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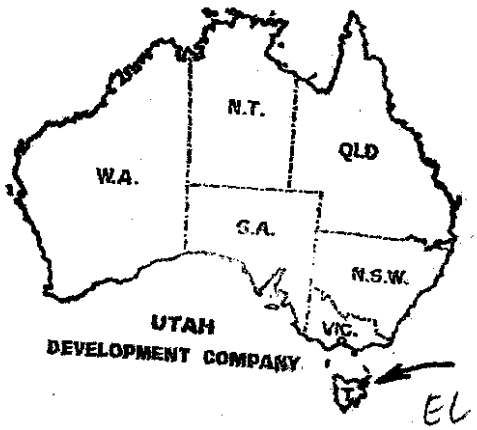
Report on

PROGRESS OF INVESTIGATIONS FOR TIN in NORTH-EAST TASMANIA

No. 135.

December, 1965.



EL 6/63

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AMG REFERENCE POINTS ADDED

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SUMMARY AND RECOMMENDATIONS

Since October 1963, the Company has held an Exploration Licence, EL. 6/63, over the north-east Tasmanian alluvial tinfield.

A detailed geological study of the tinfield was completed late in 1964 (Warin and Appleby, 1964), and since that time the recommendations for testing contained in that report have been followed.

The alluvial tin generally occurs concentrated in the basal gravels of buried Tertiary river channels ("leads"), although some tin also occurs scattered through thin upper Tertiary gravels and sands. Testing is aimed first at finding the buried channels and then at sampling them for their tin content.

Initially Induced Polarization geophysics, making use of "membrane polarization" phenomena associated with clays in the Tertiary valley fill and in the weathered granite bedrock below, was used to prospect for channels. This method was apparently successful to begin with, while the ground was thoroughly soaked from the winter rains, but had to be abandoned later because of charging effects at the electrode to ground contact which it was not possible to exclude.

A method of auger drilling, using a Gemco Solid Auger, was then developed. Once the water table is penetrated the auger gives no continuous return, but some clays, clayey sediments, and weathering clayey bedrock are retained in the auger flights, and if the rods are withdrawn periodically so that the hole advances in a series of steps, these can be used to give an approximate log of the hole and a fairly close estimate of the depth to bedrock. These bedrock elevations are then used to outline channels.

This method of prospecting for channels has proved fast, inexpensive and generally effective. In all, 8,549 feet of Gemco augering have been completed.

For sample drilling, first a Failing 1500 rotary rig and later two, sometimes three, churn drills have been employed on contract. Four months were spent in attempting to perfect a method of rotary drilling with the Failing 1500, but eventually the rig had to be abandoned and we were forced to revert to churn drilling. So far a total of 4,332 feet (1,066 feet by the rotary rig, 3,266 feet by churn drilling) have been completed.

Both the sample drilling and the prospecting for channels were seriously delayed by the eventual failure of the testing method first used. The results of testing so far have been very discouraging. A number of bedrock channels have been located, but no concentration of tin in their basal gravels has been found. In some instances, channels have been found to be deeper than was anticipated and therefore below mineable depth. Three of the four highest priority test areas have now been tested and abandoned, and one of the original second priority test areas has also been tested and abandoned.

Because of the disappointing results, the geological reasoning behind the initial choice of test areas has been reviewed. In fact, however, in many instances buried drainage was found in the predicted positions, and there seems no reason to doubt the validity of the basic geology, nor in fact any reason drastically to change the choice of test areas.

Since the testing began, a review of possible operating profits for alluvial tin properties has pointed up the great attractiveness of shallow deposits, and the testing proposed has been revised to place greater emphasis on possible shallow, large yardage targets.

Two new Test Areas (Nos. 11 and 12) have been added, and two of the originally proposed areas (9 and 10) have been withdrawn.

INTRODUCTION

During late 1963, Mr. Don King compiled a comprehensive report (King, 1963) on the tin potential of Tasmania. He was particularly impressed by the possibility of developing alluvial tin in north-east Tasmania; accordingly he recommended that the Company seek an Exploration Licence over a major part of the tinfield there.

On October 29, 1963, the Company was granted an Exploration Licence (EL. 6/63) covering 300 square miles north and east from an origin at Derby Railway Station (see Plate 2). Subsequently, in June, 1964, an additional 84 square miles were added to the south-west corner of the first area, so that virtually the whole of the alluvial tinfield was held.

A detailed geological study of the Exploration Licence area was undertaken, and a report presented (Warin and Appleby, 1964) in November, 1964, in which ten areas were recommended for testing by sample

drilling and by Induced Polarization geophysics. The recommendations were accepted, and a start was made on the testing.

Alluvial tin occurs generally in the area in the basal gravels of buried Tertiary river channels ("leads") and testing is, in the first instance, directed at finding these buried channels and then at sampling them for their content of alluvial tin. The results of testing so far have been very discouraging; although a number of buried channels have been found no concentrations of alluvial tin have been found within them.

This report summarises the progress of the testing, and reviews and amends the selection of areas for testing in the light of the present findings. In the first part of the report, the testing techniques are reviewed, and then the testing at each test area. In the second part, the results are discussed and the reasons for the selection of the new areas given.

An appendix describes the design and operation of the Tin Sample Treatment Plant.

PART I.

PROGRESS OF TESTING

In this section of the report, the various testing techniques will first be reviewed, then a summary will be given of testing so far achieved at each test area.

TESTING TECHNIQUES

(i) Geophysical Testing:

A number of different geophysical techniques, refraction seismic, gravity, aeromagnetic, ground magnetic and resistivity have been previously tried in the search for tin leads in this area. None of these techniques has had any real measure of success, generally because there is very little physical contrast between the weathered bedrock below a channel and the Tertiary drifts and clay within the channel.

In this programme, a new approach was suggested by the Company's Manager, Mr. R. D. Ellett; to search by Induced Polarization for the concentrations of disseminated and nodular marcasite present in the basal Tertiary material of the channel. However, during a month's preliminary test work of the Induced Polarization technique, it was found that any response obtained from the sulphide in the channel was completely swamped by very large responses believed to be due to "membrane polarization" of clay minerals in both the Tertiary alluvials and the weathering bedrock.

Dr. Hansen, the parent Company's Chief Geophysicist who came over from Americal to supervise the I. P. testing, was able to devise a method of survey and interpretation which appeared, from test work over known channels, to differentiate between the membrane polarization response from clays in Tertiary alluvium and clays in weathered granite bedrock. Results were initially presented as a plot of a ratio; values of this ratio approaching zero were generally thought to indicate bedrock channels. The method was used in Test Areas 2 and 4, where preliminary test drilling appeared to show that the method was effective. Unfortunately the programme of test drilling was seriously delayed because of the poor performance of the Failing 1500, and it was not possible to check bore more than a few of the targets provided by I. P.

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work. However, a decision to continue with the I. P. work had to be made on this limited evidence, and a full scale survey of the Arba river flats (Test Area 1) was undertaken.

It was during the last stage of this survey that disturbing evidence of non-repeatability of results began to appear. Local charging at the electrode to ground contact was observed to give effects large enough to mask the "ratio anomalies" on which the identification of bedrock channels depends. These local charging effects were not detected when the I. P. work was first begun during the wetter spring months, but appear to have increased as the ground dried out during the summer.

As soon as this phenomenon of charging at the electrodes had been established, the I. P. work was stopped andan alternative method of defining bedrock channels was sought.

It is still not clear how reliable are the indications obtained from the I. P. work. In the Arba area, where the most complete survey was made, the first test holes showed that the ground of the river flats is too deep to be mined. No further sample holes could be justified therefore, and the I. P. indications remain untested. In Test Area 2, drilling over an I. P. traverse made very late in the survey (probably with maximum electrode charging effect) shows practically no correlation between the I. P. traverse and the drilling.

The only I. P. results that are presented with this report are from the survey of the Arba area. The results are presented as contoured overlays; the first a contoured overlay of the ratio results, the other two of resistivity and frequency effects. All are for "first separation" readings taken with 100 ft. dipoles. The readings therefore represent effects down to somewhat less than 100 ft. In the case of the ratio plot, the lower values trending to the north-west across the river flat were originally thought to represent a channel, and the drill holes were therefore sited on this feature. The depth of the sample holes 20 and 21 indicate that this may be so. No further geophysical testing is proposed in the remaining programme.

(ii) Auger Drilling:

As an alternative to a geophysical method for determining the whereabouts of bedrock depressions, a trial was made of rapid augering. In the first instance a Gemco auger was hired for a week's trial. During this first week the auger rods were drilled down until it was thought basement had been penetrated; then they were retrived and an estimate made, from the

material adhering to the flights, of the depth at which basement had been penetrated. The return of material is fairly complete until the water table is reached; then only the most clayey material (e.g. siltstone, clay, very clayey drift or weathered granite) is retained in the flights. Since material penetrated moves rapidly up the flights towards the surface, it is extremely difficult to estimate where exactly different lithologies (returned to the surface or retained in the flights on withdrawal) have been penetrated. Accurate estimation of basement depth is, however, possible if the whole string of rods is withdrawn within a few moments of penetrating basement; in this instance only the last two or three feet, say, of the final rod withdrawn show any retained basement material.

Now a more sophisticated technique has been evolved in which 6 ft. auger rods are added in lots of two or three at a time, and retrieved after each addition so that the hole advances in a series of steps of 12 or 18 ft. each. This technique, coupled with careful observation of the behaviour of the rig (e.g. gravels generally cause the rig to "jump") has allowed reasonably accurate depth estimates to be made.

A more basic difficulty is that of definitely recognising the lithology penetrated from the material in the flights. Clayey drift and weathered granite for example, once they have been cut by an auger and forced into its flights, are indistinguishable. In another instance, a tenaceous dark green to black micaceous siltstone was wrongly interpreted as basement.

The Gemco auger, plus a sampling rig under the control of a geologist who is experienced at recognising the lithologies penetrated, and who can constantly review the information as it is obtained and can plan traverses accordingly, represents an efficient and reasonably fast means of prospecting for basement channels and then sampling them as they are found. This is therefore the method of testing recommended for the remainder of the programme.

(iii) Rotary Drilling:

The first preference for sample drilling was originally given to a rotary rig, because it was felt that it could prove quicker, more reliable and more accurate than the traditional percussion method. W. L. Sides and Son were awarded a contract for 1, 200 ft. of drilling using a modified Failing 1500 rig. The original proposal was to rotate a 6-inch casing down until it was seated in the soft weathered bedrock, and then to retrive the casing, holding the contents in place by a form of closing foot valves. Provision was also made on the modified rig, however, for a number of more conventional techniques

whereby the material within the casing could be removed progressively with the advance of the casing shoe.

In spite of the apparent versatility of the rig, it was never able to operate satisfactorily and had finally to be abandoned. It was given four month's trial, during which it drilled a total of 1,066 ft. in 25 holes; 8 of which were unbottomed. The rig seems to have failed primarily because skin friction on the outside of the casing, even at quite shallow depths, prevented the casing from turning or descending while internal skin friction prevented the sample from rising up into the casing. Different speeds of rotation and different cutting shoes were tried, but although some had more success than others the general problem of intense skin friction, preventing rotation or descent of the casing, remained. The last attempt to drill with the Failing used a length of specially made up casing with a narrow exterior flighting to try to break down the skin friction. Even this was not satisfactory, but subsequent experience with Gemco augers, using hollow augers, suggests that a method along these lines might work if a full range of flight widths, flight angles etc., was available for experiment.

(iv) Percussion Drilling:

The long trial period and final failure of rotary drilling with the Failing 1500 seriously set back the whole testing programme; it became necessary to continue drilling through the difficult winter rains, and two, sometimes three, churn drills were employed in an effort to speed up completion of testing.

The first drilling undertaken by the Company in North Eastern Tasmania was sample boring of Wood's Mussel Roe River property, using a percussion drill (see Report No. 128). Objections to percussion drilling as a tool for accurate assessment of alluvial deposits are discussed in Report Nos. 128 and 130. This discussion will not be repeated in detail here, but some comment is given later on in this report.

In the present drilling, vacuum sand pumps have been used to improve the clean-up of the bottom of the hole.

SUMMARY OF TESTING AT EACH TEST AREA

Test Area 1 - Southern Ringarooma:

The original proposals (Report No. 130) for testing in this area are summarised in Table A; the testing achieved is also shown. Three leads were originally proposed for testing; the Arba lead, the Ruby Flat-Mount Joseph

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lead, and, of lower priority, the Valley lead. The rich Arba lead was mined in the Arba mine along the south-east edge of the basalt-capped Arba hill. The testing for the Arba lead was based on the theory that the lead would follow a general north-westerly course under the basalt hill, and under the Ringarooma River flats to the north-west of the hill. It was hoped the lead would be rich and about 100 ft. deep.

An initial Induced Polarization survey tended to encourage this geological interpretation, as the "ratio" plot (see Plate 3a, and section on geophysical testing) showed a pattern of lows heading north-west. It was not possible completely to test the geophysical indications, and unfortunately the geophysical survey of the area was almost completed before any sample drilling could be undertaken.

Three sample holes (2 Failing 1500, 1 percussion) were put down. The two Failing holes (20 and 21) had not bottomed when the rig's physical limit was reached at 93 ft. and 130 ft.; the percussion hole (200) was taken to 155 ft. before it was finally abandoned because the ground appeared too deep to be economic. Small amounts of tin were found in each hole in the wash between 35 and 45 feet, but the lower sections contained virtually no tin and gave no encouragement to continue testing.

The conclusion to be drawn from our testing is therefore that the Arba lead, although it may exist below these river flats and may be flowing in the north-westerly direction proposed in Report No. 130, is certainly much deeper than was originally thought, and is very unlikely to be rich enough to be economically mined.

Test Area 2 - Edina-Lawry's:

Three areas within Test Area 2 were proposed for testing (see Warin and Appleby, 1964). They are shown here on Plate 6. At the first of these, (a), where it was hoped there might be a northward continuation of the Mathinna cobble wash mined at the Edina workings, the drilling of ten sample holes (Bores 1 - 10) showed high basement and no sizeable continuation of the wash. The cobble wash deposits worked at Edina, Purdue and Arcadia are therefore thought to have been terrace deposits of the present Ringarooma River, not early Tertiary leads.

At the second target, (b), where a north-east flowing lead was expected, three I. P. traverses were put in first across the expected lead direction. A large anomalous zone along one of these lines was drilled by a percussion drill. A wide bedrock channel with a 40 ft. thick bed of the distinctive

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lower unit carbonaceous marcasitic siltstone was found, but the basal gravels were found to be thin and not stanniferous.

