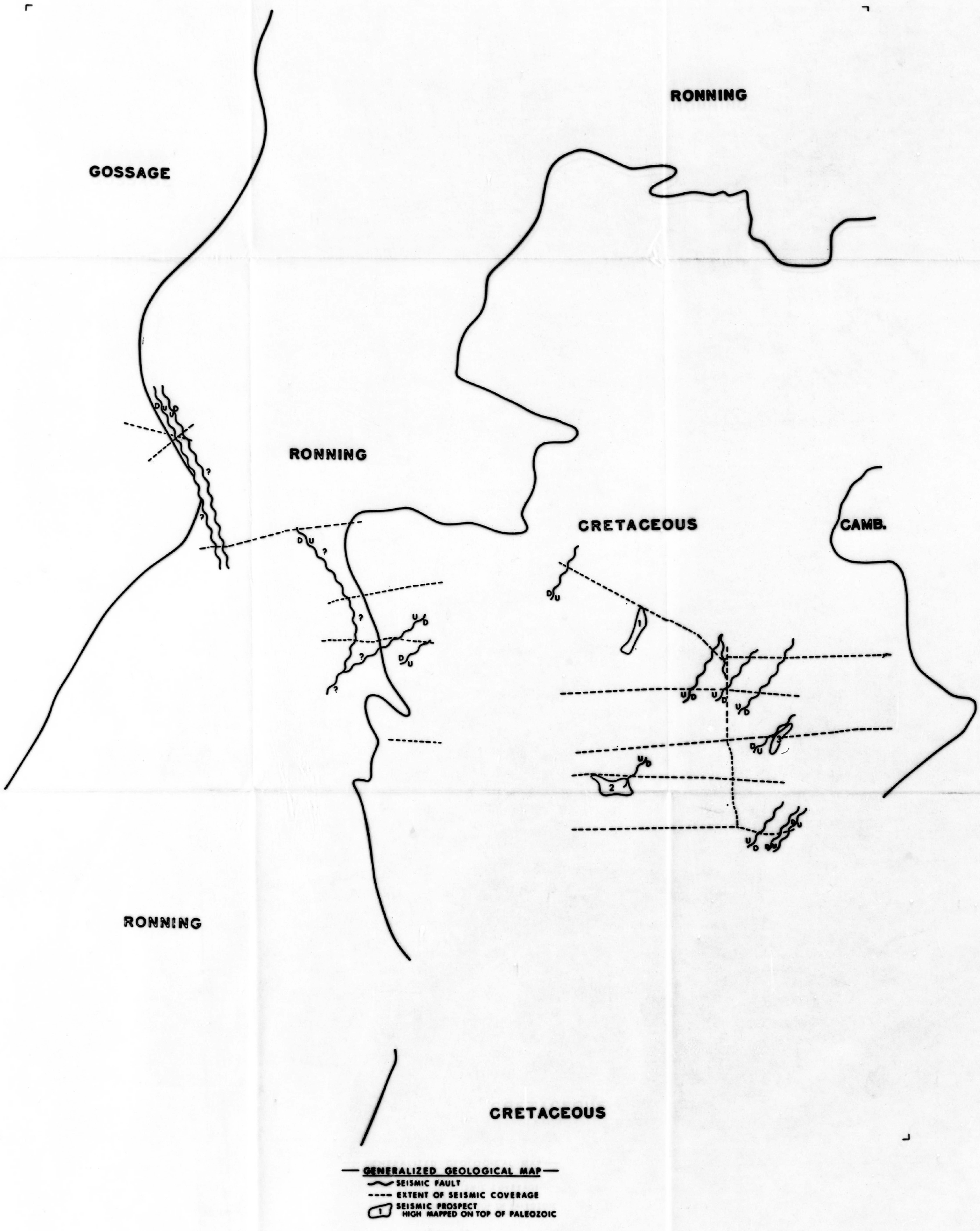
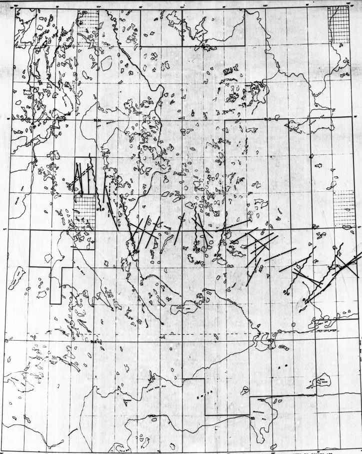


Figure 3A

57-07-06-090



MOBIL OIL CANADA, LTD.
NORTH CANADA AREA
GREAT BEAR LAKE N.W.T.

— DIRECTION OF STRIKE (------TENDING TO ISOTROPY)
— STRIKE / DIP ANGLE
~ FAULT (INFERRED FROM STRIKE / DIP ANGLES)

MILES

Figure 3

Mobil

GREAT BEAR LAKE MAGNETOTELLURIC SURVEY

September 1973

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ABSTRACT

Between August 11 and September 14, 1973, a 24 station magnetotelluric survey was conducted north of the Smith Arm of Great Bear Lake (Fig. 1). Interpretational difficulties arose due to a lack of noise-free, high frequency data. As a result, the final interpretation would be rated as only fair. The main structural features apparent on the cross-section (Fig. 2) consist of a horst and graben configuration. To the west, the Cambrian clastics are faulted upwards against the impermeable Proterozoic providing a potential trapping situation.

