

ROCK UNITS: Flat lying to gently dipping rhyolites and dacites with K-Ar age dates of 13 m.y. to 16 m.y.

ALTERATION/MINERALIZATION: No alteration was observed

HEAT FLOW DATA: A group of springs near Three Forks Sec. 3 T35S R45E has temperature of 32°C. Water has low mineral content and does not deposit sinter. Location at the bottom of 500 m deep canyon would indicate that the warm springs are a product of groundwater circulation through a near normal geothermal gradient. Two water wells on the western edge of the Owyhee Uplift intersect warm aquifers: Overshoe Well 28.91°C at 197 m; Cherry Well 21.10°C at 45 m.

REMARKS/FURTHER ASSESSMENT WORK:

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 2 3 (4) 5 6 7 8 9 10

Poor Good

DATE: June 5, 1982 GEOLOGIST: W. Teplow MAP NO. OR-97

AMS MAP: Adel TOPO MAPS (7.5) (15): Harper

SAMPLES:

PHOTOS:

DISTRICT NAME: Harper MINES VISITED:

LOCATION: ¼ SEC: T 21-23 N (S) R 42,43 (E) W COUNTY: Malheur STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE:

ROCK UNITS: Middle to Early Pliocene (4 to 9 m.y.) tuffs and welded ash flow tuffs capped by olivine basalt.

ALTERATION/MINERALIZATION: Localized or intense hydrothermal alteration was not observed in the area.

HEAT FLOW DATA: A gradient hole with $\Delta T = 110^{\circ}C/km$ and bottom hole temperature of $24.8^{\circ}C$ at 140 m was reported (38) in Sec. 11, T21S R42E. Could not locate this hole

REMARKS/FURTHER ASSESSMENT WORK: but nearby wells were cold: $15.82^{\circ}C$ at 52 m in Sec. 19 T20S R42E and $11.4^{\circ}C$ at 4 m in Sec. 4 T20S R42E. Thermal data and lack of hydrothermal alteration indicate no further assessment is justified.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: June 9, 1982 GEOLOGIST: W. Teplow MAP NO. OR-99

AMS MAP: Klamath Falls TOPO MAPS (7.5) (15): Cox Flat

SAMPLES: B30675, B30676

PHOTOS:

DISTRICT NAME: White King MINES VISITED: White King, Lucky Lass

LOCATION: NE Center ¼ SEC: 25 T 37 N (S) R 18 E - Lucky Lass
30 T 37 N (S) R 19 (E) W COUNTY: Lake STATE: OR

TYPE OF DEPOSIT/MODE OF OCCURRENCE: HgS - volcanic

ROCK UNITS: Early and Middle Miocene rhyolitic and dacitic tuffs and flows overlayed by Pliocene basalts.

ALTERATION/MINERALIZATION: Extensive silicification and argillization particularly in fault zones. System of parallel normal faults trends NW through the region. Basalts do not show alteration.

HEAT FLOW DATA: No wells or mineral holes.

REMARKS/FURTHER ASSESSMENT WORK: Pre-Pliocene age of alteration and lack of thermal data indicate that no further assessment work should be undertaken.

OWNERSHIP (BLM) (NF) (STATE) (FEE): Fremont National Forest

RATING: 1 (2) 3 4 5 6 7 8 9 10
Poor Good

DATE: June 6-7, 1982 GEOLOGIST: G. Maurath MAP NO. UT-17

AMS MAP: Delta TOPO MAPS (7.5) (15): Fish Springs, Sand Pass & Swasey Peak series

SAMPLES:

PHOTOS: Landsat fcc 041-033, 042-033

DISTRICT NAME: House Range MINES VISITED:

LOCATION: ¼ SEC: T 11-21 N (S) R 13-14 E (W) COUNTY: Millard & Juab STATE: UT

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Recent faulting, gravity low, area of high heat flow.

ROCK UNITS: Paleozoic sedimentary and metasedimentary rocks. Tertiary quartz, rich rhyolite of Crystal Peak (T23S R16W) appears unaltered and no other alteration was observed.

ALTERATION/MINERALIZATION: There are several areas of extensive calcite veining in Cambrian limestones, dolomite and siltstone along the eastern portion of the House Range.

HEAT FLOW DATA: No MX drillholes were located in the area. BHT 9.8°C @ 5.3 m (T23S R14W); Stove Spring (11°C) SE 33 T17S R13W, Antelope Spring (30 T17S R12W) 15°C (solar?)

REMARKS/FURTHER ASSESSMENT WORK: There is an active underground gold mine being run by Notch Peak Minerals Corp. on Sawtooth Mt. T19S R14W. There has been extensive exploratory drilling, with no abnormally warm drillholes reported. Mine follows quartz veins in quartzite and dolomitic limestone. No further work is recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: June 7-8, 1982 GEOLOGIST: G. Maurath MAP NO. UT-18,19

AMS MAP: Delta TOPO MAPS (7.5)(15):

SAMPLES:

PHOTOS: Landsat fcc 041-033, 041-032

DISTRICT NAME: Little Drum/Keg Mts. MINES VISITED:

LOCATION: ¼ SEC: T 11-16N (S) R 9-12 E (W) COUNTY: Juab STATE: UT

TYPE OF DEPOSIT/MODE OF OCCURRENCE: gravity low, above average heat flow, Recent faulting, Late-Tertiary silicic volcanism, photolinear intersections.

ROCK UNITS: Drum Mts. - Cambrian & Pre-Cambrian carbonates - extensively faulted. Little Drum & Keg Mts.- Oligocene and Miocene rhyolites, dacites, and andesite.

ALTERATION/MINERALIZATION: Areas of hydrothermally altered rhyolite include limonite staining and minor silicification (areas are leased and staked).

HEAT FLOW DATA: Black Point ΔT (attached) HFU = 12.4 , welded ΔT, limestone ΔT (attached), several normal temperature wells and springs in the area were measured. Limestone cuttings from approximately 200' measured 13°C in a well being drilled in SE SE 28 T11S R10W.

REMARKS/FURTHER ASSESSMENT WORK: Areas which display the most geothermal potential have been leased. Low rating is due to extensive recent drilling activities for geothermal and disseminated gold in the Whirlwind Valley - Drum Mts. area which greatly reduce the chance of locating an "undiscovered" thermal anomaly. The most promising areas have been leased.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: 1 (2) 3 4 5 6 7 8 9 10

Poor Good

DATE: June 9, 1982 GEOLOGIST: G.Maurath MAP NO. UT-20

AMS MAP: Tooele TOPO MAPS (7.5) (15): Tetzlaff Peak

SAMPLES:

PHOTOS: Landsat fcc 042-032

DISTRICT NAME: Tetzlaff Peak MINES VISITED:

LOCATION: ¼ SEC: T 11-13N (S) R 9-10 E (W) COUNTY: Juab STATE: UT

TYPE OF DEPOSIT/MODE OF OCCURRENCE: Miocene andesite, faulting, warm wells east of range.

ROCK UNITS: Upper Paleozoic carbonate and clastic rocks, Miocene andesite, Quaternary rhyolite.

ALTERATION/MINERALIZATION: Extensive calcite veining (up to 10 cm wide) throughout the Paleozoic section. No alteration was associated with Cenezoic rocks.

HEAT FLOW DATA:

REMARKS/FURTHER ASSESSMENT WORK: No further work recommended.

OWNERSHIP (BLM) (NF) (STATE) (FEE):

RATING: (1) 2 3 4 5 6 7 8 9 10

Poor Good