With the increasing difficulty in obtaining valid and reliable I. P. results, a Gemco auger was used to further outline and follow the system of bedrock gutters at this target. Basement contours established by this means are shown in Plate 6. Sample drilling within these gutters showed, however, that this basal drainage had virtually no tin; the only values found being sporadically distributed in the wash immediately above the siltstone.

These results are interpreted as meaning that during the lower Tertiary the Mathinna ridge along the north-west side of Test Area 2 extended further south forming a complete barrier between this drainage and the stanniferous granite of the east end of the Mt. Cameron Range. Thus a water-shed would have existed where high Mathinna basement is now exposed in Lawry's workings. This water-shed would have divided the run-off into west-flowing streams eroding Mathinna metasediments and granite, and east-flowing streams eroding unstanniferous Mathinna metasediments only. In the later Tertiary, the effect of this water-shed was evidently removed and small concentrations of tin are sporadically distributed throughout the upper wash in the area.

The third target in the area, (c), was a possible north or north-east flowing lead at the head of Harden's Ravine, where previous mining has exposed one flank of a gutter with coarse cobbles. The testing at this target has been rather unsatisfactory; a geophysical traverse indicated a well defined bedrock channel and two sample holes, 12 and 12A (Failing 1500) were attempted at the centre of the geophysical anomaly. Both holes were unbottomed because the Failing rig could not penetrate a compact dry sand and siliceously cemented sand. Later, a line of Gemco auger holes was placed along the first of the I. P. traverse lines. The auger holes all bottomed on a very hard layer, probably of siliceously cemented drift, and did not reach bedrock or delineate a channel.

This target was originally conceived as likely to supply a small yardage of rich sluicing ground to be worked in conjunction with other deposits of similar grade and size in the area. The other two targets (a and b) are now known not to contain such deposits, and target (c) is unlikely to provide sufficient tonnage to make a viable operation on its own. No further testing there is proposed at the moment.

Test Area 3 - Scotia-Lochaber:

In Report No. 130, a search was proposed at Test Area 3 for tributary leads flowing north or north-east into the Scoloch lead, which has already been proved by Mines Department drilling to the north (see Plate 11). Drilling was delayed in this test area because the Scoloch lead area, which is a Mines Department reserve not in our Exploration Licence, was being tested by the Dorset Tin Division of Storey's Creek Tin N. L. (Aberfoyle). No testing was undertaken in the test area while the Dorset Tin Division's testing to the north continued.

Testing, using a Gemco auger followed by sample drilling, is recommended in this test area.

Test Area 4 - Endurance-Pioneer:

Area 4 is a broad area of low sandy rises and button grass flats. There are no basement rocks exposed, and the soils are thought to be derived from the weathering of Tertiary sediments rather than directly from basement. A number of leads are known or supposed to come into the area; the Endurance lead from the north, the Pioneer lead from the south, and possibly two leads from below the Dorset Flats to the east. It was originally proposed to test the area by an I. P. survey and then sample drill any geophysical indications. The actual testing achieved is shown in Table A. First a number of "ratio lows" were discovered along the main Pioneer-South Mount Cameron road, and these were re-identified along parallel traverses; then a second reconnaissance traverse was made along a track running south-west across the centre of the area. Again ratio lows were located and re-located along parallel traverses. Sample holes close to Corduroy Creek along the main road showed shallow ground and a good wash but low tin values; other holes testing I. P. ratio lows further west showed ground too deep to be economically interesting.

Test Area 7 - South Anson's Bay Road:

At this Test Area, auger drilling showed a broad bedrock depression running north and very roughly corresponding to the position of the surface swamps thought to indicate an ancestral drainage (see Report No. 130). Scattered low values were encountered in the upper wash, but the lower wash again appears to be unstanniferous. The large channel appears to be the continuation of the drainage explored at Watt's Lead (Test Area 2).

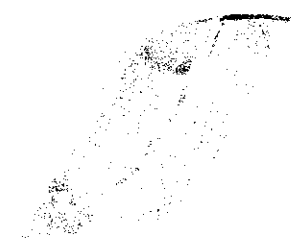

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TABLE A.

TASMANIAN TIN - SUMMARY OF TESTING

Area	Name	Description of Targets		Size of Targets: Poss. Ydge. (Mill. cu. yd)	Size of Targets: Poss. Grade (lb Sn/ cu. yd)	Type of Mining Proposition.	Original Drilling Proposals: Footage	Original Drilling Proposals: No. of Holes	I. P. Line Feet	Testing Completed: Auger Drilling Footage	Testing Completed: Auger Drilling No. of Holes	Testing Completed: Sample Drilling Footage	Testing Completed: Sample Drilling No. of Holes	Further Proposed Testing: Auger Drilling Footage	Further Proposed Testing: Auger Drilling No. of Holes	Further Proposed Testing: Sample Drilling Footage	Further Proposed Testing: Sample Drilling No. of Holes
1	Southern Ringarooma	Continuation of 3 known leads	(a) Ruby Flat/Mt. Joseph	7	.5)	Open pit, hydraulic mining.	3,000	30	(a) -	-	-	-	-				
			(b) Arba Lead	10	.5)				(b) 26,200	344	4	378	3				
			(c) Valley Lead	6	.2)				(c) -	-	-	-	-				
2	Edina-Lawry's-Elizabeth	Three suspected leads	(a) Edina	1+	.6)	Open pit, hydraulic mining.	2,500	50	(a) -	-	-	-	-				
			(b) Watt's	4	.6)				(b) 7,800	3,550	58	164	10				
			(c) Lawry's	½	.6)				(c) -	324	5	1,506	16				
									(d)* -	1,635	36	50	1				
3	Lochaber-Scotia	Search for tributary leads to Scoloch Lead	(a) "Doone" Lead	5	.4	Open pit, hydraulic mining.	2,500	50	-	-	-	-	-	1,900	38	600	12
4	Endurance-Pioneer	Search for suspected w-flowing leads	Possibly 3 leads of similar size	25	.4	Open pit, hydraulic mining.	4,000	50	32,700	-	-	1,032	14				
5	North Mussel Roe			28		Dredge	1,500	50	-	-	-	-	-	-	-	1,600	40
6	Hastie's	S-flowing continuation of Hastie's Lead		3		Open pit, hydraulic mining.	1,000	20	-	-	-	-	-	1,000	20	500	10
7	South of Anson's Bay Road	Test of n-flowing ancestral drainage to Rushy Lagoon		17		do.	4,000	50	-	2,696	32	2,234	19				
8	Amber Hill area	Possible tributary leads		2	?.4.	do.	2,000	40	-	-	-	-	-	900	18	600	12
9	Herrick Surrey	Possible lead remnant		3		do.	1,000	20	-	-	-	-	-				
10	Ringarooma Bay Beaches			250		Dredge	4,000	100	-	-	-	-	-				
11	Delta-Dugarde	Ancestral Ringarooma River		100		Dredge								1,000	20	750	15
12	**Swain's Creek**	**Possible leads**		**6**		**do.**								**900**	**18**	750	15

*Garfield Creek - Continuation of Watt's Lead.

PART II

DISCUSSION AND PROPOSALS

Discussion of Present Testing:

A comparison of original drilling proposals and testing actually completed is set out in Table A. Test Areas 1 - 4 were given first priority. Drilling at Test Area 1 (Arba) was abandoned because of the great depth of Tertiary sediments encountered, but the results also showed disappointingly low tin values - low values in an upper wash between about 35 - 45 ft., and none in the thick lower wash horizons.

Test Area 2 (Edina-Lawry's) was extensively tested, but though channels were located at a reasonable mining depth only a little tin sporadically distributed in the upper wash was found; the lower wash was barren.

Test Area 3 (Lochaber-Scotia) has not yet been tested.

In Test Area 4 (Endurance-Pioneer) a number of channels were located; most were too deep to warrant further testing, but again none showed good values in the lower wash.

The only other area in which any testing has been done is Test Area 7 (south of Anson's Bay Road). Here again, the testing revealed a large bedrock channel and scattered low values in an upper wash, but no values in the lower wash on bedrock.

The basic premise behind all testing, both our own and that of others, in the area has been that the first step is to find bedrock channels, and that most channels will contain tin. A disturbing conclusion from our testing so far is that although the programme has been outstandingly successful in finding and outlining bedrock channels, it has been singularly unsuccessful in finding tin.

There are possible explanations in each area. In Test Area 1 and Test Area 4, the channels were found to be so deep that only a very small number of sample holes were put down and some of these were not bottomed. Our testing proved them to be too deep rather than non-stanniferous. In Test Area 2 and Test Area 7, where much more sample drilling was done, the drainage that is directly on bedrock apparently is all closely related, and we may only have proved that all this particular drainage is non-stanniferous.

This type of piecemeal explanation of the failure to find tin so far seems the most likely to be true. The target that is being sought is a very elusive one; the high tin values evidently lie in narrow runs and pools which are so confined areally that even when drilling within a stanniferous gutter only some holes will intersect high values. During the testing of the Endurance Lead, it is said that with holes spaced 66 ft. apart in fences running across the lead, only one hole in every third fence on average intersected the really high values of the lead. However, if the difficulty of locating the narrow targets were the only factor operating, one would have thought that by now at least one or two holes would have given high values. Other possible explanations have therefore to be critically examined.

One unwelcome possibility is that the drilling technique could be at fault; the drill may not pick up all the tin in the hole. The tin may be constantly sinking in the slurry at the bottom of the hole and may not be adequately recovered by the vacuum sand pump. This seems very unlikely, since the same methods have been used elsewhere and in this field to test successfully for tin. The problem was examined in detail during our drilling campaign at Wood's Mussel Roe River property, where a standard percussion rig with a "clack valve" sand pump was used. Towards the end of the Wood's drilling, two tests were carried out in which dummy samples were mixed, poured into the cased hole, and drilled out. Both tests showed low tin recovery (77% and 73%) and as a result it was decided in any future programme to clean up the bottom of the hole with a vacuum sand pump, as was done this time. However, at the start of this programme a rotary rig was used, and the question of the reliability of percussion results was left in abeyance. No further confirmatory tests with dummy samples have been made yet, but it is proposed to include this in the remaining testing.

Another possibility is that cassiterite travels only very short distances in normal river channels, and the sections of leads we have located and tested may be too far from the shedding areas. This seems hardly likely to be broadly applicable to all our testing, as the leads tested are at varying distances from possible sources. In any case, the Mines Department testing of the Scoloch lead has shown this single gutter to be continuously stanniferous over a length of about $2\frac{1}{2}$ miles.

Yet another possibility has been raised (by Dr. B. Campana) that during the development of a drainage off a tin shedding area cassiterite may be deposited in channels that are "perched" within the river's own alluvium and that bear no direct relationship to the bedrock gutter. This situation is theoretically possible, and obviously occurs in some places (e.g. Malaya - see Report No. 130, page 31), but does not seem to occur in this field except

017

in the upper wash deposits. All the richer lead deposits have been mined from within bedrock depressions.

On the basis of the information obtained so far, a number of test areas have been dismissed as unlikely to provide an attractive mining property. These areas are listed below:

	Test Area	Reason for Dismissal
1.	Arba	Ground too deep.
2.	Edina-Lawry's	No tin in basal drainage.
3.	Endurance-Pioneer	Ground too deep.
7.	S. Anson's Bay Road	Ground too deep and no tin.

Because of the failure of these areas to produce a mine, the geological thinking on which their choice was based has been critically examined, but no new conflicting evidence has been found; no radically different geological interpretation has suggested itself which better fits the information we have. In fact, in many instances buried drainage has been found in the predicted positions, but has either not contained tin or been too deep for mining.

Since Report No. 130 was written, studies of likely operating costs have made the attractiveness, from the mining standpoint, of shallow ground increasingly apparent. The first deposits worked in the tin field were of course the shallowest; with time, increasingly deep deposits have been worked and all shallow ground intensively prospected. We must expect at this stage that any new lead deposits found will be under, say, 50 ft. of overburden.

There are possibilities of shallower ground in -

(a) Upper Tertiary gravels, e.g. Lawry's workings.

(b) Quaternary or Recent river deposits or Tertiary deposits whose overburden has been partly stripped by recent river action.

Operations in the upper Tertiary gravels appear to be generally low grade, and only possible where a very favourable fall allows low cost working of large yardages.

Deposits of the second type, (b), were dredged at the Dorset Flats on the Ringarooma River and averaged 0.178 lbs Sn/cu.yd. over the life of the

dredge there. Other similar deposits along the Ringarooma River can be expected to yield similar grades. The only remaining area of this type is the large area at the mouth of the Ringarooma River, known as Foster's Marsh. It is proposed to test the south-west of this area; any encouraging findings can be followed across into the Marsh.

No deposits of this type have been dredged along the Mussel Roe River; Test Area 5 (Mussel Roe Swamp) may contain this type of deposit.

Areas Proposed for Testing:

The proposals are shown in Table B. The drilling at each area is divided into Gemco augering and percussion drilling; an approximate timing is given for each. The proposal is to use two churn drills and one Gemco auguer on areas 11, 3, 12, 8 and 6, and to use a Pioneer-Stork (semi-mechanised) in a separate programme planned for Area 5 (Mussel Roe Swamp).

Should economic mineralisation be discovered, enough additional drilling will be put on programme to enable a feasibility study of the deposit to be made. Two of the areas (No. 11, Delta-Dugarde, and No. 12, Swain's Creek) were not in the original proposals of Report No. 130. No. 11 has been included because it offers a hope of finding a fairly extensive shallow deposit amenable to dredging. Area No. 12 is to the east of the Dorset Flats; the target here is the shallower parts of the leads that were found to be too deep to mine in Area 4 (Endurance-Pioneer).

UDC Report No. 135.

TABLE B.