INTRODUCTION

The objective of this survey was to provide the opportunity for a field feasibility study of the magnetotelluric method. Model studies indicated that the Great Bear Lake location would be a difficult area to interpret due to the shallow sedimentary section, the relatively thin bedding, and the resistor (Ronning carbonate) overlying conductor (Cambrian clastic) sequence*. However, this area was chosen for the survey since seismic costs are very high and no geophysical data has been recorded over the north part of the block.

The general, overall quality of the survey would be rated as fair. Despite the fact that the geologically complicated subsurface structure did cause some interpretational difficulties, the most severe limitation showed itself as a lack of sufficiently noise-free, high frequency data.

For most sites, the upper frequency limit for noise-free data was 10 hz. Coupled with the fact that the depth of the sedimentary column is relatively shallow (approximately 5000 feet), the lack of enough high frequencies caused the layered model to be ambiguous. Thus, for future surveys, it is recommended that in the Great Bear Lake area, the upper frequency band must record good, useable data to at

* M-T interpretation is difficult in an area of thin conductors imbedded in resistors.

least 100 hz.

Nevertheless, within certain geological limits, a model was determined for each site. Because of the nature of the data, the following conclusions concerning the final cross-section (Fig. 2) should be noted:

1) The stratigraphic sequence is generally valid.
2) The major structures shown are correct.
3) Individual formation thicknesses and depths to each formation may be questionable. Great care was taken to ensure that the final cross-section presented a geologically consistent picture; however, variations in individual thicknesses of up to ± 20% could be expected.

The major structure apparent on the resulting profile is a horst graben configuration with further faulting to the west, which places the permeable Cambrian clastics in juxtaposition with the impermeable Proterozoic sediments.

Comparisons with seismic reflection results and limited geological subsurface data show excellent correlations.

INTERPRETATION

A) Fault Indications: (see Appendix D)

Figure 3 shows the interpreted magnetotelluric fault patterns together with the strike angle, θ_z, and the strike/dip angle, θ_{sd}

With the exception of sites 1, 2 and 6, geological strike is shown to be in a NW-SE direction which agrees with the known regional geology. The three anomalous sites show strong indications of flat-lying formations, one-dimensionality and isotropy; and consequently, their θ_z and θ_{sd} are relatively meaningless. Due to the lack of high frequency data, all strike directions had to be picked at low frequencies and therefore probably represent Proterozoic strike.

Since both θ_z and θ_{sd} represent Proterozoic angles, the resultant fault pattern also occurs in the Proterozoic. From the present MT data, it is not possible to determine whether this faulting is relatively recent or a pattern rejuvenated at several occasions during the geological history.

The overlay, figure 3A, shows the extent of seismic coverage and the interpreted seismic faults. It should be noted that the seismic results shown originate from poor quality, vibroseis data.

In the areas of seismic coverage, there is an excellent correspondence between the seismic and magnetotelluric fault patterns. Faulting between sites 7 and 7B, which is of particular importance to the area geology, had strong indications throughout the MT interpretation and is supported by seismic both in position and throw.

A government map showing generalized surface formation boundaries is included in figure 3A. It was used in a regional sense as an aid in the interpretation; however, any conclusions are too general to be of much value. One should also bear in mind the following points.

1) The formation boundaries are determined from aerial photos and general interpretation.
2) The boundaries of the Cretaceous will not extend any further than shown; but, they could conceivably be reduced in extent.
3) The thickness of the Cretaceous is unknown.
4) The Gossage fits in age between the Ronning and Cretaceous; however, lithologically, it is similar to the Ronning.

B) <u>Geological Profile</u>: (see Appendix D)

The interpreted geological profile is shown diagrammatically in figure 2 and numerically in Table 2. The cross-section is diagrammatic in that stations are not projected into a straight line but are plotted with true horizontal distances between each pair of adjacent stations.

The major geological structure apparent on the profile is a horst and graben configuration which extends from west of site 4 to the fault east of site 7A. Cretaceous shales have been preserved over the graben, but have been eroded away over the two horst blocks exposing the Ronning to the west and the Ronning and Proterozoic to the east.

Further faulting between sites 7 and 7B has placed the porous section of the Cambrian sediments below site 7 in juxtaposition with the non-porous Proterozoic to the east. As shown in Table 1, the Cambrian consists of four formations, the top three of which are tight; only the Mt. Clark shows any significant porosity (12-15%). A potential stratigraphic trapping mechanism evolves from the blocking of the porous Mt. Clark sandstone to the east by the impermeable Proterozoic and the capping above by the upper three, non-porous Cambrian sediments.

Another area of interest is the structure apparent in the profile of 6A, 6 and 6B. Although this structure is not completely defined, it is apparent that further work should be done to the south of 6A in the hope of defining a major stratigraphic feature.

Structure shown in the Cambrian at sites 2, 3 and 4B are questionable due to the inaccuracy of layer thicknesses and depths.

