CONCEPTUAL GEOLOGIC MODEL FOR BRADY'S GEOTHERMAL FIELD, NEVADA

Submitted to

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INTRODUCTION

Brady Power Partners (BPP) and US Food Ingredients Company (USFI) utilize the geothermal resource at Brady's Hot Springs, Nevada (Figure 1) located approximately 40 miles east of Reno. BPP has operated a 20 MWe electrical power plant since 1992 and USFI's onion dehydration facility started up in the late 1970's . Both of these operations obtain geothermal water from wells drilled along a thermal anomaly that coincides with the Brady's Fault.

In 1959, Magma Power Company began drilling the first geothermal wells in the area. The first well, B-1, was located near an "old" hot-springs resort and was initially drilled to a depth of 690 ft (Figure 2). Its location in the footwall of the west-dipping Brady's Fault did not allow intersection with the permeable fault, and consequently, it was non-productive. Subsequently, about forty additional wells have been drilled at Brady's Hot Springs (Figure 2) at least seventeen of which were or are capable of hot water production. The data from these wells, whose total depths range from 443 to 7,275 ft, are summarized in Appendix A.

Previous geologic studies of the Brady's field have concluded that geothermal water migrates from depth, upwards along the Brady's Fault Zone. Most of the successful wells at Brady's intersect this fault zone, and depending on their depth, the initial resource temperatures ranged from ~300°F to ~400°F, with the deeper wells being hotter.

To better understand the Brady's field and provide a basis for optimizing future performance, Mesquite Group, Inc. (Mesquite) is constructing a numerical model of the Brady's geothermal reservoir. The first phase of this modeling effort requires the integration of available geologic and temperature data into a conceptual model of the field. Mesquite has used these data to formulate the conceptual model described in this report. After approval by BPP and USFI, this geologic model will become the basis for a numeric simulation model.

REGIONAL GEOLOGY

Brady's Hot Springs is located in west-central Nevada in the Basin and Range physiographic province. The surrounding mountains; i.e. Hot Springs Mountains to the south and east, Trinity Range to the north, and Truckee Range to the west form part of the northwestern boundary of the Carson Sink depression. Pre-Mesozoic stratigraphy and structure information in the area is meager. Available data indicate that west-central Nevada was the site for deposition of eugeosynclinal rocks throughout the Paleozoic Era. Late Paleozoic orogenies disrupted and telescoped these rocks eastward, but detailed documentation of these effects is meager because post-Paleozoic rocks cover the region.

Rocks exposed in the mountains surrounding Brady's Hot Springs range from Triassic to Quaternary in age. The pre-Tertiary rocks consist of metamorphosed sedimentary and volcanic rocks which have been intruded by mafic and siliceous plutons. Middle Jurassic folding and faulting have distorted these older rocks into structurally complex relationships. Deeper wells at Brady's have encountered marble, meta-tuff, phyllite, greenstone, and quartzite rocks that appear to be Triassic to Jurassic in age.

Cenozoic geology in west-central Nevada reflects a period of intense volcanism complicated by pervasive Basin and Range normal faulting. These rocks occur in complex, interfingered sequences of flows, tuffs, and subvolcanic intrusives. Fluvial and lacustrine sediments occur sporadically, but locally upgrade to formational rank. Cenozoic deformation consists of high-angle normal faulting and tilting into typical Basin and Range horst and graben blocks.

Tertiary volcanics ranging from basalt to rhyolite in composition overlie pre-Tertiary rocks in the Brady's Hot Springs area. The oldest Tertiary rocks are rhyolitic to dacitic lithic tuffs that are tentatively dated as Oligocene. Stratigraphically above these tuffs are gray, aphanitic, highly vesicular basalts of the Chloropagus formation that occur as flows and dikes. Sitting unconformably on these basalts are light-colored, opalized shales, siltstones, and tuffs interbedded with undifferentiated andesite and basalt flows of the Desert Peak formation. The Truckee Formation composed of a thick accumulation of lacustrine and fluviatile sediments with interlayered basalt and tuff flows is the youngest Tertiary rocks except for very sparse and isolated basalt vents.

Quaternary alluvial and lacustrine deposits cover more than half of the region. These deposits include Pleistocene Lake Lahontan sediments, unconsolidated alluvium and pediment gravels.

Both the Tertiary and Quaternary rocks have been tectonically raised and tilted by Basin and Range high-angle normal faults, creating the common Nevadan horst and graben block structure. This deformation began in the early Miocene and continues today. The major normal faults trend north to northeast, bounding the ranges and commonly fragmenting the interior of both ranges and valleys.

At Brady's Hot Springs, it has long been recognized that all the surface thermal manifestations are located along the Brady's Fault Zone. This fault zone is visible on the surface over a distance of two miles and appears to consist of en echelon normal faults striking approximately N25°E and dipping ~67° westward. The stratigraphic displacement on the fault zone is less than a thousand feet, and where exposed, the fault scarp is less than six feet high. Low sun angle air photogeology (Bell, 1984) clearly illustrates the en echelon character of the Brady's Fault Zone and identifies the last movement as Holocene age (<12,000 years), based on truncation of Lake Lahontan shore lines.

Historical and present day thermal manifestations at Brady's Hot Springs consist of geysers, hot springs, fumaroles, hot ground, mud pots, and well blow-outs. Naturally occurring hot springs, which ceased to flow before 1970, had a reported maximum surface temperature of 180°F, with fumaroles ranging up to 204°F. In addition to thermal manifestations, several other indications of geothermal activity occur along the Brady's Fault Zone. Abundant opaline sinter that commonly cements brecciated rock is found along the fault trace. Small concentrations of cinnabar (mercury sulfide) and native sulfur are present. Intensely hydrothermally altered alluvium occurs in the fault. This material exists as a red, soft, iron-stained kaolinite or a red, silica-cemented kaolinite. Calcite (calcium carbonate) veins containing large euhedral crystals trend along the east side of the fault zone.

TEMPERATURE GRADIENT ANOMALY

Temperature gradient measurements have long been used as the primary shallow exploration method to locate geothermal resources. The size and potential of a geothermal system is assessed by measuring thermal gradients in shallow, temperature gradient holes. The temperature data are interpreted after consideration of lateral movements of both groundwater and thermal fluids. The resulting gradients are classified as conductive or convective. Conductive gradients exceeding 10°F/100 ft usually are indicative of commercial-grade geothermal resources at depth.

A study of 28 published (Benoit et al, 1982) thermal gradients from the Brady's Hot Springs area shows that anomalous (i.e., higher than normal) gradients (Figure 3) are found both in the vicinity of Brady's Hot Springs and for a distance of several miles south, north, and east. These gradients are distributed in a three-mile wide, northwesterly trending zone that extends for at least six miles. Temperature gradients in this area range from 0.7°F/100 ft at the southern edge of the area, to over 100°F/100 ft in the Brady's Hot Springs field. The very high gradient values in the Brady's Fault Zone are indicative of a convecting geothermal resource reaching the near surface. Temperature gradient holes located between Brady's and Desert Peak exhibit high conductive gradients of 10.5 to 50°F/100 ft, indicating a widespread geothermal system.

The 10°F/100 ft contour (Figure 3) outlines a zone of approximately 24 square miles that includes Brady's Hot Springs, Brady's Mountain located east of the hot springs and the Desert Peak geothermal field situated in the valley east of Brady's. This anomaly, which extends to the south for an unknown distance, suggests the widespread presence of heat.

GEOLOGY AT BRADY'S HOT SPRINGS

Three previously published geologic maps of the Brady's Hot Springs area (Benoit et al, 1982; Anctil, 1960; GDA, 1992 [Plate 1]) show that four stratigraphic units outcrop in the Brady's area (Figure 4). An additional three stratigraphic units have been penetrated by the existing wells at Brady's. From the youngest to oldest, these units are: alluvium, late Pliocene basalt vents, Truckee formation, Desert Peak formation, Chloropagus formation, an unnamed rhyolite, and basement. Based on descriptions of these units, correlations of both electrical and mud logs with surface geologic maps have been made. The characteristics of these units are:

Alluvium - Quaternary alluvial and lacustrine sediments consisting of unconsolidated sands and gravels. Mud logs usually describe this unit as light brown sandstone or siltstone with a clay matrix containing scattered gravel fragments. During drilling, the alluvium has a slow penetration rate, averaging approximately 25 ft per hour. The thickness of the alluvium ranges from a few feet on the eastern side of the field to 150 ft at the 27-1 location (Figure 2).

Basalt - A hill located east of the BPP power plant is topped with basalt. Benoit, et al (1982) show this basalt to be late Pliocene in age. This mafic extrusive is either a near-vent flow or an erosion remnant because none of the Brady's wells have intersected this basalt.

Truckee formation - Pliocene tuffaceous lake sediments and fresh-water limestones form the bulk of this unit. A high drill rate of over 100 ft per hour occurs while penetrating the Truckee formation. Electric logs of the Truckee formation have low resistivity values (< 10 ohm-meters) and almost continuous dip-meter readings due to thin clay beds. The unit reaches a thickness of greater than 900 ft in Wells 81-11 and 27-1.

Desert Peak formation - This unit consists of thinly interbedded siltstones, lithic tuffs, and basalts dated by Axelrod (1956) as Pliocene in age. From electrical logs, the Desert Peak formation is characterized by resistivities of 10 to 20 ohm-meters. Limestone is absent. and dip-meter readings are infrequent and show random dips. This unit has an apparent thickness of 1,600 ft in Well 68B-1.

Chloropagus formation - An interbedded sequence of basalt flows, agglomerates, lithic tuffs, and fine-grained sediments dated by Benoit et al (1982) as Pliocene/Miocene age. The lavas have electrical resistivity readings of 50 to 100 ohm-meters, with thickness ranging from 20 to 100 ft. Well SP-2 penetrated approximately 1,800 ft of Chloropagus formation. In Well 27-1, Chloropagus rocks were drilled at high penetration rates averaging approximately 100 ft per hour.

Rhyolite - Tertiary rhyolite/rhyodacite tuffs and flows occur beneath the Chloropagus formation in the deeper wells at Brady's Hot Springs and in outcrops located six miles to the east. These silicic volcanic rocks are recognized by biotite in the cuttings and a nearly consistent penetration rate of 50 ft per hour. Resistivity values on electric logs are similar to those of the Chloropagus formation, but there is more massive bedding. The greatest apparent thickness of these Tertiary volcanics is 1,800 ft in Well SP-1.

Basement - Basement in the wells drilled at Brady's consists of greenstone, metavolcanic, marble, and phyllite rocks. Although hornfels are reported on the mud logs, intrusive rocks have not been intersected.

STRUCTURE AT BRADY'S HOT SPRINGS

The most prominent structural feature at Brady's Hot Springs is the Brady's Fault Zone. The zone has a mapped length of over two miles and strikes approximately N25°E. Besides sinter, breccia, and hydrothermally altered ground, numerous fumaroles and steam vents exist along the fault zone. Following start-up of the BPP power plant, the fumarolic activity increased, and an airborne infrared-imagery survey was flown. The surface thermal anomaly outlined by this survey, along with surface mapping conducted by GDA in 1992 (Plate 1), shows a narrow zone of fumaroles trending N25°E from near the boundary of Sections 12 and 13 northward to east of the USFI plant. The thermal anomaly (Figure 5) then turns N30°E and continues as a fairly narrow zone to the boundary of Sections 1 and 12. North of this boundary, the thermal zone widens to over 600 ft and strikes N20°E for approximately 2,000 ft. Beyond this point, the number of thermal vents decreases and they strike N30°E in a narrow zone.

Detailed mapping, by the geologists previously mentioned, clearly shows the Brady's Fault Zone with at least three major offsets. The southern most of these cross-faults, which is located east and north of the USFI plant, has a left-lateral sense of movement with a total displacement of approximately 300 ft. The middle offset, which is less pronounced, occurs near the BPP plant, and appears to also have a left-lateral type displacement. The north offset is located near the mid-point of Section 1 and appears to have a bending rather than lateral type offset. The thermal locations of manifestations discussed above also reflect these three major offsets.

The offsets of the Brady's Fault Zone are caused by three northwest-southeast striking faults intersecting the zone. These cross-faults explain both the offsets and the alignment and clustering of the thermal features. The middle cross-fault can be projected southeasterly to a mapped fault (Benoit et al, 1982). The southern cross-fault coincides with a fault mapped by GDA (1992). The northern cross-fault has not been located by geologic mapping, although both GDA (1992) and Anctil (1960) show faults located in the hills to the east being truncated where the cross-fault should exist. For this reason and those discussed below, Mesquite has selected the location shown in Figure 6 for the northern cross-fault. The three cross-faults appear to be older normal faults downthrown to the north that allowed the Brady's Fault to bend or offset along existing planes of weakness.

SUBSURFACE STRUCTURE

Mesquite obtained all available mud logs, induction wireline logs, and dip-meter electric logs from wells drilled at Brady's. These logs were reviewed, and the stratigraphic units were selected for correlation. Electrical resistivity logs reproduced side-by-side are shown in Figure 7. Lines, connecting the tops and bottoms of the stratigraphic units, have been drawn illustrating the correlation of the resistivity logs. Five stratigraphic units are seen on the wireline log correlations. In addition, mud logs have been used to determine the thickness of alluvium present at each well site.

Utilizing the geologic maps and the subsurface data combined with the correlations, Mesquite interprets the surface faulting at Brady's Hot Springs as illustrated on Figure 7. The Brady's Fault Zone consists of three major normal faults that dip to the west. Three-point solutions for the wells located west of Interstate 80 indicated the faults in this area strike N16°E to N25°E and dip westward at approximately 67°. Projection of the surface fault trends downward into lost circulation/production zones in the shallower wells confirm that the faults dip at approximately 67°.

The western-most major normal fault is informally named the 27-1 Fault by Mesquite because it created significant drilling problems in Well 27-1. In this well, lost circulation occurred at 2,640 ft where temperature buildup surveys indicated an equilibrium temperature of approximately 330° F. A review of the temperature profiles (Appendix B) shows the same fault with similar temperatures is penetrated at about 2,700 ft in Well 18-1 and at about 2,800 ft in Well 18A-1. The lack of static temperature logs in Well 82A-11 Original

Hole (OH) prevent locating the 27-1 Fault intersection, but high penetration rates occurred in the 3,400 ft interval.

The Middle Fault, again informally named, causes lost circulation during drilling in the shallow production intervals. Fumaroles also vent along this fault in Section 1 (Figure 5). It has been encountered in Wells EE-1 at approximately 600 ft, in the 47 and 48 wells located in Section 1 at depths ranging from 1,200 to 2,000 ft, and in the wells located west of Interstate 80 at measured depths below 4,000 ft.

The eastern normal fault has previously been mapped as the Brady's Fault. The majority of the geothermal manifestations in Sections 1 and 12 are aligned along this fault. This fault was intersected in Well SP-2 at 480 ft, Well 56-1 at 1,090 ft, and Well 56A-1 at 1,530 ft.

These three Brady's Zone faults are cut by three northwest-trending faults. These cross-faults dip steeply to the northeast and appear to have normal-type movement. The southern of these cross-faults, hereafter named the USFI Cross-Fault, dips at a high, but unknown angle. The middle of the three northwest trending faults, informally named the BPP Cross-Fault, dips at approximately 70°. This fault was encountered at the 2,300 ft interval in Well SP-1. The northern cross-fault's location is not known, but the logs from BPP's northern injection wells clearly show an offset in the Brady's Fault Zone between Wells 64-1 and 81B-1. The alignment of the thermal manifestations suggest its location, as shown in Figure 7.

The geophysical logs (Figure 7) support the existence of cross-faulting in the Brady's field. The top of the Chloropagus formation occurs at approximately 2,300 ft above sea level in Wells 68A-1, 77-1, and SP-1 compared to elevations around 2,600 ft at the 56's well locations in Section 1. These elevations are in reverse relationship to what would be expected, given that the hanging wall of the Brady's Fault Zone is downthrown to the west. That is, the wells to the west should have lower elevations than those to the east. To explain these observed relative elevations, a cross-cutting fault must down-drop the stratigraphic units in the wells located to the east.

Mesquite has constructed six geologic cross-sections (Figures 8-14) utilizing both mud log and electric wireline log correlations to confirm that the faults discussed above offset the stratigraphic units and dip at the angles discussed. These cross-sections show the offsets of the rocks along the three major faults of the Brady's Fault Zone and offsets at the USFI and BPP Cross-Faults. The stratigraphic displacements at the faults range from at few hundred feet on the 27-1 fault to 700 feet on the BPP Cross-Fault.

NATURAL STATE TEMPERATURE AND PERMEABILITY DISTRIBUTION

The distribution of temperature and permeability are discussed together because they are directly related. In a convecting geothermal resource venting to the surface, such as Brady's, thermal fluid flows upward from depth through permeable structures, i.e. fault zones, to ground level. Defining the three-dimensional pattern of temperature, therefore, also specifies the permeable zones.

All downhole temperature data for Brady's wells have been collected and reviewed to locate surveys which represent true static conditions before the BPP power plant started. These pre-startup records define the natural temperature state, which is required for the numerical model. The "best" survey for each well was then selected. Plots have been constructed for both BPP and USFI wells for which static profiles are available (Appendix B).

From these selected temperature profiles, subsurface temperatures have been obtained at elevations selected by the reservoir engineer. These temperatures are listed in Table 1 and are contoured on horizonal sections drawn at seven elevation intervals between +3,900 and +1,000 ft (msl). These seven sections are shown on Figures 15-21.

Vertical temperature sections have also been constructed from the temperature profiles and combined with the geologic sections. These thermal sections are shown on Figures 22-26.

Collectively, these drawings show the three-dimensional distribution of temperature and the manner in which geologic structures control the temperature pattern and define the Brady's reservoir. The main characteristics of the reservoir are:

- A northeasterly-trending thermal anomaly, as defined by the 350°F isotherm, occurs at all elevations below 3,900 ft, but the distribution of the wells provides the best control on the west flank in the central area of the field. The 350°F isotherm is not as well defined on the east flank and to the north and south.
- The thermal anomaly coincides with the Brady's Fault Zone and is offset westward to the north due to cross-faulting.
- Below -1,000 ft (msl), the resource temperature exceeds 400°F. This higher temperature appears to be the parent reservoir's temperature.
- The vertical sections show that isotherms are distributed symmetrically around the Middle and Brady's Faults and that the crest of the thermal anomaly migrates westward

with depth following the dip of these two faults. This indicates hot fluids are flowing upward along permeable zones corresponding to the Middle and Brady's Faults.

- The crest of the thermal anomaly defines the geometry of the upflow zone. At the elevation with the most data (3,500 ft), the thermal anomaly is divided into two lobes. The northern lobe is longer than the southern lobe, but is of equal temperature.

- The temperature cross-sections and individual well profiles show that the cross-faults contain ~330°F water. Apparently mixing of this "cooler" water with the ~410°F reservoir fluid provides the ~350°F resource produced by the shallower wells at Brady's.

CONCEPTUAL GEOLOGIC MODEL

Utilizing the information discussed above, Mesquite defines the conceptual geologic model of the Brady's field by the following features:

- The predominate permeability consists of fractures associated with major faults. Three major faults comprising the Brady's Fault Zone strike northeast through the field. These faults are offset westward by northwest trending cross-faults. These cross-faults appear to dip steeply northward.

- Seven stratigraphic units exist in the Brady's field. All of these units have been structurally displaced and rotated by the faults. The only effect the different lithologies have on the resource is that limited matrix permeability occurs in near-surface siltstones in BPP's northern injection area and in shallow basalt lavas that appear to be micro-fractured away from the faults creating matrix-like permeability. An additional effect may be caused by a marble bed in the basement that could allow secondary calcite to seal deeper portions of the faults.

- The parent ~410°F reservoir is located in the basement stratigraphic unit which appears to be fractured similarly to the Desert Peak geothermal reservoir, located approximately four miles east. Water from the parent reservoir at ~410°F enters permeable fractures associated with the Middle and Brady's Faults and migrates upward along these fault planes until it intersects the cross-faults. These cross-faults contain ~330°F water that mixes with the hotter water to yield ~350°F water produced by the shallow wells at Brady's.

- The cross-faults intersect all three major faults of the Brady's Fault Zone. Therefore, all faults are in pressure communication.

- In the initial state, water moved "slowly" within the cross-faults allowing heat transfer to increase the temperature to ~330°F. Increased production of the field probably increased the speed of water movement through the cross-faults, permitting less heating, and resulting in lower temperatures. This "cooler" recharge may account for some of the observed cooling at Brady's, but numerical modeling is required to confirm this hypothesis.

- Four wells have penetrated into or near the basement stratigraphic unit at Brady's. Only two of these wells, EE-1 and SP-1, have static temperature surveys, and they measured ~400°F. This suggests that the basement may contain a high-temperature productive resource.

- Generally, the Brady's Fault has been found to have high permeability. However, at least two wells penetrated the fault in areas of low permeability. The lack of permeability in wells such as 27-1 and 82A-11 OH that have intersected the Brady's Fault Zone indicates that secondary minerals, mostly calcite, may have sealed portions of the zone. Mesquite is not aware of any technique that can predict were the fault is sealed. The numerical model should calculate the deeper recharge into the system. If this recharge is greater than that presently being produced, then the intersections of the BPP Cross-Fault with the Middle and Brady's Faults may be a future exploration target.

- Several of the BPP wells were drilled hundreds of feet below their intersection with the Brady's Fault Zone. Temperature logs have shown the deeper portions of these holes are cooler than the faulted interval. A careful review of these data, combined with a study of the workovers conducted, could indicate wells whose deeper intervals should be plugged to prevent cooler water from entering the wellbore.

- The portion of the Brady's Fault Zone south of the USFI lease has limited permeability and is therefore cooler. The fault zone north of Well 64-1 has not been tested, but a tracer test shows it is permeable to at least as far north as BPP's injection site in the 18-31 area.

- Another geologist has suggested that the Brady's and Desert Peak fields are interconnected. Mesquite has reviewed the available data and concludes that they are not directly connected. Exploration conducted by Phillips Petroleum Company, including drilling of wells between the two fields, clearly shows no thermal connection.

At least two wells situated between the fields are "cool", indicating no continuous geothermal system. In addition, the chemical components of the waters preclude a common reservoir. At Desert Peak, the TDS is 6,700 mg/l and the Cl/B ratio is 240 for ~400°F water, while at Brady's the ~400°F water has a 2,100 mg/l TDS and Cl/B ratio of 170. In the mega-sense, the fields have a common heat and recharge source, but they do not share the same reservoir.

POTENTIAL INJECTION WELL SITES

Tracer and pressure interference tests indicate that BPP's northern injection area is in strong hydrologic communication with their central area production wells. This communication resulted in cooling of the production zone following startup of the BPP plant. Since this time, different injection scenarios have been attempted to correct this problem. Although the results of the numerical modeling are not available, it appears that relocation of injection could arrest or at least slow the rate of production-zone cooling. Therefore, Mesquite investigated possible new injection sites during the conceptual model study.

Past tests have shown with reasonable certainty that all of the Brady's Fault Zone situated north of the USFI lease is in pressure and hydrologic communication. This indicates that new injection wells located in the Brady's Fault Zone should be either located south of USFI's lease or very deep. Deep injection wells are expensive to drill, and there is no assurance that they will not communicate with the present production wells over time. Therefore, Mesquite has temporarily discarded this option.

Possible new injection sites that may not communicate with the production at Brady's include:

- The site of slim hole 26-12. This well encountered total lost circulation at a measured depth of 1430 ft. Surveys measured a temperature of only 240°F compared to over 350°F in the fault zone at Well B-1, located less than 1,600 ft east of 26-12. This suggests that the 26-12 site is not in communication with the portion of the Brady's field presently developed northward of this area. Mesquite believes an injection test should be conducted in this well while monitoring for pressure response with the existing monitoring system.

- Benoit et al (1982) report that lost circulation occurred during the drilling of Hole ST-8, located approximately two miles southeast of the Brady's field in Section 19-T22N-R27E. The temperature profile from this hole has a constant temperature of 140°F from 300 to 1,300 ft. This 1,000-ft thick isothermal section reflects a low-temperature thermal aquifer or series of aquifers. The lithology log shows the aquifer is capped by limestone which should prevent any migration of injectate to the surface.

- Benoit et al (1982) also show an exploration hole drilled by Supron Energy Corporation in Section 25-T22N-R26E that measured over 160°F at 100 ft below the surface. Mesquite does not have any additional information on this hole, but again a thermal aquifer is clearly present at this site.

- The northeast striking range-front fault located one mile east of the Brady's field is a possible injection site. Although to Mesquite's knowledge this fault has never been drilled, Mesquite is aware of three spectacular travertine mounds extruding from Quaternary gravel near the NW corner of Section 5, located approximately two miles northeast of Brady's Hot Springs. These mounds, which occur near the range-front fault, were formed at fossil hot spring sites, suggesting that the fault is permeable.

- A mercury soil survey conducted by Mesquite in 1986 outlined an anomaly located in the southwest corner of Hot Springs Flat, approximately two miles west of Well 27-1. Willden and Speed (1974) show a fault trending through this area which may also be a new injection site candidate.

POTENTIAL PRODUCTION WELL SITES

Mesquite was also requested to briefly discuss future production well sites at Brady's. Mesquite will limit this discussion to a deeper, high-temperature reservoir as a future target, because a ~330°F resource can be drilled anywhere along the Brady's Fault Zone between the USFI and unnamed northern cross-faults. Mesquite can suggest two likely 400°F targets which remain untested at Brady's. These are:

- The intersection of the BPP Cross-Fault with the Middle and Brady's Faults. This intersection should be targeted below an elevation of -1,000 ft to avoid the marble bed discussed above. Experience has shown that fault intersections are favorable production well sites because higher fracture permeability is commonly found there. The temperature in this area should be ~400°F.

- The second potential production target occurs beneath the existing production area. Wells EE-1 and SP-1, which are 5,061 and 7,240 ft deep respectfully, encountered bottomhole temperatures over 400°F, which suggests that both wells are close to a permeable fault. GDA's geologic map (Plate 1) shows a northeast striking fault located 2,150 ft east of EE-1 that may be the source of high temperature close to EE-1.

Although not mapped in the SP-1 area, a similar fault surfacing east of SP-1 could explain its high bottomhole temperature. This points to additional geologic mapping or geophysical studies before a deep target can be selected in this area.

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Table 1

TEMPERATURE (°F) AT SELECTED ELEVATIONS

BRADY'S GEOTHERMAL FIELD

WELL	ELEVATION (mean sea level)											
	+3900	*+3700*	*+3500*	*+3000*	*+2500*	*+2000*	*+1500*	*+1000*	*+500*	*0*	*-1,000*	*-2,000*
46-1	236	279	305	345	362							
26-12	257	260	254	240	239							
22-13	263	260	246	222								
18-31	279	372	303									
18B-31	298	314	291									
68A-1	288	305	304	299								
48A-1	237	288	302	352								
57-1	287	332	336	342	346	346	346					
64-1	277	317	333	340								
81-1	312	352	340									
68B-1	315	327	320	319	321							
81-11	100	118	137	172								
81A-11	305	348	327									
47C-1	256	298	315	342	357							
77-1	288	295	300	299	308	316	325					
SP-2	300	349	350	340	334	332	333	336	343	347		
SP-1	298	302	310	315	322	326	336	343	359	365	387	398
56B-1	254	306	330	354								
55-1	285	325	341	352								
56-1	276	329	341									
56A-1	256	291	316	351	340							
MGI-2	321	351										
MGI-1	310	340	308									
EE-1	253	283	293	277	278	298	319	333	356	369	396	
B-8	208	260	267	271	272	286	309	318				
B-1	304	343	352	337	305							
81B-1	312	340	328									
82A-11	94	129	145	166	185	198	208	228	240	260	307	367
47-1	242	286	298	347	362							
47A-1	255	283	296	320	358	361						
18-1	118	138	159	201	233	275	309	356	360	364	388	
18A-1	92	136	158	197	229	272	318	348	368	377		