Test Area	Gemco				Percussion				Pioneer-Stork			
	No. of holes	Approx. Depth	Total footage	Time (wks)	No. of holes	Approx. Depth	Total footage	Time (wks)	No. of holes	Approx. Depth	Total footage	Time (wks)
No. 11 (Delta-Dugarde)	20	50	1,000	2	15	50	750	5				
No. 3 (Scotia-Lochaber)	38	50	1,900	3	12	50	600	4				
No. 12 (Swain's Creek)	30	50	1,500	2	15	50	750	5				
No. 8 (Amber Hill)	18	50	900	2	12	50	600	4				
No. 6 (Hasties)	20	50	1,000	2	10	50	500	4				
No. 5 (Mussel Roe Swamp)									40	40	1,600	24
TOTALS:	126	-	5,300	11	64	-	3,000	22	40	40	1,600	24

020

230021

REFERENCES

WARIN, O. N. and APPLEBY, W. R., 1964	Tin Resources of North Eastern Tasmania and Proposed Drilling Programme. UDC Report No. 130.
KING, D., 1963	Report on the Tin Resources of Tasmania. UDC Report No. 121.
APPLEBY, W. R., 1964	Report on the Drilling of Wood's Mussel Roe River Property. UDC Report No. 128.

021

230022

Report No. 135

APPENDIX I

RECORD OF SAMPLE DRILLING

Bore	Total Depth	Depth to Bedrock	Depth of Basal Wash	Value lb Sn/ cu. yd	Value in Basal Wash lb Sn/cy	Upper Wash Depth	Upper Wash Value lb Sn/ cu. yd	Locality
1	11' 6"	8'		.06			)	Test Area 2, Target (a)
2	12'	6'		Nil			)	
3	26' 7"	16'		Trace			)	
4	16'	9' 6"		Nil			)	
5	18'	10'		Nil			)	
6	16'	10'		Nil			)	
7	10'	8'		.06			)	
8	14'	5'		Nil			)	
9	30'	29'	2'	.24	1.33		)	
10	31' 8"	29'	2'	.25	1.37		)	
12	17' 9"	u/b		.17			)	Test Area 2, Target (c)
12a	51' 7"	u/b		Nil			)	
13	12'	0		Nil			)	Test Area 4
14	15'	2'		.02			)	
15	5'	0		Nil			)	
16	39'	29'	4'	Nil			)	Test Area 4, South of
17	28'	25'	10' 6"	Nil			)	Corduroy Creek
18	32' 1"	29' 6"	7' 6"	.05			)	
19	50'	Hole abandoned.		Nil				Test Area 4, North of Corduroy Creek
20	93'	u/b (abandoned)		.04			)	Test Area 1 (Arba)
21	130'	u/b (abandoned)		.029			)	
22	78'	70'		.004			)	Test Area 2, Target (b)
23	57'	u/b (abandoned)		.002			)	
23a	106'	99'	4'	Nil			)	
24	40'	u/b (abandoned)		Nil			)	
25	115'	110'	3'	Nil			)	
26	126'	122'	2'	Trace			)	

022

230023

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APPENDIX I
Page 2.

Bore	Total Depth	Depth to Bedrock	Depth of Basal Wash	Value lb Sn/ cu. yd	Value in Basal Wash lb Sn/cy	Upper Wash Depth	Upper Wash Value lb Sn/ cu. yd	Locality
27	126'	121'	4'	.01		76'	.017)	Test Area 2, Target (b)
28	118'	112'6"		.0036		70'	.0059)	
29	128'	123'	5'	.005		75'	.0085)	
30	75'	70'		.0025		36'	.0052)	
31	60'	55'	2'	.0295		25'	.0708)	
32	80'	75'		Nil			)	
33	82'	74'		.0079		35'	.0169)	
34	93'	89'		.0022		50'	.0208)	
35	90'	84'		.0143		49'	.0262)	
36	105'	99'	5'	.0040				
37	80'	72'		.0002				
38	115'	111'		Nil				
39	126'	115'	1'	.0023				
41	98'	95'6"	0'6"	.0094				
42	83'	78'						
43	115'	u/b						
44	100'	95'						
200	155'	u/b (abandoned)		.009			)	Test Area 1 (Arba)
201	130'	113'	15'	.007			)	Test Area 4
202	145'	u/b (abandoned)		.01			)	
203	145'	u/b (abandoned)		.036			)	
204	136'	130'	15'	.004			)	
205	135'	129'		Trace			)	
206	85'	55'					)	Test Area 4 (Eastern Lead)
207	75'	62'					)	

NOTES ON SAMPLE TREATMENT

Samples from each 5 ft of sample hole are placed in a drum and sealed. Samples consisting entirely of clay are discarded, and a 5 ft sample length is varied on occasion to decrease the clay content. The volume of sample is measured on arrival at the Sample Treatment Plant by a gauge consisting of a graduated stick and a circular plate that is a loose fit in the drum. The stick is forced down to the bottom of the drum, and the flat plate is forced down on the surface of the material in the drum. The depth is read from the graduations, and the volume calculated.

The sample is then tipped through a 2" screen into a primary agitator where the clay is broken up and the slurry produced. From the primary agitator the sample is fed through a trommel and is split into three fractions:-

(1) -10 mesh;

(2) +10 mesh $-\frac{1}{4}$";

(3) $+\frac{1}{4}$".

The trommel feed is by gravity and is carefully controlled by a 3" Saunders valve. The two larger sizings are examined visually for cassiterite and, if none is present, are discarded. The -10 mesh material should contain any heavy material present, and this is raised, poured into a feed hopper, agitated and fed across a Wilfley concentrating table through a control valve. Two 40" laboratory Wilfley tables are used as the tabling is the slowest part of the sample treatment. The low-grade concentrate obtained from each sample is tabled a second time to reduce bulk before being sent for assay. The Sample Treatment Plant was designed by Mr. K. Blaskett of the CSIRO on the basis of research he carried out on samples from the N. E. Tasmanian tinfield. The detailed designs were by UCE, and the Plant was fabricated in Melbourne.

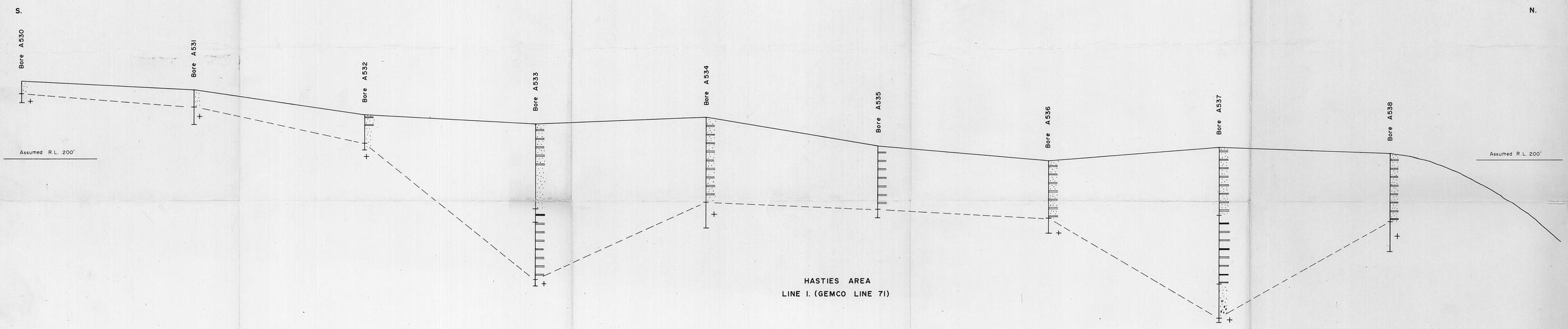
Three dummy samples have been used to check the efficiency of the Plant. For each sample a weighed amount of concentrate of non-assay was added to the volume of barren drift and processed as if it were a normal drill sample. Of these test samples, however, individual concentrates and middlings from the final re-tabling were sent for separate assay. The assays for the third dummy are not yet available, but the first two are shown in Table C.

The results of Sample A are not wholly satisfactory; the apparent excess of recovered tin may be due to trace amounts in the barren drift used to mix the dummy. Another sample of a barren drift is being run to check for this possibility. Alternatively, it represents such a small range in the actual assay value of the concentrate (6.82% to 7.29%) that it may be due to the natural variation between splits of concentrates assayed. Assaying is carried out by the Department of Mines, Launceston, and our samples are further processed (ground and split) before assaying. The very small amounts (zero of A, 0.4% of total for B) of tin in the middlings from the final tabling are an encouraging indication of the efficiency of the final concentrating of the product.

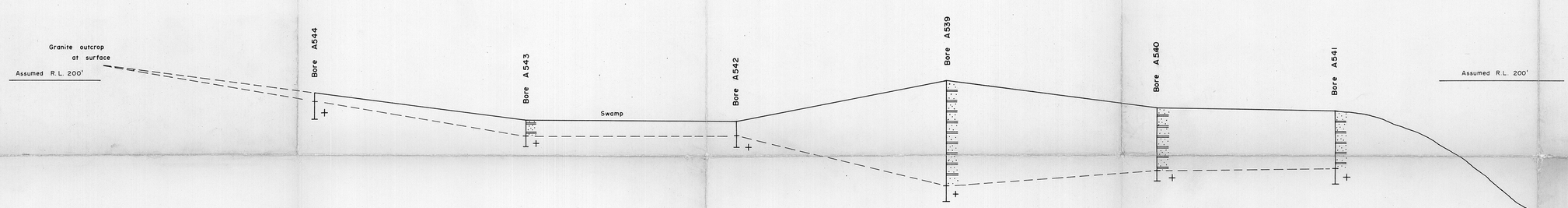
It has been found possible to process between 8 and 17 samples a day in the Sample Treatment Plant; the number depending on the amount of clay in the samples. This means the plant can deal with between 40 and 85 ft a day of sample drilling at least; as an average of 20 ft for each 100 ft drilled is of clay, which is discarded and not processed, the plant can generally deal satisfactorily with about 80 ft of drilling a day.

TABLE C

Test Sample	Total Tin Introduced (oz Sn)	Tin in Concentrate (oz Sn)	Tin in Middlings (oz Sn)	Total Tin Recovered (oz Sn)	Recovery (%)
A	0.7455	0.7968	Nil	0.7968	107
B	0.8421	0.8298	0.0032	0.8330	99.



HASTIES AREA
LINE 1. (GEMCO LINE 71)



HASTIES AREA
LINE 2.(GEMCO LINE 72)

LEGEND

- Topsoil
- Fine grained quartz sand and drift.
- Coarse grained quartz drift.
- Clayey sand.
- Clay
- Off white to light grey siltstone to claystone.
- Carbonaceous siltstone.
- Wash.
- Granite
- M — Mathinna group – shale, sandstone, very fine sandstone meta-sediments.

SCALE: Horiz. 1 inch = 50 feet.
Vert. 1 inch = 20 feet.

UTAH DEVELOPMENT COMPANY 65-409.

LITHOLOGICAL SECTIONS
HASTIES AREA
Gemco Lines 71 & 72 230626

? Plate 9

? Plate 9
Rpt 139 Oct 1966 ?

To accompany
Monthly Report for Dec, 1965.
by W.R. Appleby.

Two N-S lines to the west of Hastie Rd

Drawn by B.Madex. Feb, 1966

4242

4230

BASS STRAIT

RINGAROOMA BAY

Foster I.

Cape Portland

AMG
579500E,
5485500E.

BOOBYALLA
(Delta Dugarde)
E.L.6/63

MUSSEL ROE BAY

LITTLE MUSSEL RIVER

LAGOON

Bowlers Lagoon

FOSTERS LAGOON

MUSSEL ROE RIVER

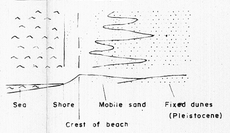
MUSSEL ROE SWAMP
E.L.6/63

LEGEND

QUATERNARY & RECENT

- Mobile shore sand
- Stabilized (Pleistocene?) dune system
- Reed swamps, river flats, tree swamps, shallow water.
- Alluvium, generally button grass flats

Shoreline features



TERTIARY

- Sand and pebbles apparently derived directly from weathering unconsolidated Tertiary sediments.
- F.T. Surface rubble of iron cemented sands etc., derived from Tertiary sediments.
- S.T. Siliceously cemented sand etc., generally indicating a shallow bedrock.
- Basalt

JURASSIC

- Dolerite

PERMIAN

- Sandstone, shale — fossiliferous in places

DEVONIAN

- Granitic intrusives

SILURIAN

- MATHINNA Group — shale, sandstone, very fine sandstone metra-sediments

- Fault, joint, photo-lineament.
- Open workings.
- Tailings.
- Roads.
- Tracks.
- Railway.

Dobsons
Delta
MacGregor
Beltz
Taylor
Canary
ABERFOYLE HILL
Aberfoyle
Richardson's
Black Duck
Vulcan
Lochaber
Native Lass
Doone
Newhaven
Scotia
Empress
GLADSTONE
Lawrys
Cybele
Traceys
New Edna
Edna
Old Star Hill
Browns
JEWEL FLATS
Purdue
Arcadia
Ambir Hill
Lanko
NORTH MUSSEL ROE SWAMP
Eastern Terrace
WOODS FLAT
Wood's
MT. CAMERON
Endurance
STH. MT. CAMERON
ENDURANCE FLATS
Hasties
Rainbow's Banka
Swains
DORSET FLATS
Eastern Leads
Pioneer
PIONEER
Sth. Pioneer
WINNALEAH
HERRICK
Echo
MOORINA
HASTIES
E.L.6/63
Briseis
Lone Brother
DERBY
Valley
Ardea
BRANXHOLM
Mt. Joseph Mine
Briseis Dam
Ruby Flat
LEGERWOOD
Mt. Paris
SHALLAMAR FLATS
Monarch
White Rocks
BOOBYALLA
BROOKS CK.
MOORINA
GREENSTONE CK.
WELD RIVER
FROME R.
PB CK.
BAKER CK.
HAIRY CK.
GREAT
GOLDFIELD
TIN HUT CK.
ROCKY CK.
SASSAFRAS
FRIEND CK.
CHUM CK.
OLD
BLACK CK.
WHITFORD
RINGAROOMA
DAVID CK.
DIXHAM
BROADSHAWS CK.
FAULT CK.
SWAINS CK.
PEACOCK
KERMODE CK.
GILSON CK.
SAPPHIRE CK.
CAMPBELL
VICARY CK.
SHALLAMAR CK.
BOOBYALLA
FIELDS
STN
F.T.

558200E
5434300N

MICROFILMED

UTAH DEVELOPMENT COMPANY

65-409

GEOLOGICAL MAP,
N.E. TASMANIAN TINFIELD.

PLATE 1

230627

Scale 1 inch to 1 Mile

Mile 1 1/2 0 1 2 3 4 5 Miles

5 cm

AMG REFERENCE POINTS ADDED

Dec 1965
~~Sept. 1966~~
Report No. 485

4230

4231

BASS STRAIT

BANKS STRAIT

Foster I.