The Union et al Mobil Colville D-45 well, drilled on a surface structure, ties well to the MT interpretation at site 1. The top of the Cambrian as shown by well logs is 1863 feet; magnetotellurics puts it at 1875 feet! Unfortunately, the resistivity log records only the section from 2706 to 3852 feet - half-way through the Mt. Cap formation into the Proterozoic - so that a good comparison of resistivities cannot be made; however, the log does emphasize the variability in resistivity of the Proterozoic. As shown in figure 4, the Proterozoic at this site is more conductive than the Cambrian above. As a result, the final model shows an unusually great thickness of Cambrian sediments. This may well occur at other sites - site 7 is particularly suspect.

The Union IOL E Maunoir M-48 well is located out of the section approximately one mile SE of site 3 and one mile SW of site 3B.

Unfortunately, the only applicable information available is the total depth which is 2830 feet. Assuming that this value is at or near the top of the Proterozoic, a good comparison exists with site 3 which shows the depth to the Proterozoic as 2931 feet. Although brief comparison with well data is excellent (maximum of 3.56% error), one must keep in mind that due to modeling ambiguities, larger variations across the section can be expected.

Two final points should be made in reference to the geological profile. Firstly, although the sounding curves of site 6B overlaid those of site 6, the modeling was very ambiguous and in some instances layering structures more like site 7 were obtained. In the final analysis, only the top of the Proterozoic could be defined, and consequently, no layering is shown above that. Secondly, as previously stated, a lack of high frequencies precluded modeling of the permafrost. This same effect would be seen for any thin layer at the surface. If, as suggested by the general geological map (Fig. 3A), a thin conductive layer of Cambrian and/or Cretaceous sediments overlie the Proterozoic at sites 7B, 8A, 8 and 8B, these thin beds would probably not be "seen". Similarly, thin Cretaceous sediments would not be seen at sites 3B and 4A. Of course, one other possibility exists that even with higher frequencies, these thin, conductive sediments would be frozen parts of the resistive permafrost, and consequently, blend in with the Ronning and/or Proterozoic.

C) Conclusions and Recommendations:

The overall survey quality is rated as fair. Layering sequences and major structures are accurate; but, individual formation thicknesses and depths may be questionable.

The lack of sufficient, noise-free, high frequency data introduced ambiguity into each site model. Furthermore, it precluded modeling of the permafrost or other near-surface layering; and, consequently 3 sites out of a total of 24 sites were rejected because of a low S/N ratio.

There exists an excellent correlation between the MT and the seismic faults. The fault between sites 7 and 7B, which is of particular importance to the area geology, is substantiated by seismic.

The major structure is a horst and graben configuration between sites 4 and 7A. A potential stratigraphic trap exists below site 7 since the Mt. Clark is capped above by the non-porous upper Cambrian and to the east by the impervious Proterozoic.

It is recommended that for future surveys in the Great Bear Lake area attempts be made to obtain useable data to at least 100 hz.

It is also recommended that because of the possible structural plays at sites 7 and 6B, further geophysical work should be done over these structures.

APPENDIX A

OPERATIONS REPORT

There were 27 magnetotelluric sites (including re-recorded sites 1, 1A and 1B) recorded in 12½ working days for an average of 2.2 sites per day. An overall average, including days lost due to instrument problems (5 days) and weather (3½ days), was 1.3 sites per day.

Table 4 is included as a visual aid to days worked and number of sites recorded.

A substantial amount of time was lost due to the following:

1) The camp was located about 50 miles from the magnetotelluric sites.
2) The 206B helicopter was somewhat undersized and not equipped to carry the M-T equipment efficiently.
3) Weather conditions at this time of year, such as fog and cold, did hamper normal operations.
4) A brief survey is inherently inefficient.

The M-T field operation was estimated to cost $30,000 for a two week field program. However, actual costs were $58,697.00 excluding processing and Mobil personnel costs.

The main items that can be identified as contributing to the cost over-run are high aircraft charges for fuel hauling, time lost due to instrument problems and weather, and high helicopter usage.

The high costs incurred in this experimental project should not be used as a guide to M-T operations in general, Given advance notice so that pre-planning can be effectively done, costs could be drastically cut. The time of year to conduct the survey, winter stock-piling of fuel, judicious selection of campsites and helicopter usage would be essential to an efficient and economical operation.

APPENDIX B

GREAT BEAR LAKE MT DATA PROCESSING

In order to interpret the field data, Mobil Oil Canada's IBM 360/50 and associated IBM 2250 graphics console were employed.

Typical data in a multiplexed form consists of a header followed by:

1) Ex, the base station, electric field in the x direction
2) Hy, the base station, magnetic field in the y direction
3) Ey, the base station, electric field in the y direction
4) Hx, the base station, magnetic field in the x direction
5) Hz, the base station, magnetic field in the z direction
6) Ex_t, the telemetry station, electric field in the x direction
7) Ey_t, the telemetry station, electric field in the y direction

Each "recorded site" consists of the simultaneous recording of the base site and one of the telemetry sites, and comprises approximately 15 runs. Each run will cover one of three frequency bands (cutoff frequencies: .01 to .125 hz, .1 to 2 hz, 1 to 25 hz) such that each band is recorded several times over a total recording time of approximately 2 hours per site.

The method of data processing is shown in figure 5.

After the field tape is demultiplexed, the following processes are applied to the data.