FIGURE 1

LOCATION MAP

BRADY'S GEOTHERMAL SYSTEM

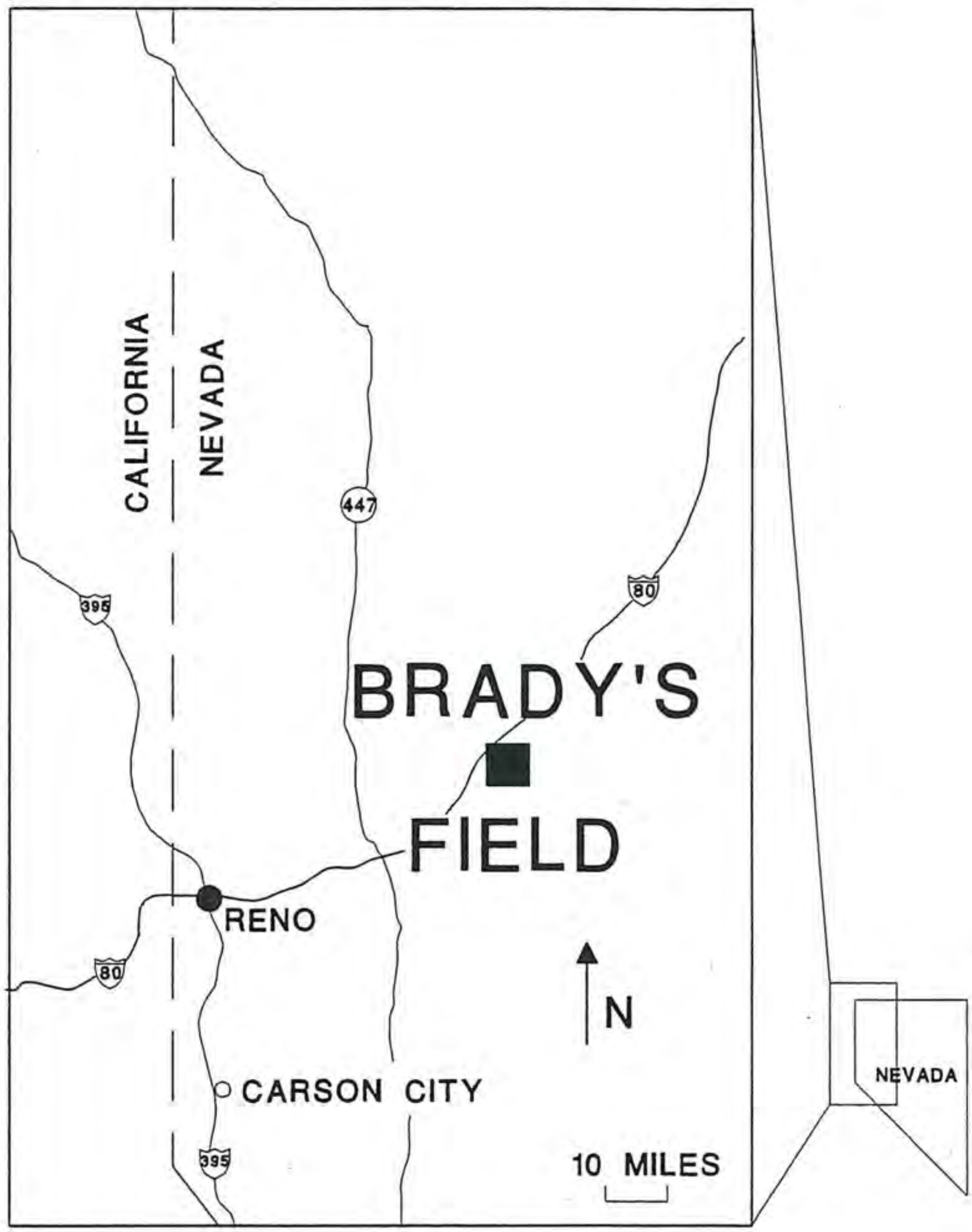

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Figure 2

WELL LOCATION MAP
BRADY'S FIELD, NV

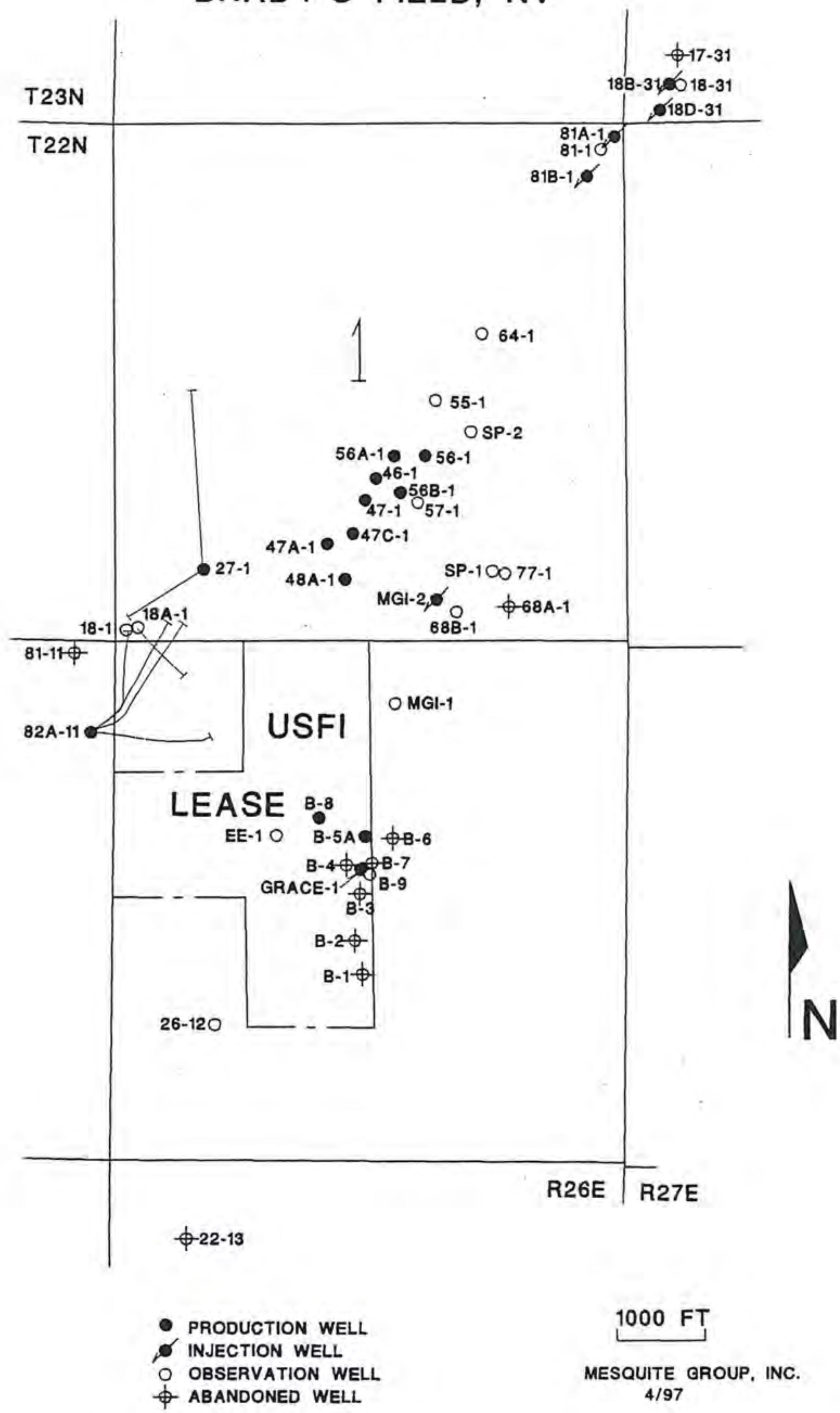

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Figure 3

TEMPERATURE GRADIENT MAP

BRADY'S FIELD, NV

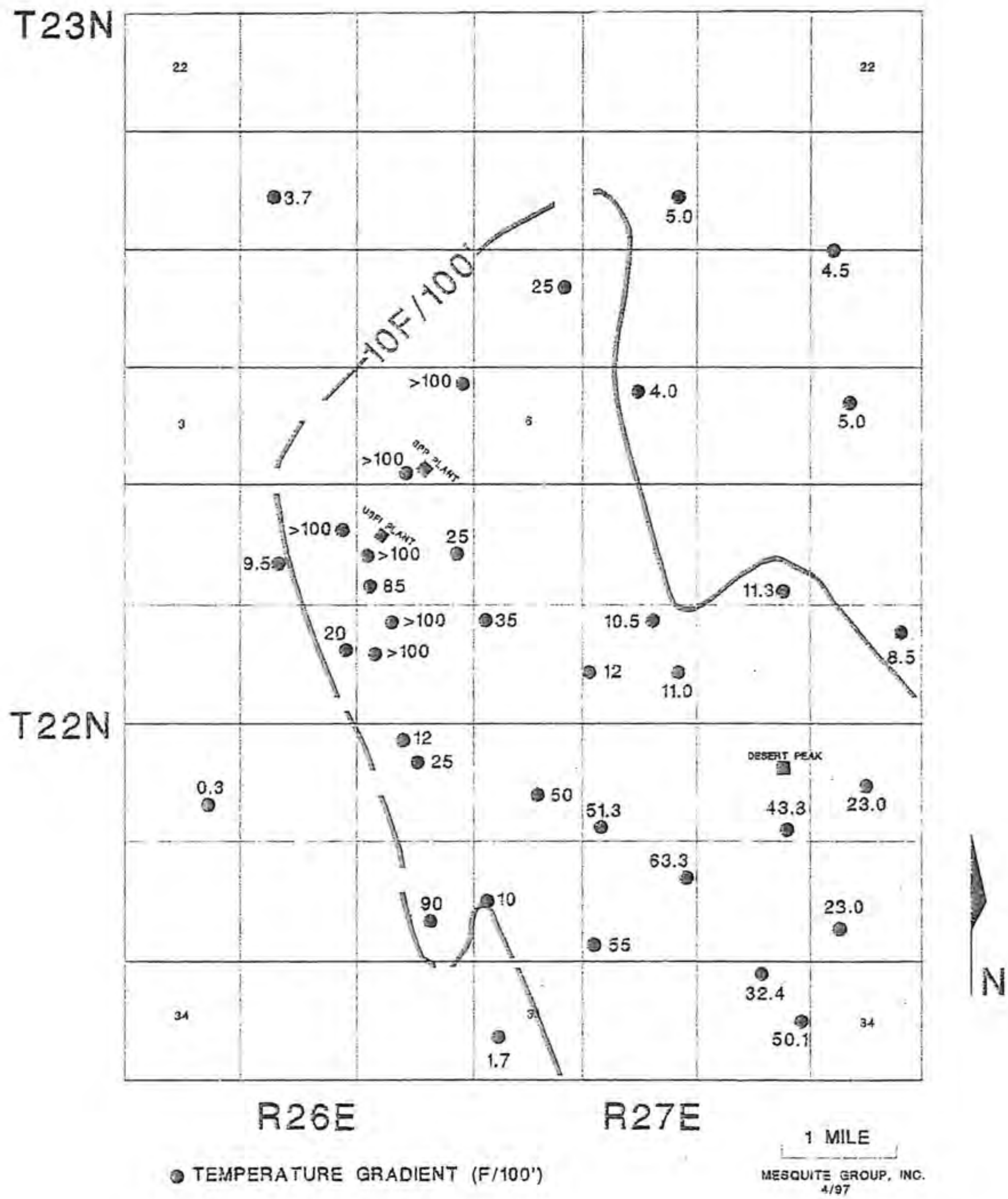
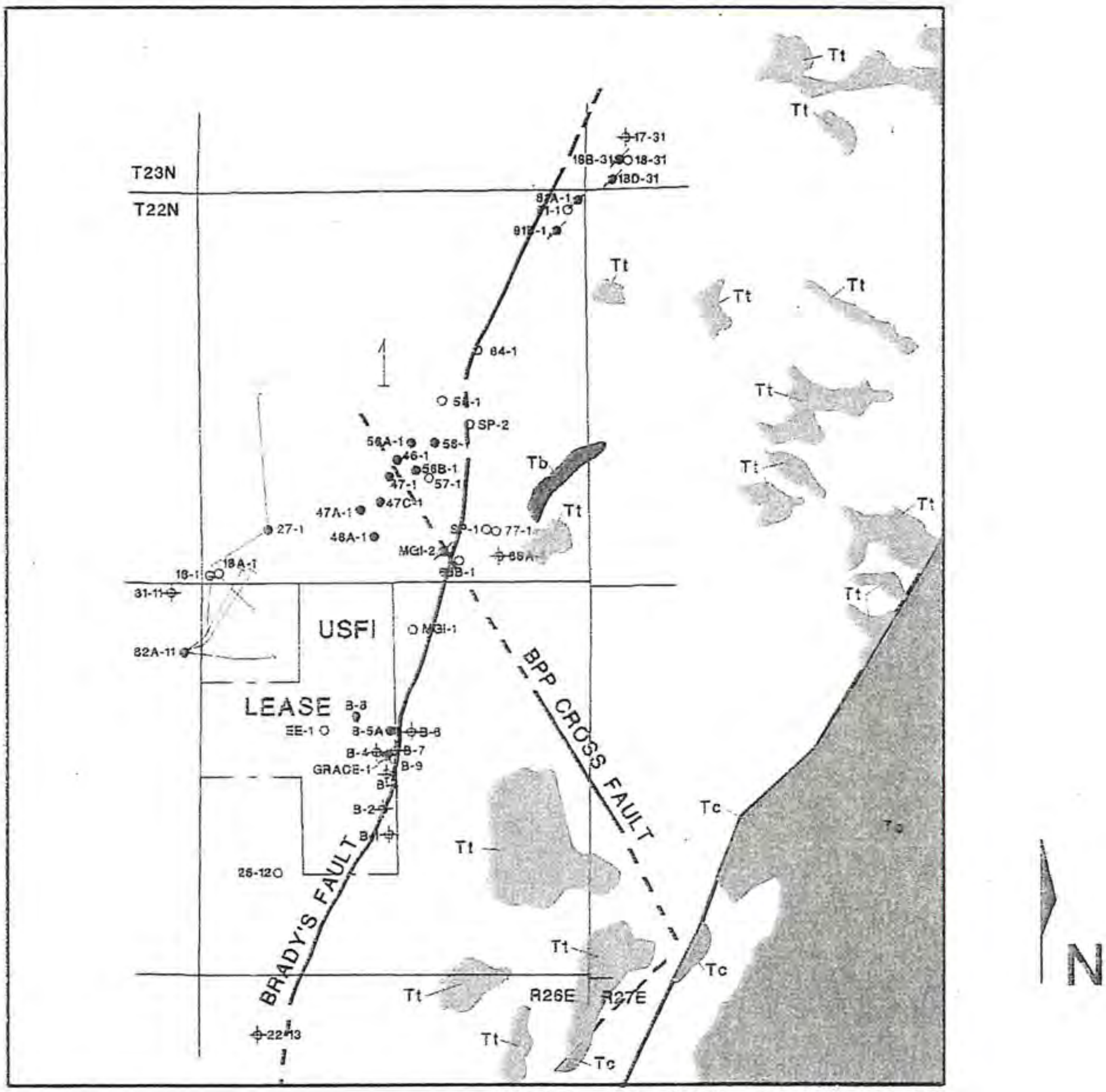


Figure 4

GEOLOGIC MAP

BRADY'S FIELD, NV



MODIFIED AFTER ANCTIL, 1960 AND HINER, 1979

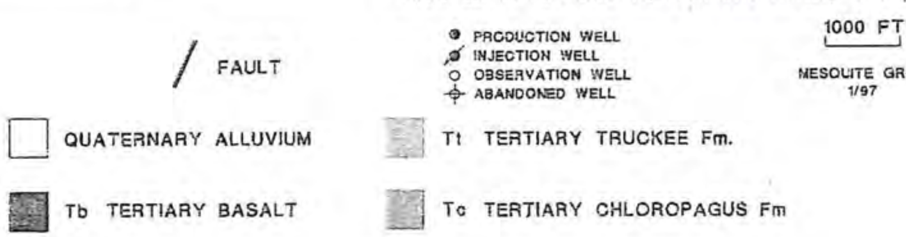


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Figure 5

SURFACE THERMAL ANOMALY MAP

BRADY'S FIELD, NV

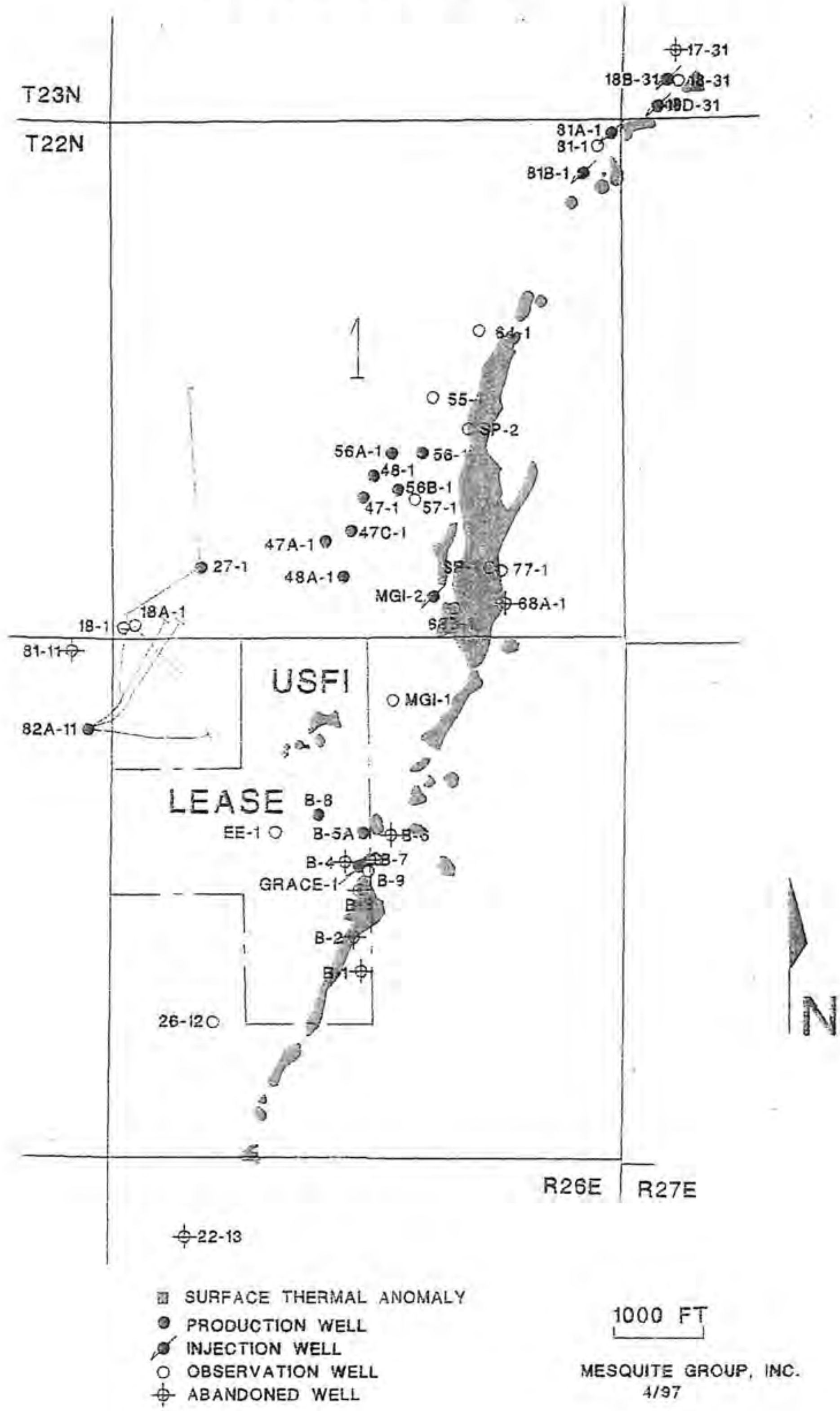
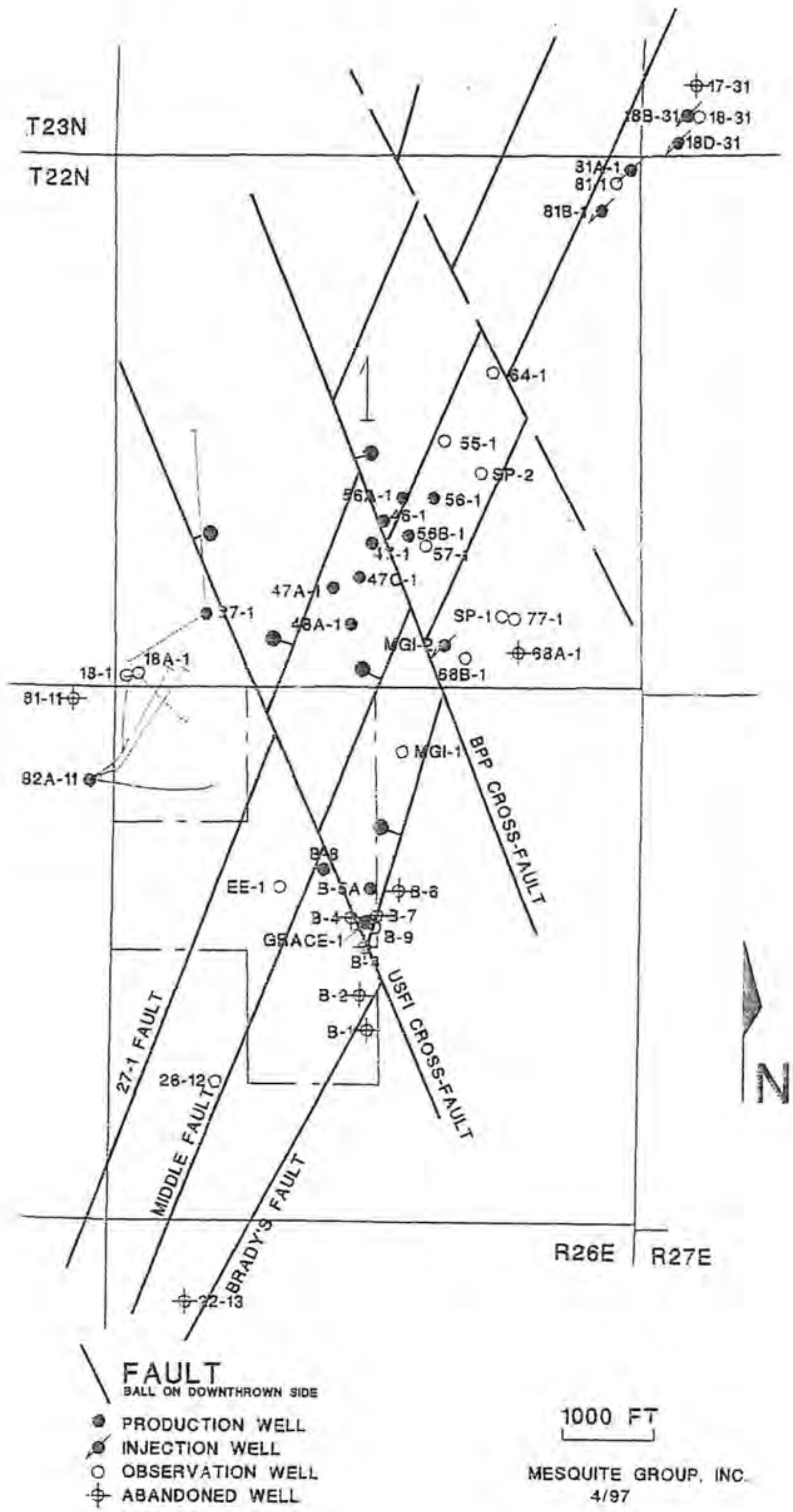
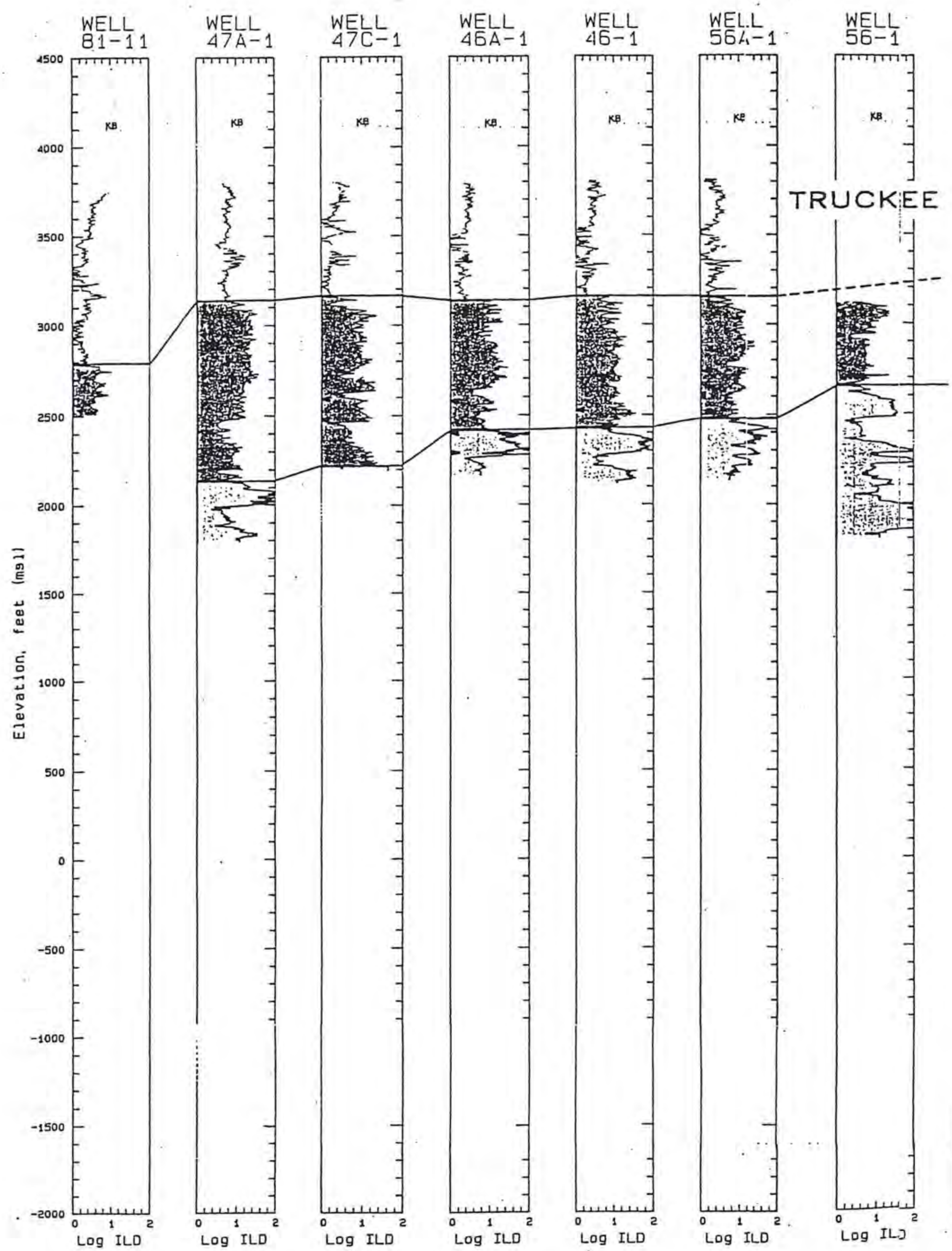


Figure 6

FAULT LOCATION MAP
BRADY'S FIELD, NV



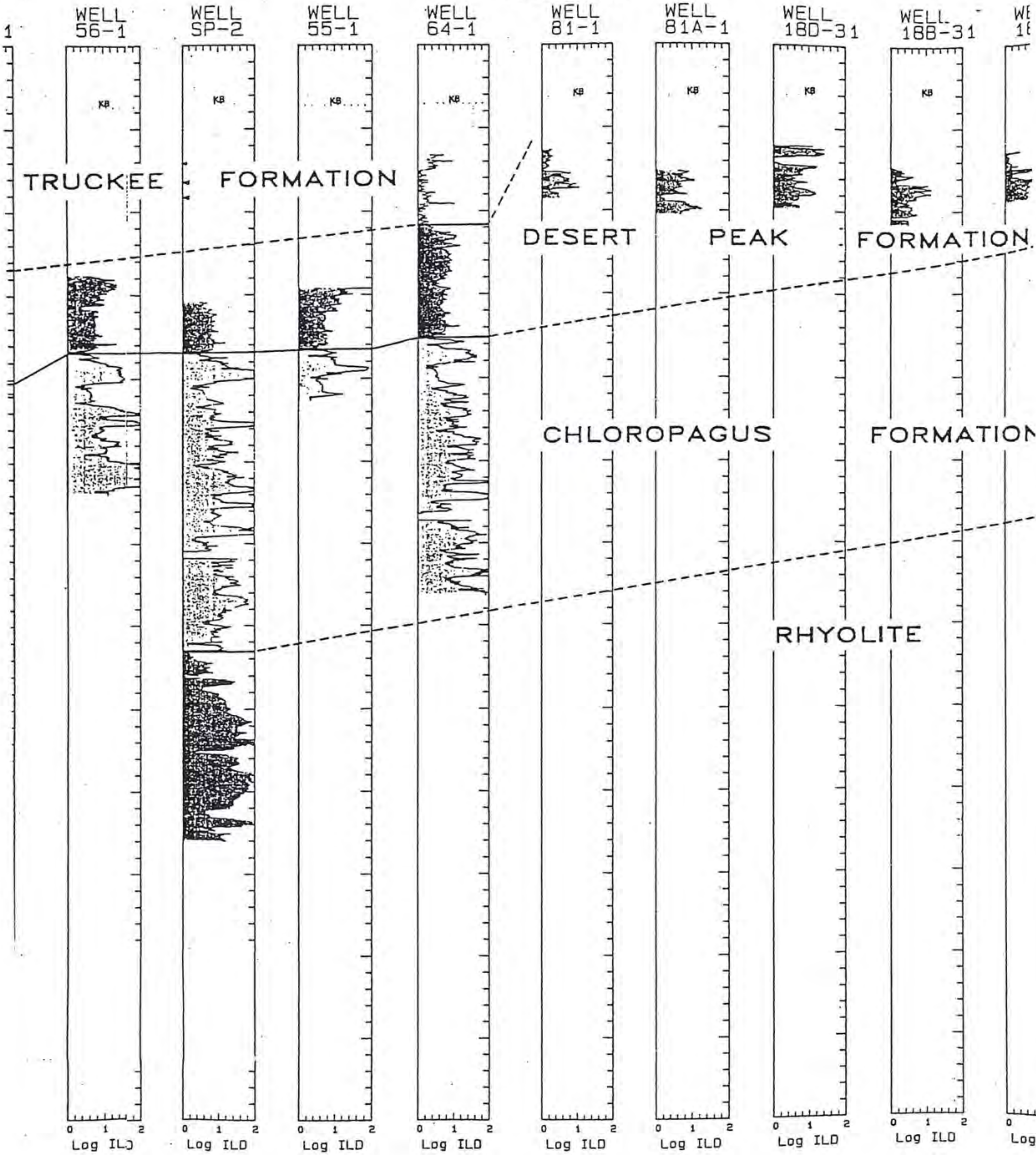


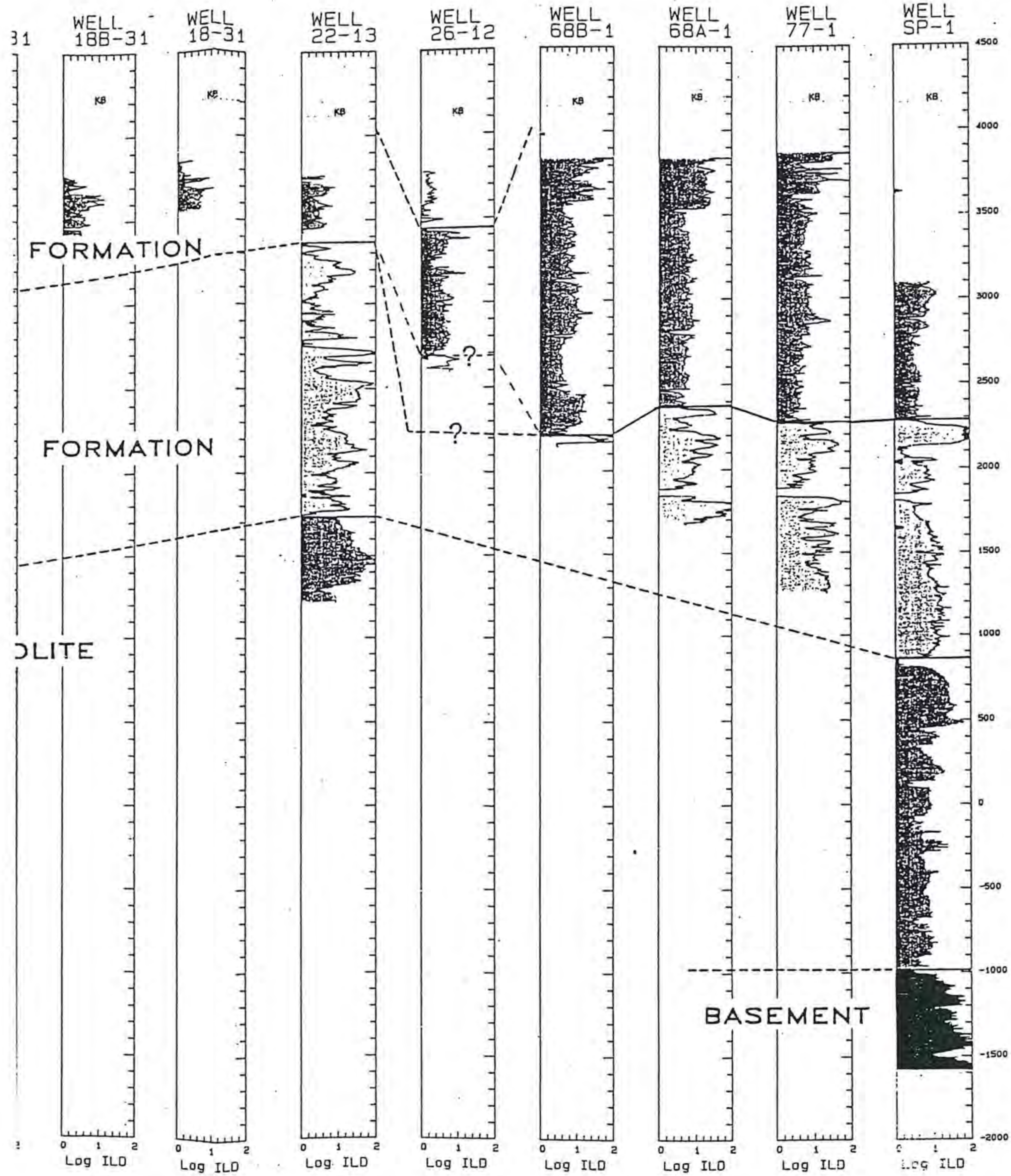
WELL 81-11
WELL 47A-1
WELL 47C-1
WELL 46A-1
WELL 46-1
WELL 56A-1
WELL 56-1
TRUCKEE
KB
Elevation, feet (msl)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
0 1 2
Log ILD

Figure 7

INDUCTION WIRELINE LOG CORRELATIONS

Brady's Field, NV





31
WELL 18B-31
WELL 18-31
WELL 22-13
WELL 26-12
WELL 68B-1
WELL 68A-1
WELL 77-1
WELL SP-1
KB
FORMATION
FORMATION
OLITE
BASEMENT
?
?
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
0 1 2
Log ILD