Cape Portland

RINGAROOMA BAY

AREA 10

Bowler's Lagoon

BOOBYALLA PORT (Abandoned)

RINGAROOMA

RINGAROOMA TIER

FOSTERS MARSH

BOOBYALLA RIVER

Dobsons

Delta

Dry Gut

Beltz

MacGregor

Taylor

Canary

ABERFOYLE HILL

M.L. F

Richardson's

Abertoyle

Black Duck

Vulcan

EX. 2

Scaton Lead

AREA 1

Lochaber

Pig and Whistle Ck

Mallinsonsa

Newhaven

Doone

Native Lass

Scotia

Mary

Bridge

Tamar Ck

GLADSTONE

Empress

Lawrys

Elizabeth

EX. 3

AREA 3

AREA 2

M.L. E

Cybele (Watts)

Traceys

Garfield Ck

RUSHY LAGOON

MUSSEL ROE BAY

MUSSEL ROE RIVER

Eastern Branch

NORTH MUSSEL ROE SWAMP

AREA 5

New Edina

Old Star Hill

Edina

Brownes

JEWEL FLATS

Purdue

Arcadia

Amber Hill

Lanka

AREA 8

North Mussel Roe Pty.

Eastern Terrace

WOODS FLAT

Wood's

Sassafras Ck

Shallamar Flats

Monarch

Vicary Ck

White Rocks

Brooks Ck

Walpole Ck

Little Boobyalla River

S.P.L. 399

Shallamar Ck

EX. 1

Hasties

Rainbow's Banka

AREA 6

CAMERON MT.

Campbell Ck

Sapphire Ck

Star of Hope Ck

Gibbon Ck

Cutting Ck

Endurance

STH. MT. CAMERON M.L. D

Smith Ck

Ruby Ck

Swains

ENDURANCE FLATS

AREA 4

Corduroy Ck

A.B.C. Ck

Eastern Leads

DORSET FLATS

Swans Ck

Trout Ck

Gilham Ck

Broadsheet Ck

M.L. C

Pioneer

PIONEER

Sth. Pioneer

AREA 9

WINNALEAH

David Ck

HERRICK

RINGAROOMA

Wynyard

Greensone Ck

Echo

MOORINA

Doolish Ck

Trushka Ck

RAILWAY

Lone Brother

Briseis

DERBY

Sarah Ann

MUTUAL HILL

Mutual

M.L. B

Cascade R.

Briseis Dam

Valley

Valley Ck

Roma M.L. A

Arba

Boobyalla Ck

Lone Star Ck

Black Ck

BRANXHOLM

Mt. Joseph Mine

Legerwood Ck

Ruby Flat

Boulder Ck

S.P.L. 400

Mt. Paris

LEGERWOOD

E.L. 6/63 (384 sq. ml.)

P.B. Ck

Weld River

Frome R.

GREAT

LEGEND

WORKED GROUND SHOWN :- Swains

AREAS FOR TESTING SHOWN :-

SPECIAL PROSPECTING LICENSES, MAIN. MINERAL LEASES AND EXEMPT AREAS WITHIN E.L.6/63 SHOWN :- (See reference below)

S.P.L. 399	V. Wood	14·5 sq. ml.
S.P.L. 400	W.C. Burrows	4 sq. ml.
M.L. A	A.S. Edwards	151 ac.
M.L. B	Briseis Tin N.L.	
M.L. C	V. Wood	
M.L. D	Endurance Tin Mining Co. N.L.	
M.L. E	H.C. Lawry	
M.L. F	Storeys Ck. Tin Mining Co. N.L.	760 ac.
EX. 1	Exempt from the Mining Act 1929	13980 ac.
EX. 2	" " "	1750 ac.
EX. 3	" " "	360 ac.

All boundaries approximate only.

UTAH DEVELOPMENT COMPANY

65-409

PLAN SHOWING AREAS PROPOSED FOR DRILLING AND GEOPHYSICAL TESTING, N.E. TASMANIA.

230028

PLATE 2

5 cm

Scale 1 Inch to 1 Mile

Mile 1 1/2 0 1 2 3 4 5 Miles

December 1965
Report No. 135

RIVER

RINGAROOMA

LINE 23

LINE 19

LINE 18

LINE 25

LINE 21

LINE 16

LINE 24

LINE 22

? ORMUZ

LINE 23

TASMAN HIGHWAY

ROMA

LINE 15

LINE 17

LINE 20

ARBA

WALSH'S

Black Ck.

RIVER

RINGAROOMA

TASMAN HIGHWAY

BRANXHOLM

Branxholm Ck.

UTAH DEVELOPMENT COMPANY

65-409

LEGEND

TERTIARY

- Basalt
- Sand, clay and pebble gravel — poorly exposed.

DEVONIAN

- Granitic rocks.

SILURIAN

- Mathinna Group — metasediments.

- River flats.
- I.P. Traverse lines.
- Tracks.
- Fences.

GEOLOGICAL MAP, TEST AREA 1, ARBA

PLATE 3

5 cm

1000 500 0 1000 2000 Feet.

SCALE : 1 inch = 1000 feet.

Drawn by V. F. Chamagne.

230029

Dec. , 1965
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230030

RIVER

RINGAROOMA

LINE 19 · LINE 20 · LINE 21 · LINE 22 · LINE 23 · LINE 17

? ORMUZ

ROMA

TASMAN HIGHWAY

ARBA

Black Ck.

Membrane Polarization Ratio

$$MPR = \frac{PFE(10-5) \times 100}{PFE(10-0.3) - PFE(10-5)}$$

CONTOURS OF RATIO VALUES

PLATE 3a

4233

Report 135

RINGAROOMA RIVER

TASMAN HIGHWAY

BRANXHOLM

Branxholm Ck.

UTAH DEVELOPMENT COMPANY

65-409

LEGEND

TERTIARY

- Basalt
- Sand, clay and pebble gravel — poorly exposed.

DEVONIAN

- Granitic rocks.

SILURIAN

- Mathinna Group — metasediments.

- River flats.
- I.P. Traverse lines.
- Tracks.
- Fences.

GEOLOGICAL MAP, TEST AREA 1, ARBA

PLATE 3

5 cm

1000 500 0 1000 2000 Feet.

SCALE : 1 inch = 1000 feet.

Drawn by V. F. Chamagne.

230029

Dec. , 1965
Report No. 135.

4232

230031

RINGAROOMA

LINE 19

LINE 23

LINE 18

LINE 25

LINE 16

LINE 21

LINE 24

LINE 22

? ORMUZ

LINE 15

ROMA

TASMAN HIGHWAY

LINE 17

LINE 20

ARBA

Black Ck.

CONTOURS OF FREQUENCY EFFECT

PLATE 3b

4234

Report 135

RINGAROOMA

TASMAN HIGHWAY

BRANXHOLM

Branxholm Ck.

UTAH DEVELOPMENT COMPANY

65-409

LEGEND

TERTIARY

Basalt

Sand, clay and pebble gravel — poorly exposed.

DEVONIAN

Granitic rocks.

SILURIAN

Mathinna Group — metasediments.

River flats.

I.P. Traverse lines.

Tracks.

Fences.

GEOLOGICAL MAP, TEST AREA 1, ARBA

PLATE 3

5 cm

1000 500 0 1000 2000 Feet.

SCALE : 1 inch = 1000 feet.

Drawn by V. F. Chamagne.

230029

Dec. , 1965
Report No. 135.

4232

230032

RINGAROOMA

LINE 19 LINE 23 LINE 18 LINE 25 LINE 26 LINE 21 LINE 24 LINE 22 LINE 23 LINE 15 LINE 20

200 150 400 300 500

? ORMUZ

ROMA

ARBA

TASMAN HIGHWAY

RINGAROOMA RIVER

TASMAN HIGHWAY

BRANXHOLM

Branxholm Ck.

Black Ck.

WALLS

CONTOURS OF RESISTIVITY

PLATE 3c

4233

Report 135

UTAH DEVELOPMENT COMPANY

65-409

LEGEND

TERTIARY

- Basalt
- Sand, clay and pebble gravel — poorly exposed.

DEVONIAN

- Granitic rocks.

SILURIAN

- Mathinna Group — metasediments.
- River flats.
- I.P. Traverse lines.
- Tracks.
- Fences.

GEOLOGICAL MAP, TEST AREA 1, ARBA

PLATE 3

5 cm

1000 500 0 1000 2000 Feet.

SCALE : 1 inch = 1000 feet.

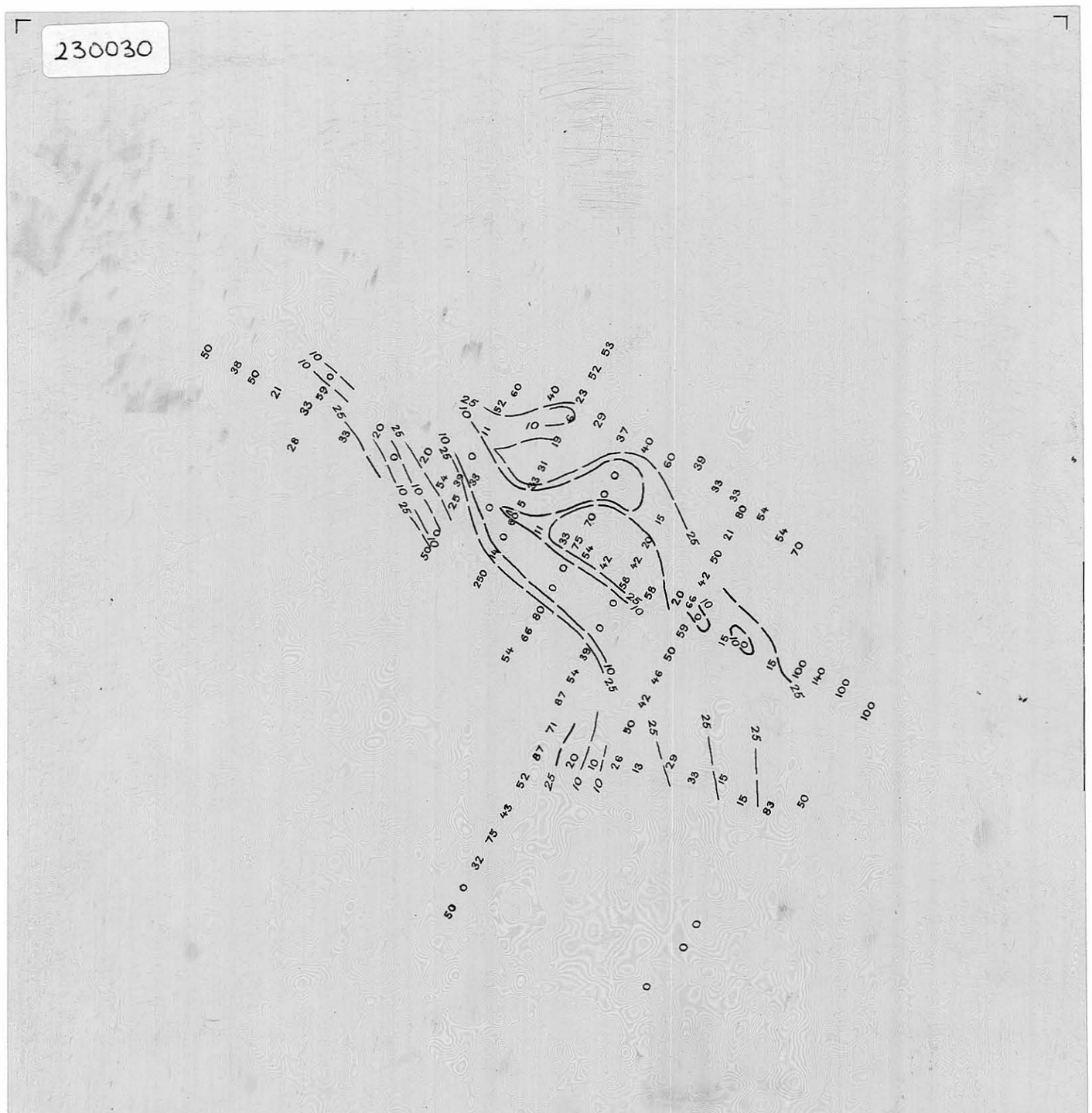
Drawn by V. F. Chamagne.

230029

Dec. , 1965
Report No. 135.