1) <u>Processing</u>:

From the demultiplexed field tape, these programmes calculate Cagniard and Tensor resistivities and determine which frequencies pass the criteria. The two criteria which each frequency, within a particular run, must pass are SKEW and PRED.E.

The SKEW criterion ($0 \leq$ SKEW) is a measure of 3-dimensionality of the substructure at each site. Although the modeling techniques assume a flat, pancake - layered earth, stations with strong indications of 2-dimensionality can also be modelled. However, all frequencies with a high indication of 3-dimensionality are flagged by the programme (i.e., flagged if SKEW > 0.3).

The PRED.E. ($0 \leq$ PRED.E. ≤ 1), on the other hand, is a measure of the noise level on the recorded signals. If for a particular frequency, this value is less than 0.7, then that frequency is flagged by the programme.

From these results, the best runs, as indicated by the two criteria, are chosen as input to the plotting stage.

2) Plotting:

The plotting stage produces a plot of resistivity and phase curves and also displays the minimum resistivity angle (strike/dip) and the strike angle. All values are plotted as a function of frequency. This step in the processing also plots the effects of all small near-surface anomalies such as variations within the permafrost as a distortion matrix. The removal of this distortion in the smoothing programme is analogous to seismic static corrections.

3) Smoothing:

The smoothing programme removes the distortion from the data and outputs, on the plotter and on cards, the smoothed curves with R.M.S. error estimates. The strike/dip angle is also plotted. If this angle has been changed to any large extent due to the removal of the distortion, then the distortion removal is repeated using the new angle.

Having successfully removed distortion and smoothed the sounding curves, the data is ready for modeling.

4) Modeling: (2250 graphics terminal)

The modelling system allows the user to match flat, pancake-layered models to his smoothed sounding curves in order to obtain the best fitting, layered model of each site.

APPENDIX C

FAULT INDICATIONS

From the plotting stage, one is able to define two angles:

1) Strike angle, θz, gives the direction of geological strike at the site. This angle is defined as the angle of the horizontal magnetic component which gives the maximum correlation with the vertical magnetic component (plus an addition of 90^{o}). Since the magnetic components are only recorded at the base sites, strike cannot be calculated at the telemetry stations. The base-only recording of the magnetic components is predicated on the tested assumption that the horizontal magnetic field remains constant over a much larger area than the electric field.

2) Strike/dip angle, θsd, defines the direction of minimum resistivity. This angle is determined by the mathematical rotation of field E and H components such that the calculated resitivity is a minimum. It may be either parallel or perpendicular to strike dependent upon the lateral variations in resistivity with respect to site location. The strike/dip angle is defined at both the base and telemetry sites.

Regardless of site position with respect to lateral resistivity or structural changes, the θ_z angle will always indicate geological strike; and, consequently, Θ_z will remain approximately constant for a localized survey. However, when crossing a fault, Θ_{sd} will often "flip" by 90° such that on one side of the fault it will be parallel to strike, while on the other side it will be perpendicular to strike.

Although a fault will be indicated, the relationship between Θ_z and Θ_{sd} will not give:

i) the strike of the fault. For this survey, site spacing is too great to allow detection of the strike of the fault. As a result, the strike and dip were interpreted from the known geology of the area.

ii) the throw of the fault. Simple models of a conductor overlying a resistor indicate that the orthogonal relationship between Θ_z and Θ_{sd} exists on the downthrown side of the fault. However, in the Mackenzie Delta survey of 1970 and in this survey (northwest of Great Bear Lake), it has been found that the orthogonal case usually occurs on the upthrown side. Obviously, further studies are required; and, therefore, for this survey neither relationship was assumed. The final determination of throw was taken from the modeling of sites.

and finally,

iii) the position of the fault between sites. Generally speaking, when a fault is indicated between two sites, the exact position is not known and the best that can be done is to place the fault halfway between sites. If the fault is considerably closer to one site than the other, the sounding curves of the nearer site will occasionally have larger indications of 3-dimensionality. This, though, is the exception rather than the rule.

APPENDIX D

GEOLOGICAL MODELLING

Subsequent to this survey, modeling studies were made based on the known geology shown in Table 1. The purpose of such studies was to determine how well the MT method would work with this layering sequence. The results were encouraging. For each modeled site, the MT technique returned the layering sequence quite accurately with the single exception of the formations within the Cambrian. The salt proved to be transparent and consequently, all four formations were "merged" into one MT unit. As a result, any one site near Great Bear Lake would be expected to model with a maximum of four layers (Cretaceous, Ronning, Cambrian, Proterozoic).

As previously stated, noise on the high frequency signals coupled with a lack of enough high frequencies caused several problems as listed below:

1) The most severe problem was the ambiguity introduced into the modeling. Resistivities and layer thicknesses could range over much wider limits than was hoped.

2) Too much high frequency noise forced the rejection of three out of 24 sites (3A, 4A, 5B). These sites could not be reasonably modeled.

3) A lack of enough high frequencies was the probable cause for not "seeing" the permafrost. A surface resistor, representative of the permafrost, would be expected to make its appearance in areas where the conductive Cretaceous outcrops; however, such was not the case.