Figure 8

CROSS-SECTION LOCATIONS
BRADY'S FIELD, NV

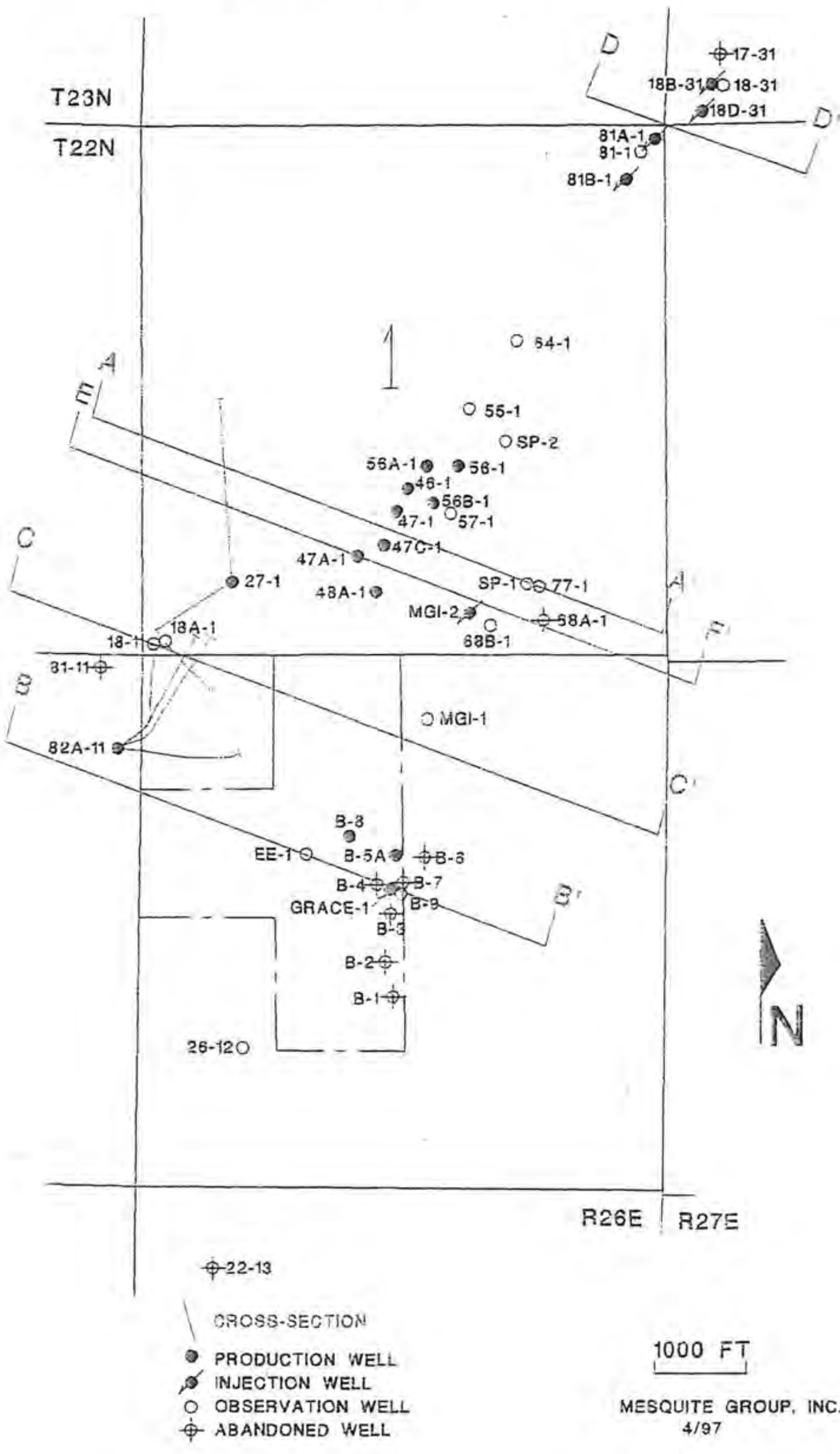


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Figure 9

GEOLOGIC CROSS-SECTION

BRADY'S FIELD, NV

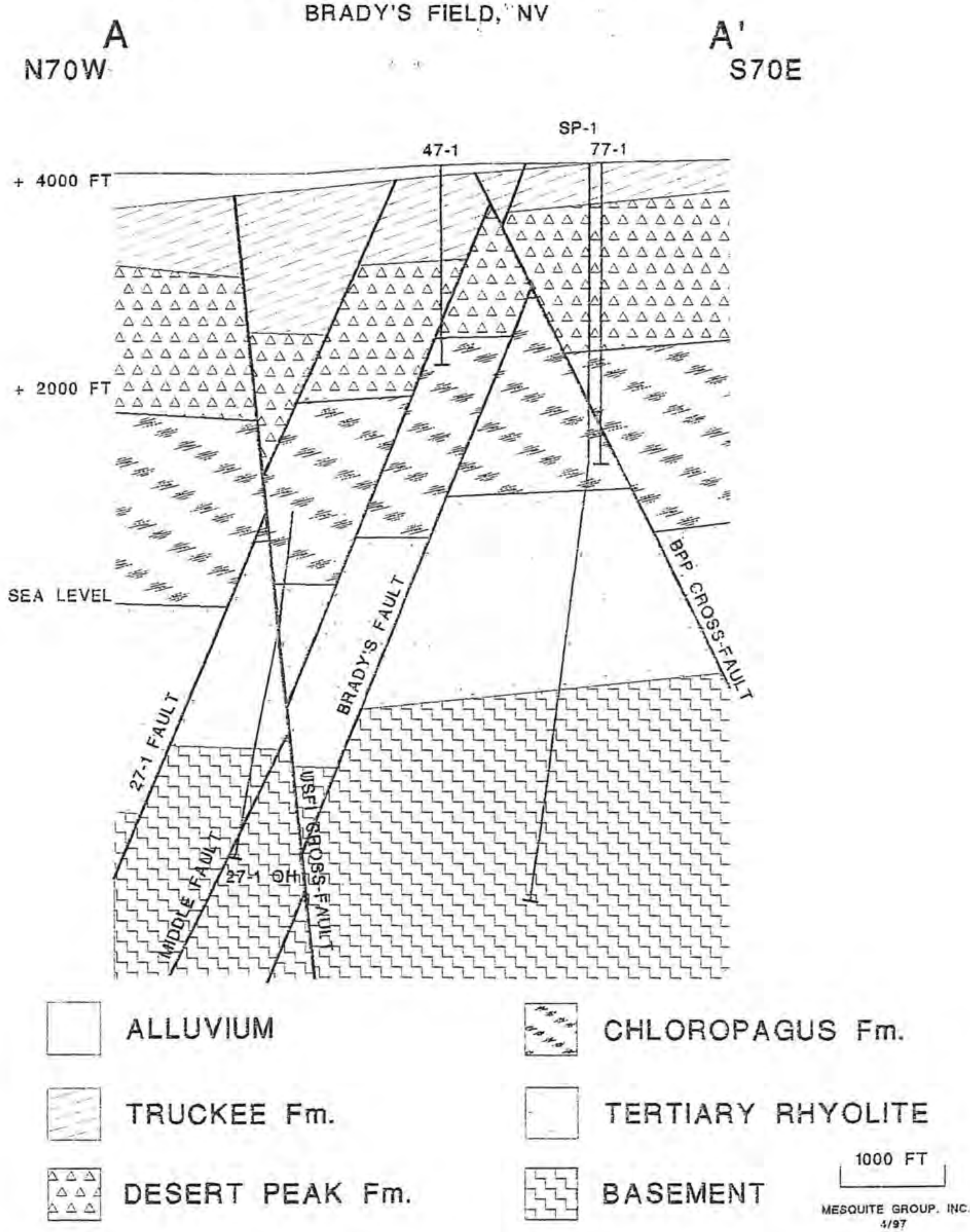

Figure 10

GEOLOGIC CROSS-SECTION

BRADY'S FIELD, NV

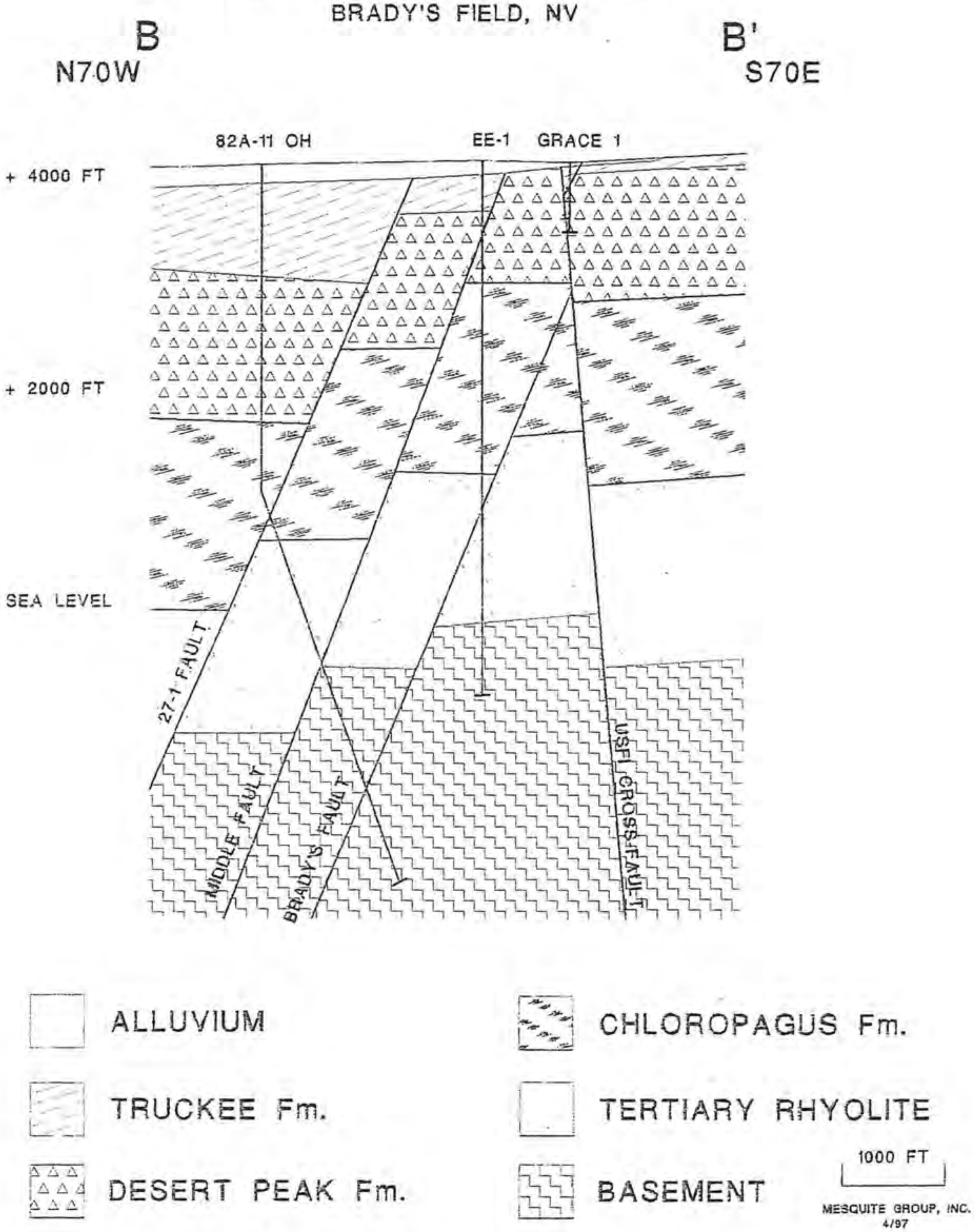

Figure 11

GEOLOGIC CROSS-SECTION

BRADY'S FIELD, NV

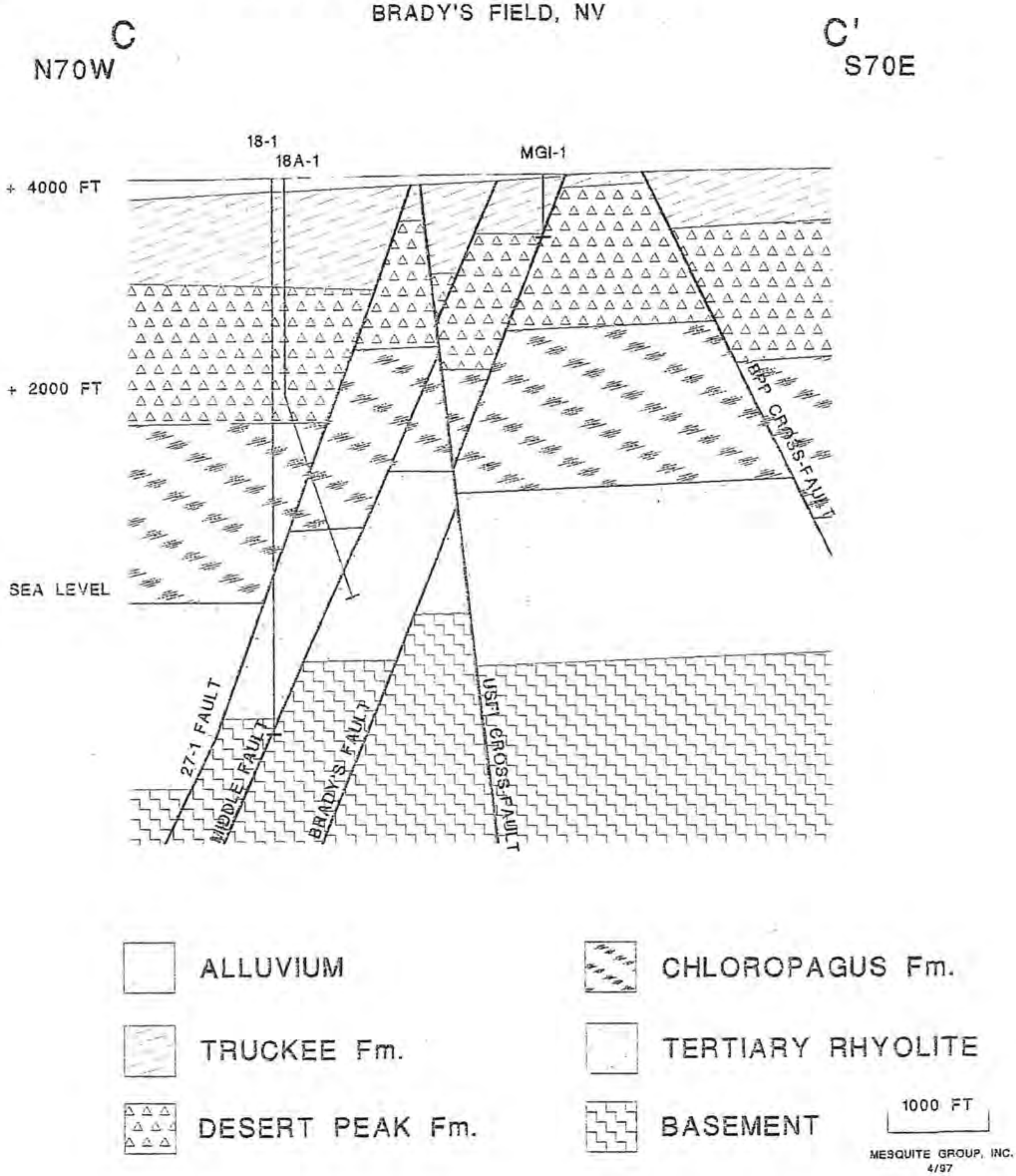

Figure 12

GEOLOGIC CROSS-SECTION

BRADY'S FIELD, NV

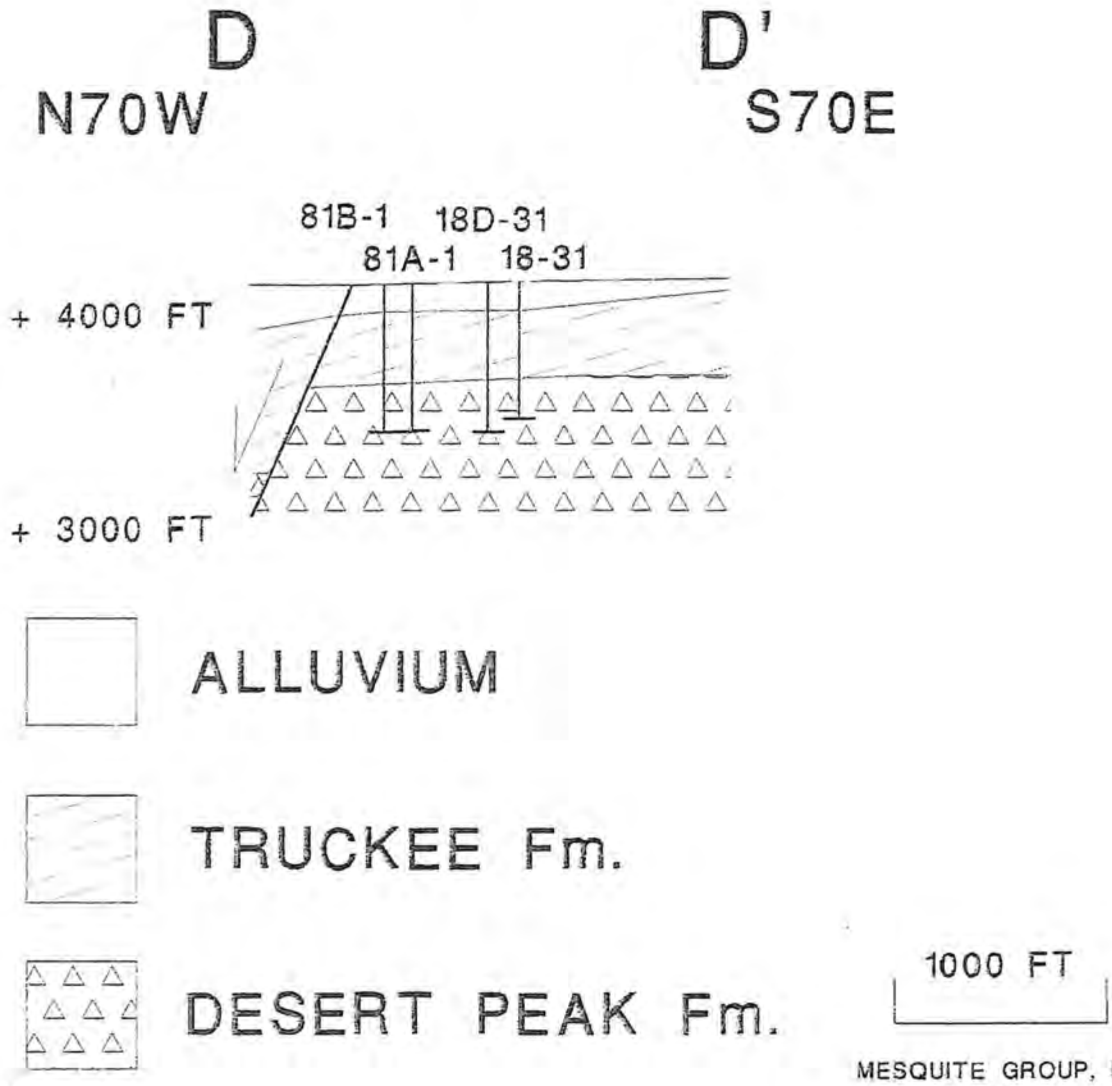

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Figure 13

GEOLOGIC CROSS-SECTION

BRADY'S FIELD, NV

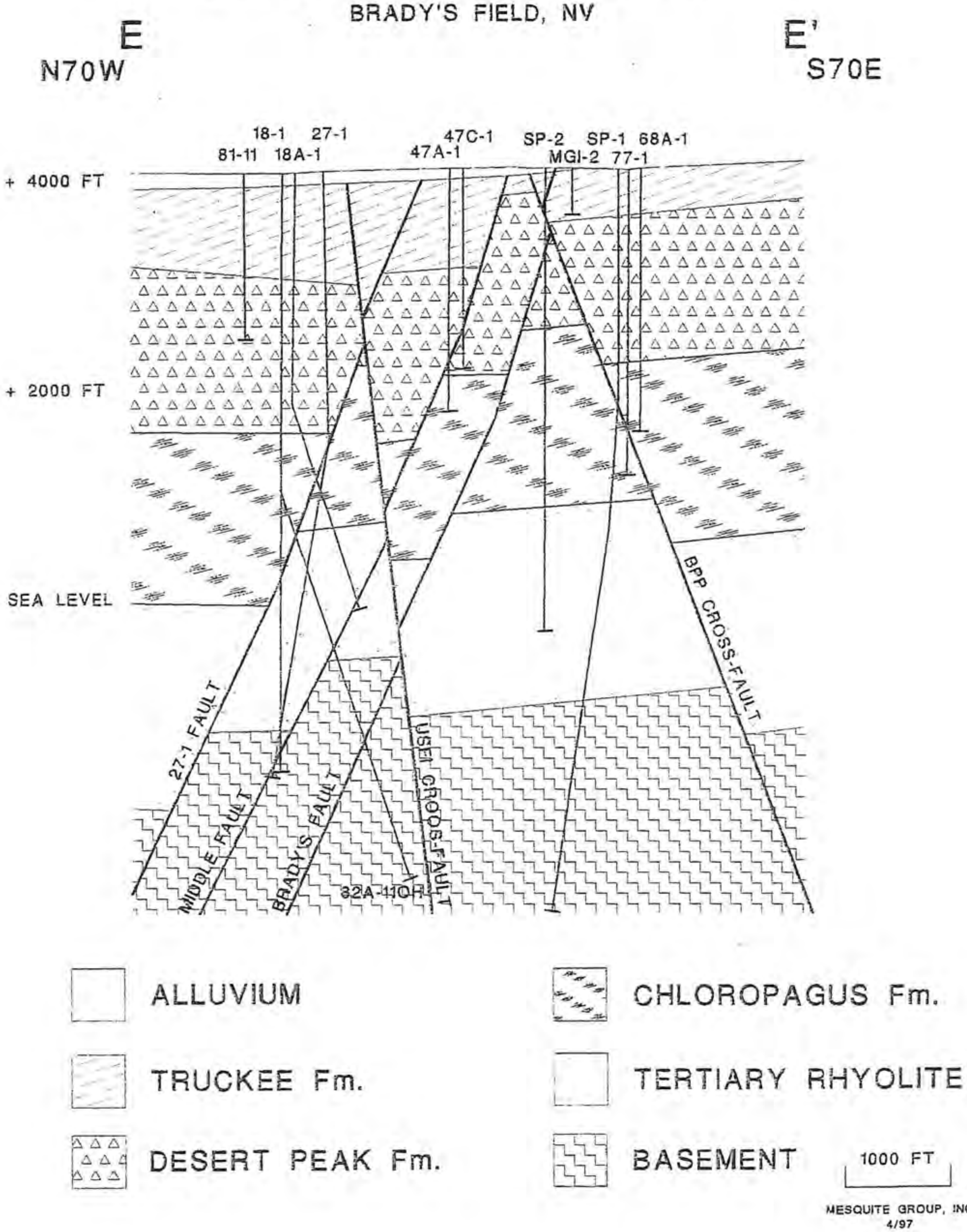

Figure 14

TEMPERATURE (F) AT 3900 FT
ABOVE SEA LEVEL
BRADY'S FIELD, NV

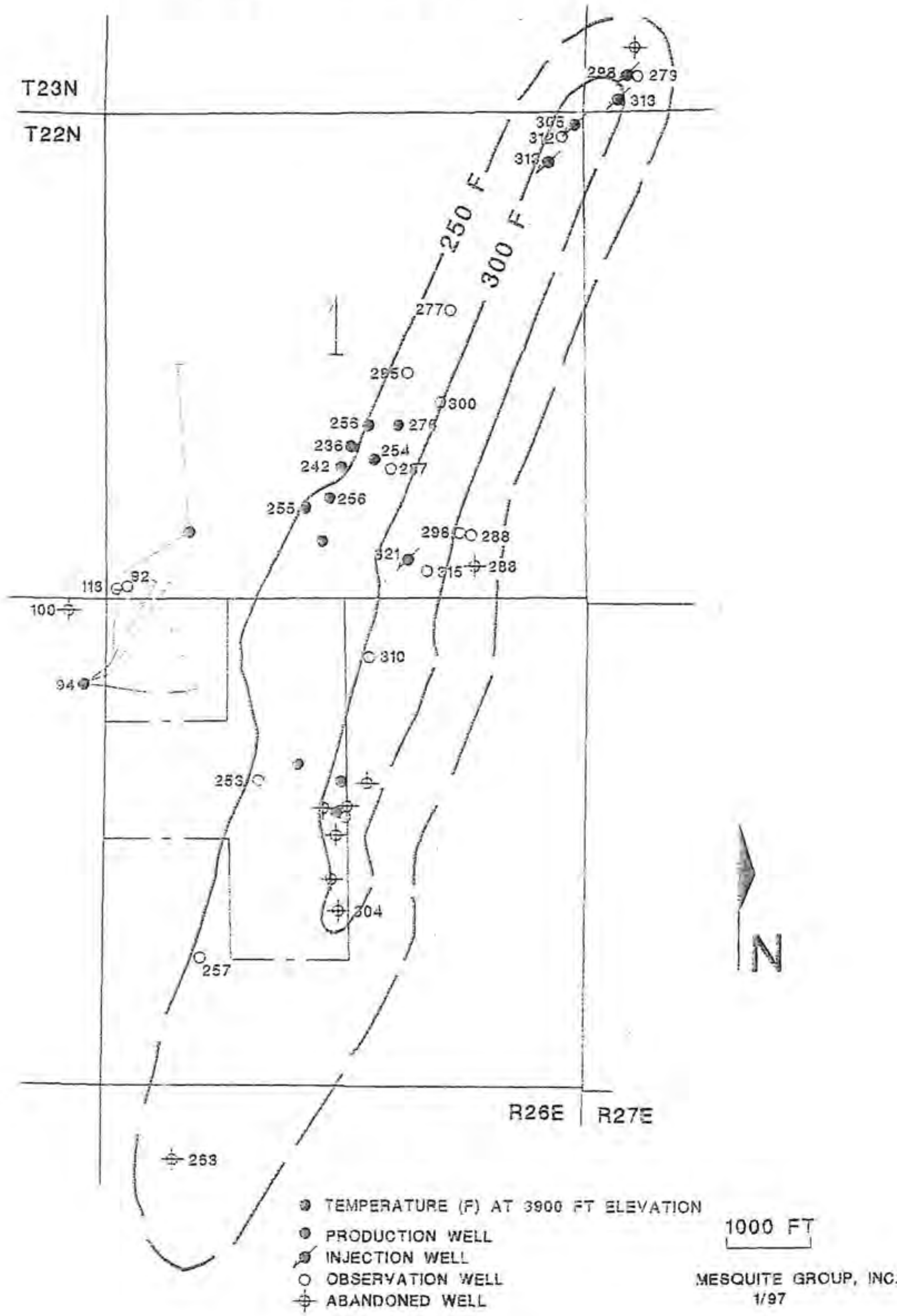

Figure 15

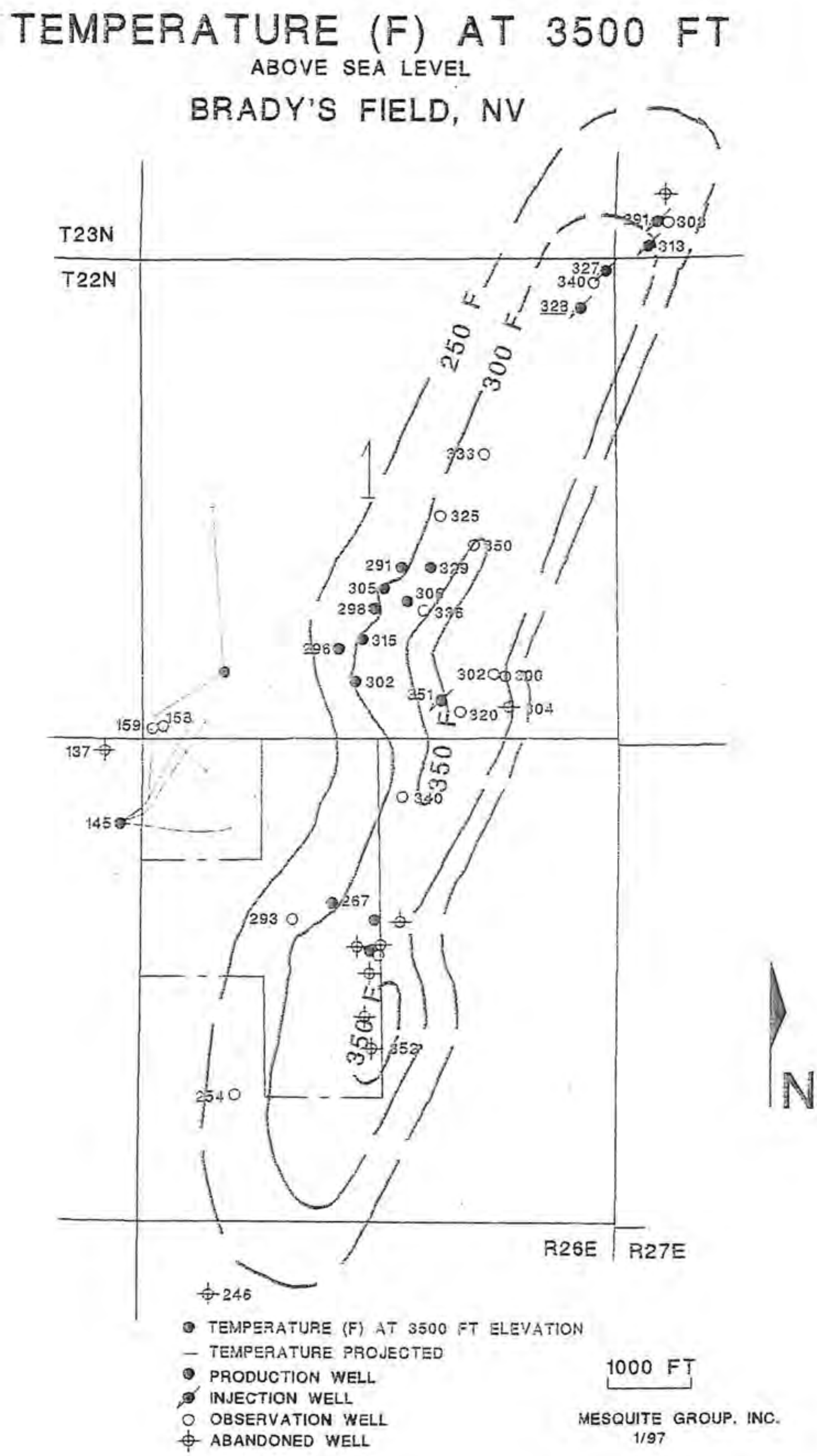
TEMPERATURE (F) AT 3500 FT
ABOVE SEA LEVEL
BRADY'S FIELD, NV
T23N
T22N
R26E
R27E
250 F
300 F
350 F
350
N
TEMPERATURE (F) AT 3500 FT ELEVATION
TEMPERATURE PROJECTED
PRODUCTION WELL
INJECTION WELL
OBSERVATION WELL
ABANDONED WELL
1000 FT
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Figure 16

TEMPERATURE (F) AT 3000 FT

ABOVE SEA LEVEL

BRADY'S FIELD, NV

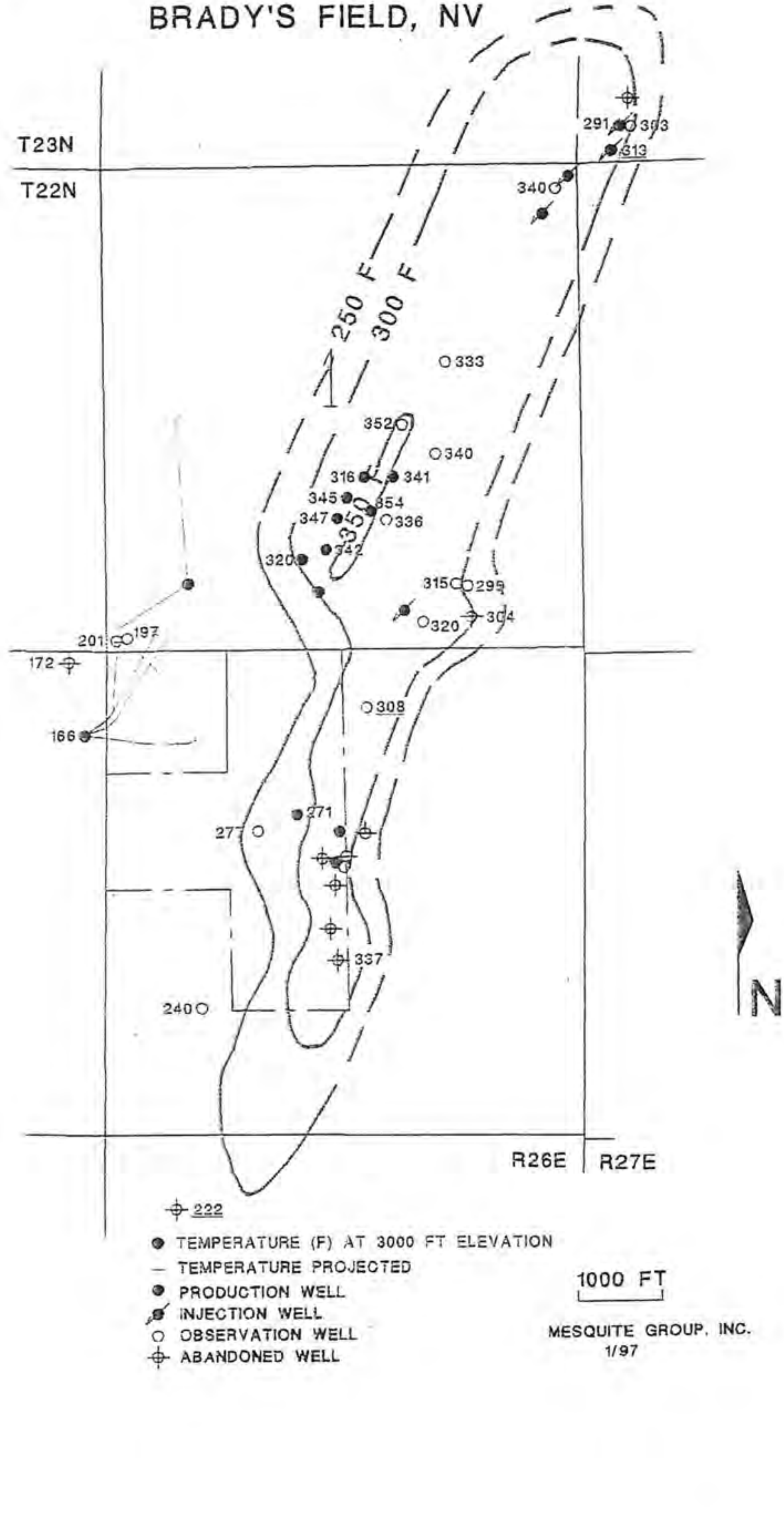

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Figure 17

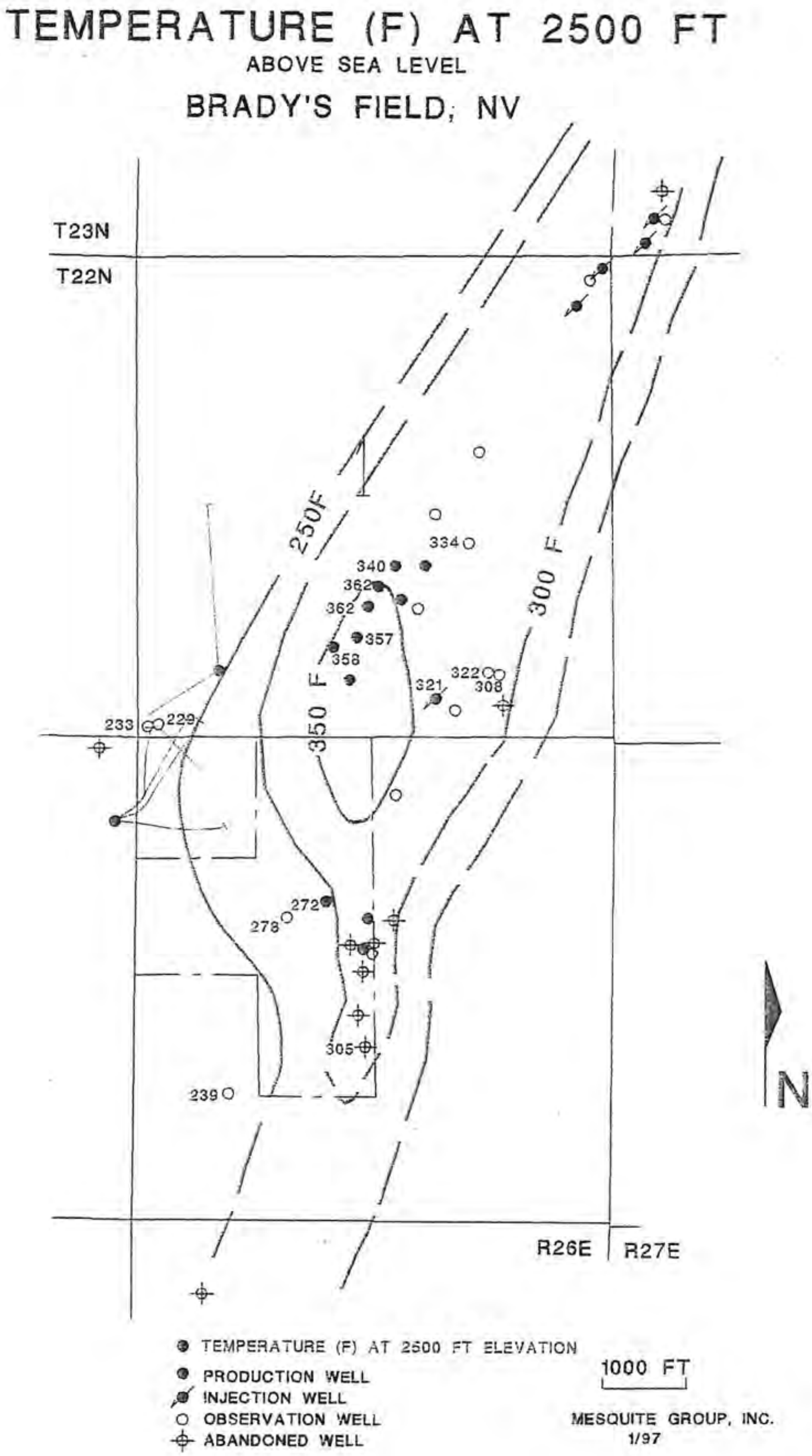
TEMPERATURE (F) AT 2500 FT
ABOVE SEA LEVEL
BRADY'S FIELD, NV
T23N
T22N
250F
300 F
350 F
334
340
362
362
357
358
322
308
321
233
229
272
278
305
239
R26E
R27E
N
TEMPERATURE (F) AT 2500 FT ELEVATION
PRODUCTION WELL
INJECTION WELL
OBSERVATION WELL
ABANDONED WELL
1000 FT
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Figure 18