4232

230030



CONTOURS OF RATIO VALUES

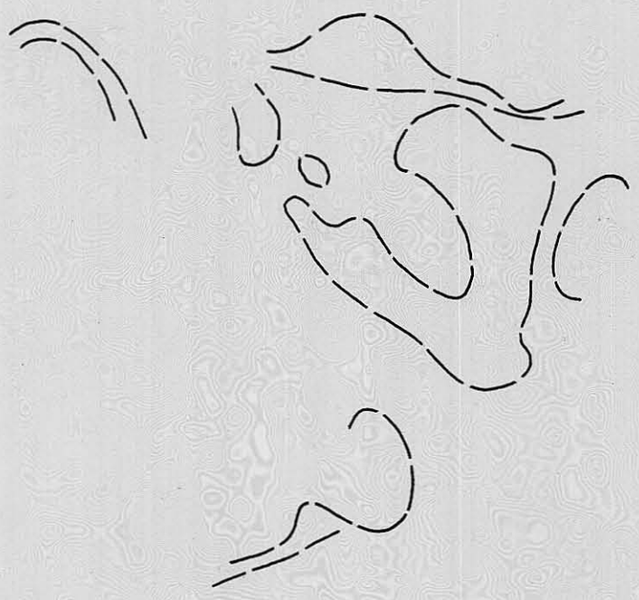
PLATE 3a

Membrane Polarization Ratio

$$MPR = \frac{PFE(10-5) \times 100}{PFE(10-0.3) - PFE(10-5)}$$

4233 Report 135

230031

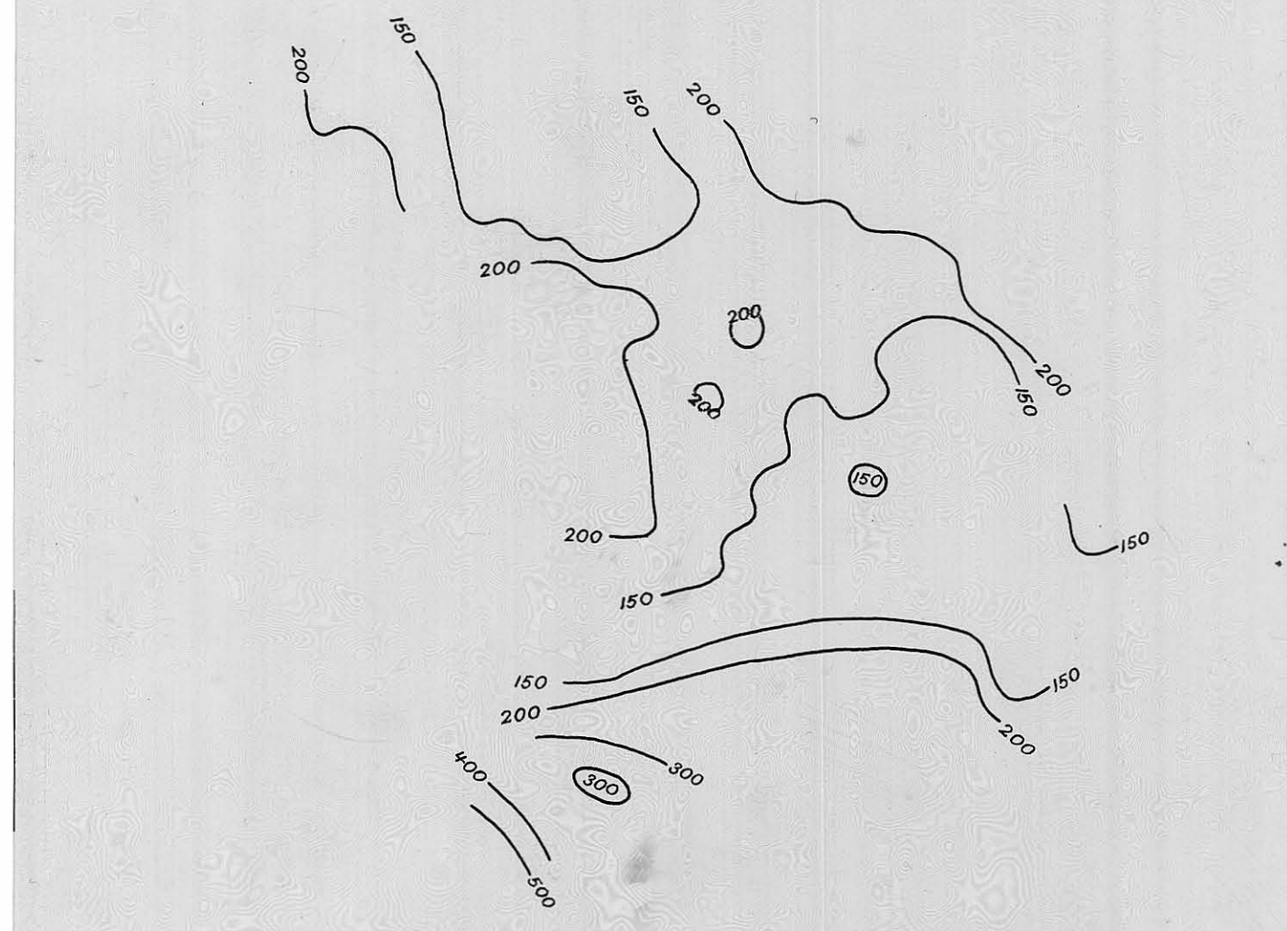


CONTOURS OF FREQUENCY EFFECT

PLATE 3b

4234

230032



CONTOURS OF RESISTIVITY

PLATE 3c

4235 Report 135

RINGAROOMA RIVER

LINE 23

LINE 22

LINE 19

LINE 18

LINE 25

LINE 16

LINE 24

LINE 15

LINE 21

LINE 17

LINE 20

CREEK

BRANXHOLM

TASMAN HIGHWAY

ROMA

ORMUZ

ARBA

WALSH'S

No. 14 Nil. 12'

No.13 Nil. 33'

No.12 0.05 20'

No.11 0.07 25'

No.5 Nil 20'

No.6 Tr. 40'

No.4 0.26 25'

No.7 Tr. 50'

No.3 0.12 26'

No.8 0.18 26'

No.10 0.06 75'

No.2 0.20 30'

No.9 0.16 41.5'

No.1 0.26 32'

200 Tr. 155' Not Bottomed (Percussion)

Not Bottomed, 130' 120'

Not Bottomed Tr. 93' Tr. 130' (Failing 150')

Gr 56' Gr 60' Gr 95'? 132 76' 133 88' 131 90'

198 191 154 170 206

LEGEND

TERTIARY

V — Basalt.

Sand, clay and pebble gravel — poorly exposed.

DEVONIAN

\+ — Granitic rocks.

SILURIAN

Mathinna group — meta-sediments.

Workings.

— o — I.P. Traverse lines.

River flats.

Approx. position, Mines Department drilling 1931.

Approx. position shallow bores (not to basement), driller unknown.

Gemco auger holes.

Churn drill holes of present programme.

UTAH DEVELOPMENT COMPANY

65-409

I.P. TRAVERSES
ARBA AREA, TASMANIA.

PLATE 4

230033

5 cm

400 200 0 400 800 1200 FEET

SCALE : 1 inch = 400 feet (approx)

Drawn by B. Madex.

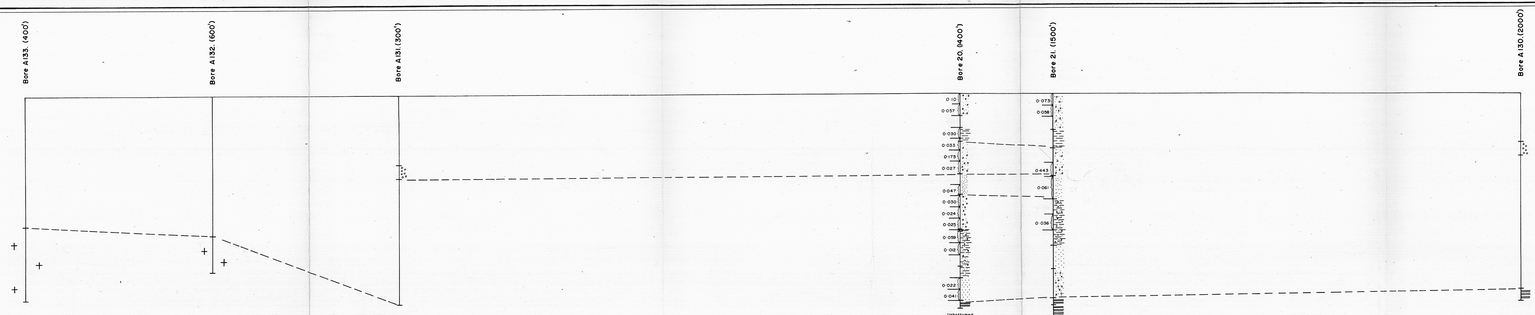
Dec, 1965
Report No. 135

4236

LEGEND

- Topsoil.
- Fine grained quartz sand and drift.
- Course grained quartz drift.
- Clayey sand.
- Clay.
- Siltstone.
- Carbonaceous siltstone.
- Wash.
- Granite.
- M — Mathinna group — shale, sandstone, very fine sandstone meta — sediments.

4237



LINE 15

UTAH DEVELOPMENT COMPANY

65-409

LITHOLOGIC SECTIONS & Sn. VALUE OF BOREHOLES IN THE ARBA AREA

TEST AREA No. 1

VALUES QUOTED AS LBS. Sn./CUB.Y.D.

PLATE 5

5 cm

SCALE Horiz. 1 inch = 50 feet
Vert. 1 inch = 20 feet

230024

Drawn by B Wilson

Dec. 1965.
Report No. 135.

4237

4238

ELIZABETH

Shallow working to granite bedrock

Shallow no bedrock

Ternary av. 20 feet deep on granite bedrock (No tin indicated)

Indications of deeper ground

Positions indistinct

Granite boulders

Water race

Creek

Garfield

Dam

Mathinna bedrock in tailrace

A4

30' deep - no bedrock exposed

Granite bedrock in tailrace

Shallow (10') no bedrock exposed

DAM

Humic lignitic clay overlying Mathinna bedrock

LAWRY'S No.1

Worked to top of middle unit

No bedrock

Granite bedrock

Shallow working granite bedrock

Shallow pits on granite

RAVINE

Only upper unit worked

Worked to bedrock granite and Mathinna

LAWRY'S CENTRAL PIT

Shallow

Upper unit on high Mathinna bedrock worked out

Water filled

Worked to top of middle unit

Worked to top of unit 2

Shallow Mathinna bedrock in old races

Shallow Mathinna bedrock

Workings overgrown and caved

WATTS (CYBELE)

Granite bedrock

Cybele Creek

TRACEYS

Granite bedrock

No bedrock exposed

Shallow workings in granite bedrock

Workings undercut by humic clay

Indications of deeper ground

Positions indistinct

Granite boulders

Indicated stanniferous gutter containing 90,000 cub. yds at 0·31 lbs Sn/cub. yd.

E 987·25

S.T.

GREAT MUSSEL ROE RIVER

NEW EDINA

Mathinna cobble wash

River flats

Lark Creek

Shallow granite (Nil to trace)

Deepening

Shallow workings on granite

DAWS

Cobble workings

Mathinna overgrown

EDINA

Remnants of Mathinna wash in overgrown workings

Dam

Shallow granite

Tailings

RINGAROOMA RIVER

JEWEL FLATS (Purdue Extended)

PURDUE

Cobble

ARCADIA

Minor tin

Deeper Ground

"A little tin"

Map Fraser

LEGEND

RECENT
- Alluviated areas - button grass flats - in part on Tertiary clays.
- River flats, swamps - subject to flooding

TERTIARY
- Sandy rises - derived from weathering of Tertiary drift and wash

DEVONIAN
- Granitic rocks

SILURIAN
- Mathinna Beds - shale and fine grained siliceous meta sediment

B2 — Previous drill traverses - see table "J" Report 135

Indications of deeper ground - possible leads.

180/140' — Gemco auger hole No. of hole – R.L. of basement

157 (S) 125' — Sample drill hole No. of hole - R.L. of basement

(ST) — Areas with outcrops of silicified Tertiary drift thought to imply shallow bed rock

220' — Subsurface basement contours R.L. from State Railway Datum - Herrick

Workings

Tailings

o gr Borehole drilled to granite bedrock

o u/b Borehole "un-bottomed"

o 265' Total depth of borehole

UTAH DEVELOPMENT COMPANY

65-409

GEOLOGICAL MAP TEST AREA No.2

PLATE 6

5 cm

SCALE: 1 inch = 400 feet

230035

Geology by: O.N. WARIN

Drawn by: P. STEWART

Date: DECEMBER 1965

REPORT No. 135

4238

LAWRY'S No.1

LAWRY'S CENTRAL PIT

HARDEN'S RAVINE

Garfield Creek

WATTS (CYBELE)

Cybele Creek

TRACEYS

NEW EDINA

DAWS

EDINA

PURDUE

JEWEL FLATS (Purdue Extended)

ARCADIA

RINGAROOMA RIVER

Lark Creek

Tailings

Dam

Water race

Shallow no bedrock

Granite bedrock

Mathinna bedrock in fairface

Humic lignitic clay overlying Mathinna bedrock

Worked to top of middle unit

Worked to bedrock granite and Mathinna

Water filled

Workings overgrown and caved

Workings undertain by humic clay

Indications of deeper ground

Shallow granite (Nil to trace)

Mathinna cobble wash

River flats

Remains of Mathinna overgrown cobble workings

Tertiary av. 20 feet deep on granite bedrock (No tin indicated)

Shallow granite (Nil to trace)

Shallow granite

Shallow Mathinna bedrock

Bottomed on silicified drift (no Sn.)