More and better high frequencies should reduce, if not remove, all three problems

As a result of the nature of the recording, resistivity data in two perpendicular directions is obtained. Two resistivity/phase curves are plotted. The minimum curves are representative of resistivity distributions in the direction of the strike/dip angle (direction of minimum resistivity) and the maximum curves display the resistivity distribution in a direction perpendicular to Θ_{sd}. Since Θ_{sd} can be related to strike (either parallel or perpendicular), so can the maximum and minimum sounding curves.

In the final analysis, it was found that in general:

1) For a conductor overlying a resistor, the curve perpendicular to strike should be used regardless of the fact that it might be a minimum ($\Theta_{sd} \perp \Theta_z$) or a maximum ($\Theta_{sd} \parallel \Theta_z$) curve.

2) For a resistor overlying a conductor, the curve parallel to strike should be used to model the site.

An assemblage of this type of information now and in the future will result in improved modeling techniques.

Table 3 lists each site together with a rating assigned to the model and the sounding curve which produced the most consistent modeling results. Also listed are the high frequency splits between the minimum and maximum sounding curves. These values are subjective. As the MT computer programmes are developed, this value will be quantified for future surveys. The split or distortion in these curves is caused by any near-surface anomalies. Through the application of the distortion matrix, this effect is removed by mathematically pulling these curves together. The greater the split, the more ambiguity is introduced into the model. However, this can be controlled to a certain extent by extrapolations from neighbouring sites with small or no splits. By such procedures, modeling errors can be reduced to a minimum.

GEOLOGY OF GREAT BEAR LAKE TABLE #1

FORMATION	GEOLOGICAL CHARACTER	EXPECTED* RESISTIVITY (OHM-METERS)	EXPECTED* THICKNESS (FEET)	COMMENTS
CRETACEOUS	shale	5-10	0-2500	
RONNING	dolomite; intermittently porous	1000-1500	0-3500	
CAMBRIAN				
a) SALINE RIVER	thinly bedded; mixture of tight dolomite, shale, sandstone and minor anhydrite	15	300-1500	from model studies, expect salt to be transparent and consequently, formations within the Cambrian will "merge" to form one MT unit
b) SALT	Lalite with variable amounts of shale and anhydrite	3000	0-400	
c) MT.CAP	thinly bedded; dolomite, shale, siltstone, sandstone	15	400-700	
d) MT.CLARK (OLD FORT ISLAND)	well rounded, fine to medium sandstone with 12-15% porosity	5	50-200	
PROTEROZOIC	either dolomite, shale, interbedded shale and siltstone, dolomite and siltstone, or dolomite and anhydrite	20-80	basement	expect large variations in resistivity

* Although values for the resistivity and thickness give an expected range, actual values may vary outside of these limits.

GREAT BEAR LAKE MODELLING RESULTS TABLE 2

	ELEVATION (FEET)	TOP OF * CRETACEOUS (-M/feet)	TOP OF * RONNING (-M/feet)	TOP OF * CAMBRIAN (-M/feet)	TOP OF * PROTEROZOIC (-M/feet)	STRIKE/DIP θ_{sd} (Degrees)	STRIKE θ_z (Degrees)
1A	1280		2000/S	16/-743	442/-2879	11.1	
1	2000		766/S	20/+125	259/-2408	-3.78	49.05+
1B	1800		2000/S	15/-90	528/-2456	-3.0	
2A	1120		500/S	20/-2490	501/-4102	+3.0	
2	1210		500/S	20/-1625	477/-2963	-15.0	2.25+
2B	1060		500/S	20/-2277	698/-3851	-22.0	
3A	1060	LOW S/N RATIO				27.90	
3	1280		1535/S	20/-789	1229/-1651	19.36	-60.82
3B	1090		1500/S	15/-1177	2000/-2769	22.95	
4A	1110	LOW S/N RATIO				17.32	
4	10	12/S	2000/-1652	11/-4372	2000/-5417	-16.0	-45.38
4B	1100	55/S	372/+121	20/-2033	677/-3423	72.0	
5A	1150	17/S	492/-661	15/-2985	2000/-4051	60.0	
5	1190	20/S	500/-469	20/-3003	2000/-3914	63.12	-50.06
5B	1400	LOW S/N RATIO				69.30	
6A	1200	17/S	727/-445	26/-2866	2000/-3866	57.0	
6	1300	5/S	1300/+544	26/-1669	2000/-3565	43.22	0.0+
6B	1410	CONDUCTOR	28/S		2000/-2512	28.05	
7A	1580	10/S	2000/-300	20/-3210	2000/-4435	65.25	
7	1780		2000/S	8/+1084	2000/-1952	-67.05	-52.65
7B	1500	RESISTORS	2000/S;	157/+970; 2000/-7710)		53.1	
8A	1850	RESISTORS	2000/S;	114/+1245; 2000/-4720)	PROTEROZOIC	40.95	
8	1750	RESISTORS	2000/S;	147/+790; 1805/-5060)		58.69	-43.85
8B	1820	RESISTORS	2000/S;	100/+1220; 2000/-5780)		52.42	

* Values given as resistivity/depth (subsea); S = surface

\+ Tending to flat-layered, 1-dimensional, isotropic case.