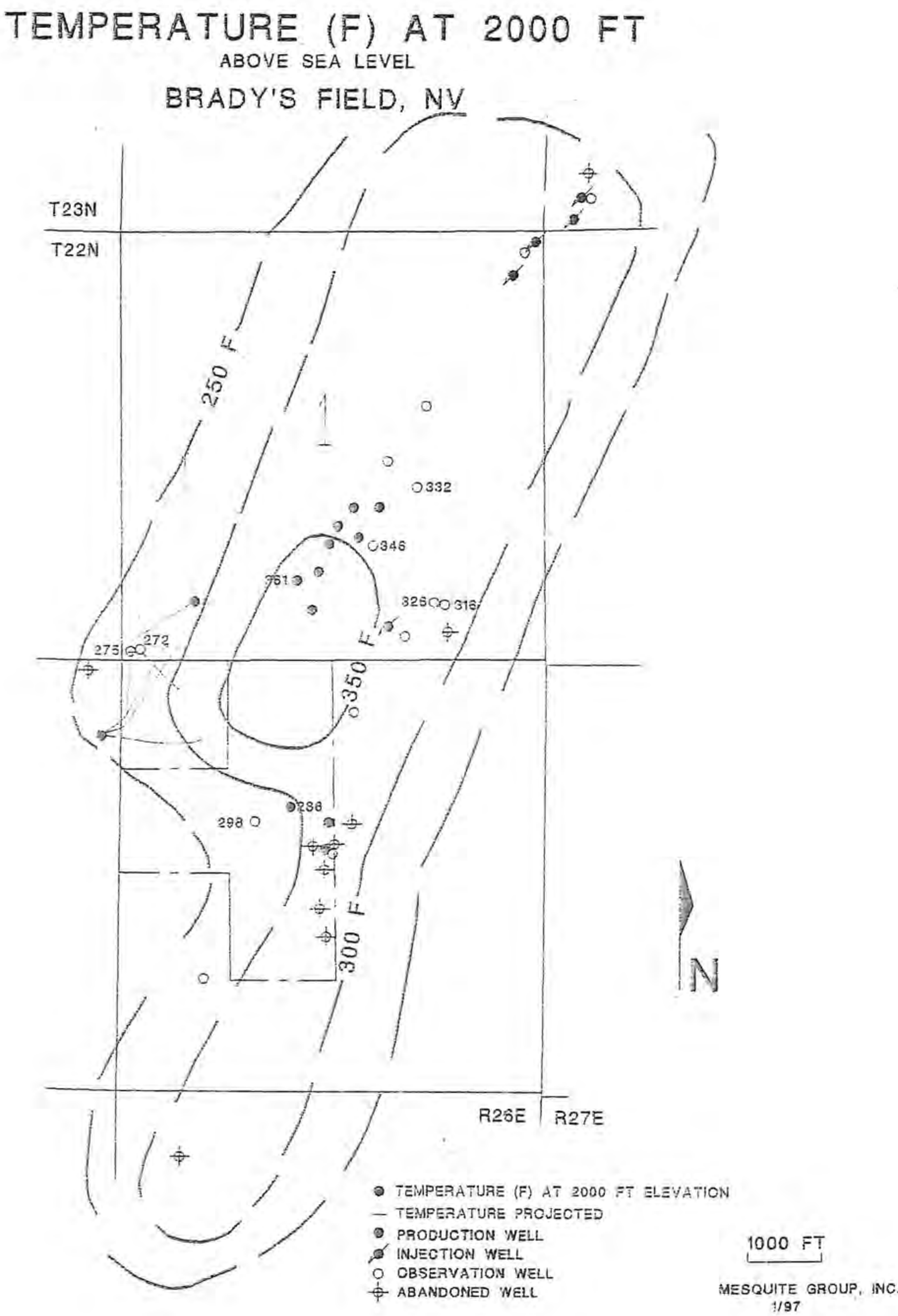
TEMPERATURE (F) AT 2000 FT
ABOVE SEA LEVEL
BRADY'S FIELD, NV
T23N
T22N
250 F
300 F
350 F
332
346
361
326
316
275
272
286
298
R26E
R27E
N
TEMPERATURE (F) AT 2000 FT ELEVATION
TEMPERATURE PROJECTED
PRODUCTION WELL
INJECTION WELL
OBSERVATION WELL
ABANDONED WELL
1000 FT
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Figure 19

TEMPERATURE (F) AT 1500 FT

ABOVE SEA LEVEL

BRADY'S FIELD, NV

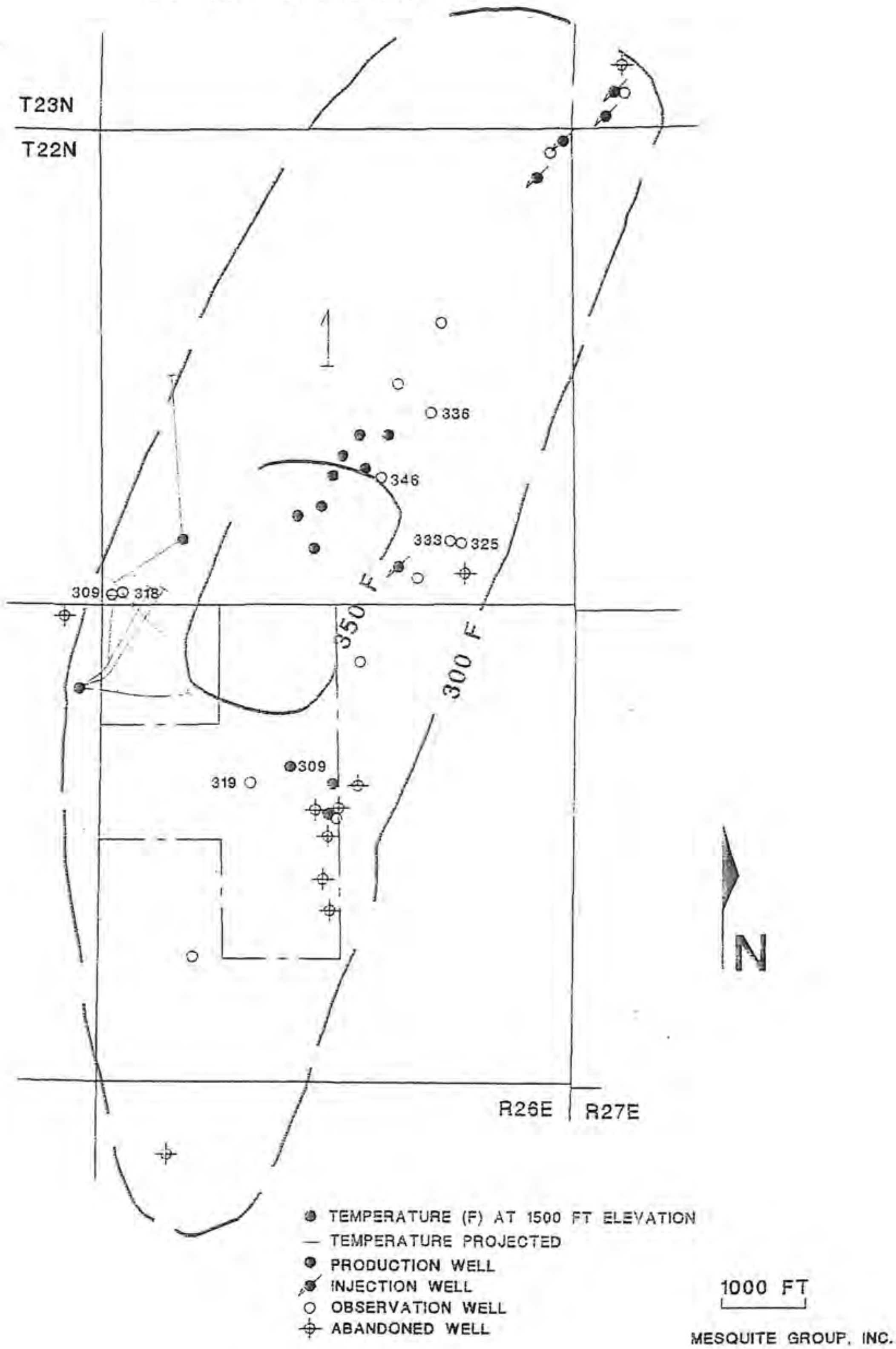

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Figure 20

TEMPERATURE (F) AT 1000 FT
ABOVE SEA LEVEL

BRADY'S FIELD, NV

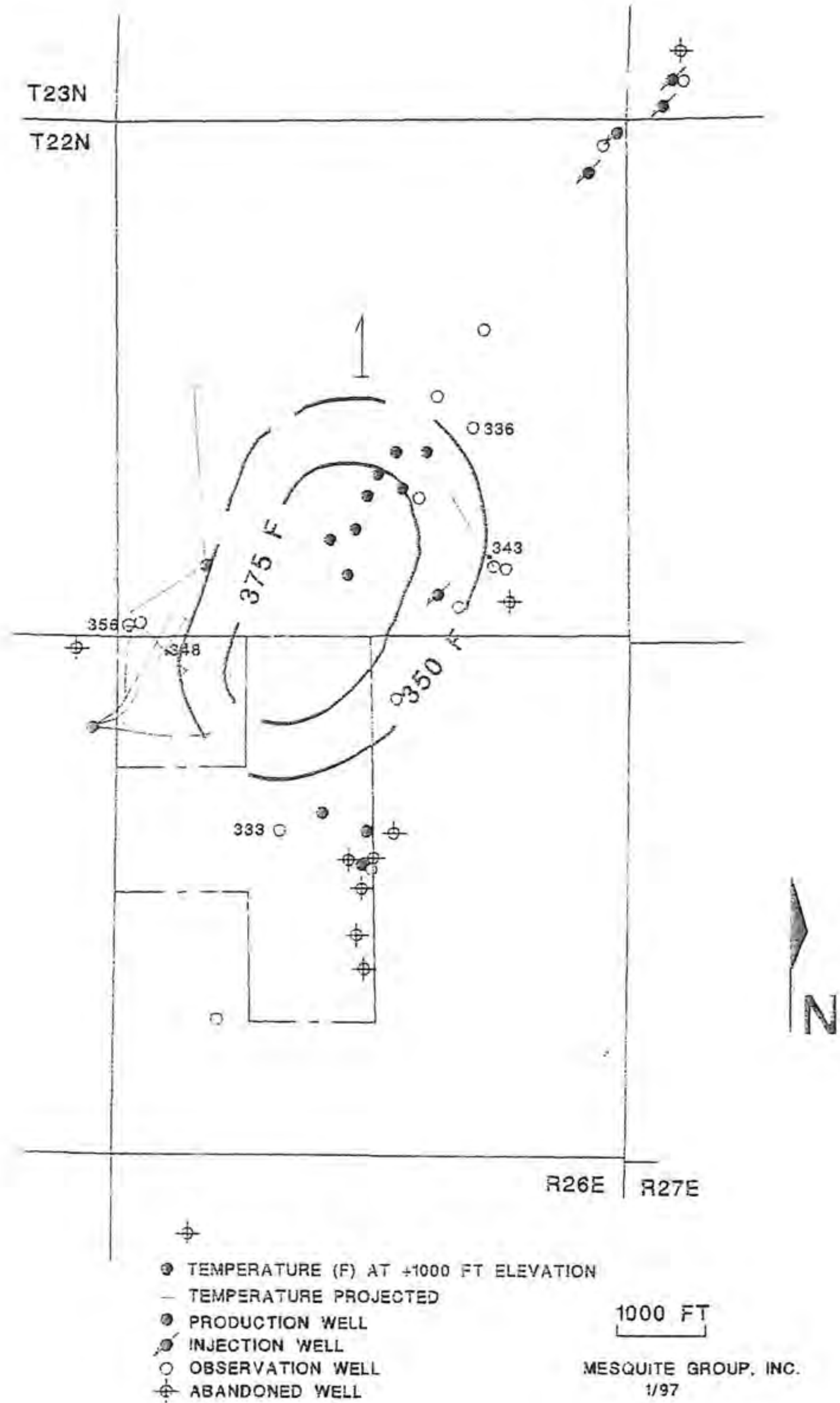

Figure 21

THERMAL CROSS-SECTION

BRADY'S FIELD, NV

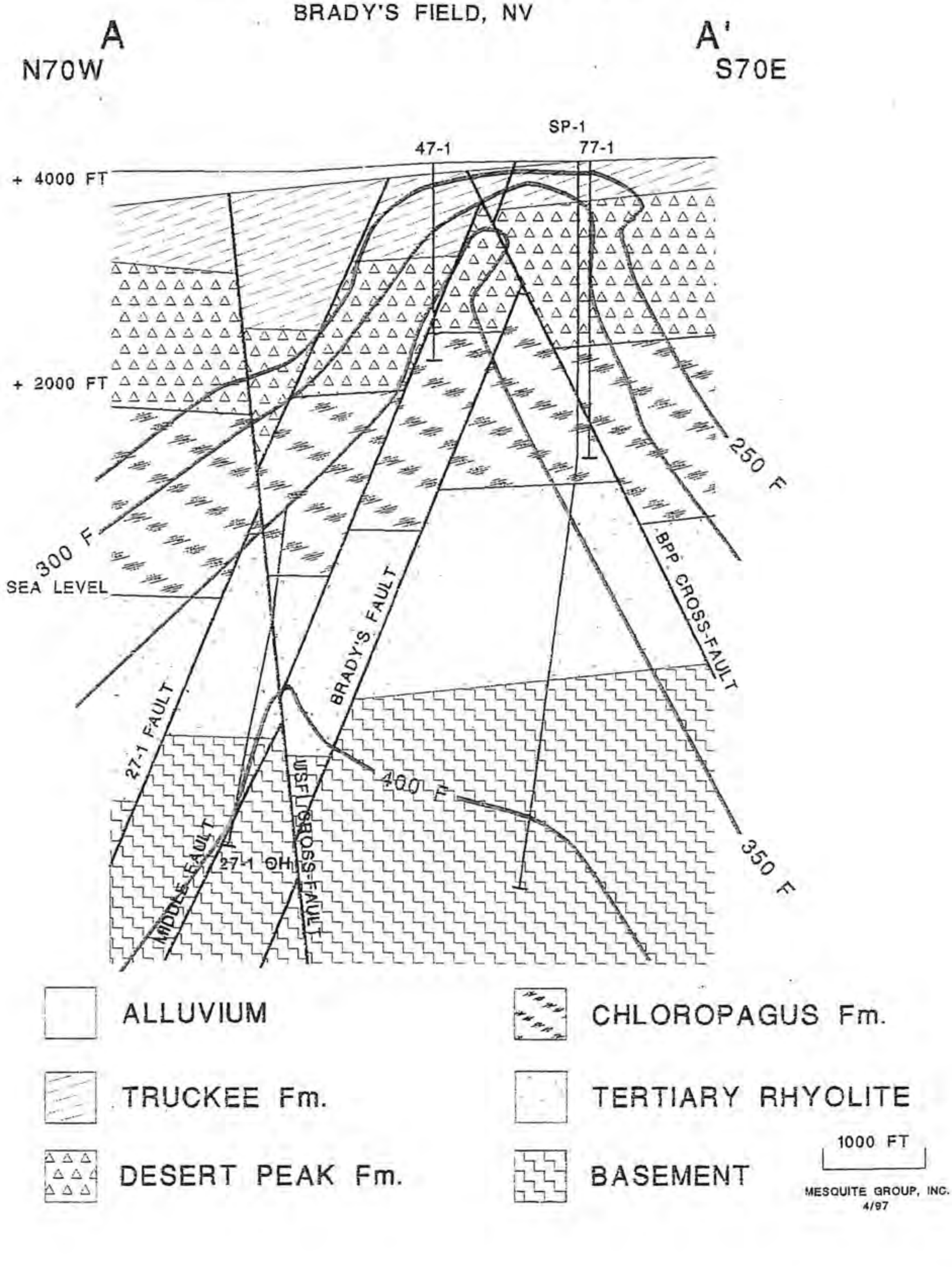

Figure 22

THERMAL CROSS-SECTION

BRADY'S FIELD, NV

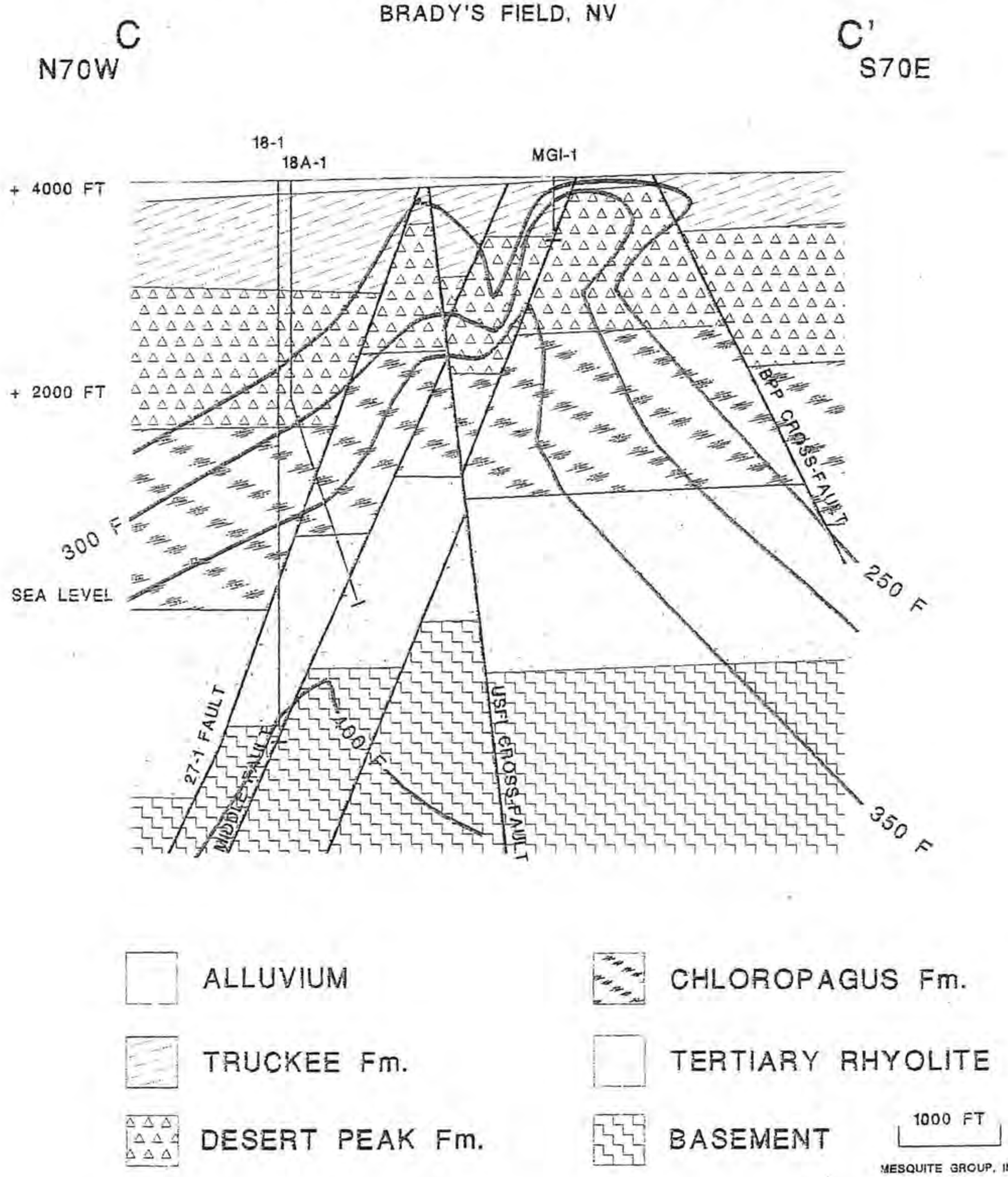

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Figure 23

THERMAL CROSS-SECTION

BRADY'S FIELD, NV

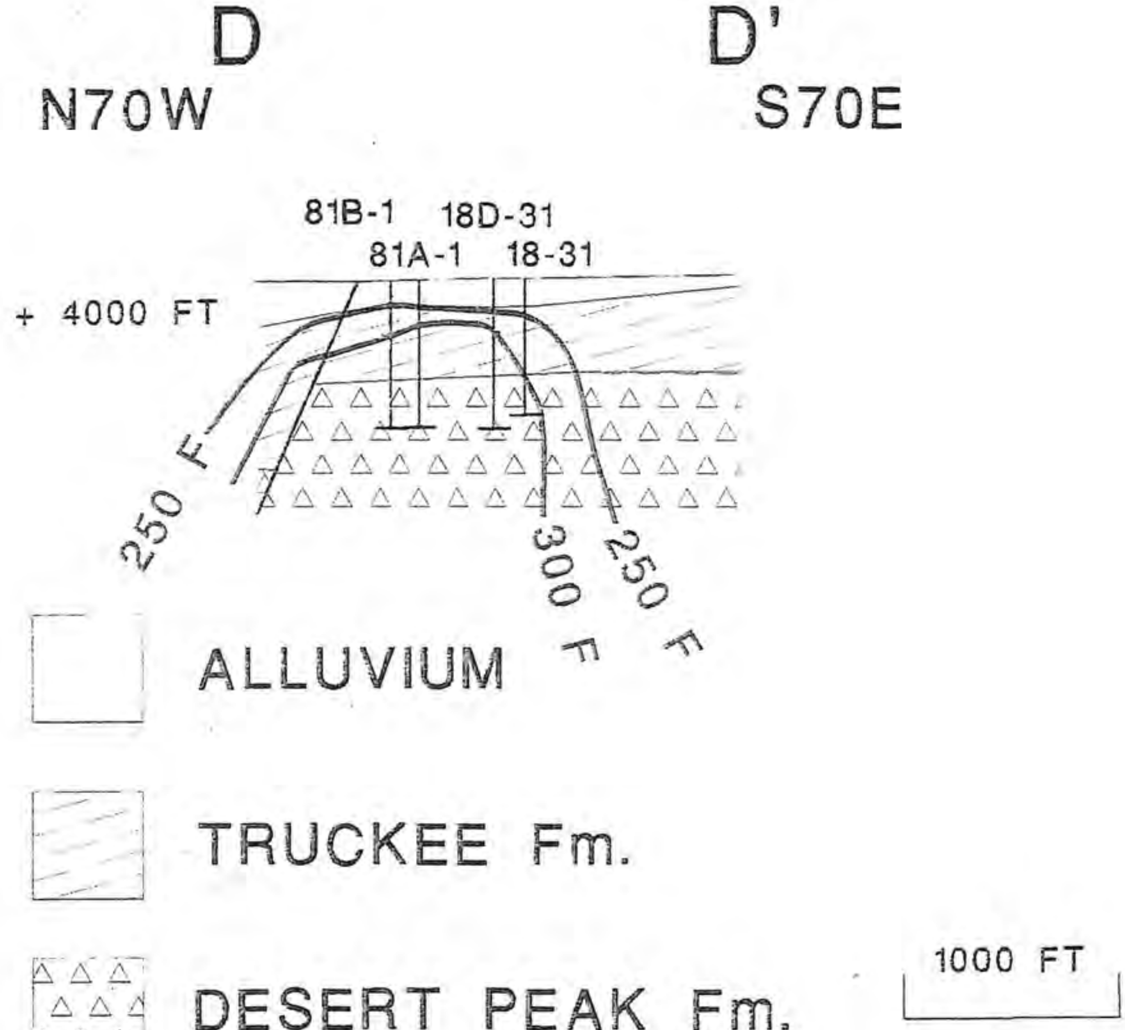

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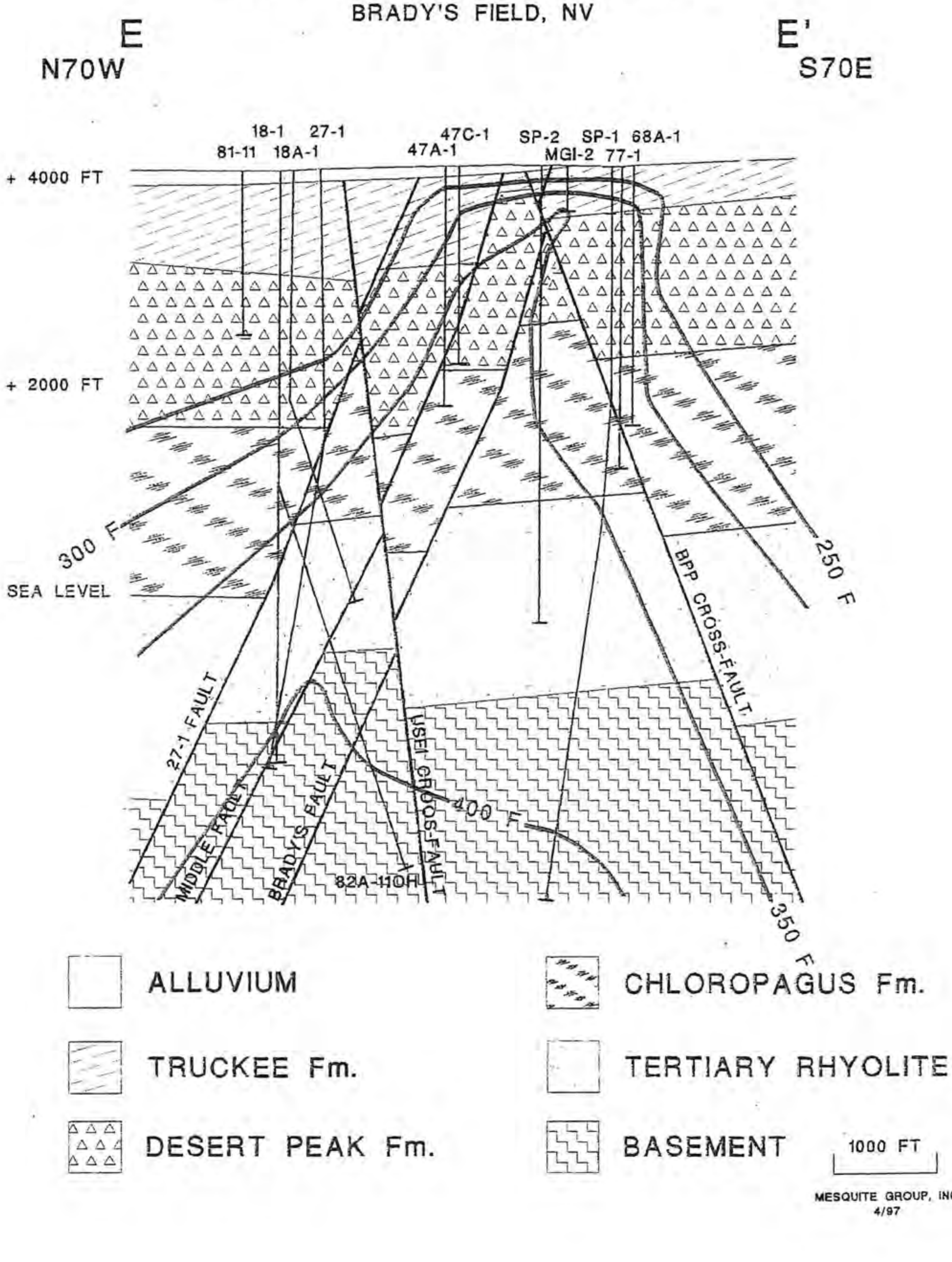
Figure 24

THERMAL CROSS-SECTION

BRADY'S FIELD, NV



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Appendix A

WELL DATA

Brady's Field, Nevada

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

Well Name	Site Name	Drilling dates		Drilled for	Drilled by	Drilling Result	Current Status
		Spud	Compl.				
56-1	P-4	8/21/91	9/12/91	Production	Buckland	Producer	Producer
55-1	P-5	9/4/91	9/27/91	Production	Grace	Producer	Producer
56B-1	P-3, 57A-1	9/17/91	9/30/91	Production	Buckland	Producer	Producer
64-1	P-6	10/3/91	10/25/91	Production	Grace	Dry Hole	Observation
46A-1	P-2, 47-1	10/12/91	10/29/91	Production	Buckland	Producer	Producer
56A-1		10/29/91	11/13/91	Production	Grace	Producer	Producer
47C-1	47A-1	11/12/91	11/26/91	Production	Buckland	Producer	Producer
46-1		11/15/91	11/30/91	Production	Grace	Producer	Producer
47A-1	47B-1	12/6/91	12/19/91	Production	Buckland	Producer	Producer
68A-1	68-1	12/4/91	12/19/91	Injection	Grace	Dry Hole	Plugged
81A-1		2/21/92	2/28/92	Injection	SER	Injector	Injector
18D-31		2/29/92	3/12/92	Injection	SER	Injector	Injector
81B-1		3/16/92	3/22/92	Injection	SER	Injector	Injector
18B-31		3/23/92	3/29/92	Injection	SER	Injector	Injector
17-31		7/20/92	7/29/92	Injection	SER	Dry Hole	Plugged
18-1		2/9/93	3/9/93	Injection	Grace	Injector	Injector
18A-1		3/29/93	4/30/93	Injection	Grace	Injector	Injector
48A-1		3/13/94	3/20/94	Production	Grace	Producer	Producer
82A-11OH		3/26/94	4/18/94	Injection	Nabors	Dry Hole	Redrilled
82A-11RD1		4/23/94	5/2/94	Injection	Nabors	Dry Hole	Redrilled
82A-11RD2		5/6/94	5/12/94	Injection	Nabors	Dry Hole	Redrilled
82A-11RD3		5/16/94	5/31/94	Injection	Nabors	Injector	Injector
27-1		7/14/96	8/18/96	Production	Welch & Howell	Dry Hole	Plugged
27-1RD1		8/19/96	9/15/96	Production	Welch & Howell	Production	Producer
Slim Holes							
77-1		7/6/90	7/22/90	Exploration	Williams	Low productivity	Idle
57-1		10/14/90	11/2/90	Exploration	Williams	Productive	Idle
68B-1		11/25/91	12/19/91	Exploration	Energy	Productive	Idle
81-11		12/21/91	12/31/91	Exploration	Energy	Dry Hole	Plugged
22-13		1/3/92	1/17/92	Exploration	Energy	Dry Hole	Plugged
81-1		1/23/92	1/30/92	Exploration	Energy	Productive	Idle
18-31		2/3/92	2/8/92	Exploration	Energy	Productive	Observation
26-12		2/11/92	2/20/92	Exploration	Energy	Dry Hole	Idle

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

Well Name	Site Name	Drilling dates		Drilled for	Drilled by	Drilling Result	Current Status
		Spud	Compl.				
SP-1	(a.k.a. MG-1)	4/19/74	6/12/74	Exploration	Union		Plugged?
SP-2*	(a.k.a. MG-2)	2/26/75	3/25/75	Exploration	Union		Idle
MGI-1		10/5/85	10/20/85	Production	Munson	Productive	Idle
MGI-2		12/18/85	2/8/86	Production	Munson	Productive	Observation
Brady 1			1959		Magma/Union		Abandoned
Brady 2			1959 or 60		Magma		
Brady 3			1960		Magma		
Brady 4			1961		Magma		
Brady 5			1961 or 62		Magma/Union		Abandoned
Brady 6			1961		Magma		
Brady 7			1962		Magma?		
EE-1			12/1/64		Union		Observation
Brady 8			1975		GFP?		Standby prod.
Brady 9			?		?		
Grace 1			1980		GFP		Standby prod.
Brady 5A			1986		GFP		Producer