Shallow workings to granite bedrock

Indications of deeper ground

Nil to trace

Shallow granite

Shallow workings to granite bedrock

Granite bedrock

Shallow granite

Indications of deeper ground

Shallow granite

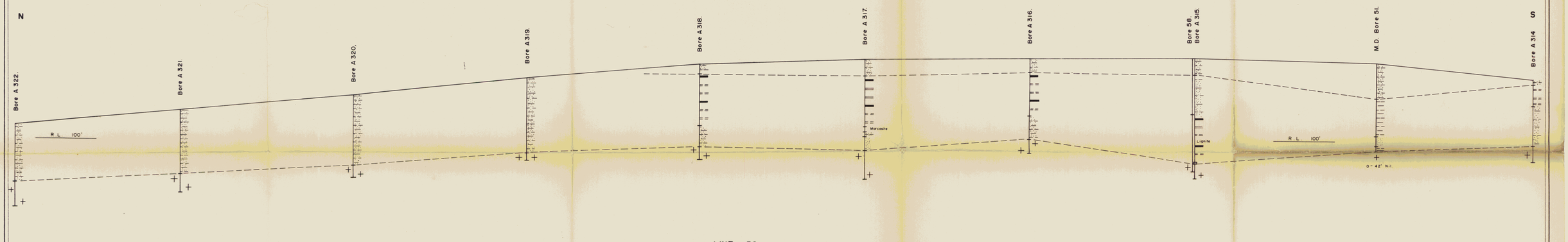
Shallow granite

Shallow granite

4239

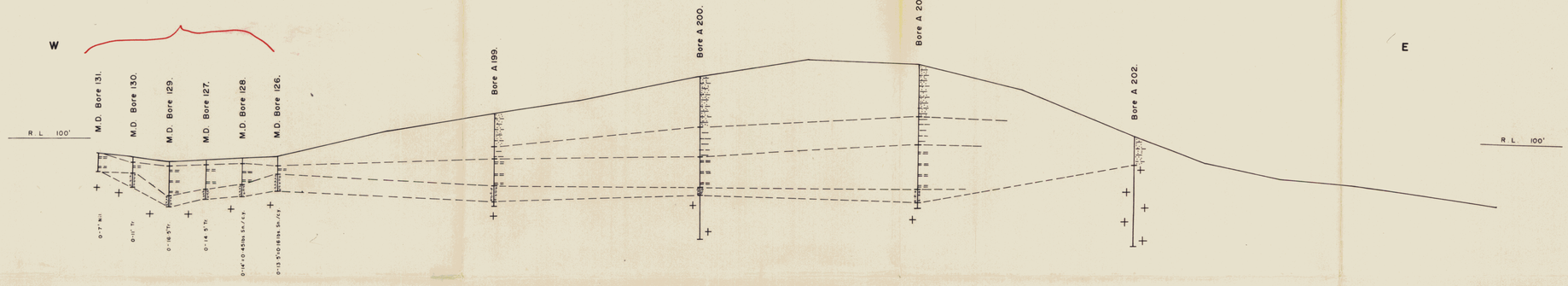


LINE 51

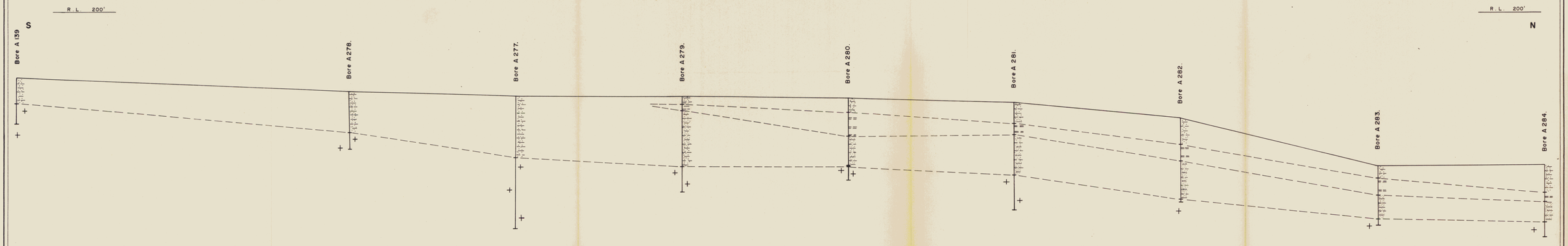


LINE 52

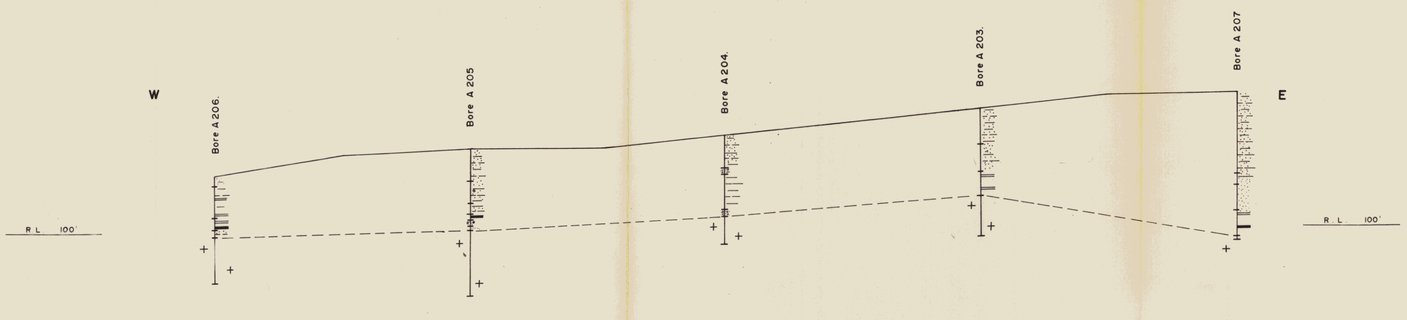
MINES DEPT.
Projected(?) see plan 1311/25.



LINE 38



LINE 47



LINE 37

Note
Refer to plate 5 for legend.

UTAH DEVELOPMENT COMPANY

65-409

LITHOLOGICAL SECTIONS
GARFIELD CREEK (PART)
TEST AREA No. 2

230036

PLATE 7

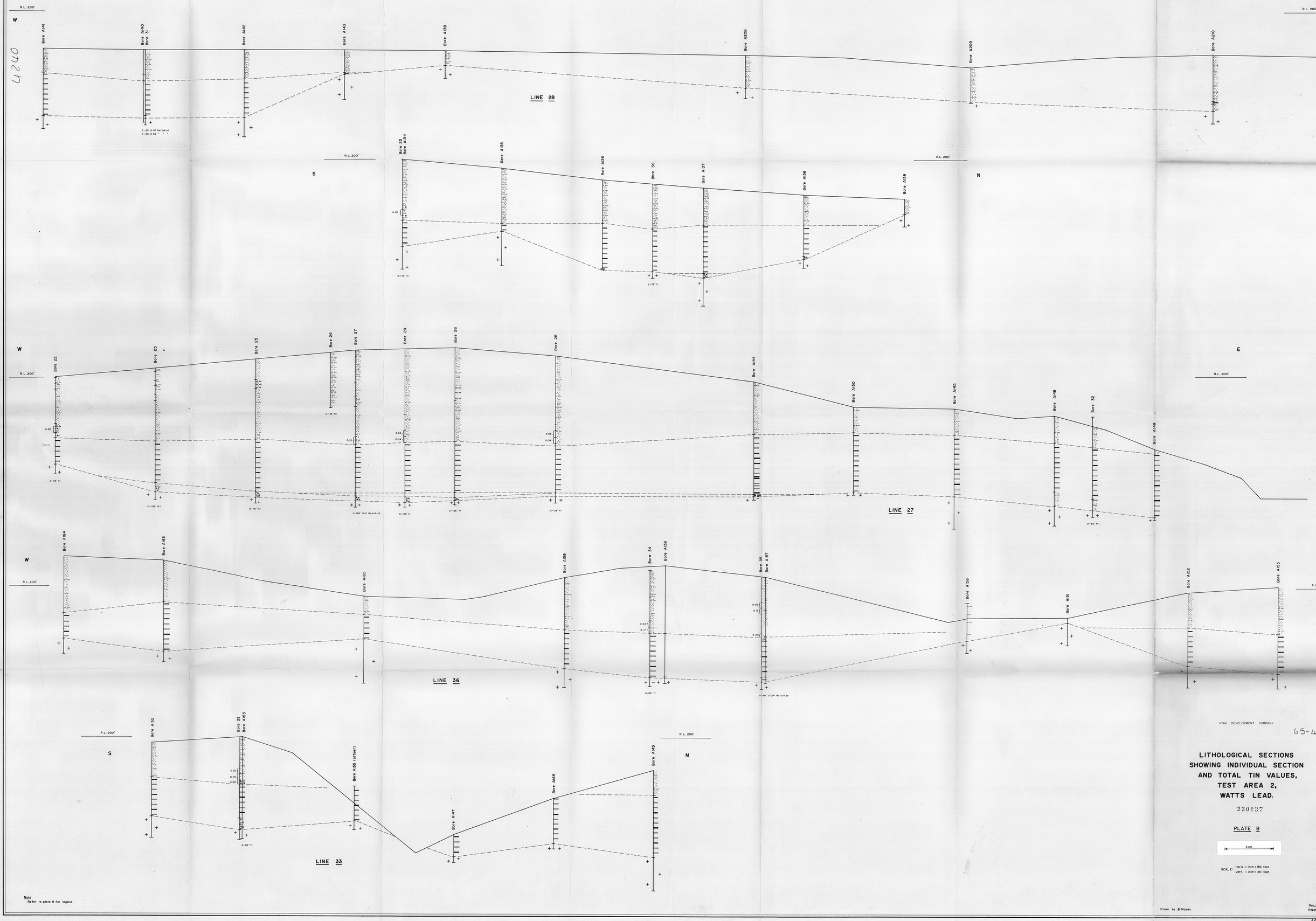
5 cm

SCALE : Horiz. 1 inch = 50 feet.
Vert. 1 inch = 20 feet.

Drawn by: B. Wilson.

Report No. 135.
Dec. 1965.

4239



Note
Refer to plate 5 for legend.

UTAH DEVELOPMENT COMPANY

65-409

LITHOLOGICAL SECTIONS SHOWING INDIVIDUAL SECTION AND TOTAL TIN VALUES, TEST AREA 2, WATTS LEAD.

230637

PLATE 8

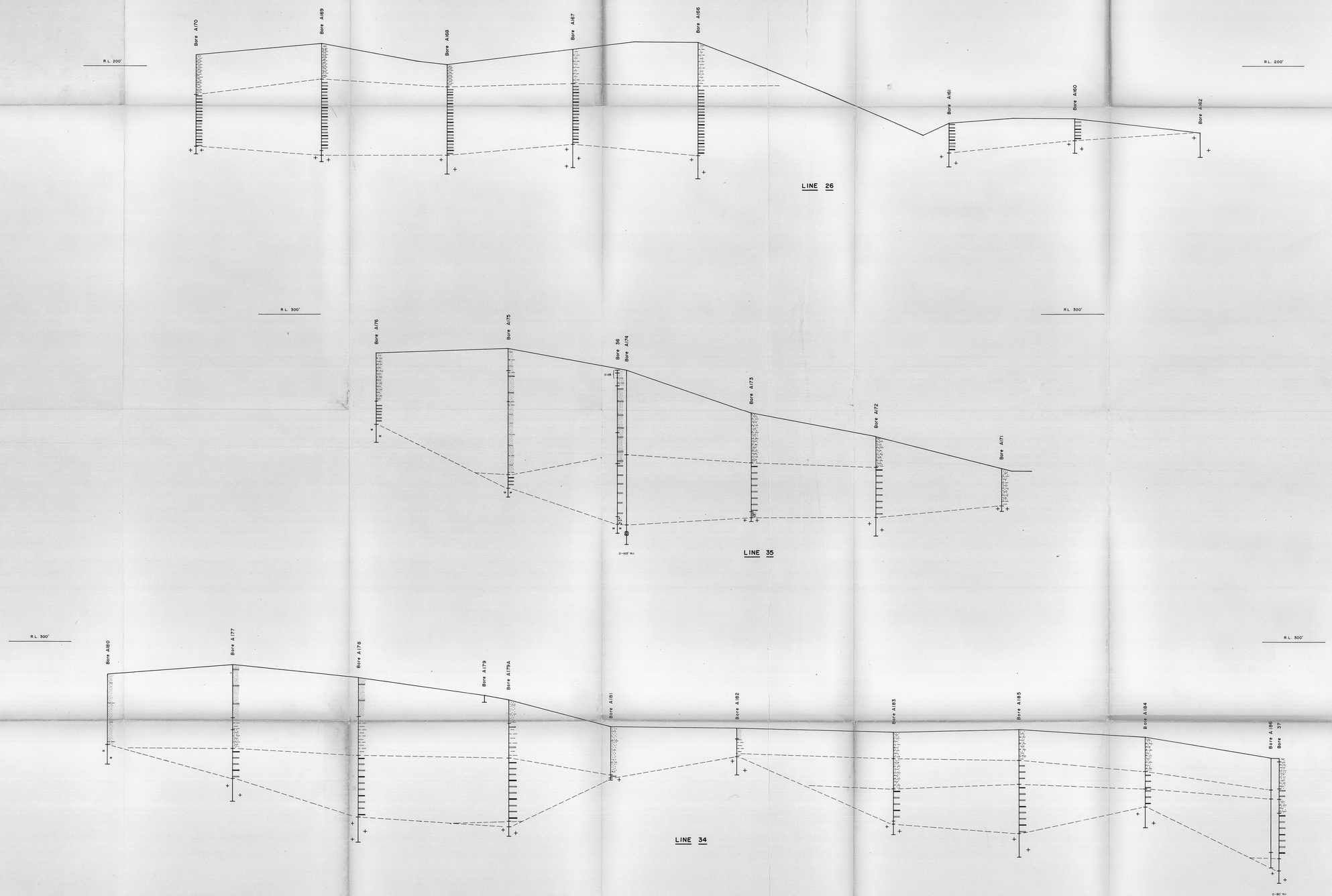
5 cm

SCALE: Horiz. 1 inch = 50 feet.
Vert. 1 inch = 20 feet.

Drawn by B. Modes.

Dec., 1965
Report No. 135.

4240



UTAH DEVELOPMENT COMPANY

65-409

LITHOLOGICAL SECTIONS SHOWING INDIVIDUAL SECTION AND TOTAL TIN VALUES, TEST AREA 2, WATTS LEAD.

230038

PLATE 9

5 cm

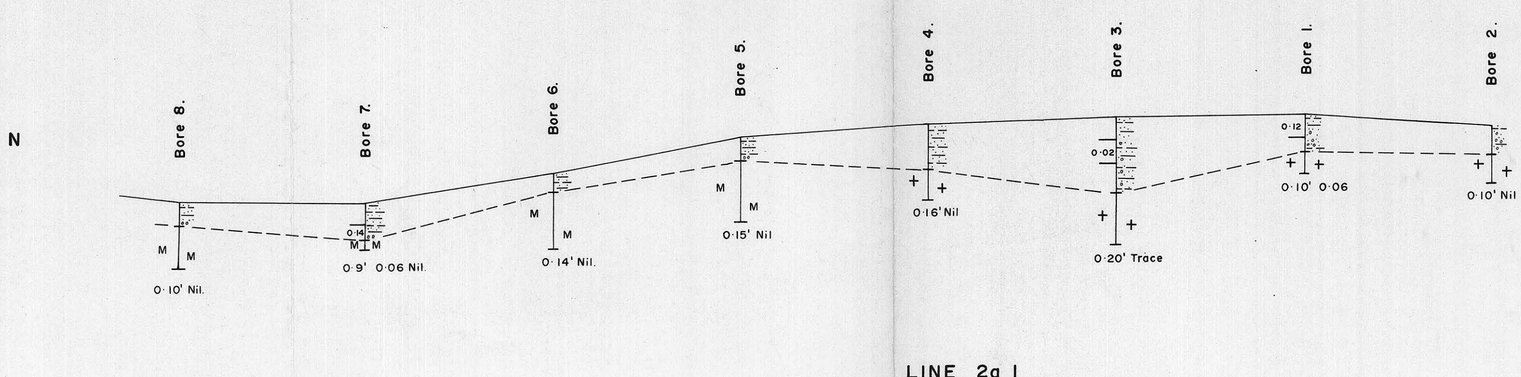
SCALE: Horiz. 1 inch = 50 feet.
Vert. 1 inch = 20 feet.

Note
Refer to plate 5 for legend.

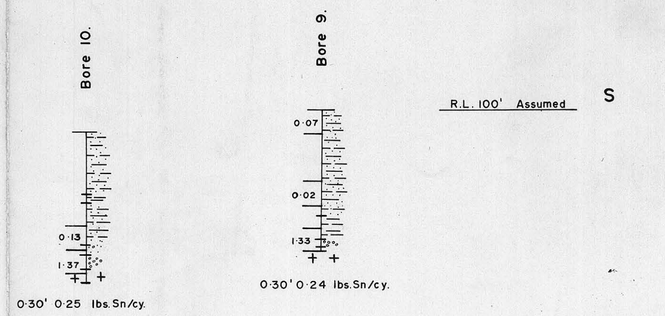
Drawn by B. Modex.