TABLE 3

CURVE VARIABLES - GREAT BEAR LAKE MT SURVEY

SITE	MODEL RATING	SPLIT*	COMMENTS	SOUNDING CURVE +
1A	fair-good	B.S.	- Skew ≤ 0.5.	minimum(?) ⊥
1	good	M.S.		minimum(?) ⊥
1B	fair	B.S.		minimum(?) ⊥
2A	fair	N.S.	- isotropic above 1 hz	minimum(?) //
2	good	N.S.	- isotropic above 1 hz	minimum(?) //
2B	good	M.S.		minimum(?) //
3A		V.B.S.	- skew ≤ 0.5 - no data above 1 hz - site omitted	
3	very poor	M.S.	- poor data below 3 hz	minimum ⊥
3B	poor	S.S.	- Skew ≤ 0.5	minimum ⊥
4A		M.S.	- no data above .5 hz - site omitted	
4	very good	B.S.		maximum ⊥
4B	poor-fair	S.S.	- fault indicated	minimum ⊥
5A	fair-good	S,S.		minimum ⊥
5	good	N.S.	- isotropic above 3 hz	minimum ⊥
5B		N.S.	- very noisy data - site omitted	
6A	poor	M.S.		maximum //
6	good	S.S.		maximum(?) ⊥
6B	very poor	B.S.	- fault indicated - sounding curves like 6; but, tend to model like 7	minimum ⊥
7A	fair	N.S.	- isotropic above 2 hz - questionable below the Cretaceous	maximum //
7	good	M.S.		maximum ⊥
7B	fair	M.S.		maximum //
8A	very good	B.S.		maximum //
8	poor	M.S.		maximum //
8B	very poor	B.S.		maximum //

* N.S. = no split; S.S. = small split; M.S. = medium split; B.S. = big split; V.B.S. = very big split.

\+ Indicates the sounding curve which produced the most consistent modelling results and its relationship (⊥ = perpendicular; // = parallel) to the strike direction.

TABLE 4

ANDERSON PLAIN-GREAT BEAR AREA
1973 M-T SURVEY
DAY LOG

NUMBER OF SITES: 1, 2, 3

AUGUST	15	MEN AND EQUIPMENT — FAIRBANKS TO WHITEHORSE.
	16	MEN AND EQUIPMENT — WHITEHORSE TO NORMAN WELLS.
	17	MEN AND PART OF EQUIPMENT TO FIELD.
	18	BAD WEATHER IN NORMAN WELLS.
	19	REST OF EQUIPMENT ARRIVED IN CAMP.
	20	1a, 1, 1b
	21	INSTRUMENT PROBLEM (PLAYBACK UNIT)
	22	INSTRUMENT PROBLEM (PLAYBACK UNIT)
	23	2a, 2
	24	2b, 2
	25	3b, 3, 3b
	26	REPAIRED PLAYBACK UNIT. SITE CREW TO NORMAN WELLS.
	27	CREW WEATHERED IN AT NORMAN WELLS.
	28	CREW RETURNED TO CAMP. RECORDED PORTION OF 4[illegible].
	29	4a, 4, 4b
	30	6a, 6
	31	6b, 6
SEPTEMBER	1	7a, 7
	2	BATTERIES TOO WEAK TO RECORD.
	3	OBSERVER IN NORMAN WELLS FOR BATTERY.
	4	7b, 8, 8a
	5	8b, 8
	6	5a, 5, 5b
	7	WEATHER DAY (RAIN AND FOG)
	8	WEATHER DAY (RAIN AND FOG) SITE PREPARATION.
	9	1a, 1, 1b
	10	MEN AND EQUIPMENT TO NORMAN WELLS.
	11	WAITING ON DC-3
	12	EQUIPMENT ARRIVED IN CALGARY.
	13	EQUIPMENT TAKEN TO WESTERN AIRLINES.
	14	EQUIPMENT SHIPPED TO DALLAS.