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

Well Name	Elevation (feet msl)			Drilled Depth (ft. KB)	Casing Data				Liner Data			Hole Size (in.)	Completion Notes
	CHF	Ground	KB		Size (in.)	Depth (ft. KB)	Size (in.)	Depth (ft. KB)	Size (in.)	Depth (ft. KB) Top	Bottom		
56-1	4,107	4107.4	4128.9	2,404	20	308	13-3/8	1,012	9-5/8	993	1,212	12-1/4	Fish in hole 2,320'-2,404'
55-1	4,113	4114.4	4138.0	1,869	20	311	13-3/8	1,216	9-5/8	1,085	1,346	12-1/4	Underreamed to 24" 1102-1225'
56B-1	4,100	4100.9	4122.4	1,206	20	306	13-3/8	1,008	9-5/8	993	1,204	12-1/4	
64-1	(4,126)*	4127.0	4150.6	2,957	20	305	-	-	-	-	-	18-1/2	Instrumented with capillary tubing
46A-1	4,094	4094.3	4115.8	1,938	20	311	16	1,334	10-3/4	1,292	1,898	14-3/4	
56A-1	4,101	4100.5	4124.1	1,979	20	312	16	1,391	10-3/4	1,360	1,809	14-3/4	
47C-1	4,094	4095.1	4116.6	1,920	20	309	16	1,395	9-5/8	1,375	1,901	14-3/4	
46-1	4,098	4098.6	4122.2	2,000	20	312	16	1,335	9-5/8	1,315	1,655	14-3/4	Csg. stuck at 1,334'; 14-3/4" hole to 1406'; Plugged back
47A-1	4,090	4089.0	4110.5	2,325	20	312	13-3/8	1,425	9-5/8	1,400	2,137	12-1/4	
68A-1	4,148	4147.0	4170.6	2,500	16	326	-	-	-	-	-	14-3/4	Plugged
81A-1		4168.3	(=GL)	704	16	321	10-3/4	444	7-5/8	402	704	9-1/2	
18D-31		4180.7	(=GL)	698	16	300	10-3/4	286	7-5/8	242	670	14-3/4	
81B-1		4166.8	(=GL)	678	16	302	10-3/4	388	7-5/8	333	676	9-1/2	
18B-31		4186.0	(=GL)	770	16	319	10-3/4	412	7-5/8	360	770	9-1/2	
17-31			(=GL)	1,094	16	312	-	-	-	-	-	14-3/4	Plugged
18-1		4088.0	4111.0	5,753	16	604	10-3/4	2,922	7-5/8	2,784	5,741	9-7/8	
18A-1		4084.0	4107.0	4,291	16	639	10-3/4	3,021	7-5/8	2,926	4,291	9-7/8	
48A-1		4075.0	4099.0	1,275	20	335	13-3/8	1,102	10-3/4	1,062	1,269	17-1/2	
82A-11OH		4075.0	4099.0	7,021	20	610	13-3/8	3,060	-	-	-	12-1/4	
82A-11RD1		4075.0	4099.0	6,168	20	610	13-3/8	3,060	-	-	-	12-1/4	
82A-11RD2		4075.0	4099.0	5,755	20	610	13-3/8	3,060	-	-	-	12-1/4	
82A-11RD3		4075.0	4099.0	5,990	20	610	13-3/8	3,060	-	-	-	12-1/4	
27-1		4071.5	4095.5	7,037	20	577	13-3/8	-	-	-	-	12-1/4	Plugged
27-1RD1		4071.5	4095.5	5,950	20	577	13-3/8	2,409	9-5/8	2,293	5,856	12-1/4	
Slim Holes													
77-1	4,148	4146.0	4158.0	2,918	7	312	-	-	-	-	-	6-1/4	Deepened from 2,021' during 8/6-8/10/90
57-1	4,107	4107.5	4119.5	3,009	7	512	-	-	-	-	-	6-1/4	Prod. zone cemented while drilling 10/91
68B-1	4,135	4131.0	4143.0	2,000	7	300	-	-	-	-	-	6-1/4	
81-11		4076.0		1,585	7	330	-	-	-	-	-	6-1/4	Plugged
22-13		4095.0		2,973	7	342	-	-	-	-	-	6-1/4	Plugged
81-1		4164.0		745	7	303	-	-	-	-	-	6-1/4	
18-31		4185.7		655	7	335	-	-	-	-	-	6-1/4	
26-12		4084.2		1,629	7	319	-	-	-	-	-	6-1/4	To be retained as observation well

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

Well Name	Elevation (feet msl)			Drilled Depth (ft. KB)	Casing Data				Liner Data			Hole Size (in.)	Completion Notes
	CHF	Ground	KB		Size (in.)	Depth (ft. KB)	Size (in.)	Depth (ft. KB)	Size (in.)	Depth (ft. KB) Top	Depth (ft. KB) Bottom		
SP-1	4,146	4144.9	4163.9	7,275	13-3/8	1,044	8-5/8	3,998	6-5/8	3,900	7,147	8-3/4	8-5/8" liner perf'd 1976; re-compl. 1985-67
SP-2*	4,127	4125.4	4136.4	4,446	20	28	13-3/8	1,181	8-5/8	1,080	4,446	10-5/8	Re-completed 1985-1986
MGI-1	4,114	4114.0	4124.0	623	20	60	13-3/8	397					Instrumented with capillary tubing
MGI-2	4,125	4125.0	4135.0	443	20	89	13-3/8	380					17-1/2" open hole to 434'; 12-1/4" to 443'
Brady 1				1,758									Init. drilled to 690'; deepened 1965
Brady 2				241									
Brady 3				~610									
Brady 4				723									
Brady 5				1,800									Init. 593'; dpnd. 1965; blew out 1979
Brady 6				770									
Brady 7				250									
EE-1				5,062	13-5/8	21	9-5/8	493	7	371	1,265		slotted: 4,820'-5,050'; perf.: 1,000'-1,100';
									4-1/2	1,164	5,050	?	1,880'-1,940'; 3,200'-3,300'; 3,600'-3,700'
Brady 8				3,469			13-5/8	1,043	8-5/8	954	3,469	?	slotted: 1,671'-3,469'
Brady 9				?									No data available
Grace 1				?									
Brady 5A				1,078	16	119	12-3/4	275				see notes	14-3/4" open hole to 600'; 12-1/4" to 687'; 8-3/4" to 1,078'. Well sanded back to 300'

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

	Mud	DIL	Cyber	FMS	Caliper	Static		Flowing		Downhole Plots		
Well Name	Log	Log	Dip	Dip	Log	Temp.	Press.	Temp.	Press.	Summary	Geophys.	Notes
56-1	X	X		X		X	X	X	X	3/13/92	10/10/91	
55-1	X	X		X		X	X	X	X	3/13/92	10/28/91	
56B-1	X					X	X	X	X	3/27/92	10/28/91	
64-1	X	X	X			X	X			1/20/92	11/4/91	Formation microscanner
46A-1	X	X				X	X	X	X	3/27/92	3/27/92	MSD, Fm. microscanner
56A-1	X		X			X	X	X	X	1/20/92	12/4/91	Dipmeter, Dual dip., Strat. dip.
47C-1	X	X	X			X	X	X	X	3/13/92	12/2/91	Stratigraphic dipmeter
46-1	X	X	X			X	X	X	X	1/21/92	12/12/91	Stratigraphic dipmeter
47A-1	X	X	X			X	X	X	X	1/20/92	12/24/91	
68A-1	X	X	X			X	X			1/20/92	12/24/91	Dual dipmeter
81A-1	X	X						X	X	3/16/92	3/3/92	Gamma ray
18D-31	X	X			X			X	X	3/27/92	3/18/92	Gamma ray
81B-1	X					X	X	X	X	4/2/92		
18B-31	X	X				X		X	X		4/2/92	
17-31	X	X										Temperature log
18-1	X	X										Dual dip; High res dip
18A-1	X	X	X									
48A-1	X	X										Temperature log
82A-11OH	X	X			X							CBL; Temperature log
82A-11RD1	X	X										Temperature log
82A-11RD2	X											
82A-11RD3	X	X										Temperature log
27-1	X	X			X		X					
27-1RD1	X	X			X		X	X	X			
Slim Holes												
77-1	X	X				X	X	X	X	10/28/91	11/7/91	Stratigraphic dipmeter
57-1	X			X		X	X	X	X	9/26/91		
68B-1	X	X	X			X	X	X	X	1/20/92	12/24/91	Dual dipmeter
81-11	X	X	X			X	X			3/13/92	1/23/92	Stratigraphic dipmeter
22-13	X	X				X	X			3/13/92	1/23/92	Dipmeter, high-res. dip
81-1	X	X	X			X	X	X	X	3/13/92	3/92?	
18-31	X	X	X			X	X	X	X	3/16/92	2/24/92	
26-12	X	X				X	X			3/27/92	2/24/92	

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

Well Name	Mud Log	DIL Log	Cyber Dip	FMS Dip	Caliper Log	Static Temp.	Static Press.	Flowing Temp.	Flowing Press.	Downhole Plots Summary	Downhole Plots Geophys.	Notes
SP-1		X				X		X	X	12/24/91	12/24/91	
SP-2*	X	X				X	X			1/20/92	10/4/91	Gamma, Formation density
MGI-1	X					X		X	X	10/10/91		
MGI-2	X					X	X	X		10/11/91		
Brady 1						X				10/21/91		
Brady 2												
Brady 3												
Brady 4												
Brady 5												
Brady 6												
Brady 7												
EE-1						X	X	X		3/16/92		
Brady 8						X	X	X		9/27/91		
Brady 9												
Grace 1												
Brady 5A												

*SP-2 data not available to Mesquite.

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

	Rig Test Results			Three-Day Test Results				Production Zone		
Well Name	**Date**	**Water flow (gpm)**	**WHP (psig)**	**Start Date**	**End Date**	**Total flow (gpm)**	**WHP (psig)**	**Depth (ft KB)**	**Temp. (°F)**	**Productivity Notes**
56-1						1,160	70-80		356	
55-1						1,020	53-63		347	
56B-1						1,422	45-55		352	
64-1										
46A-1										
56A-1										
47C-1								1,633		
46-1								1,599		
47A-1								1,918		
68A-1										
81A-1										
18D-31										
81B-1										
18B-31										
17-31										No lost circulation - well plugged
18-1										
18A-1										
48A-1										
82A-11OH										
82A-11RD1										
82A-11RD2										
82A-11RD3										
27-1										
27-1RD1	9/14/96	1110	30					5,750	365	Injection tested at <500 gpm
Slim Holes										
77-1	7/25/90	80-100	11-12	08/16/90	08/17/90	140*		1,890		*Air-assisted; would not flow unassisted
57-1	10/21/90	245-260	70-75	10/29/90	10/30/90	275	59	1,109		Later test affected by cement
68B-1	12/14/91	290	8					506	315	
81-11										
22-13										
81-1	1/28/92	350	10-12					495-550	350	
18-31										
26-12										

BRADY'S HOT SPRINGS GEOTHERMAL FIELD - WELL DATA

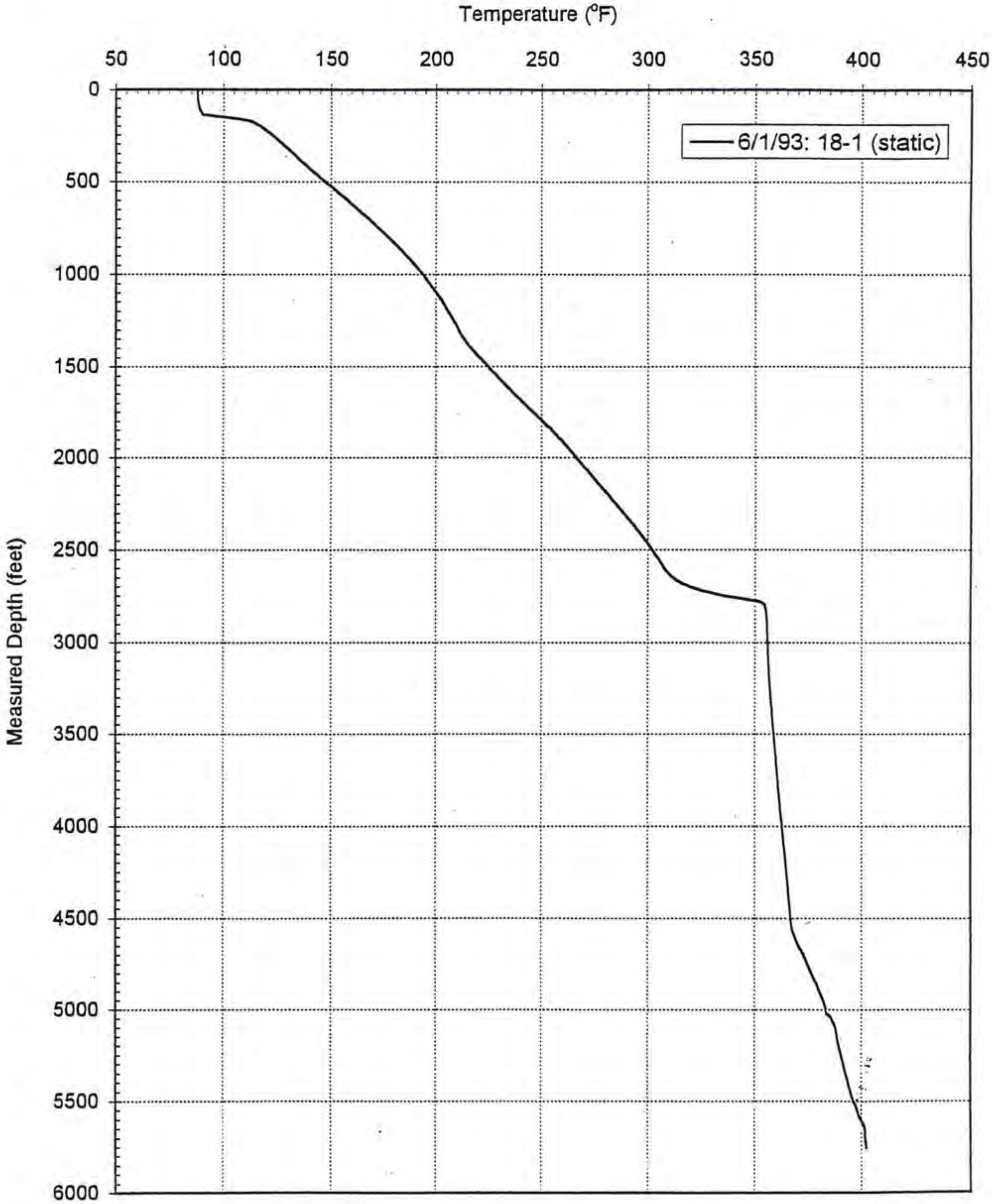
Well Name	Rig Test Results: Date	Rig Test Results: Water flow (gpm)	Rig Test Results: WHP (psig)	Three-Day Test Results: Start Date	Three-Day Test Results: End Date	Three-Day Test Results: Total flow (gpm)	Three-Day Test Results: WHP (psig)	Production Zone: Depth (ft KB)	Production Zone: Temp. (°F)	Productivity Notes
SP-1									371	Shallow hot zone 302F at 348'
SP-2*									352	
MGI-1								410	340	
MGI-2								440	348	
Brady 1									352	
Brady 2									~330	
Brady 3									340	
Brady 4									~340	
Brady 5									320+	
Brady 6									~325	
Brady 7									220+	
EE-1									305	Temp. 415F at 4,950'
Brady 8									337	
Brady 9										
Grace 1									300+	
Brady 5A									314	

Appendix B

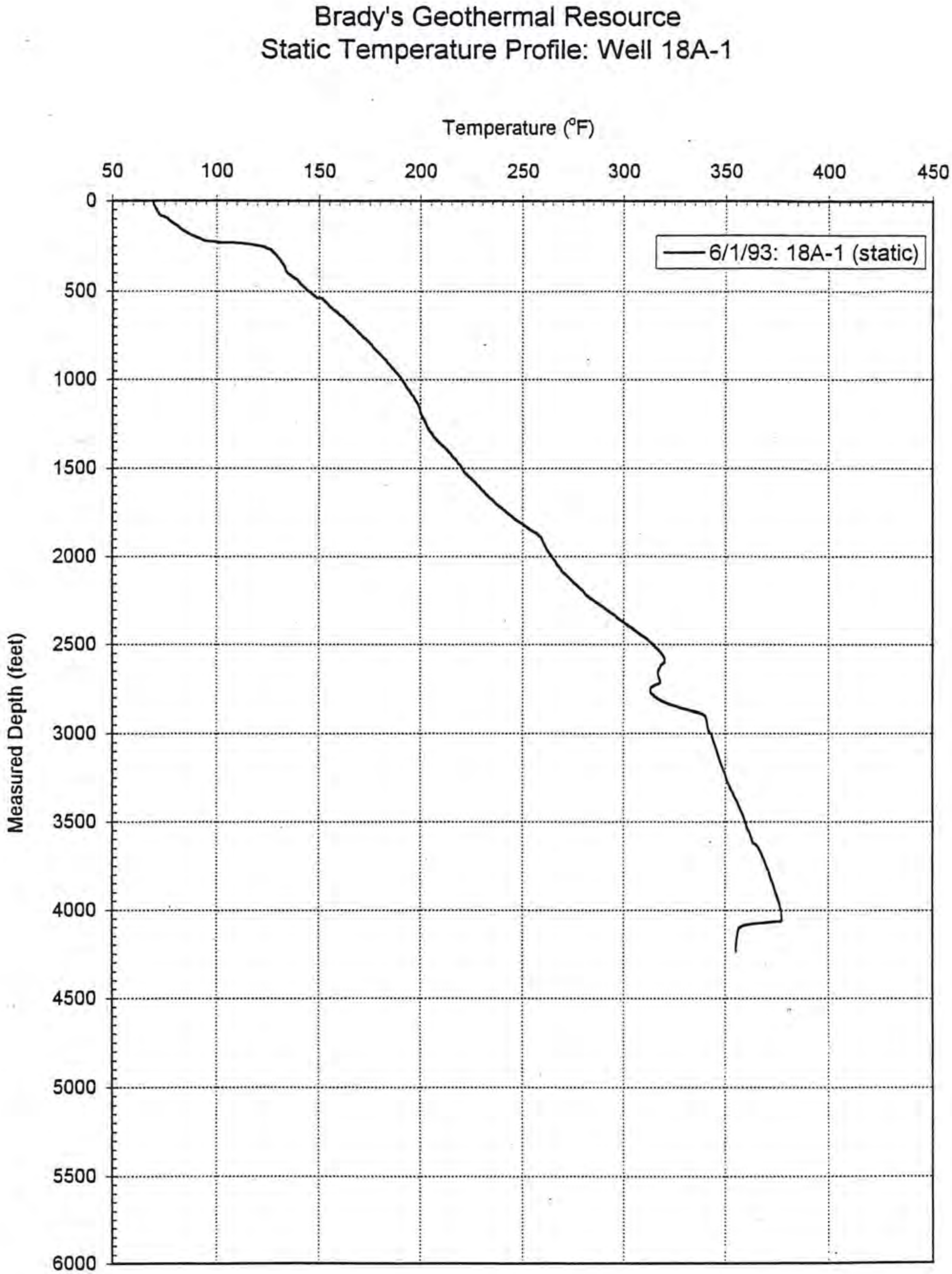
NATURAL STATE
STATIC TEMPERATURE PROFILE

Brady's Field, Nevada

Brady's Geothermal Resource
Static Temperature Profile: Well 18-1

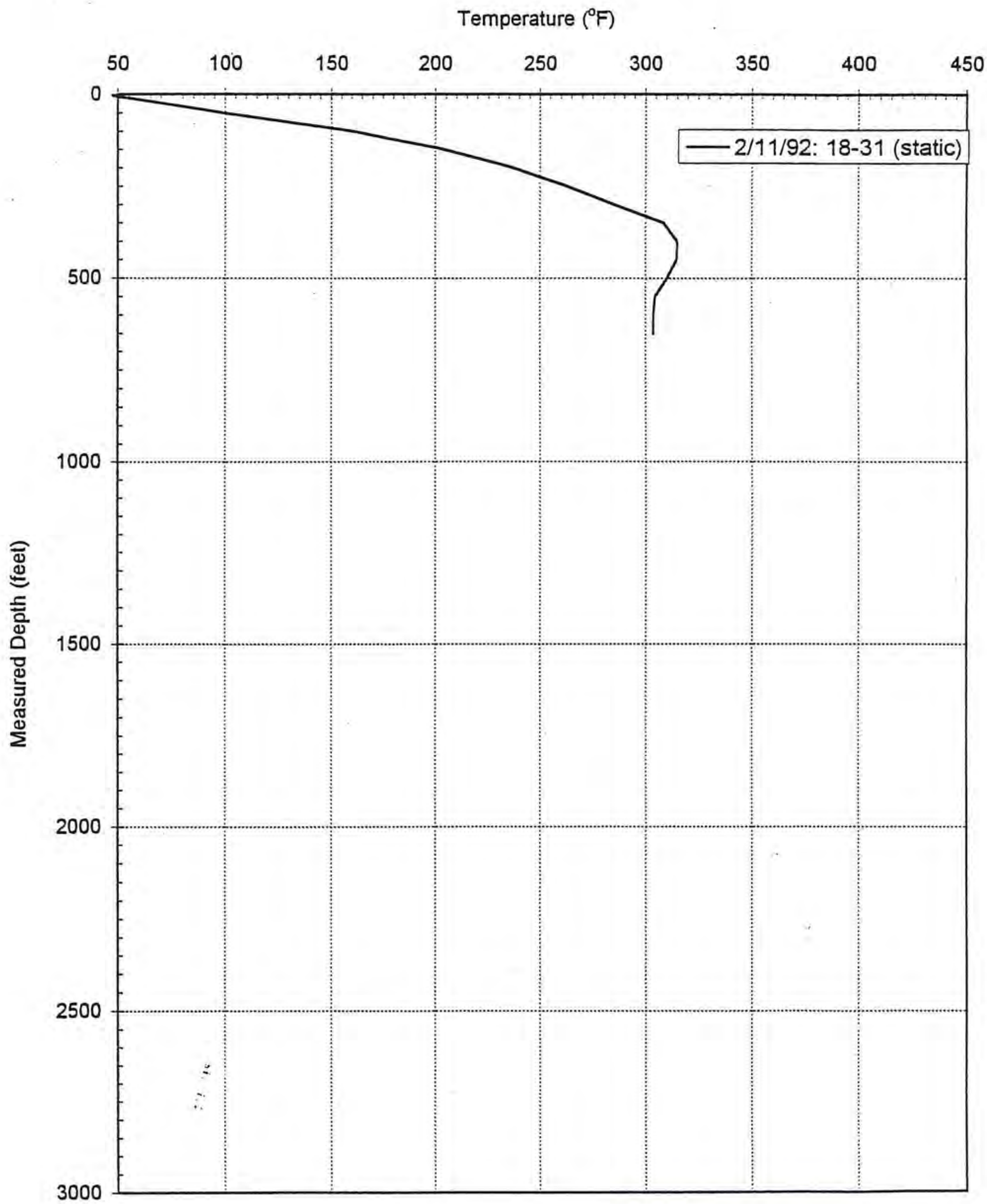


Mesquite Group, Inc., 1/15/97
BX18-1.XLS, Chart1

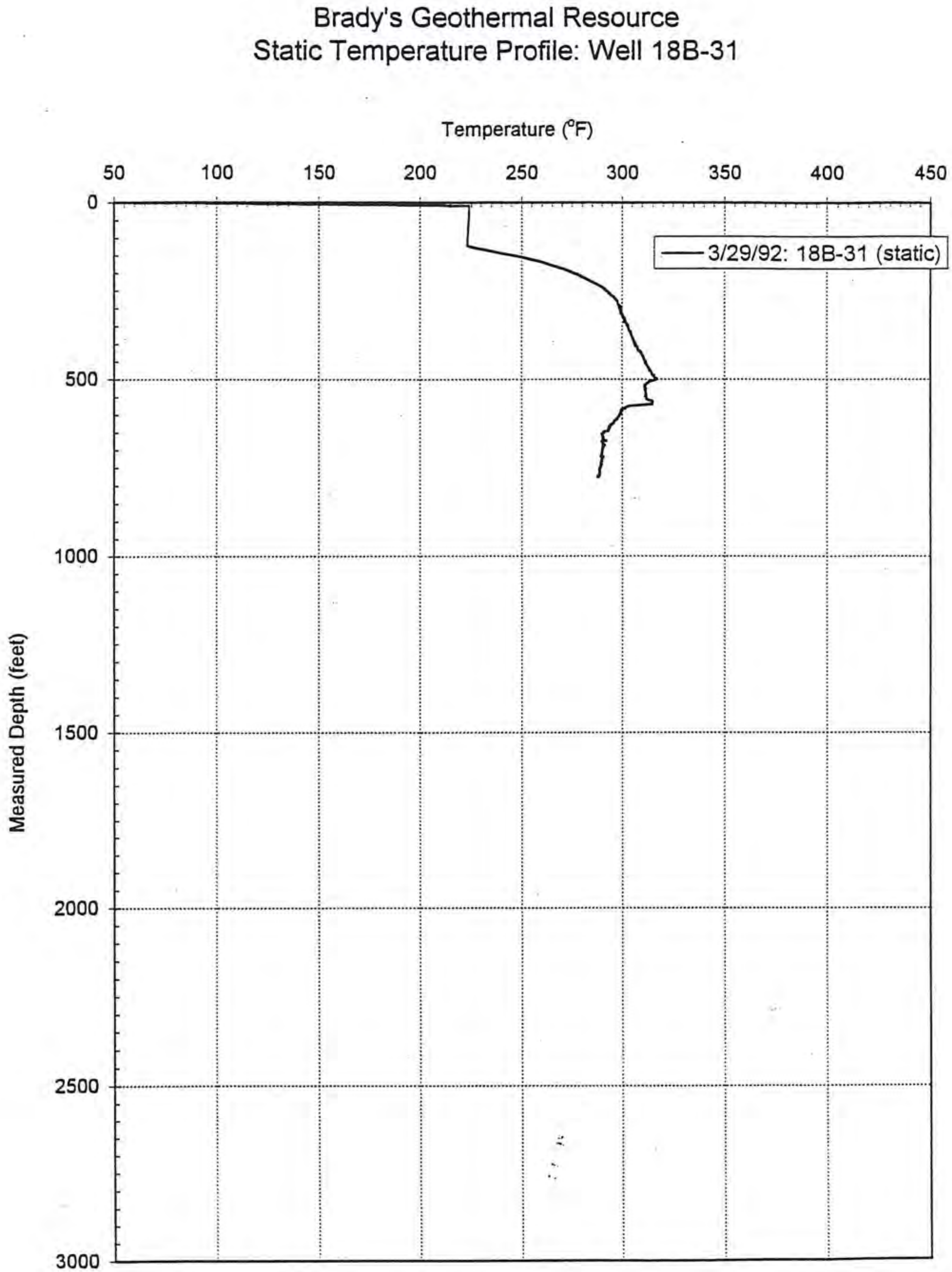


Mesquite Group, Inc., 1/15/97
BX18A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 18-31

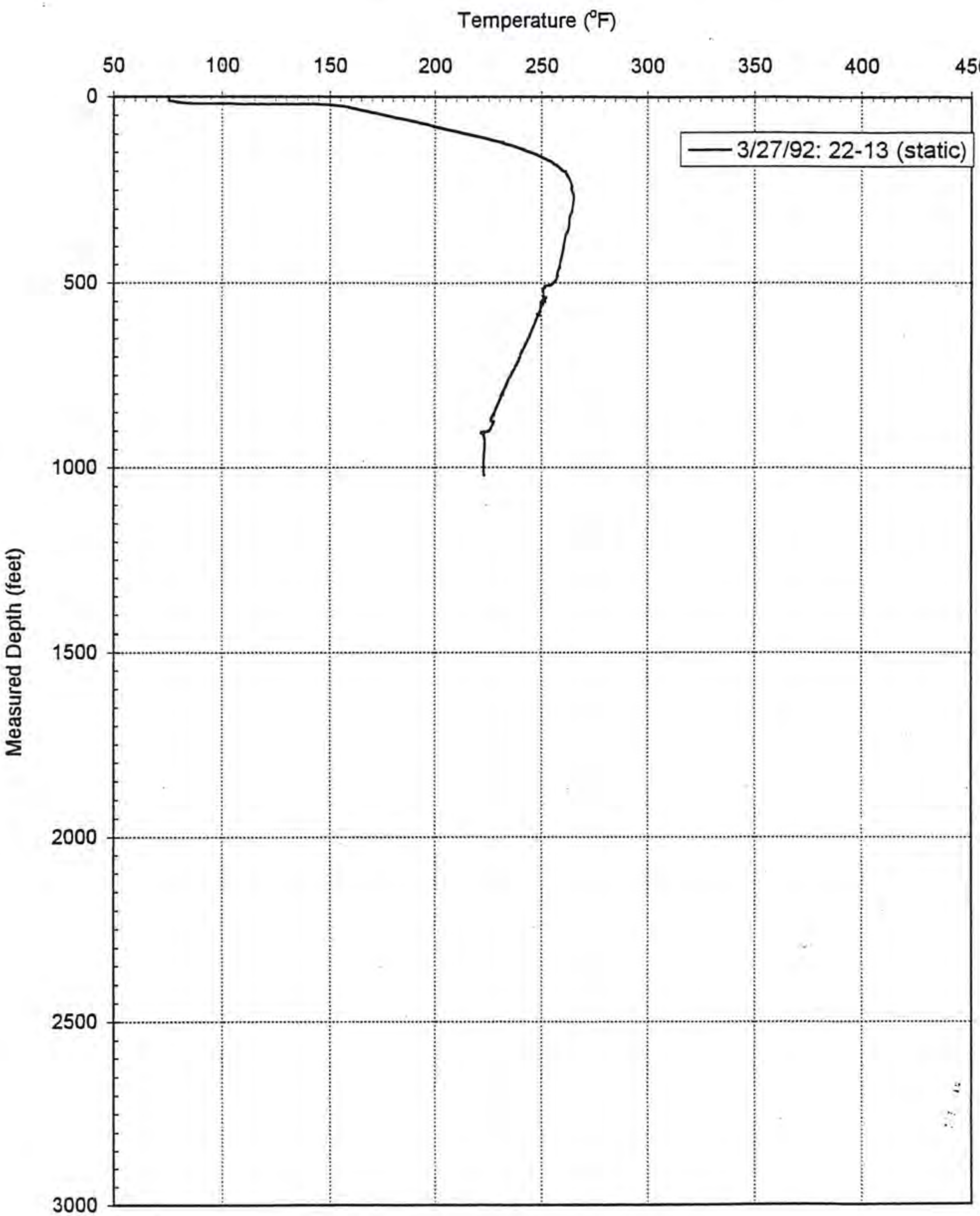


Mesquite Group, Inc., 1/15/97
BX18-31.XLS, Chart1



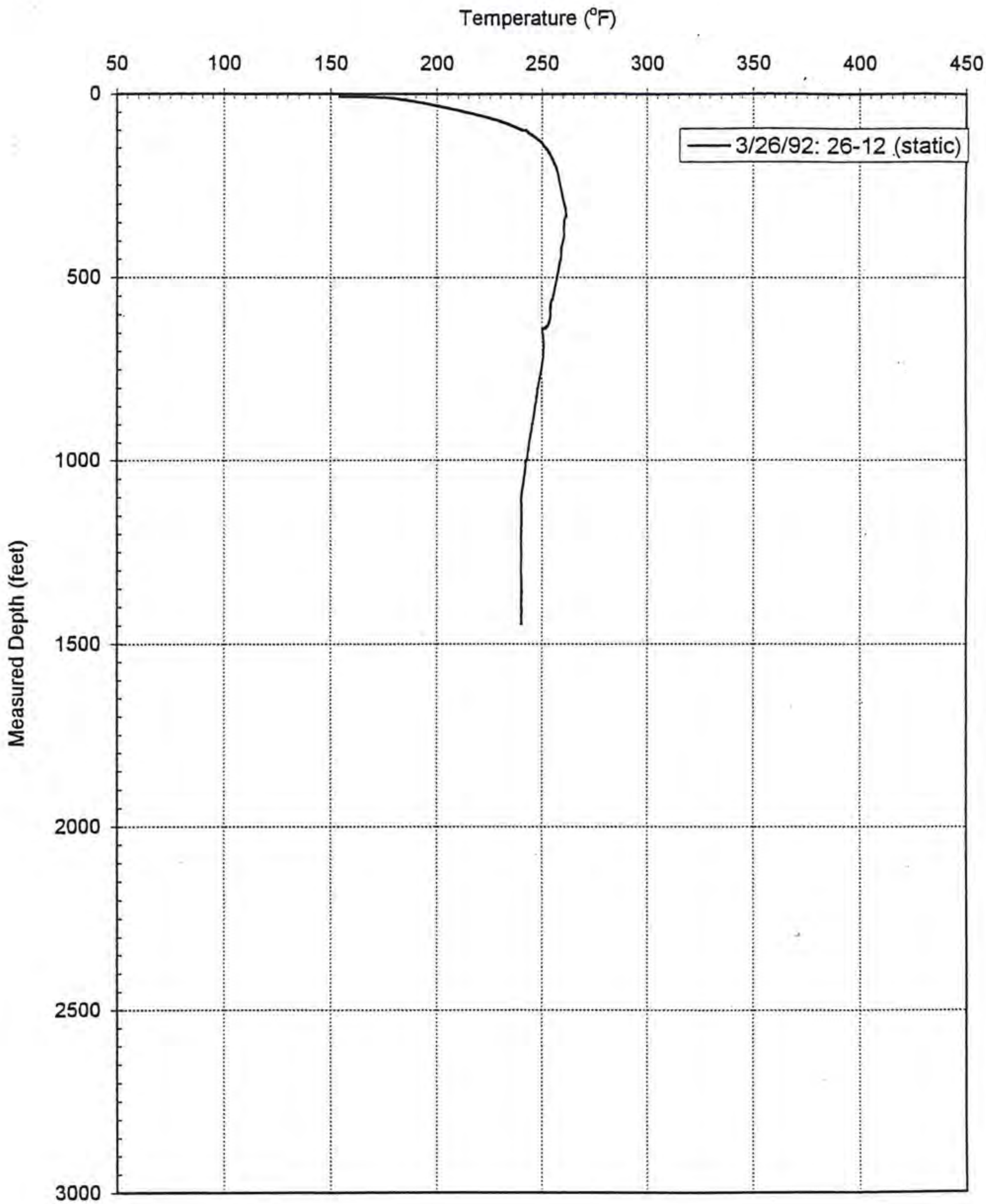
Mesquite Group, Inc., 1/15/97
BX18B-31.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 22-13