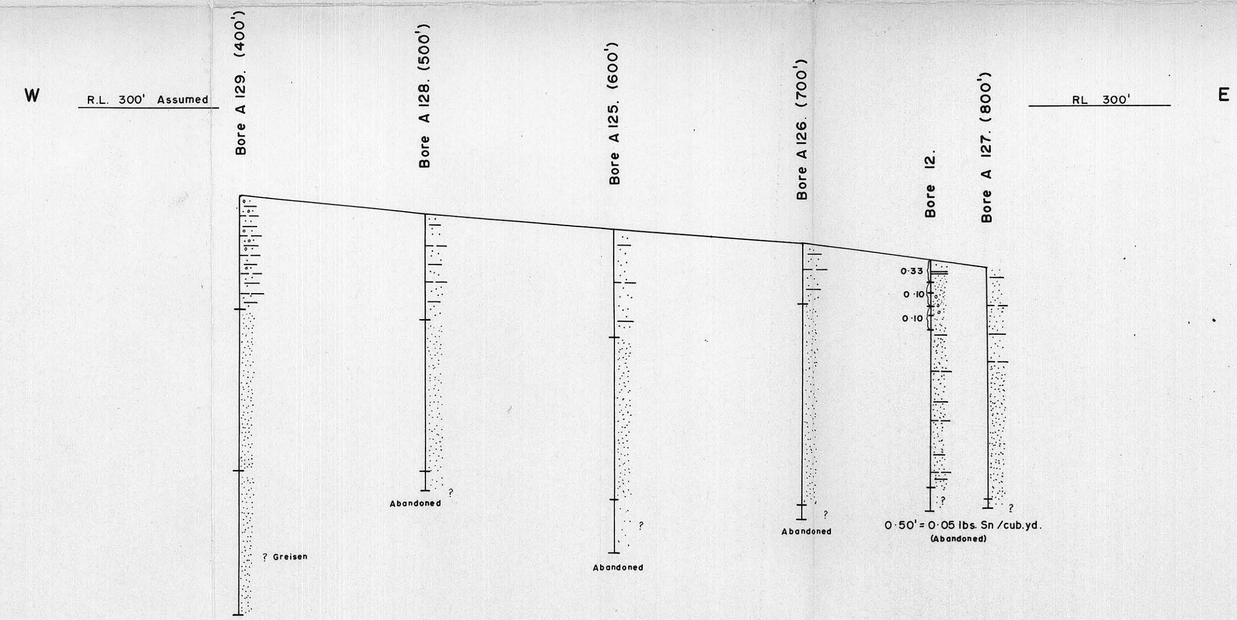
Dec. 1965
Report No. 135

4241



LINE 2a 1





LINE 8

Note.
Refer to plate 5 for legend.

MICROFILMED

UTAH DEVELOPMENT COMPANY

65-409

LITHOLOGICAL SECTIONS SHOWING INDIVIDUAL SECTION AND TOTAL TIN VALUES, TEST AREA 2,

5 cm

PLATE 10

230039

SCALE Horiz. 1inch = 50feet.
Vert. 1inch = 20 feet.

Drawn by B.Wilson

Report No. 135
Dec. 1965

4243

AREA EXEMPT FROM THE MINING ACT FROM 31-1-1938 SUBJECT OF AGREEMENT BETWEEN DEPT. OF MINES AND STOREY'S CREEK TIN MINING COMPANY (DORSET TIN DIVISION)

BLOCK No.6
585,166 cub yds at 0.30 lbs Sn/cub yd indicated

BLOCK No.5
1,259,871 cub yds at 0.29 lbs Sn/cub yd indicated

BLOCK No.4
258,964 cub yds at 0.45 lbs Sn/cub yd indicated

BLOCK No.3
1,384,525 cub yds at 0.39 lbs Sn/cub yd indicated

BLOCK No.2
579,687 cub yds at 0.32 lbs Sn/cub yd indicated

BLOCK No.1
315,000 cub yds at 0.31 lbs Sn/cub yd indicated

DOONE WORKINGS

MURRAY AND RICHARDS

NEWHAVEN WORKINGS

MALLINSON'S WORKINGS

LOCHABER MINE

SCOTIA MINE

STOREY'S CREEK

PIG AND WHISTLE CREEK

RINGAROOMA

RIVER

DAM

Tailings

LEGEND

TIN VALUES OF BORES

- Nil and trace
- Less than 0·1 lbs Sn/cu yd.
- 0·1 - 0·2 Sn/cu yd
- 0·2 - 0·4 "
- 0·4 - 0·6 "
- 0·6 - 0·8 "
- 0·8 - 1·0 "
- Greater than 1·0 Sn/cu yd.

RECENT
- Alluviated areas - button grass flats
- River flats, swamps

TERTIARY
- Drift, wash, fine sand, clay.

SILURIAN
- Mathinna beds – slate, shale, fine grained siliceous meta - sediment generally soft, deeply weathered and not exposed except in old workings.

- Workings
- Proposed Gemco auger traverse
- Approx. basement surface contours (assumed data)
- B17 Areas of previous drilling - see Table "L"

UTAH DEVELOPMENT COMPANY

65-409

GEOLOGICAL MAP

TEST AREA No. 3

230040

PLATE II

5 cm

SCALE : 1 inch = 1000 ft.

Geology by O. N. WARIN

Drawn by P. STEWART

Date DECEMBER 1965

4244

Report No. 135

LEGEND

RECENT

Alluviated areas - button grassflats - in part on Tertiary clay

River flats - swamps, subject to flooding

TERTIARY

Sandy rises - derived from weathering of Tertiary drift and wash.

DEVONIAN

Granitic rocks

Workings

I.P. Traverse line

○ 206 Sample hole

◎ A271 Auger hole

275' R.L. of Granite surface

200 Sub surface contour of Granite basement

Rudy Creek

Corduroy Creek

A.B.C. Creek

Dam.

DORSET RIVER FLATS

LINE 15

LINE 14

LINE 13

LINE 12

LINE 11A

LINE 11

LINE 10

LINE 7

EASTERN LEADS WORKINGS

UTAH DEVELOPMENT COMPANY

65-409

GEOLOGICAL MAP
TEST AREA 4
ENDURANCE - PIONEER

230041

5 cm

PLATE 12

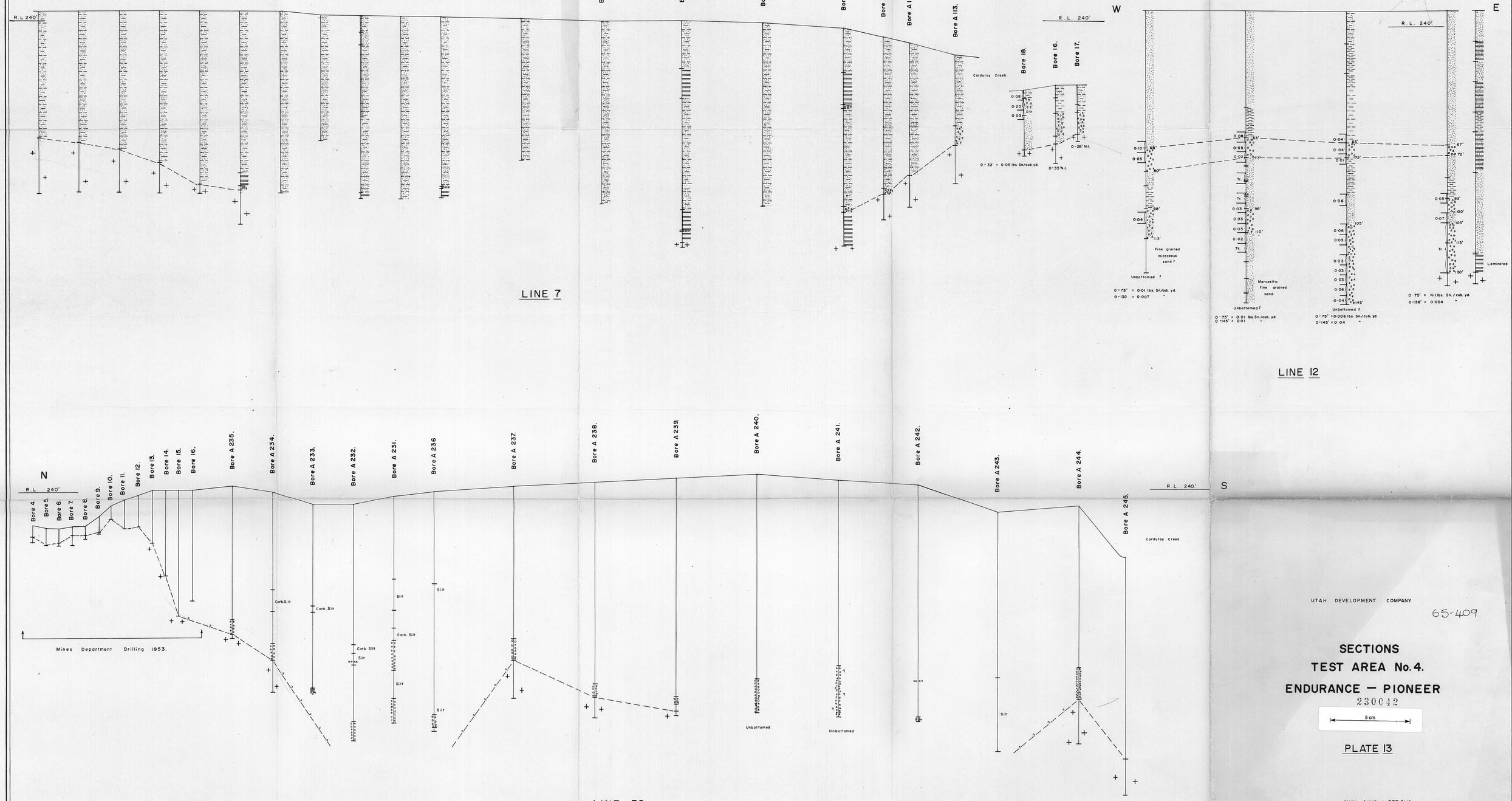
SCALE : 1 inch = 400 feet

400 200 0 400 800 1200 FEET

December 1965
Report No. 135

Geology by O.N. Warin

4245



LINE 7

LINE 12

LINE 39

Note
Refer to plate 5 for legend.

UTAH DEVELOPMENT COMPANY

65-409

SECTIONS
TEST AREA No. 4.
ENDURANCE — PIONEER

230642

5 cm

PLATE 13

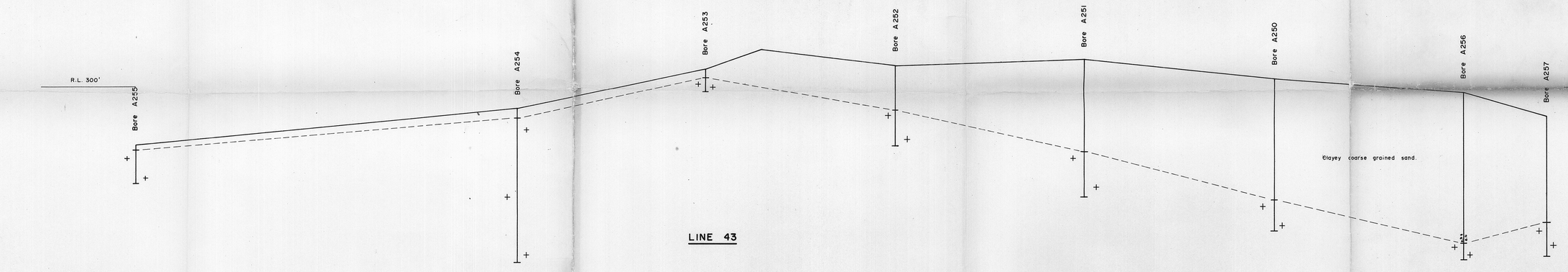
SCALE Horiz. 1 inch = 200 feet.
Vert. 1 inch = 20 feet.

Drawn by J. Schliker.