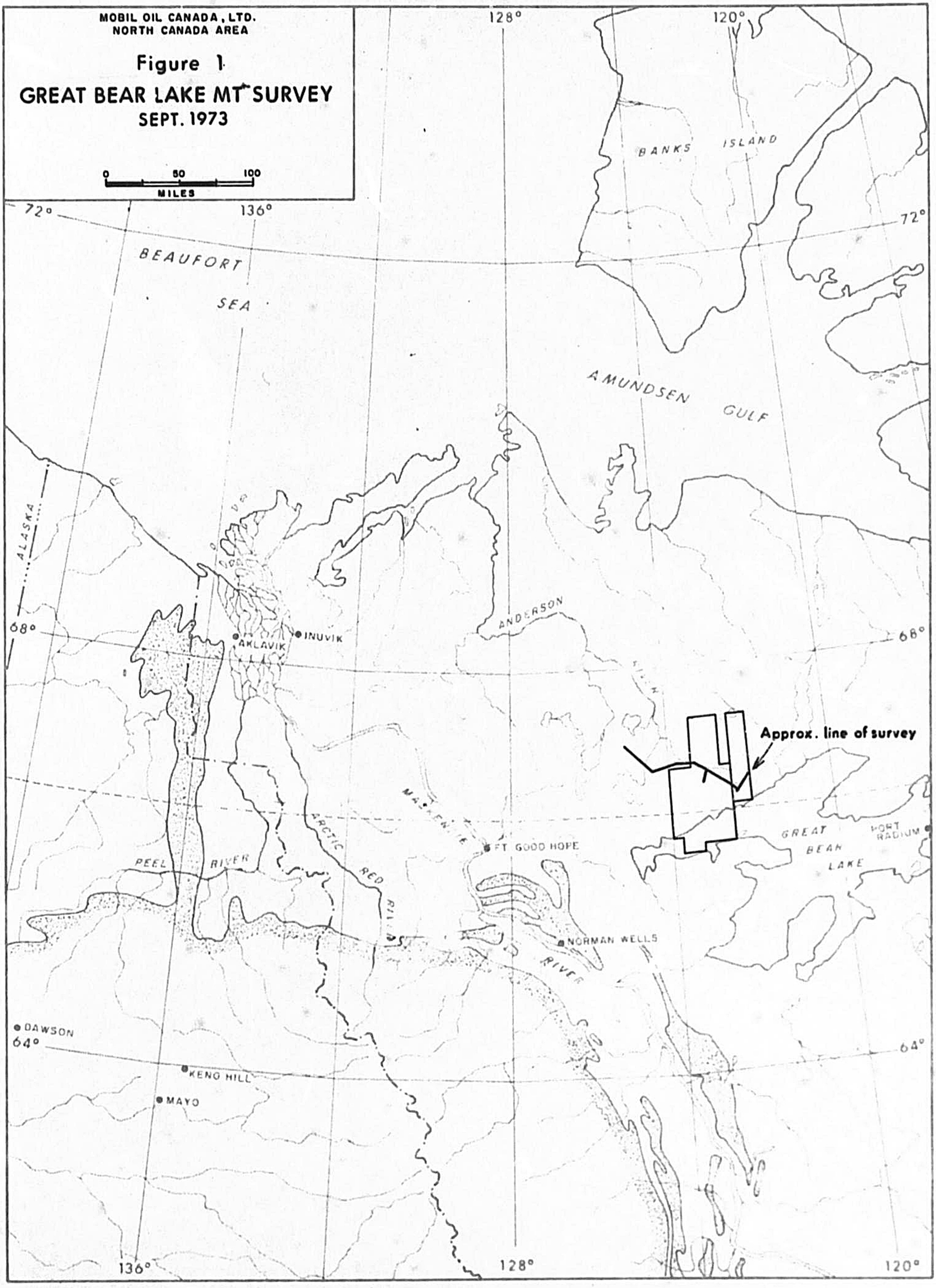
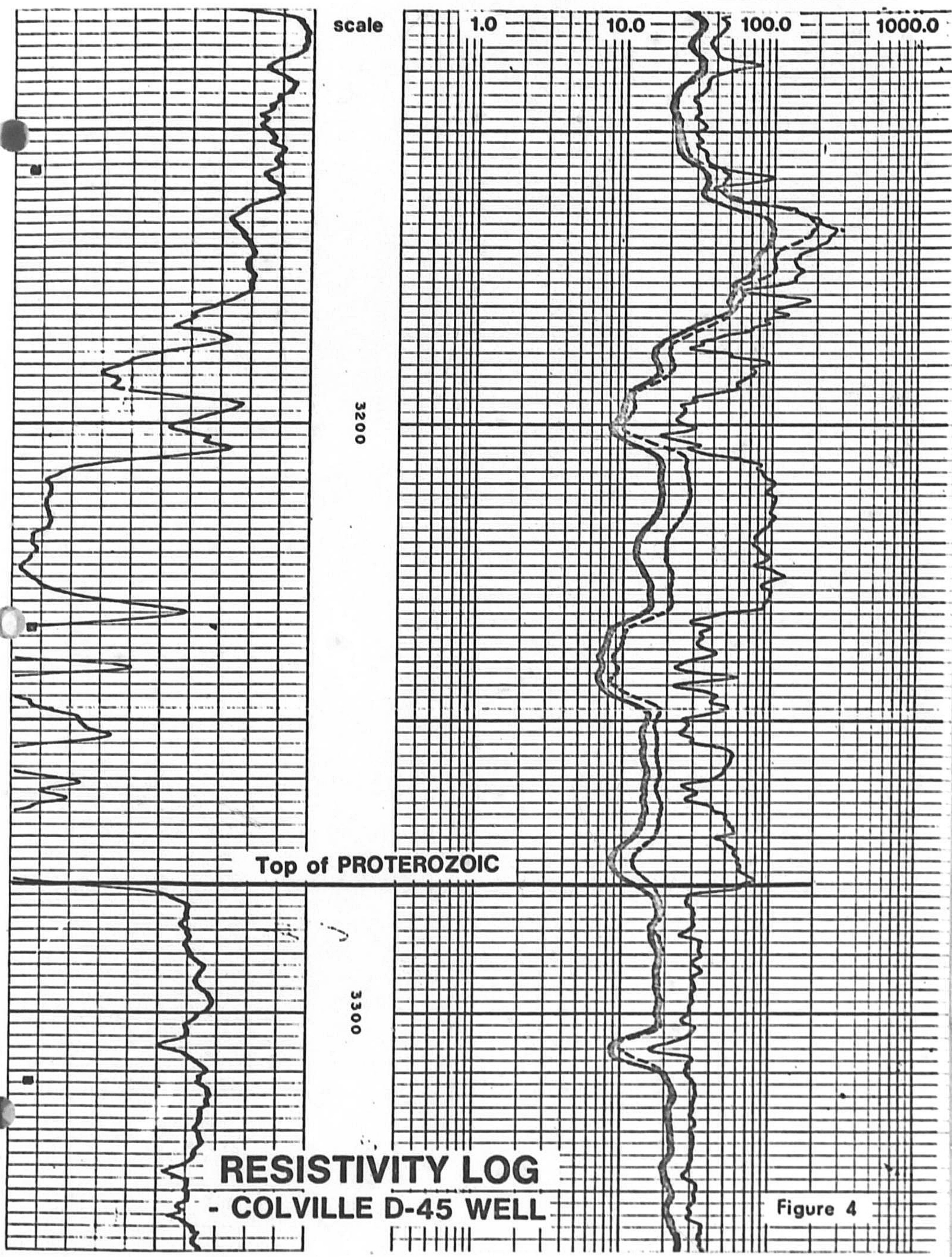