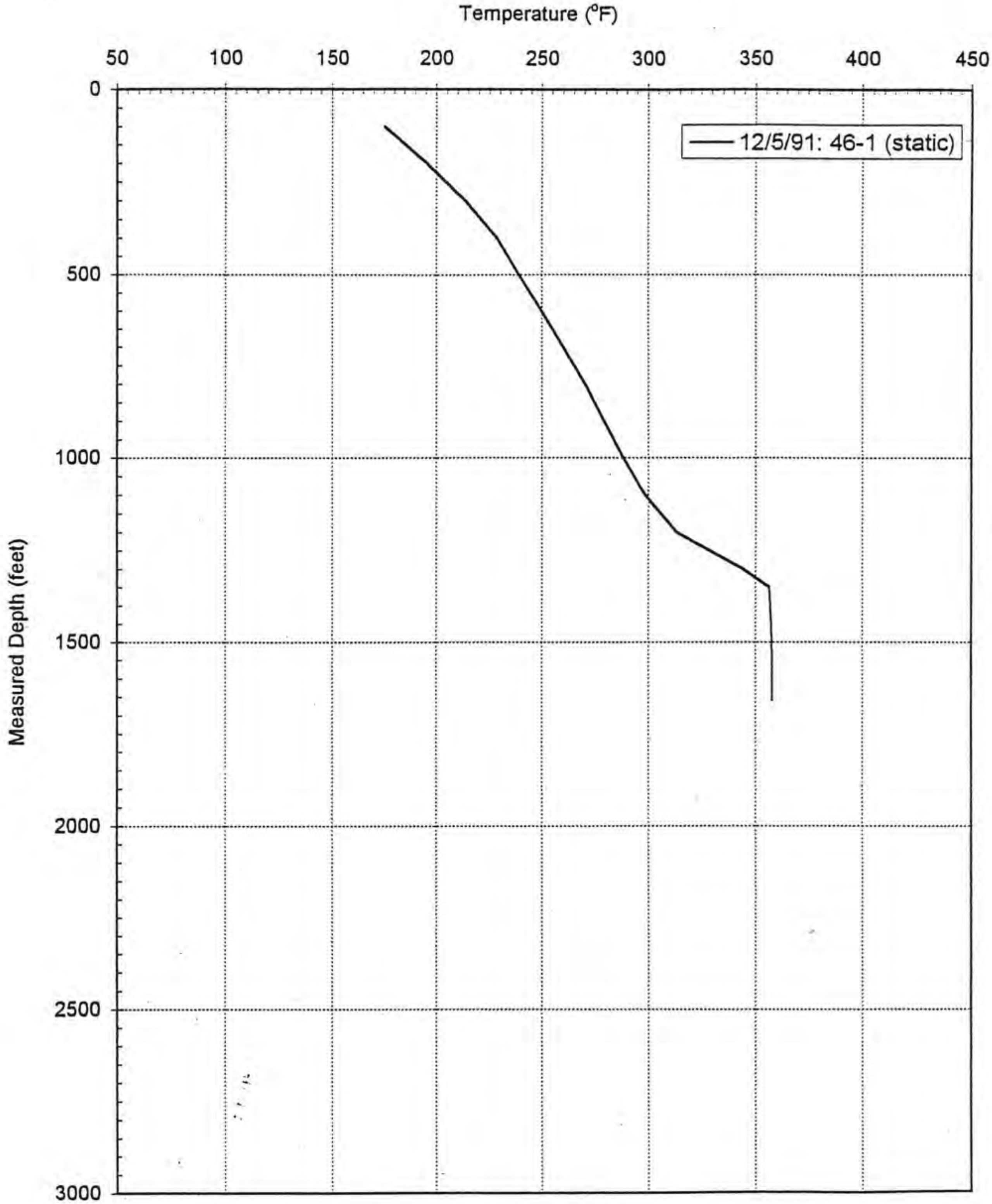
Mesquite Group, Inc., 1/15/97
BX22-13.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 26-12



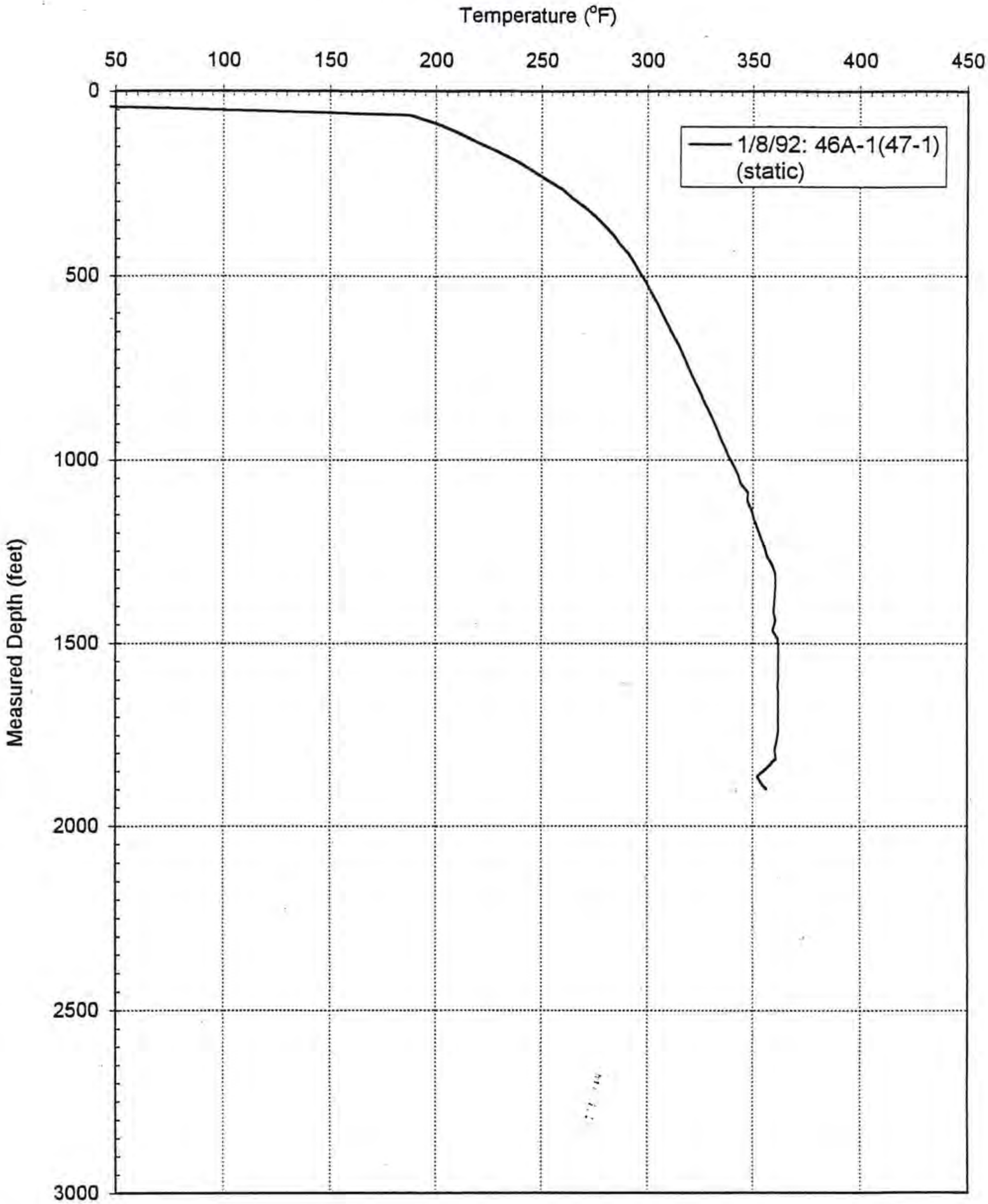
Mesquite Group, Inc., 1/15/97
BX26-12.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 46-1



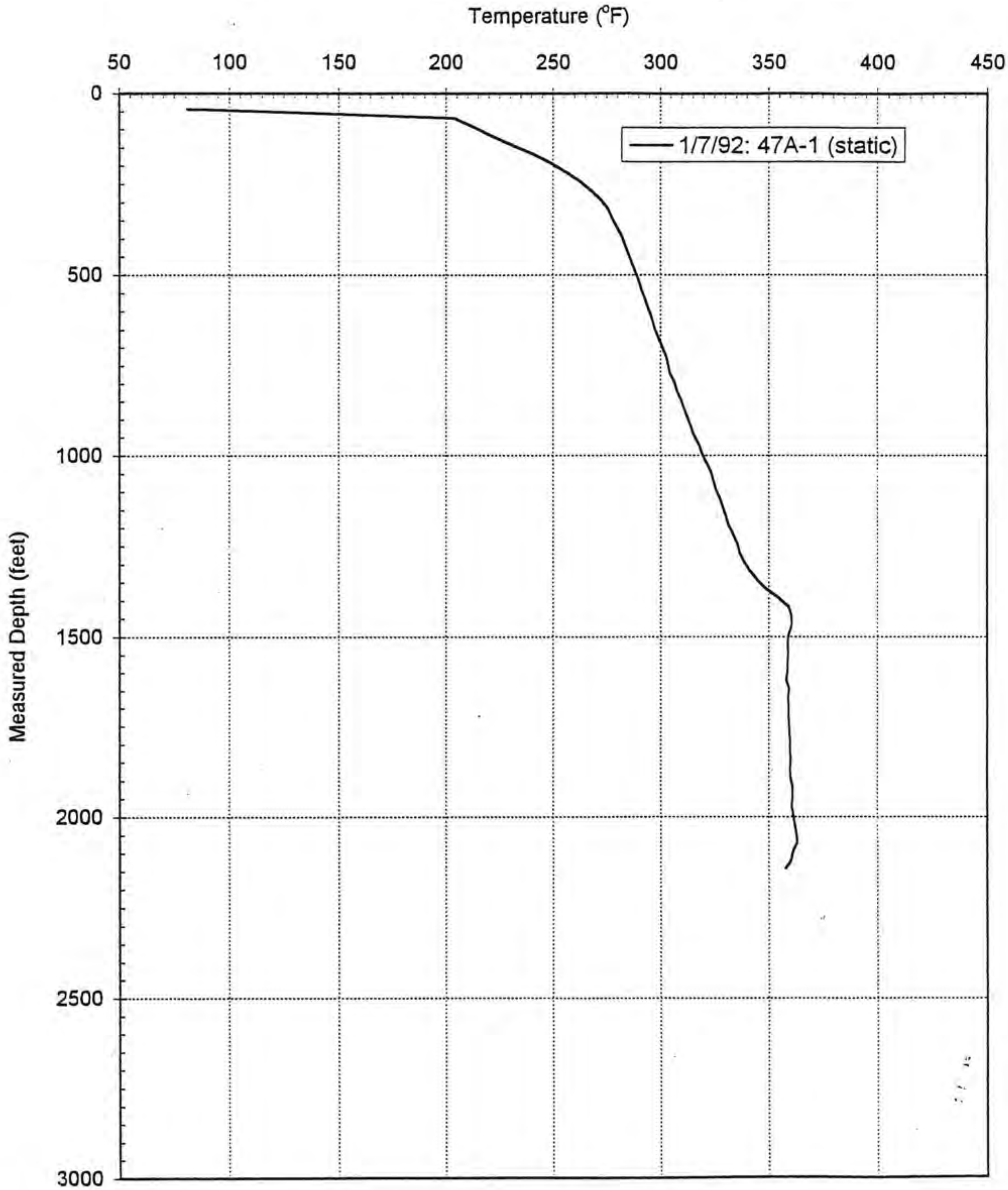
Mesquite Group, Inc., 1/15/97
BX46-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: 46A-1(47-1)



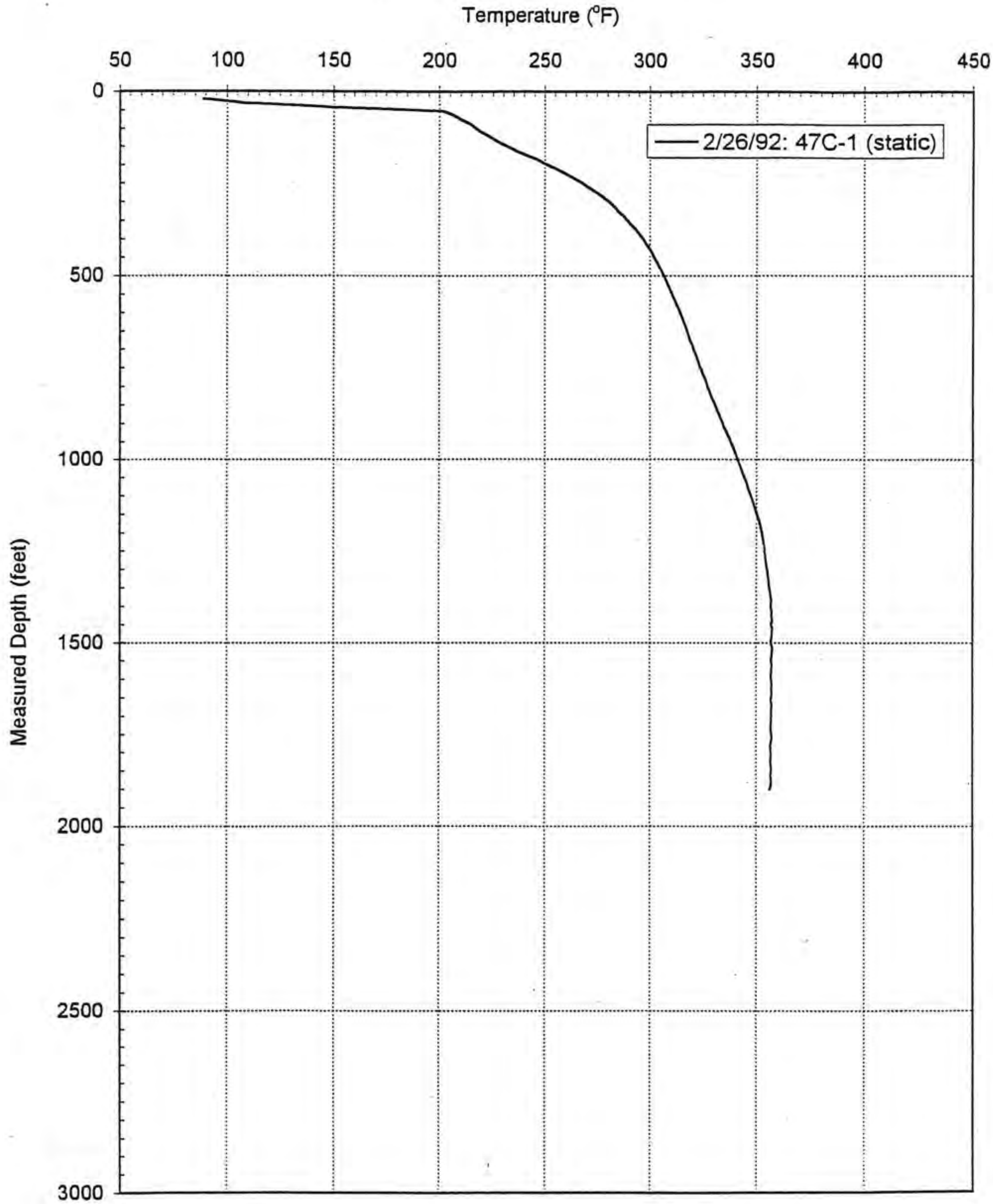
Mesquite Group, Inc., 1/15/97
BX46A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 47A-1



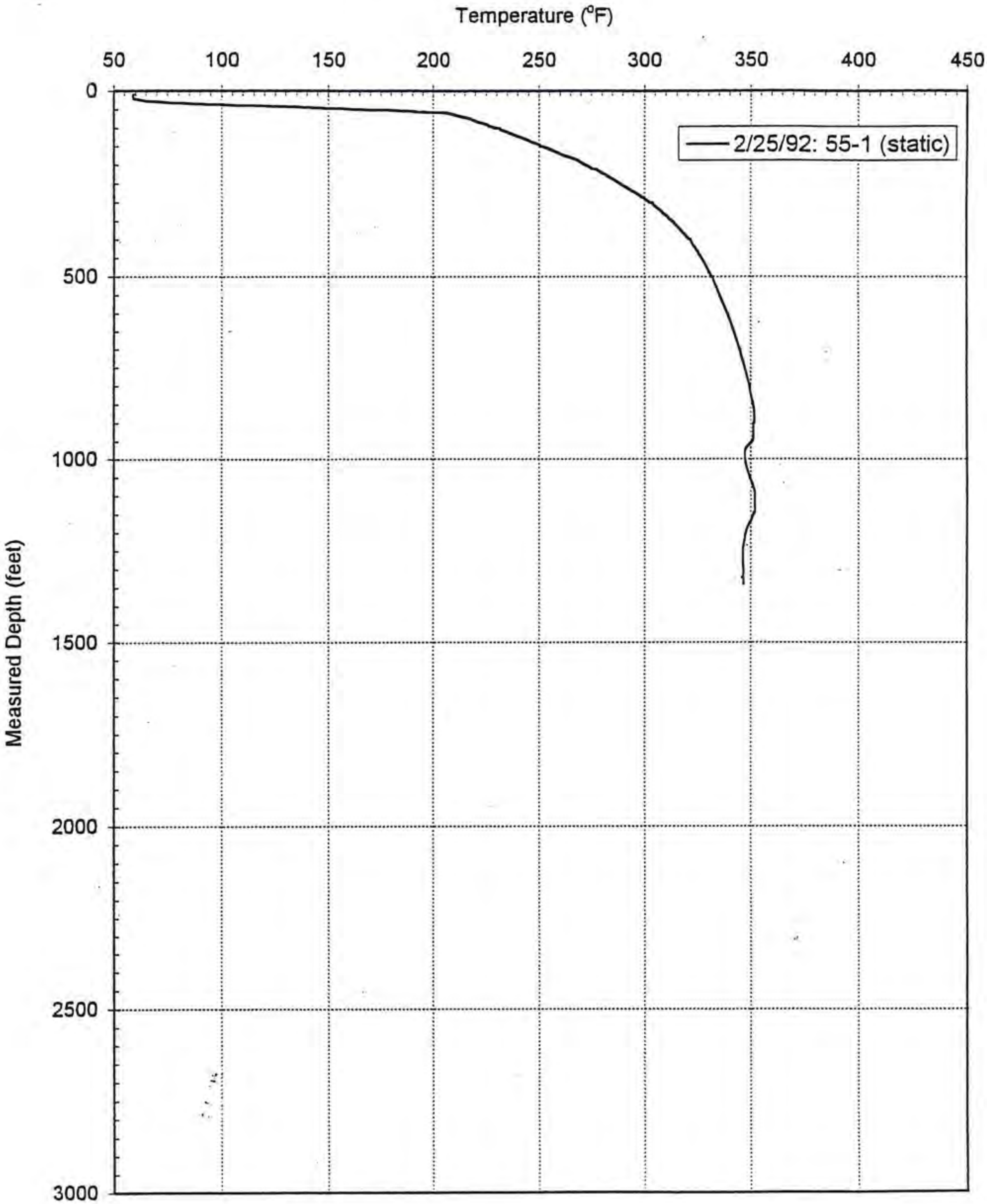
Mesquite Group, Inc., 1/15/97
BX47A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 47C-1



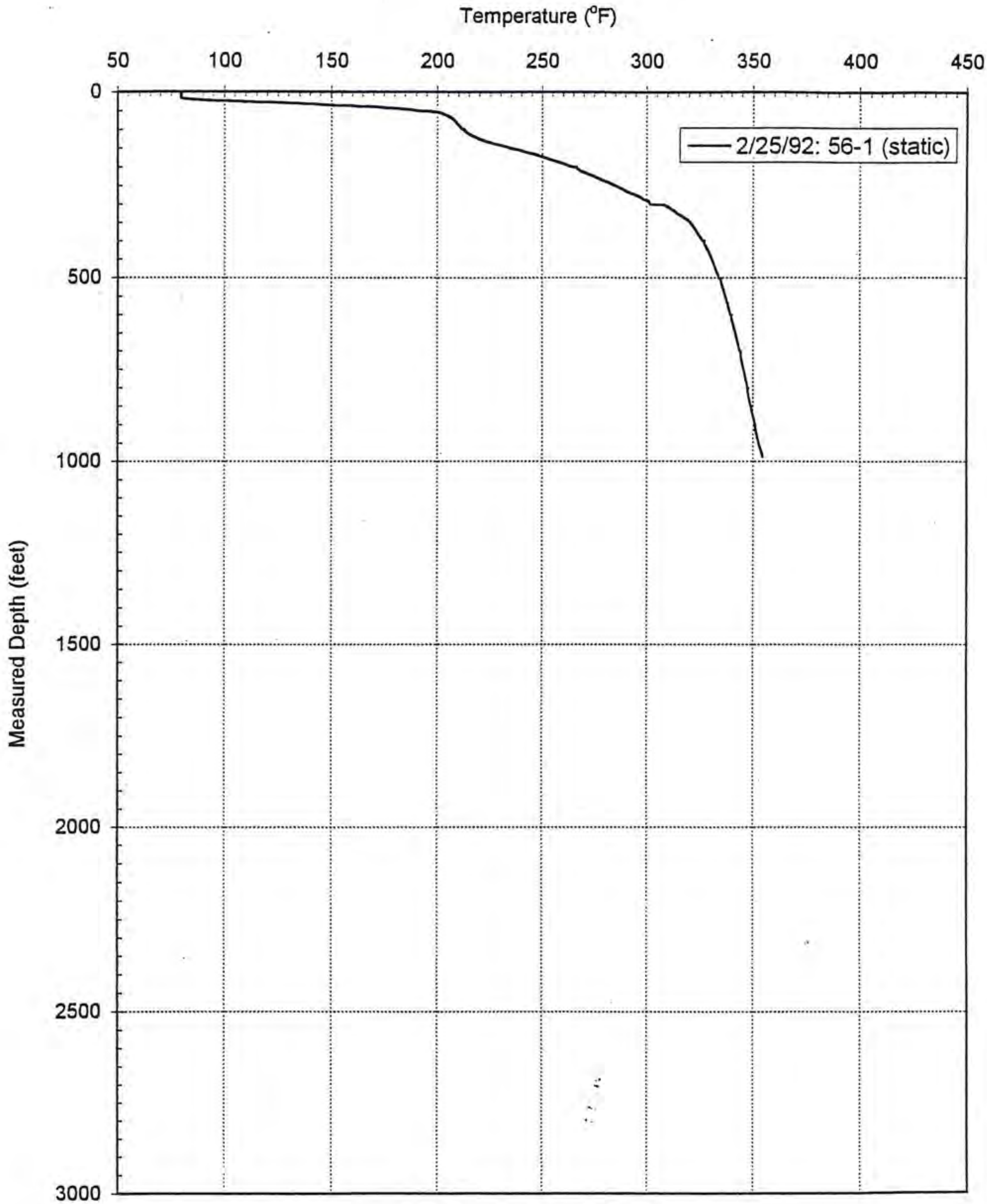
Mesquite Group, Inc., 1/15/97
BX47C-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 55-1



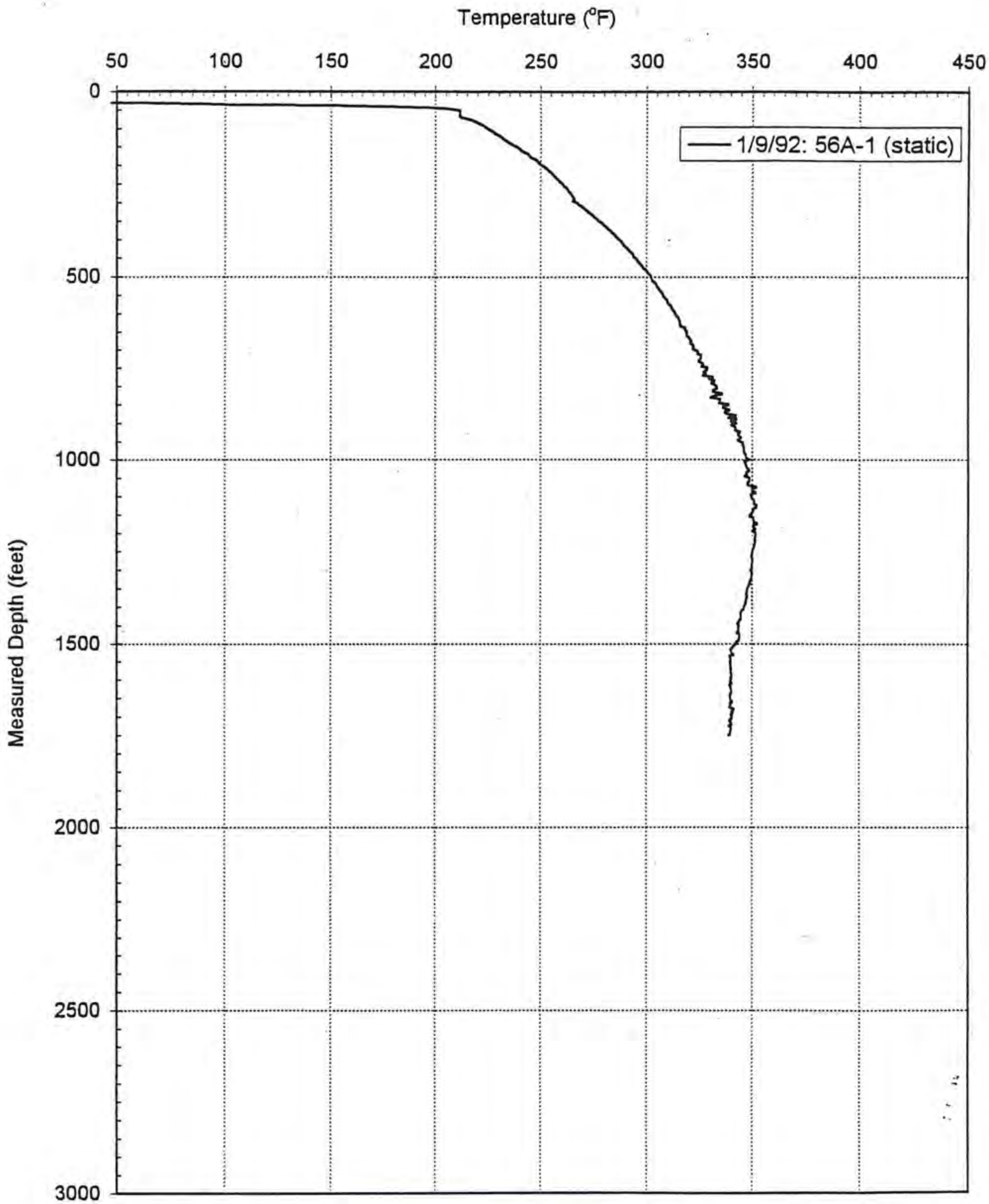
Mesquite Group, Inc., 1/15/97
BX55-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 56-1



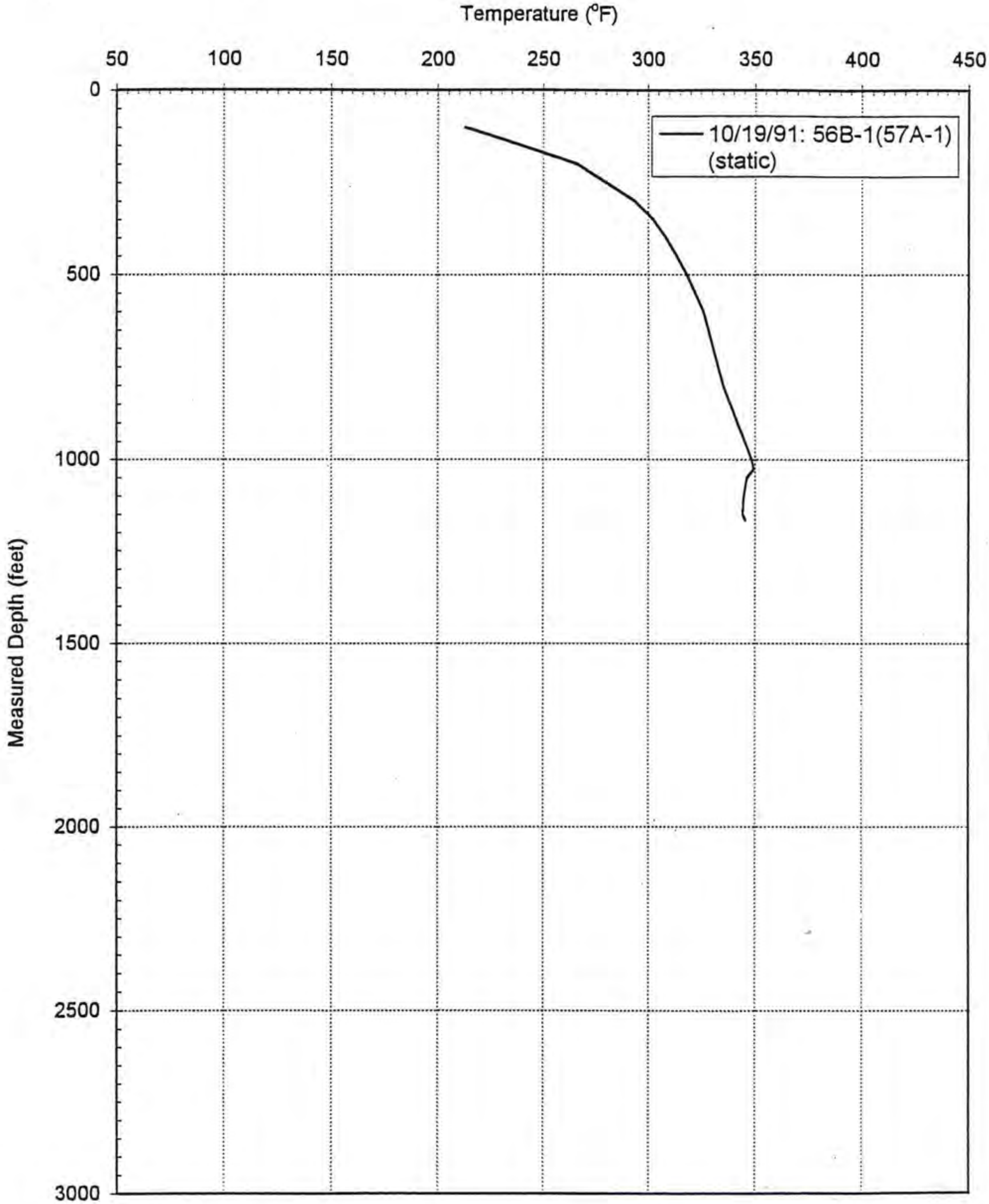
Mesquite Group, Inc., 1/15/97
BX56-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 56A-1



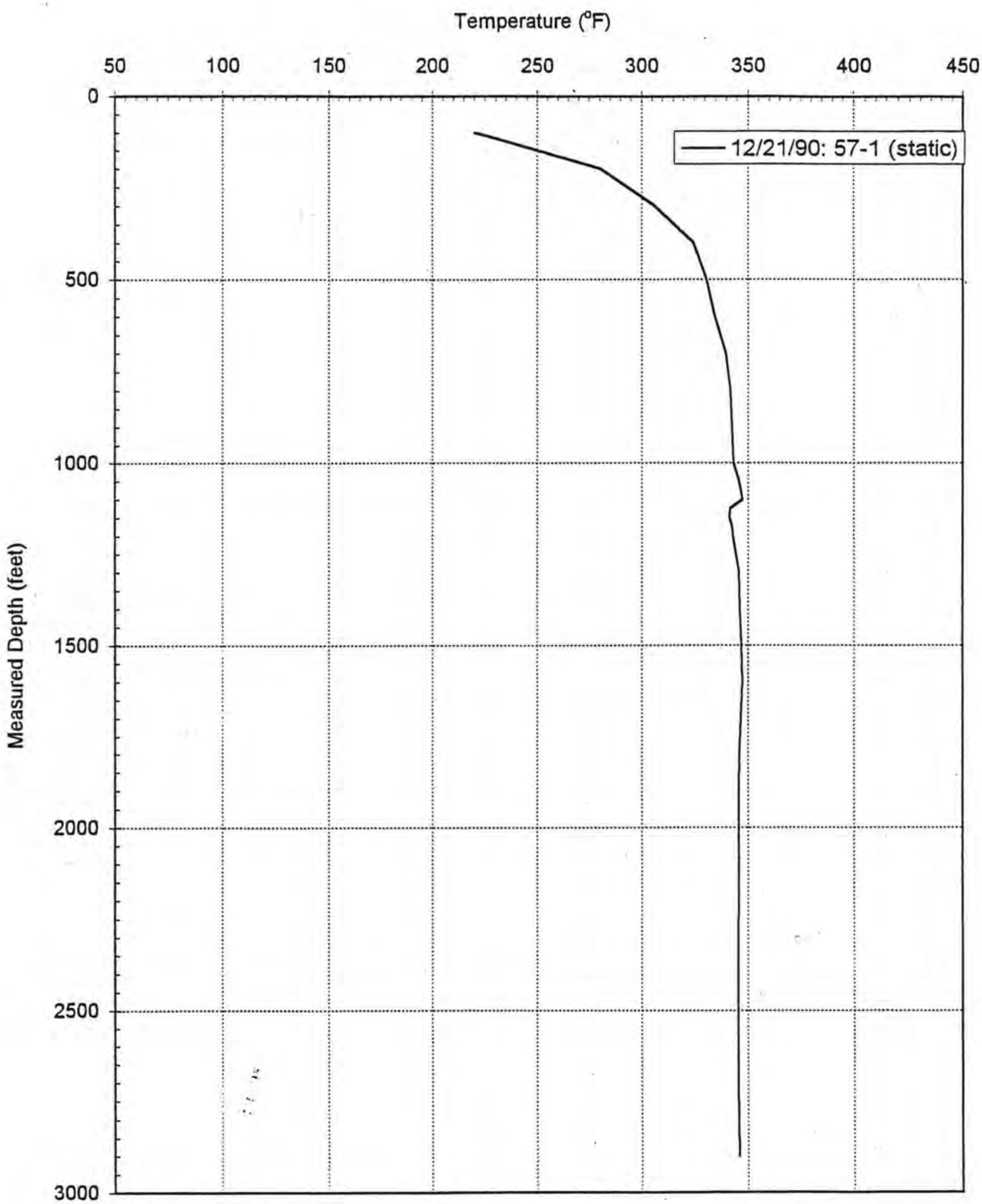
Mesquite Group, Inc., 1/15/97
BX56A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 56B-1 (57A-1)



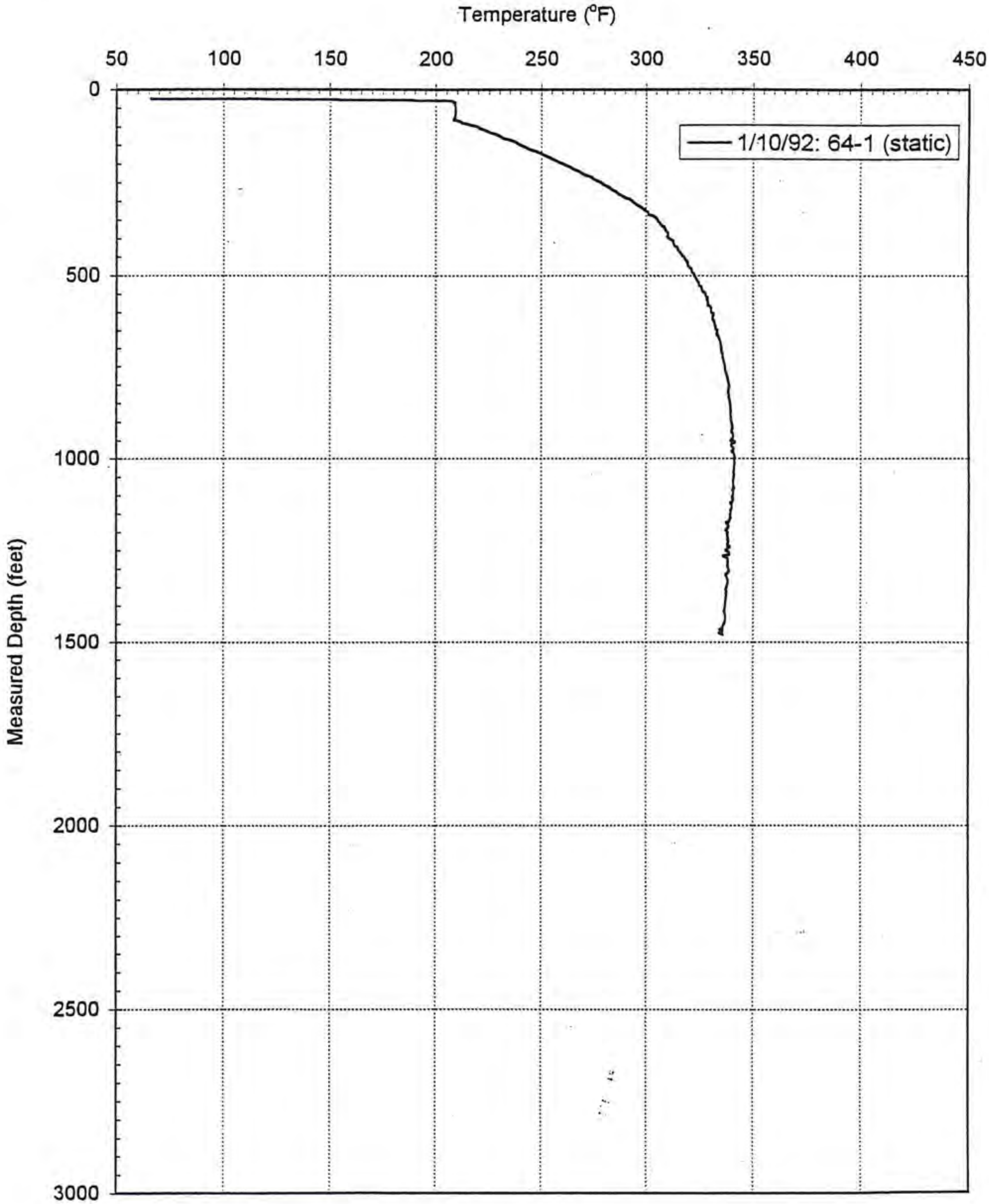
Mesquite Group, Inc., 1/15/97
BX56B-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 57-1



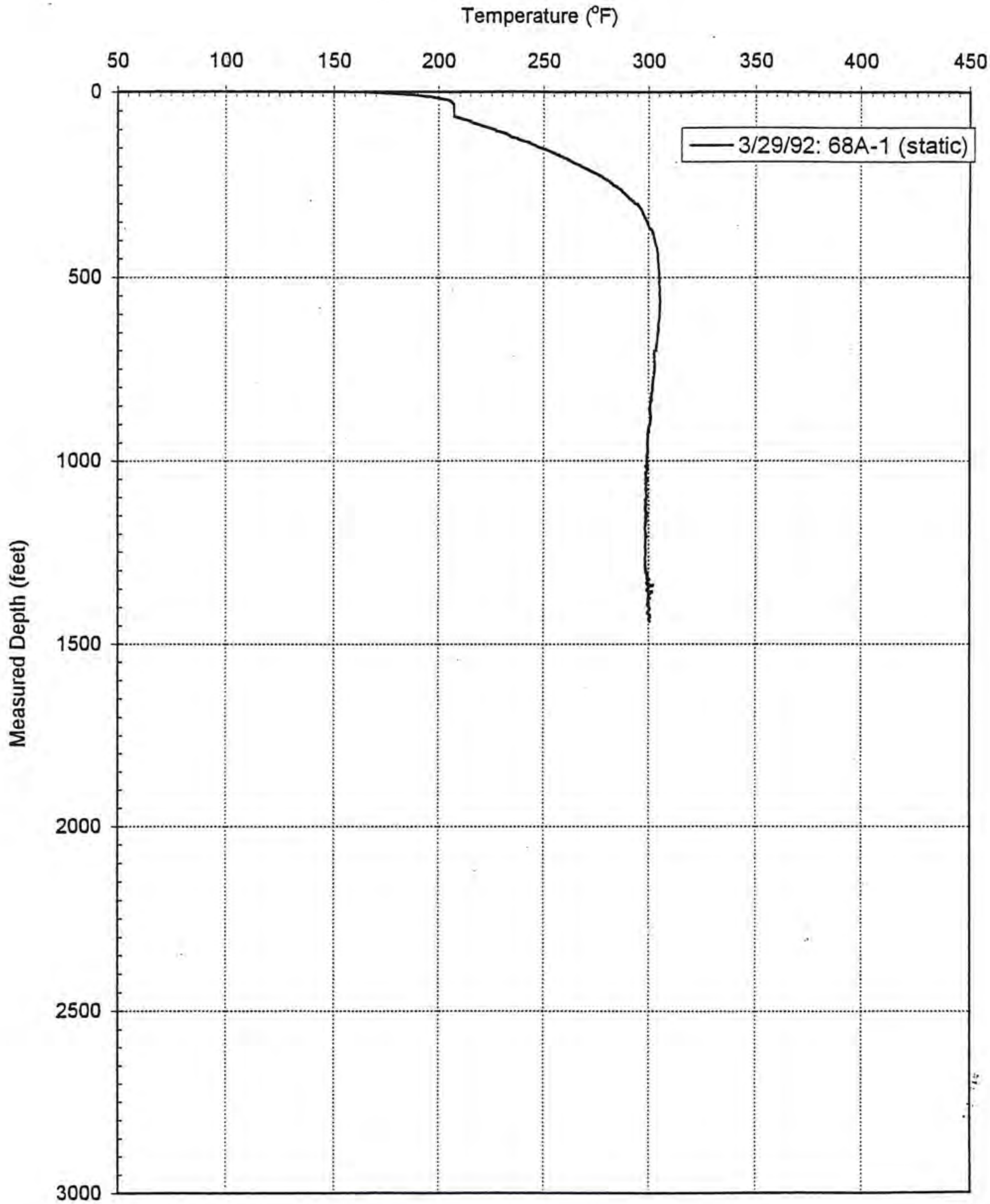
Mesquite Group, Inc., 1/15/97
BX57-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 64-1



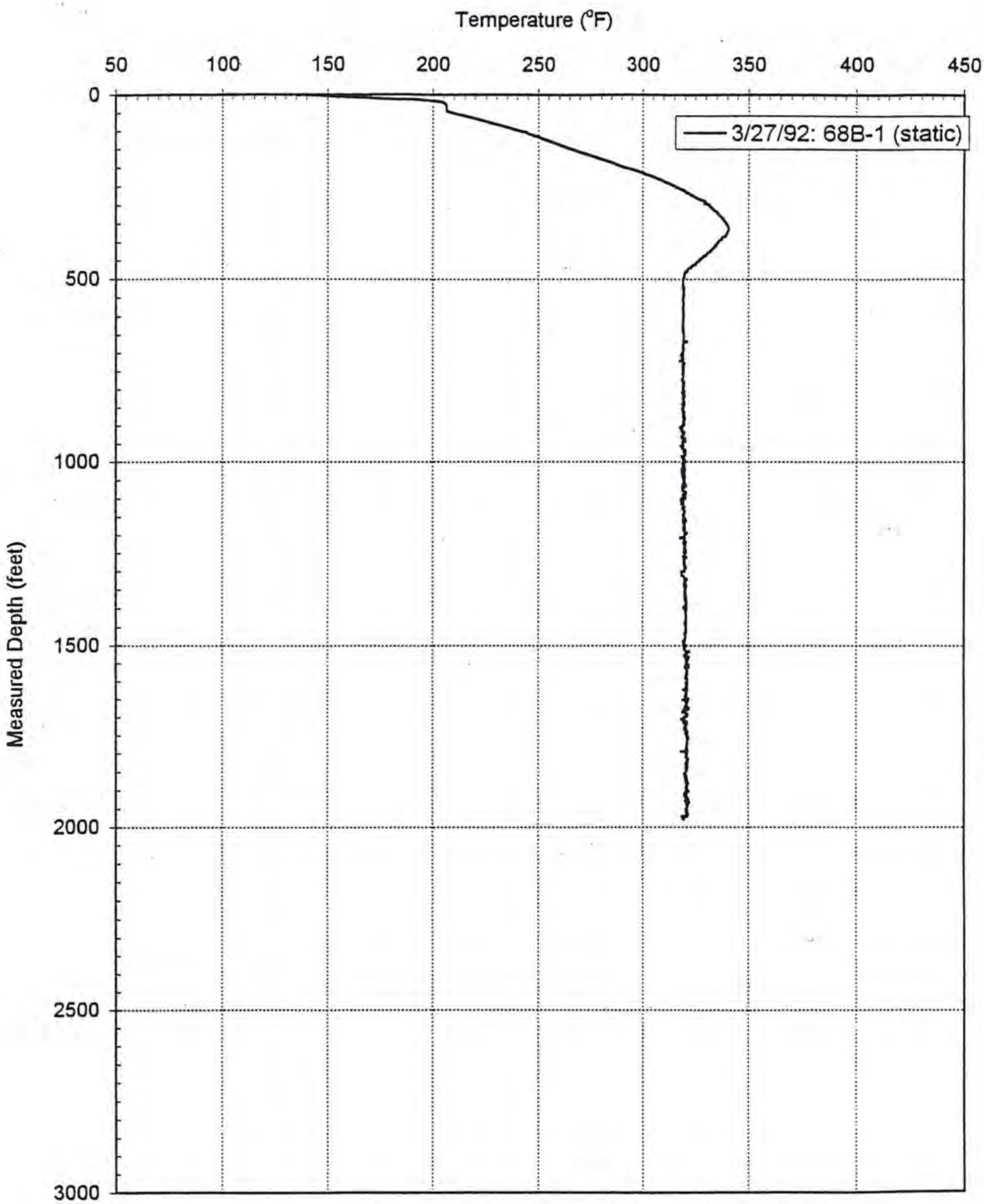
Mesquite Group, Inc., 1/15/97
BX64-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 68A-1



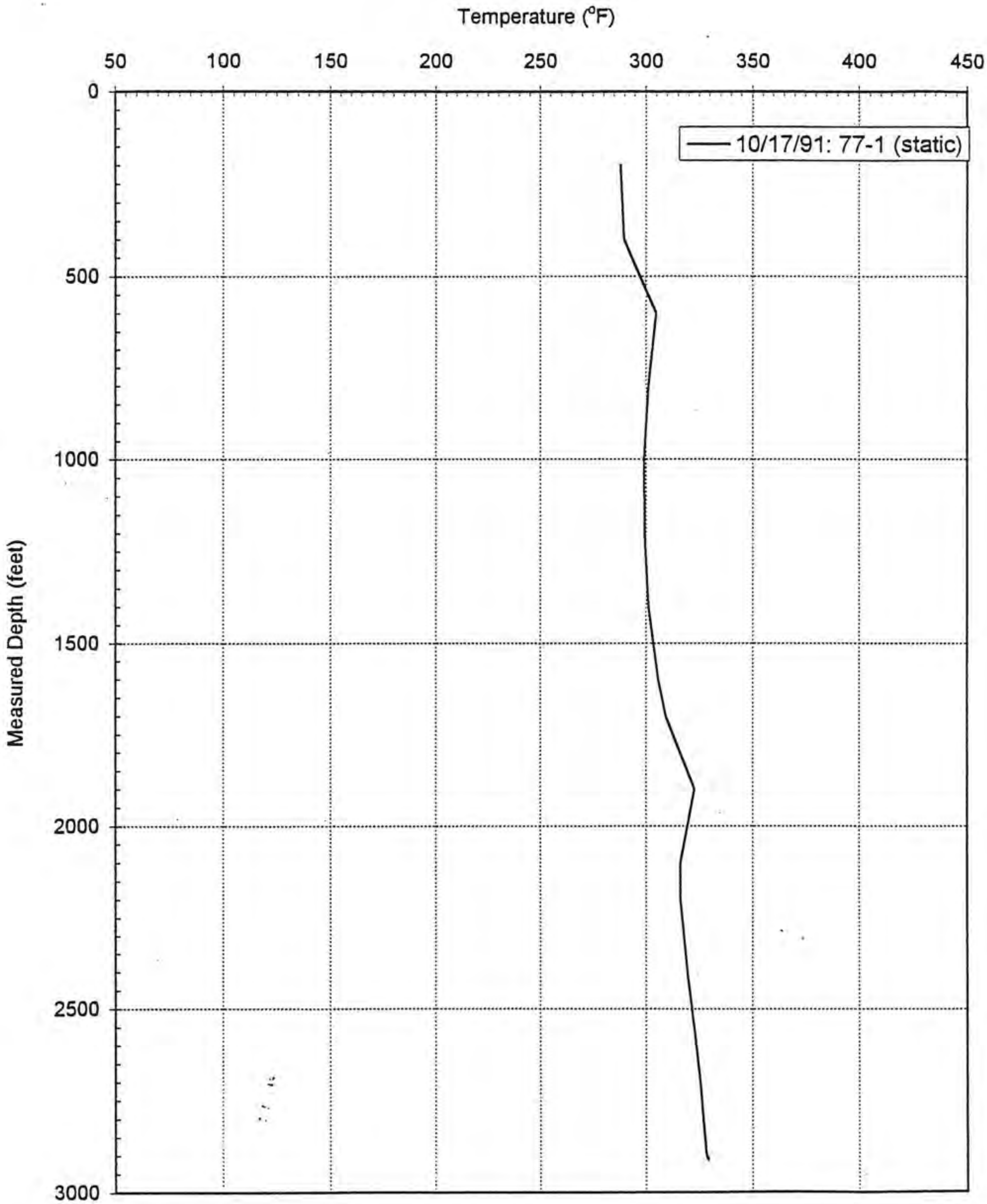
Mesquite Group, Inc., 1/15/97
BX68A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 68B-1



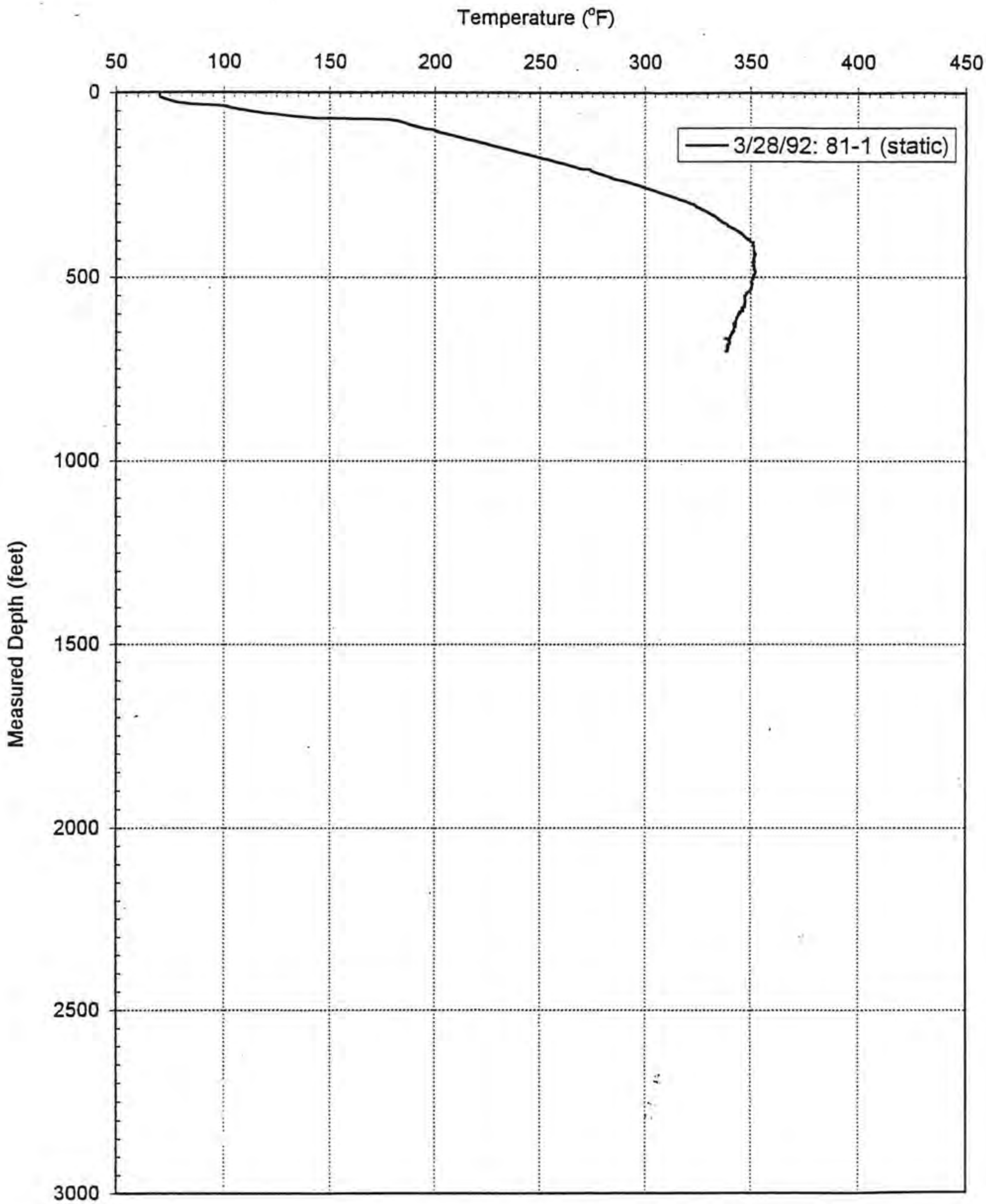
Mesquite Group, Inc., 1/15/97
BX68B-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 77-1



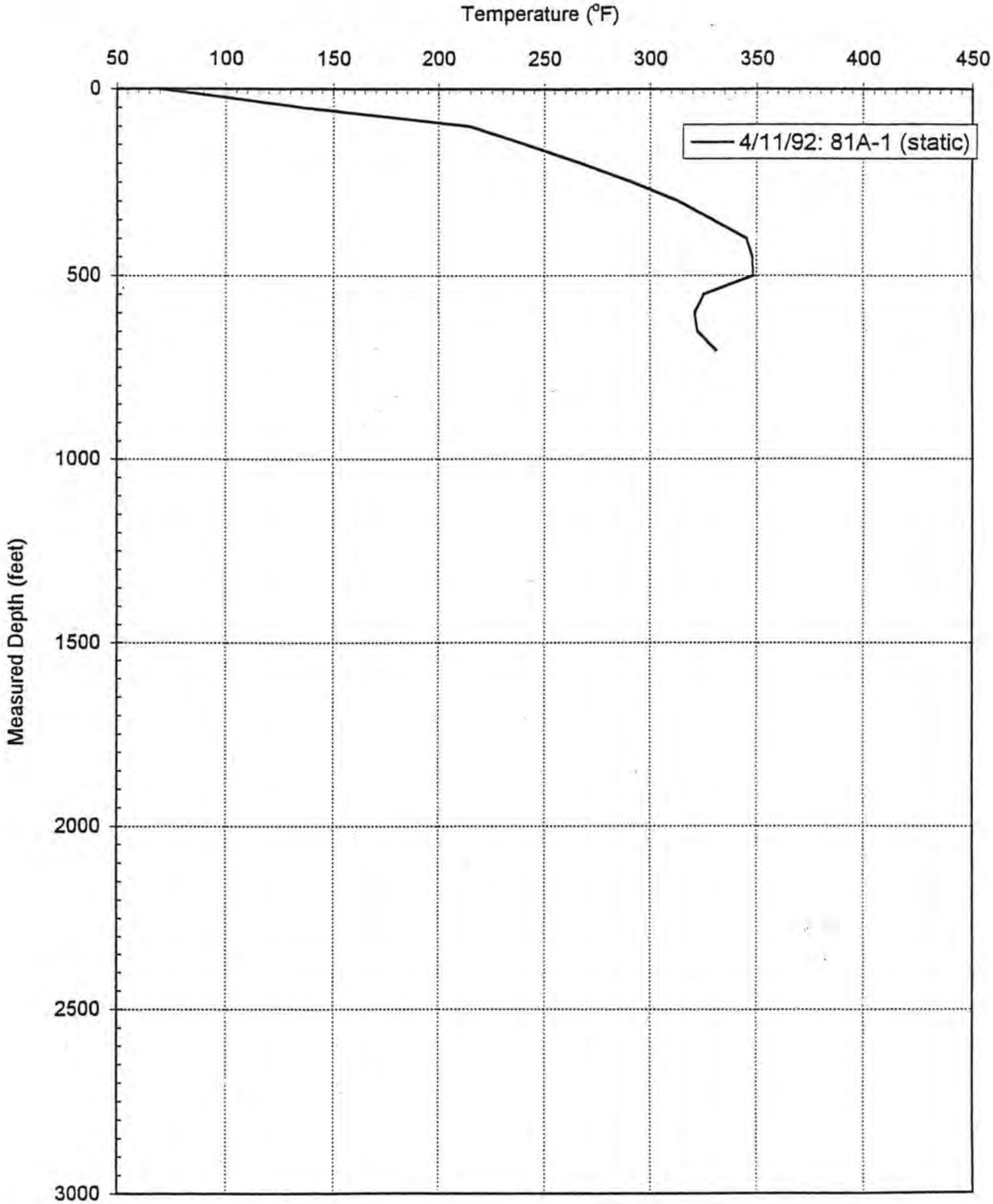
Mesquite Group, Inc., 1/15/97
BX77-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 81-1



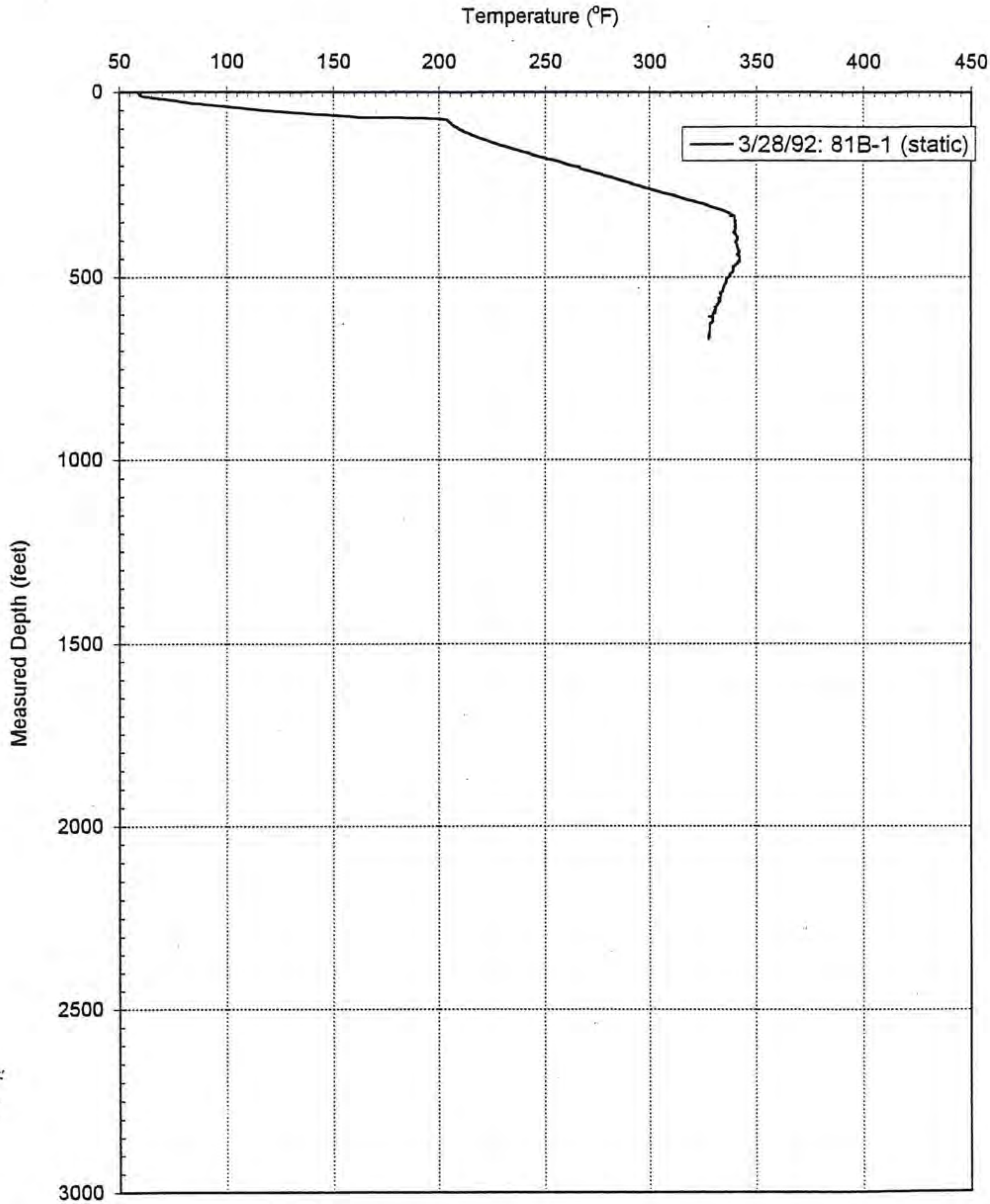
Mesquite Group, Inc., 1/15/97
BX81-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 81A-1



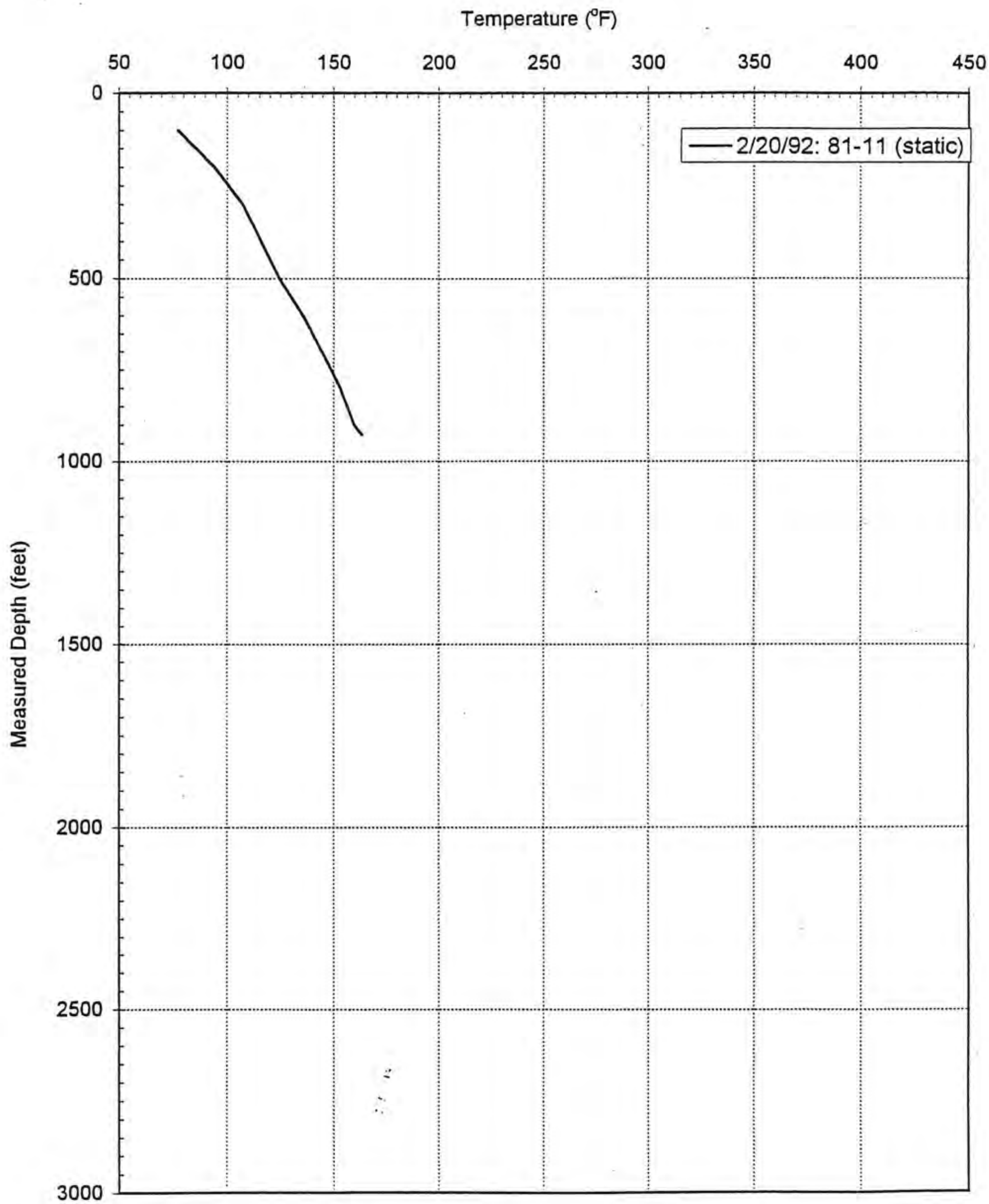
Mesquite Group, Inc., 1/15/97
BX81A-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 81B-1



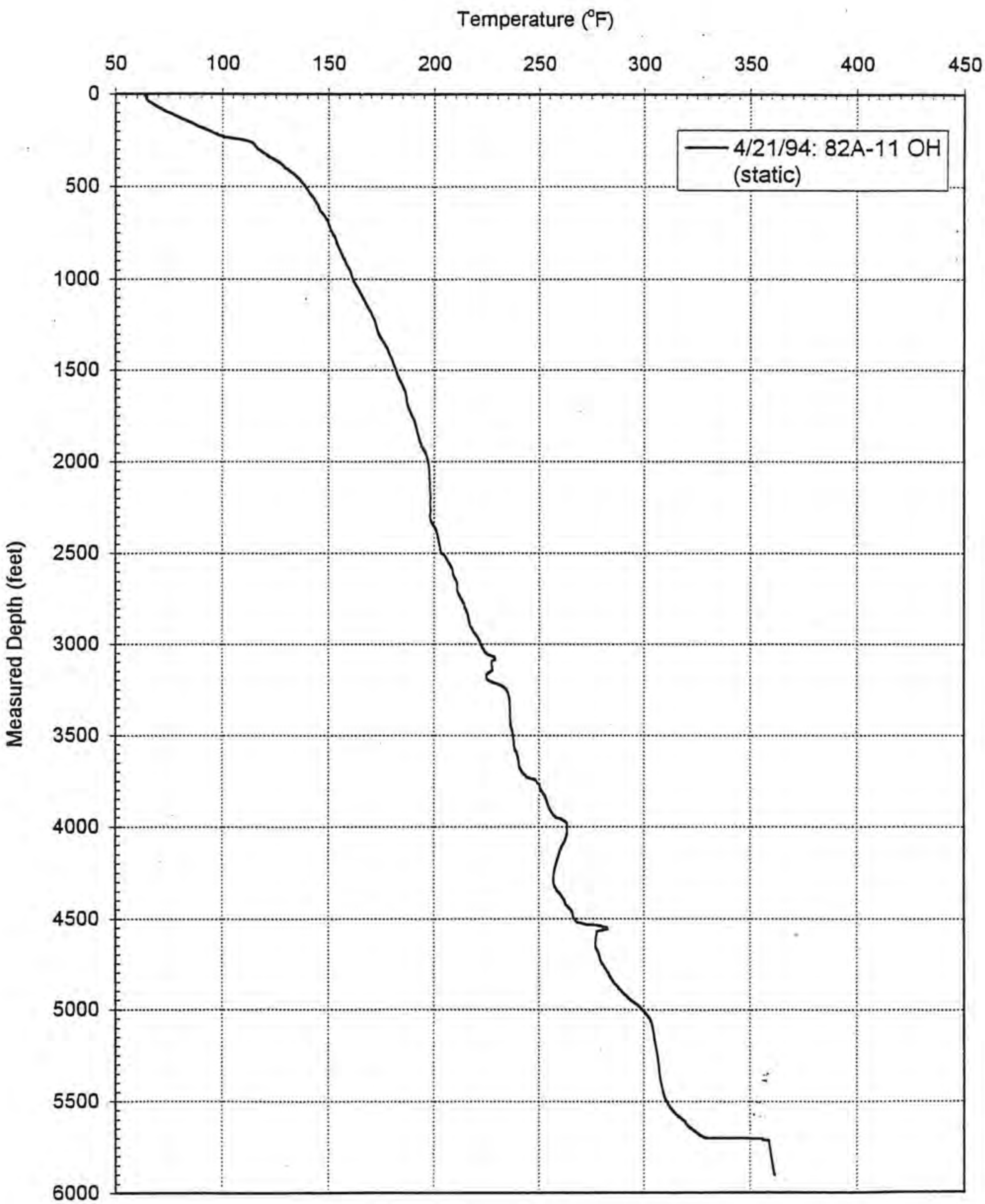
Mesquite Group, Inc., 1/15/97
BX81B-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 81-11