Figure 1
GREAT BEAR LAKE MT SURVEY
SEPT. 1973



RESISTIVITY LOG - COLVILLE D-45 WELL

Figure 4

— PROCESSING FLOWCHART —

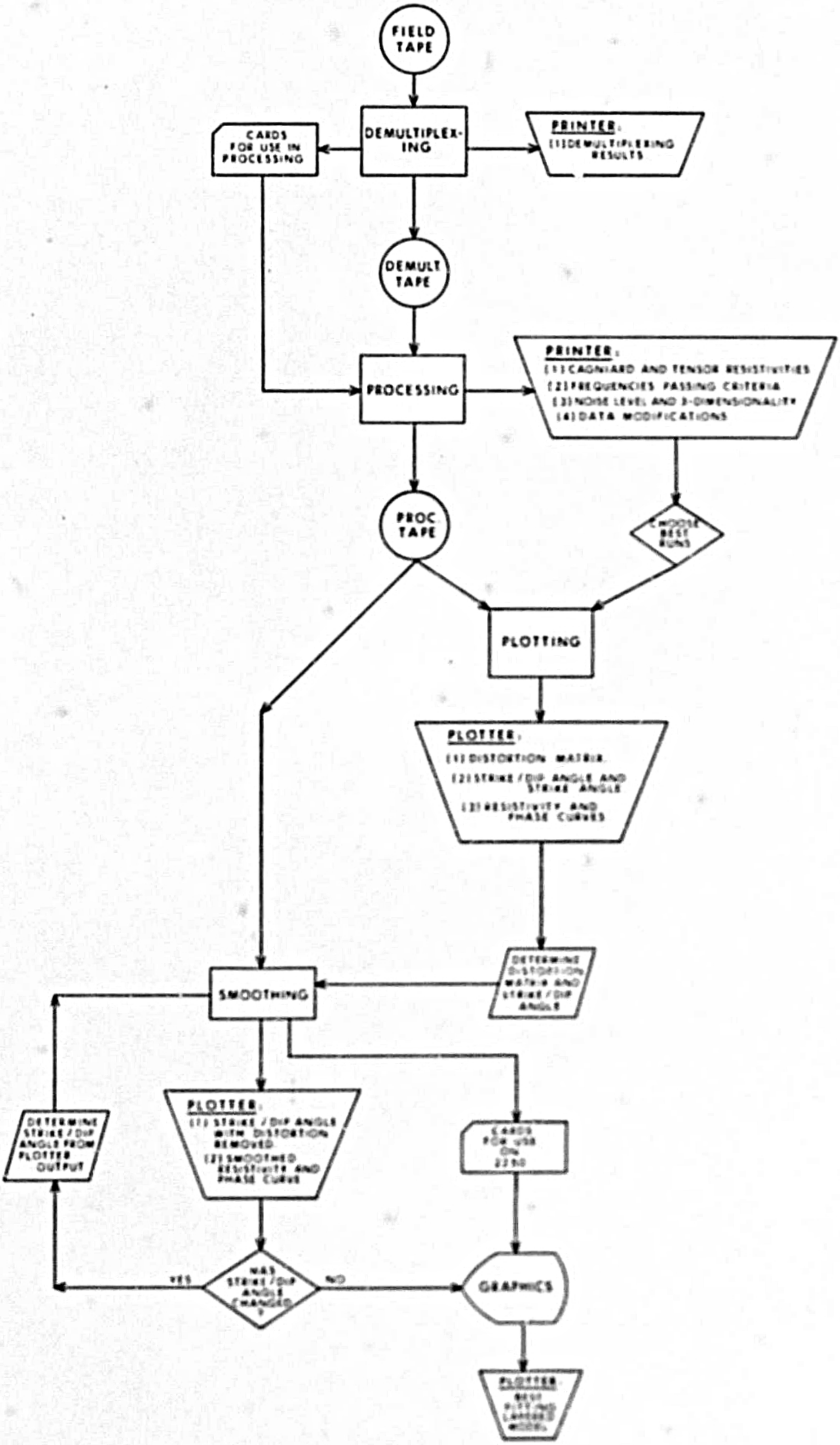


Figure 5

— GREAT BEAR LAKE N.W.T. MAGNETO TELLURIC INTERPRETATION —

SEPT., 1973

Figure 2

57-07-06-090