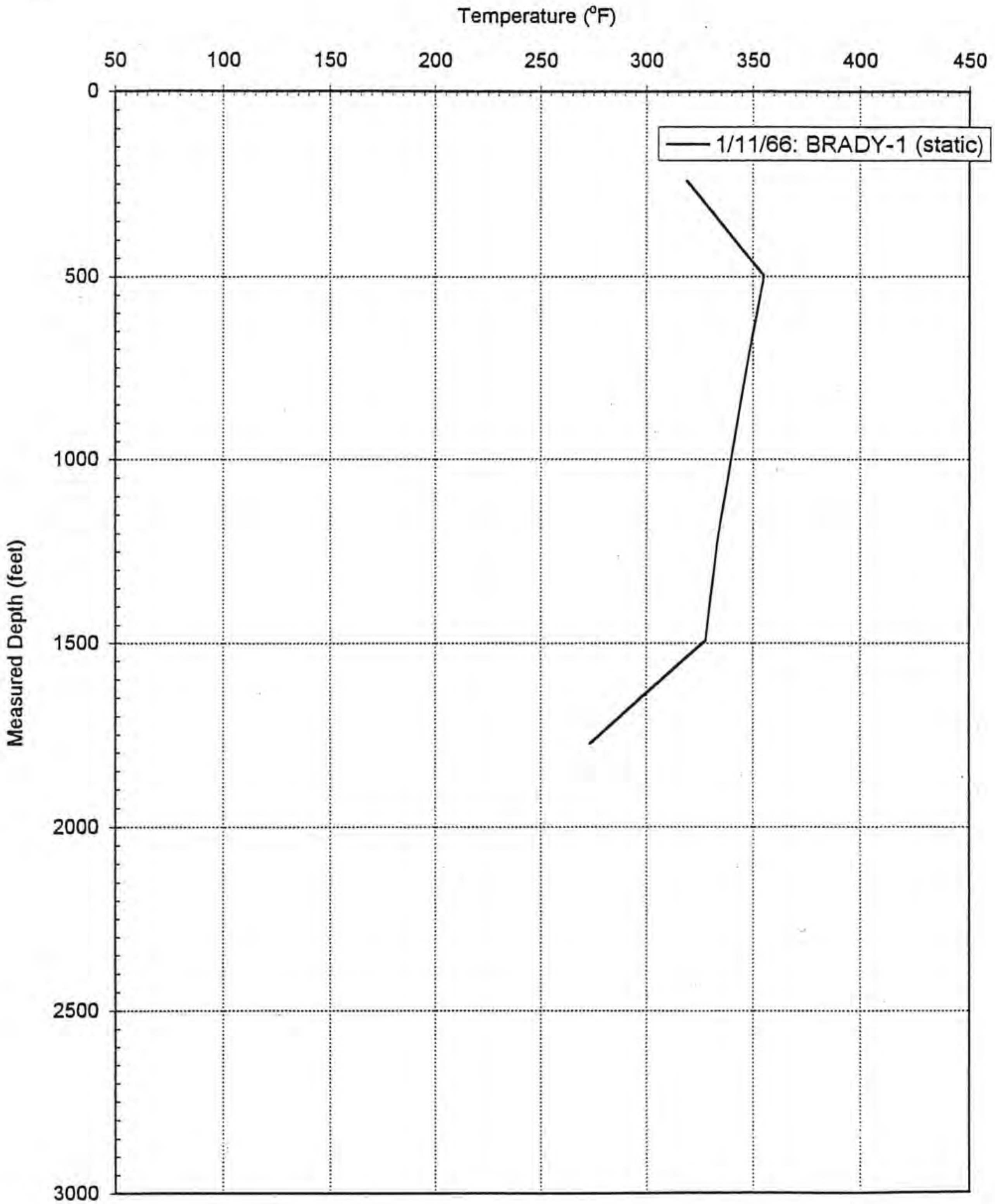
Mesquite Group, Inc., 1/15/97
BX81-11.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well 82A-11 OH



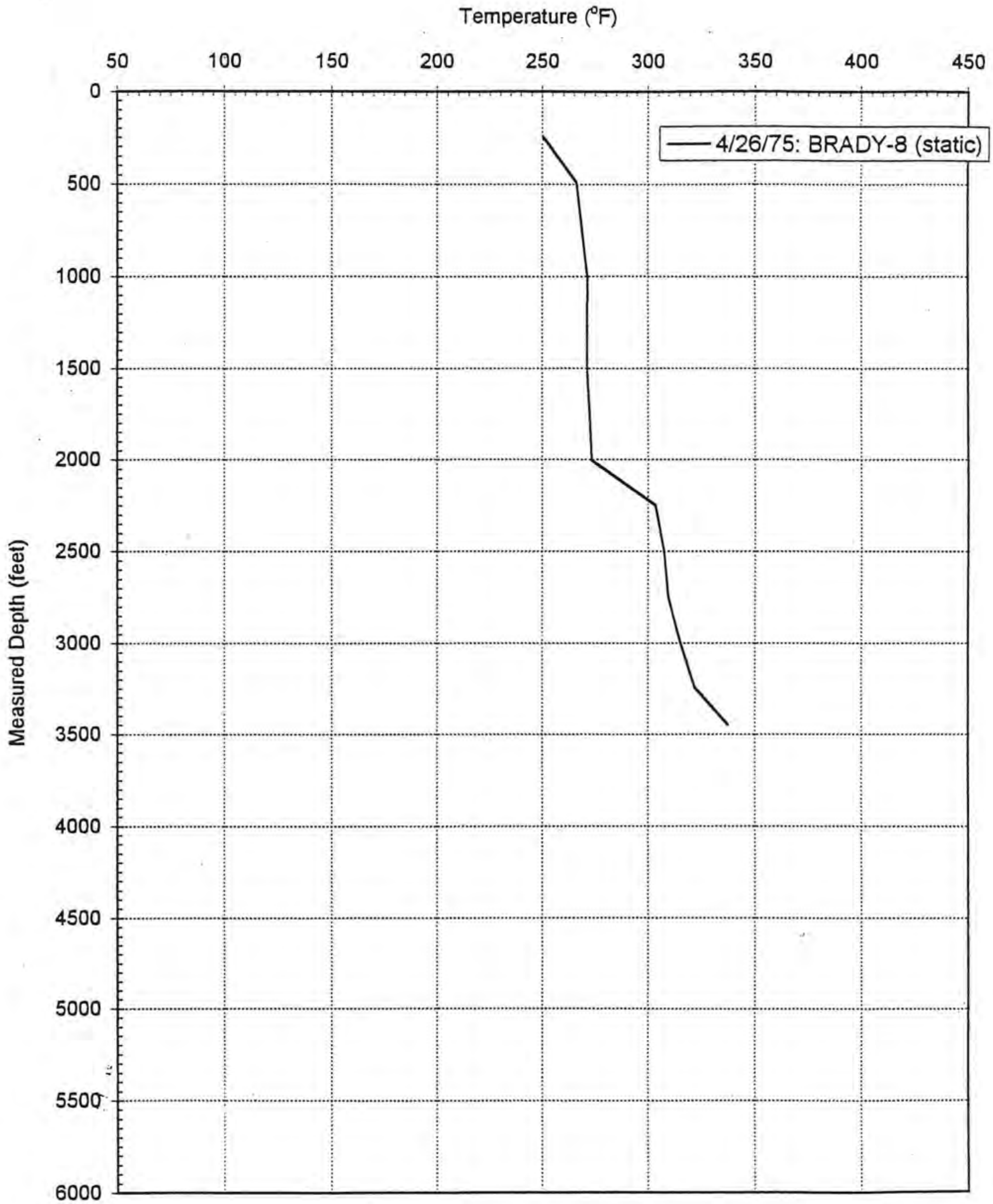
Mesquite Group, Inc., 1/15/97
BX82A11O.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well BRADY-1



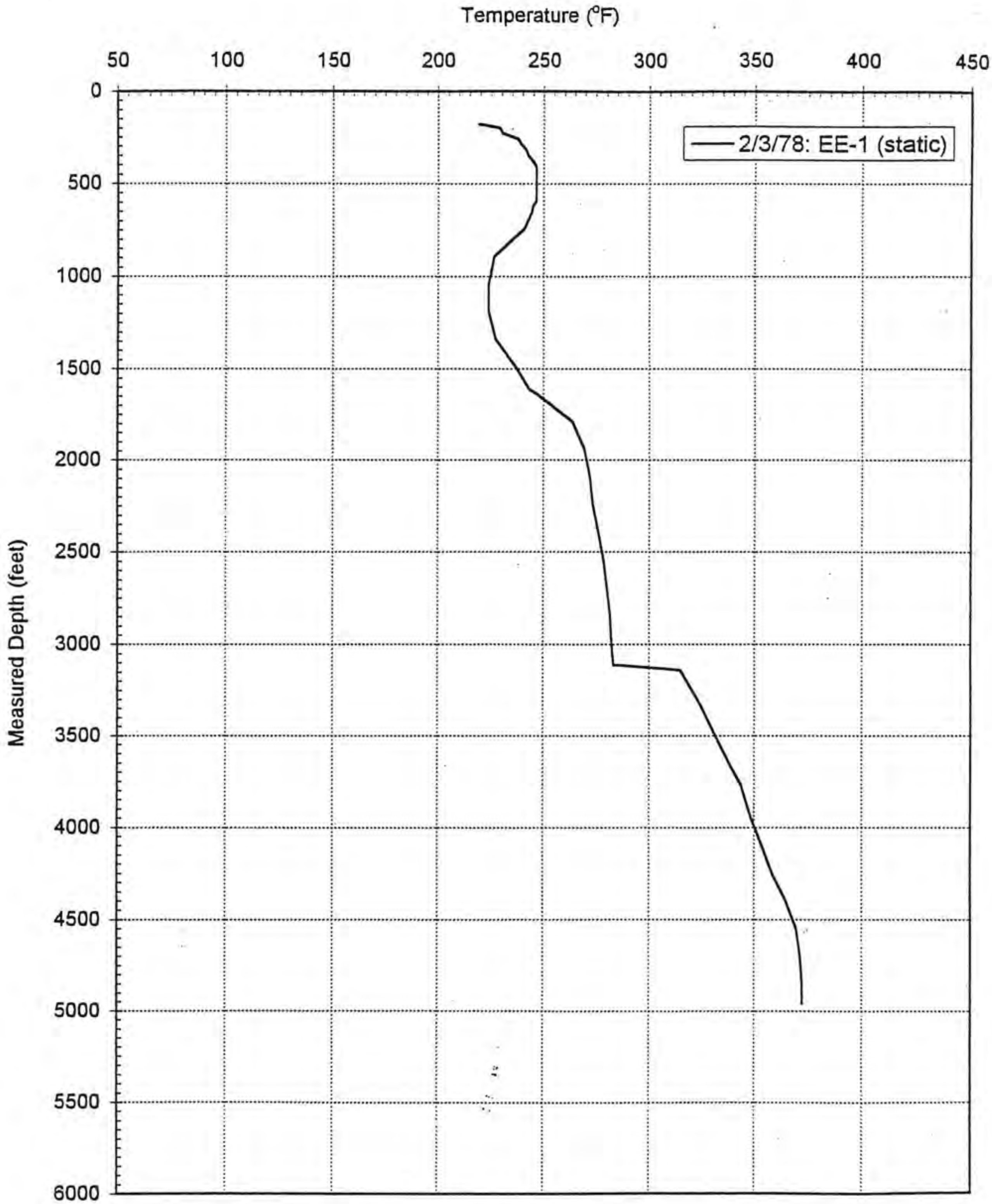
Mesquite Group, Inc., 1/15/97
BXBR-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well BRADY-8



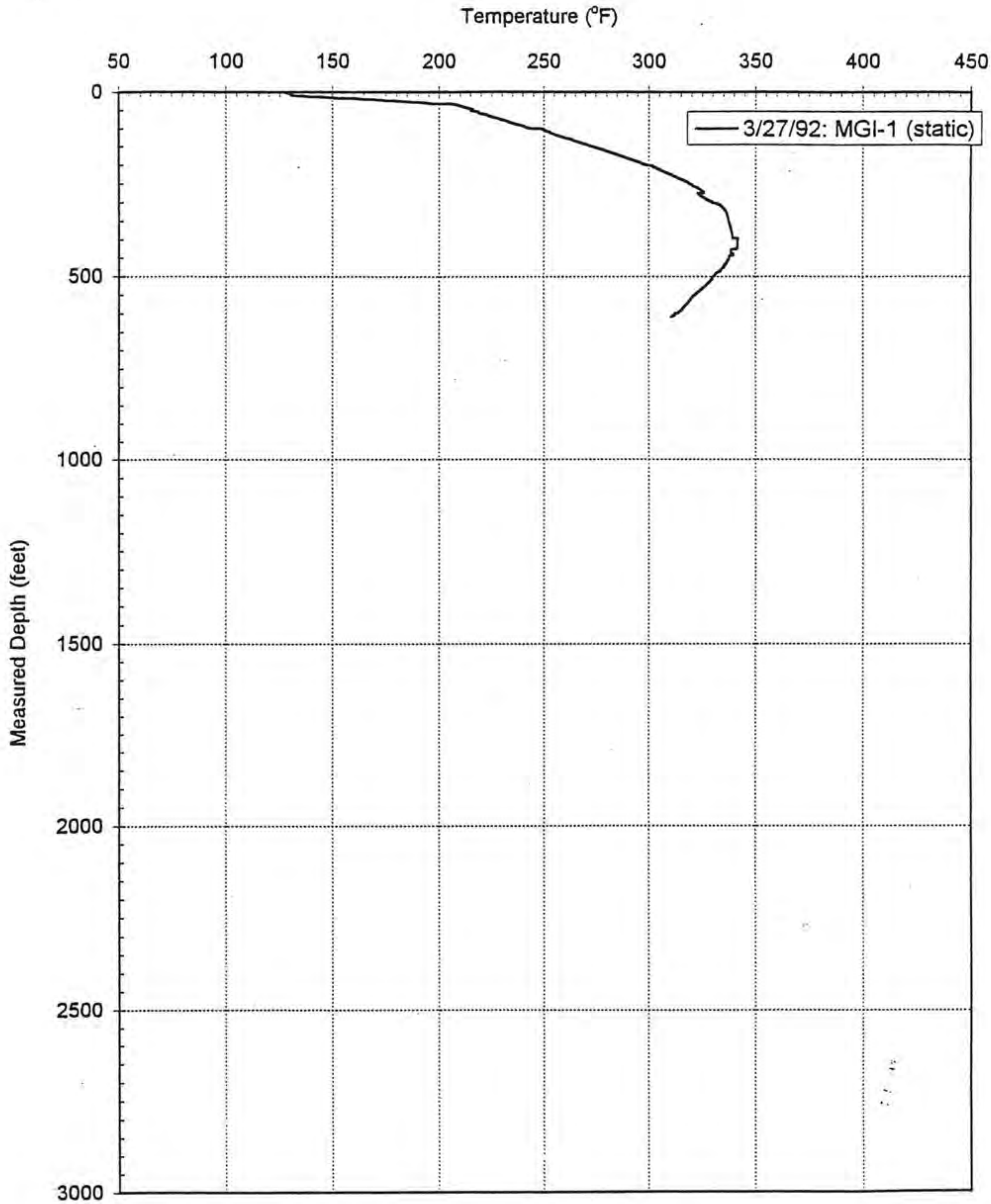
Mesquite Group, Inc., 1/15/97
BXBR-8.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well EARTH ENERGY-1



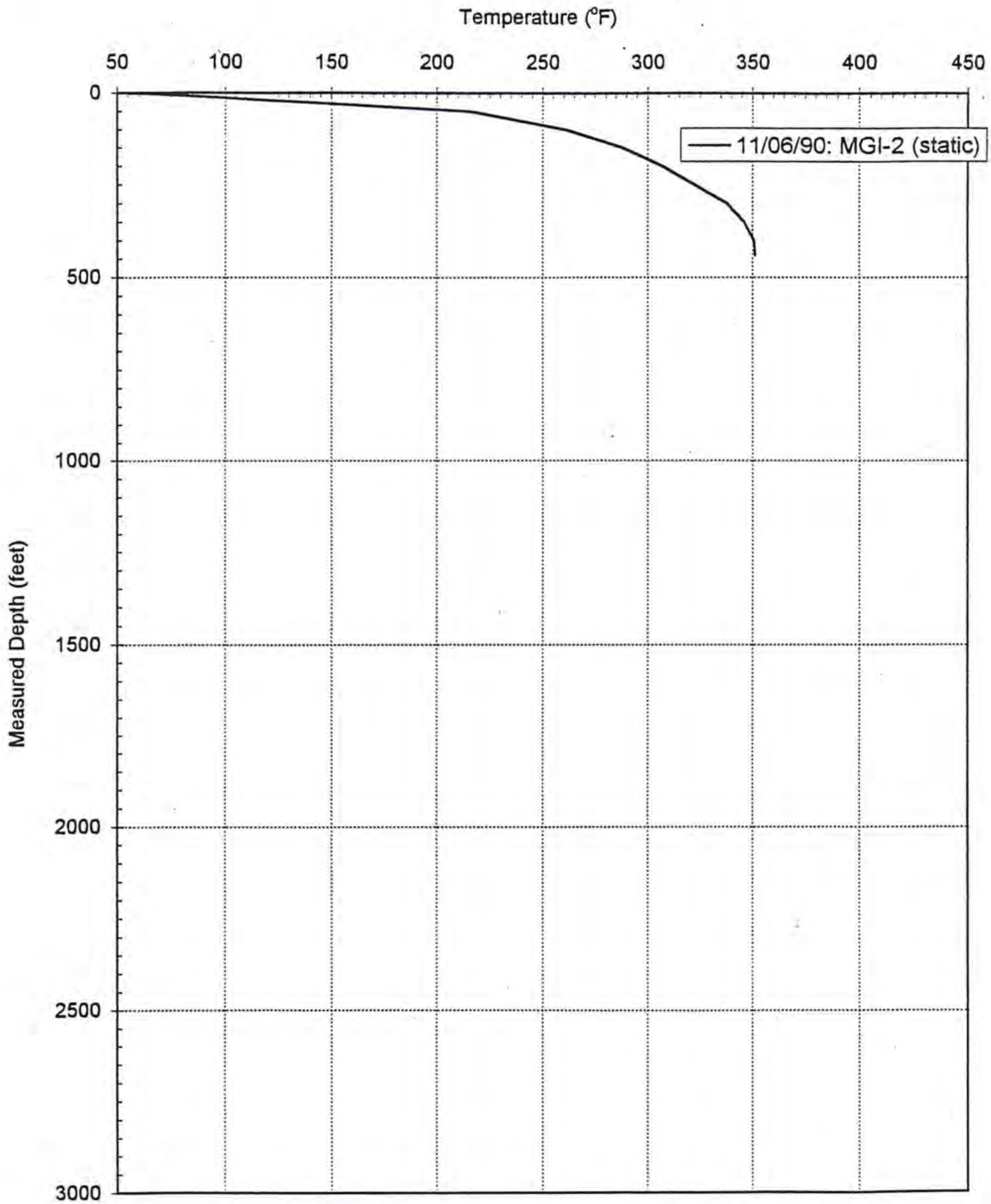
Mesquite Group, Inc., 1/15/97
BXEE-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well MGI-1



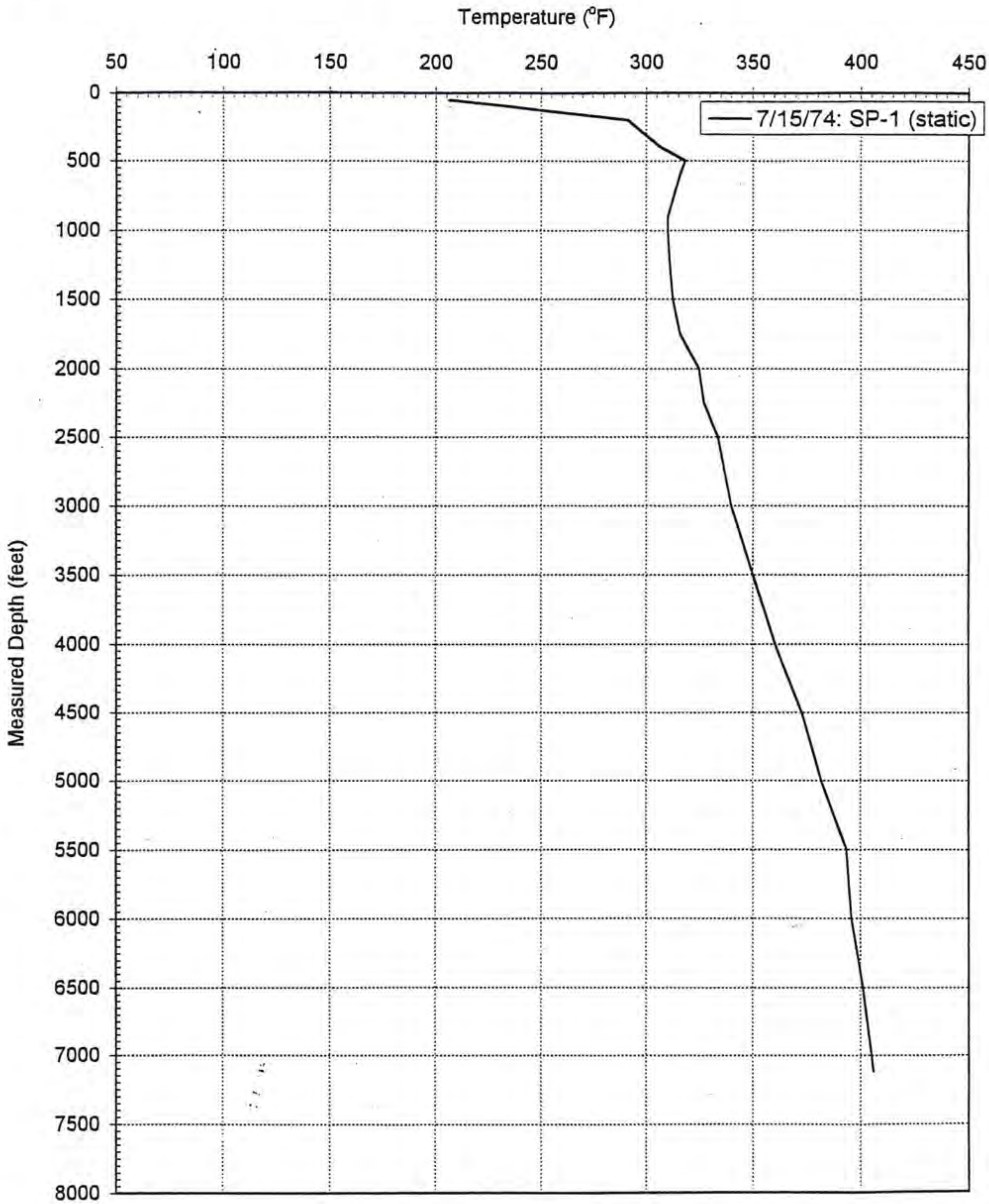
Mesquite Group, Inc., 1/15/97
BXMGI-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well MGI-2



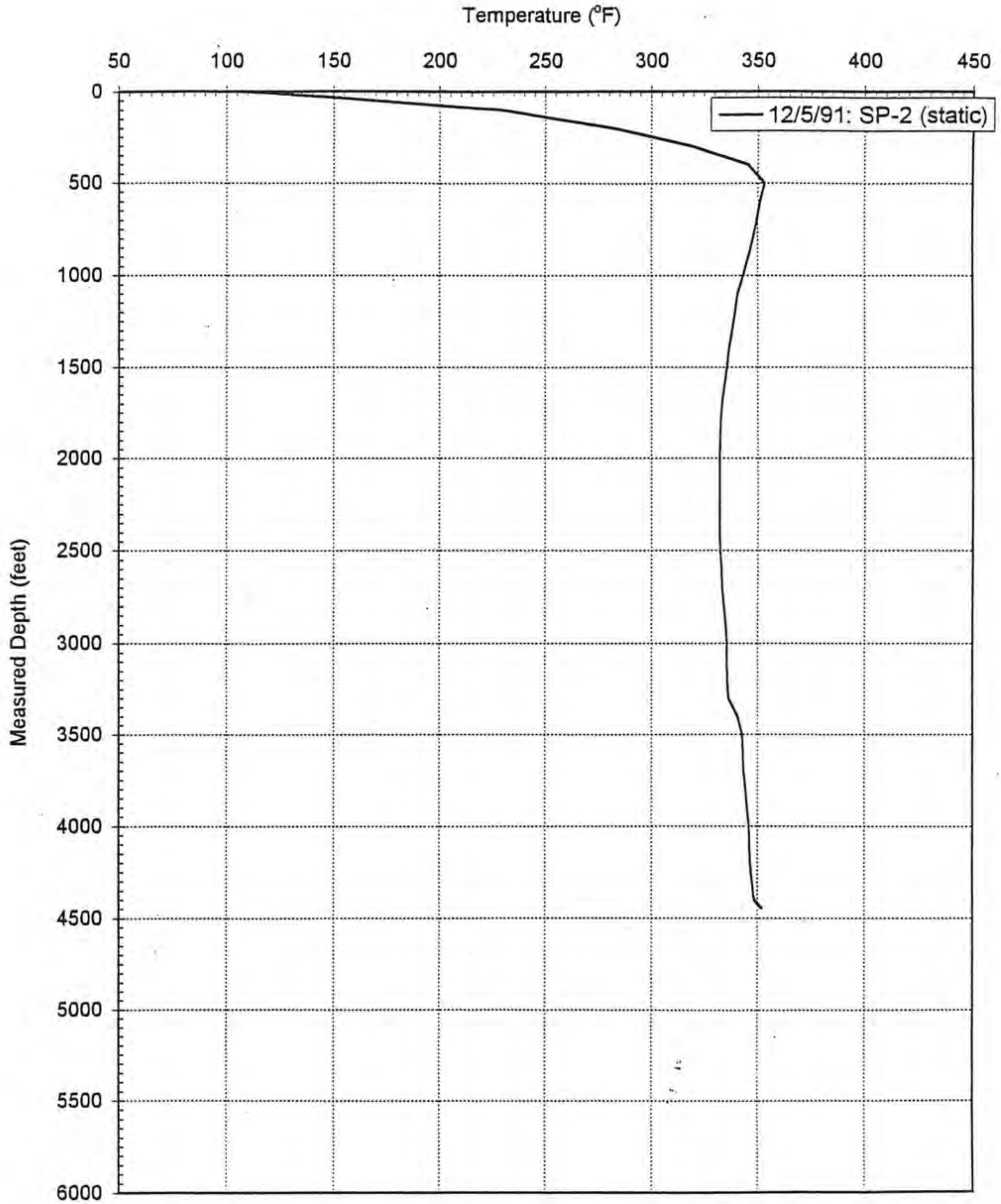
Mesquite Group, Inc., 1/15/97
BXMGI-2.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well SP-1

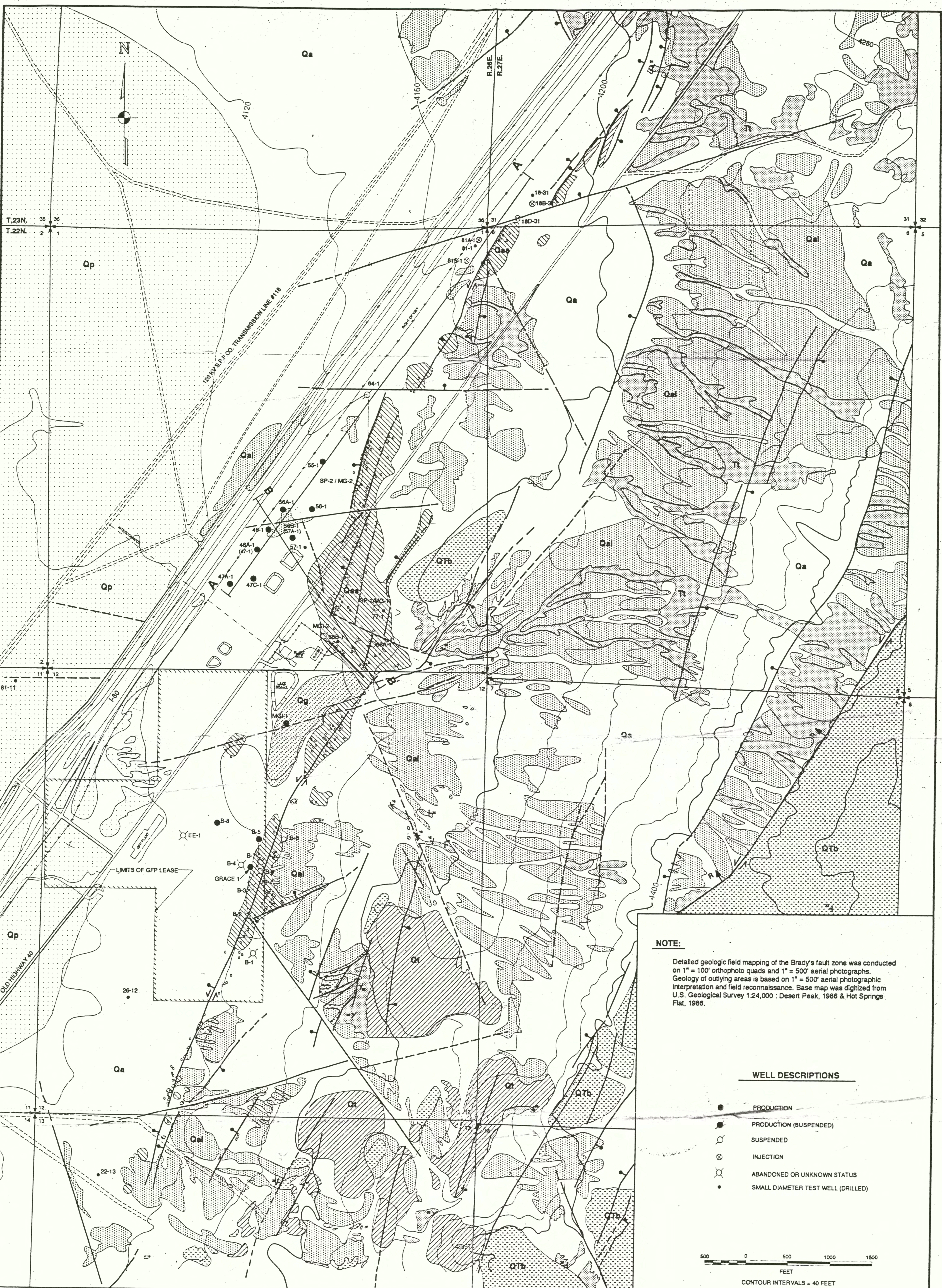


Mesquite Group, Inc., 1/15/97
BXSP-1.XLS, Chart1

Brady's Geothermal Resource
Static Temperature Profile: Well SP-2



Mesquite Group, Inc., 1/15/97
BXSP-2.XLS, Chart1



NOTE:

Detailed geologic field mapping of the Brady's fault zone was conducted on 1" = 100' orthophoto quads and 1" = 500' aerial photographs. Geology of outlying areas is based on 1" = 500' aerial photographic interpretation and field reconnaissance. Base map was digitized from U.S. Geological Survey 1:24,000 : Desert Peak, 1986 & Hot Springs Flat, 1986.

WELL DESCRIPTIONS

- PRODUCTION
- PRODUCTION (SUSPENDED)
- SUSPENDED
- INJECTION
- ABANDONED OR UNKNOWN STATUS
- SMALL DIAMETER TEST WELL (DRILLED)

500 0 500 1000 1500

FEET

CONTOUR INTERVALS = 40 FEET

PLATE 1

LEGEND

Qa	Younger alluvium; alluvial fan, pediment gravel & fluvial deposits
Qp	Playa and aeolian deposits
Qss	Siliceous sinter & hydrothermal alteralteration undifferentiated
Qt	Tuffa deposits
Qal	Older alluvium; incised pediment gravels with mature pavement
Qg	Gravels; well sorted, coarse fluvial deposits
QTb	Capping mafic, basalt and basalt tuff breccia undifferentiated
Tt	Truckee Formation Lacustrine sediments; Interbedded fossiliferous limestone, sandstone, siltstone, claystone, tuffaceous sediments, & tuffs

- Left lateral strike slip fault with oblique reverse displacement, R on upthrown side
- Left lateral strike slip fault with oblique normal displacement, ball on downthrown side
- Fault, dashed when approximately located, with ball on downthrown side where determined
- Strike and dip of bedding
- Location of hydrothermal activity; fumeroles and mud pots
- Interstate 80 Easement Fence

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GEOLOGY OF THE BRADY'S HOT SPRINGS AREA
CHURCHHILL COUNTY, NEVADA

BRADY POWER PARTNERS
BRADY HOT SPRINGS PROJECT
Churchhill County, Nevada

Dwg Date : 13 March 1992 | Revised RECEIVED MAR 2 7 1992 | File : Geology