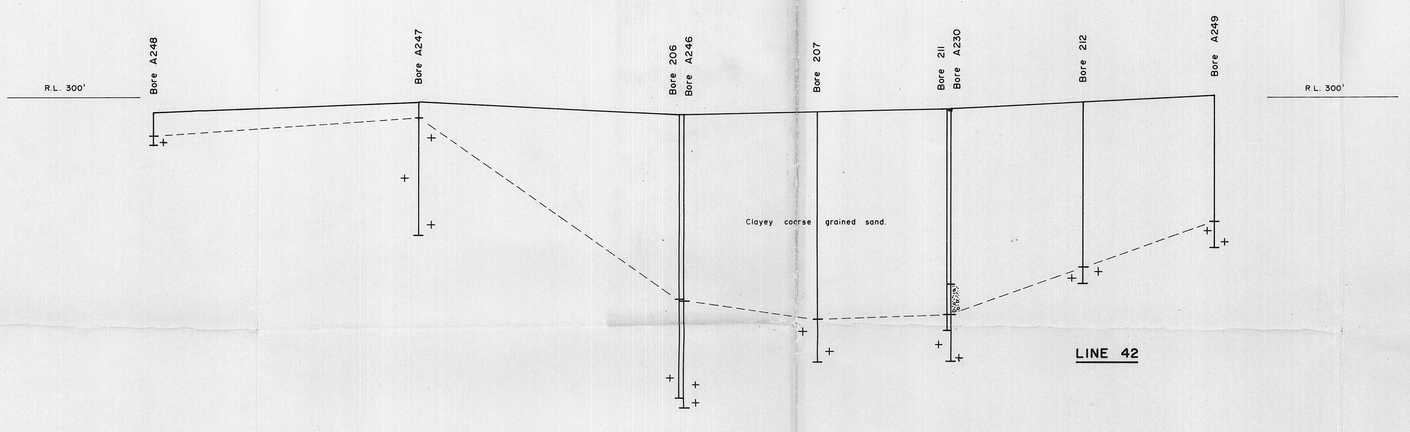
Dec. 1965.
Report No. 135

4248

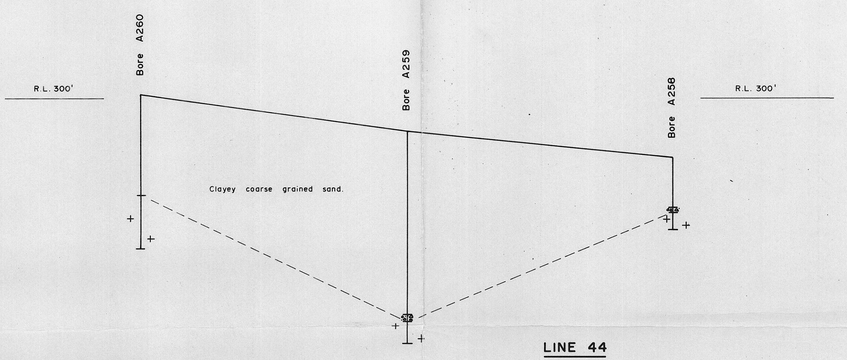
4247



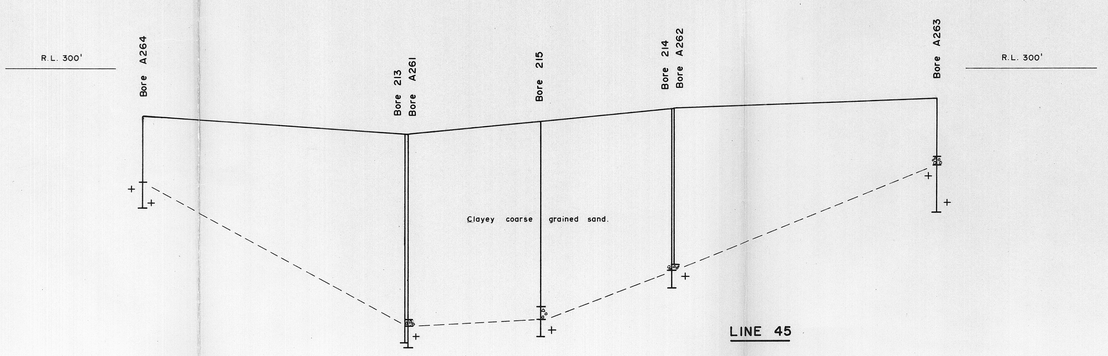
LINE 43



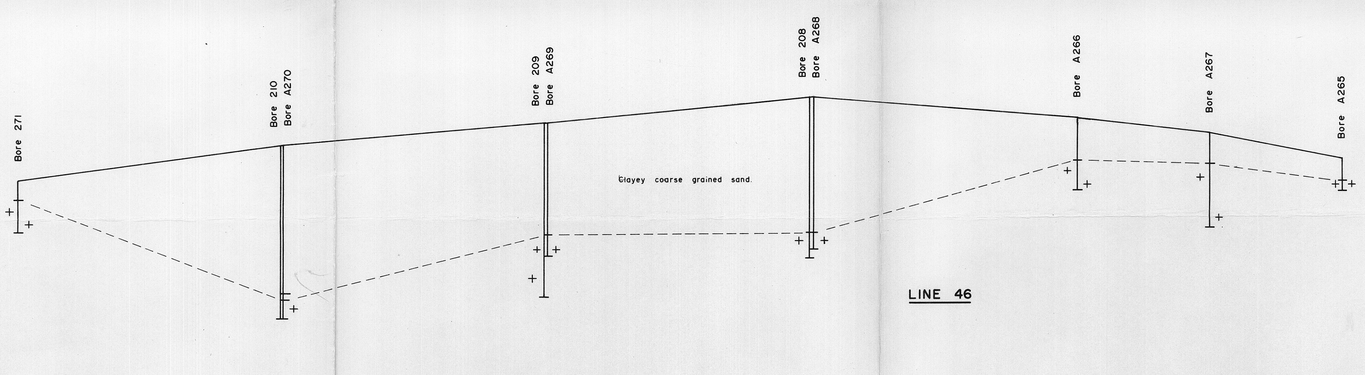
LINE 42



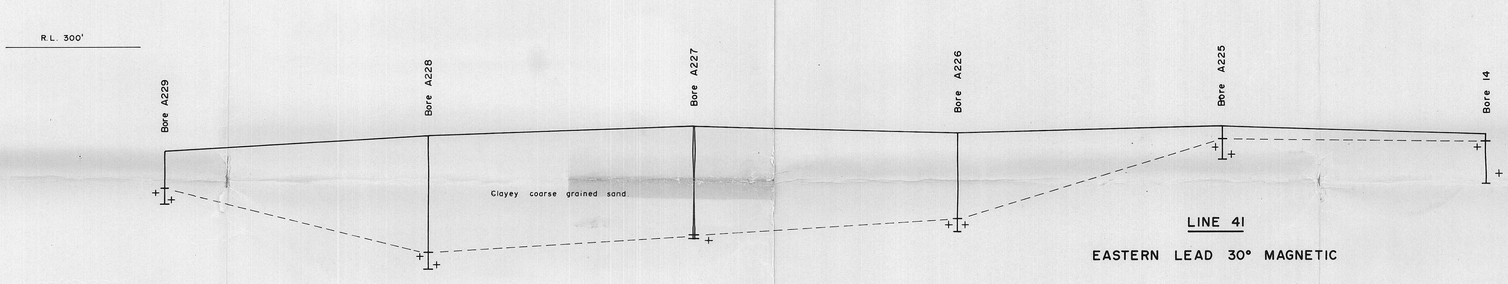
LINE 44



LINE 45

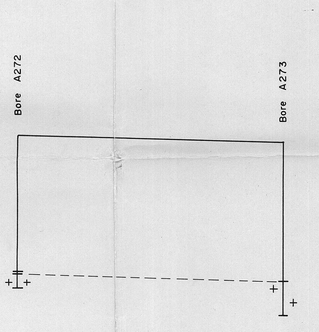


LINE 46

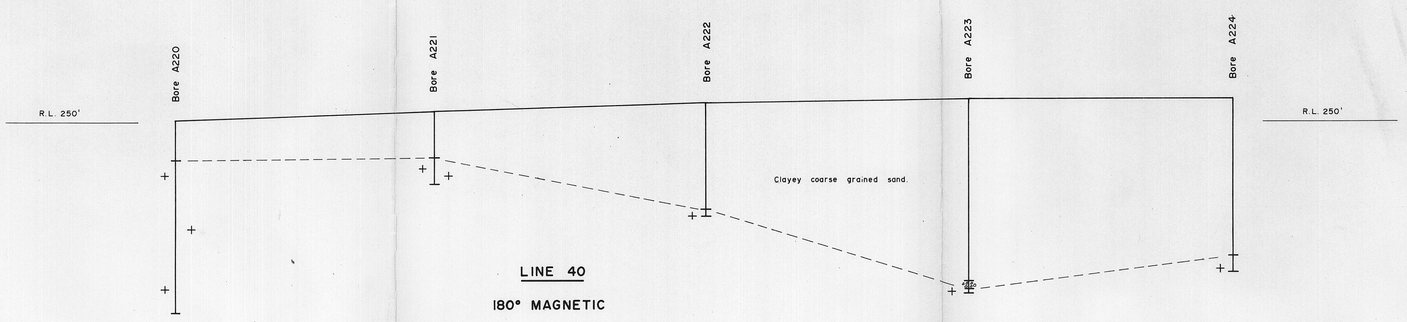


LINE 41

EASTERN LEAD 30° MAGNETIC



LINE 47



LINE 40

180° MAGNETIC

LINE 7

340° MAGNETIC

Note
Refer to plate 5 for legend.

UTAH DEVELOPMENT COMPANY

65-409

GEMCO SECTIONS
ENDURANCE - PIONEER AREA.
TEST AREA 4.

230643

PLATE 14

5 cm

SCALE: Horiz. 1 inch = 50 feet.
Vert. 1 inch = 20 feet.

Drawn by B. Madex.

Dec, 1965.
Report No. 135

4247

Drilling by Storey's Creek Tin Mining Co. N.L.
Indicating approx. 1,500,000 cu.yd. at 0·12 lbs. Sn/cu.yd.

Drilling by Department of Mines, 1953
(See F1, Table J, Report No. 130)

Drilling by Department of Mines, 1953
Indicating 90,000 cu.yd. at 0·31 lbs. Sn/cu.yd.
(See E, Table J, Report No. 130)

ELIZABETH

TRACEYS

EASTERN TERRACE

Line MR 2

Line MR 3

Line MR 1

Tailings.

Mainly tailings.

T.T.

F.T.

Garfield Creek

Cybele Ck.

water-race

RIVER

GREAT MUSSEL ROE

North Mussel Roe Swamp

LEGEND

- Alluvium, generally button grass flats.
- Basalt.
- Swampy ground with high timber.
- F.T. Ferruginous tertiary.
- T.T. Mainly lower timber, ti-tree, swamp etc.
- + Granitic intrusives.
- Distinct river channel.
- Open workings.
- Previous drill traverses.

UTAH DEVELOPMENT COMPANY

65-409

GEOLOGICAL MAP
TEST AREA 5,
NORTH MUSSEL ROE SWAMP.

230044

PLATE 15

5 cm

SCALE : 1 inch = 1,000 feet.

1000 500 0 1000 2000 3000 FEET

Geology by O.N. Warin.
Drawn by B. Madex.

Dec, 1965
Report No. 135

N

MT.
CAMERON

CK.

WALPOLE

F.T.

F.T.

RIVER

BOOBYALLA

LITTLE

LEGEND

RECENT

Alluviated area - button grass flats in part on Tertiary clays

TERTIARY

Sandy rises - derived from weathering of Tertiary drift and wash

F.T. Ferruginous Tertiary

DEVONIAN

+ Granite rocks

UTAH DEVELOPMENT COMPANY

65-409

PHOTO GEOLOGICAL MAP
TEST AREA 6
HASTIE'S AREA

230045

5 cm

PLATE 16

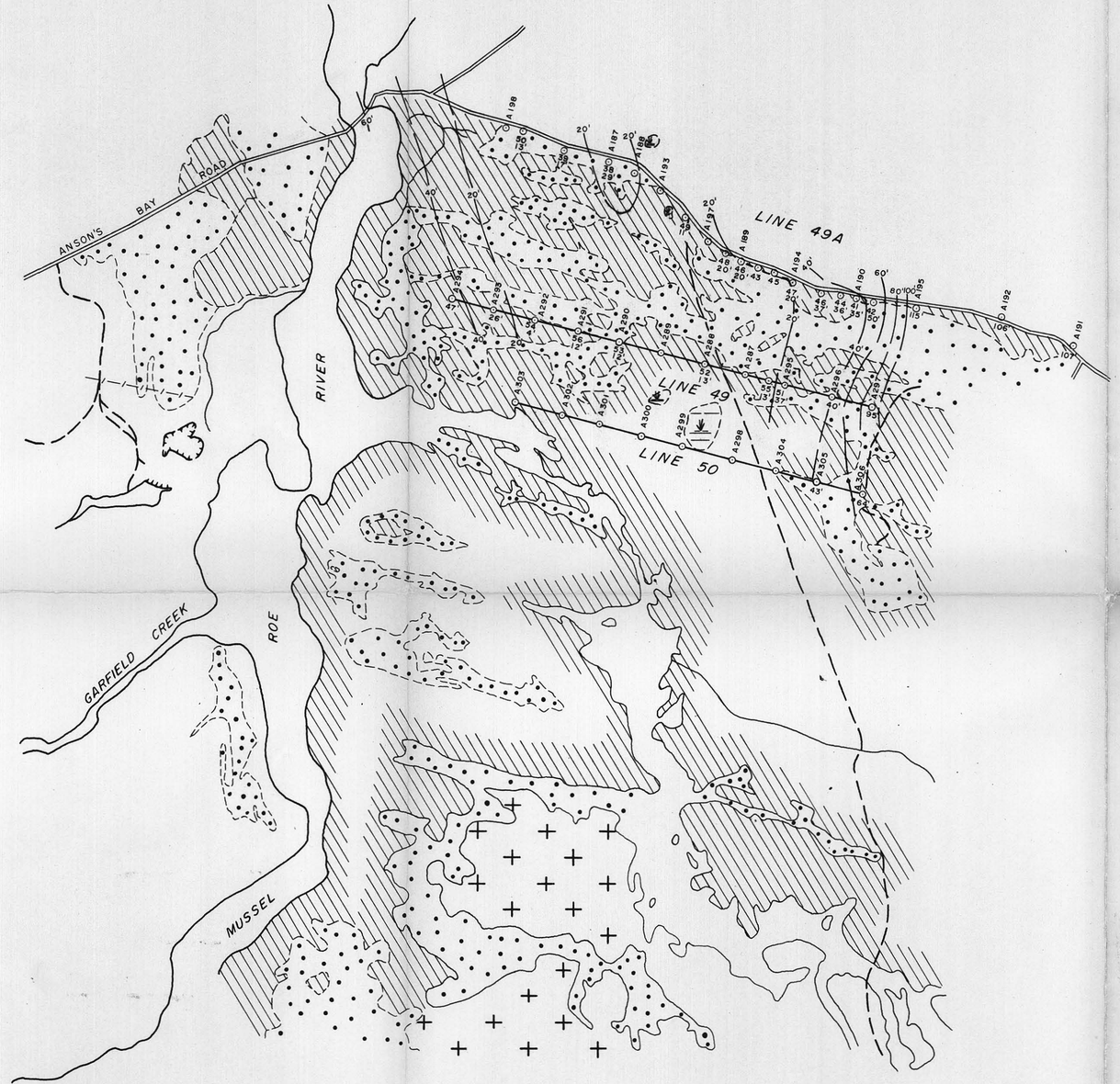
SCALE: 1inch = 1,000 feet

1000 500 0 1000 2000 3000

Geology by : W.R. Appleby.
Drawn by : B. Wilson.

Dec. 1965
Report No. 135

4249



LEGEND

RECENT

Alluviated area – button grass flats – in part on Tertiary clays.

River flats – swamps, subject to flooding.

TERTIARY

Sandy rises – derived from weathering of Tertiary drift and wash.

DEVONIAN

Granite rocks.

⊙ A298 Auger drill holes.

⊙ 51 Sample drill holes.

13' R.L. of subsuface of Granite basement.

Subsuface contours of Granite basement.

For sections on lines 49, 49A, 50 see plate 18.

UTAH DEVELOPMENT COMPANY 65-409

GEOLOGICAL MAP
TEST AREA 7
SOUTH ANSONS BAY ROAD

230046

PLATE 17

5 cm

SCALE: 1inch = 1,000 feet

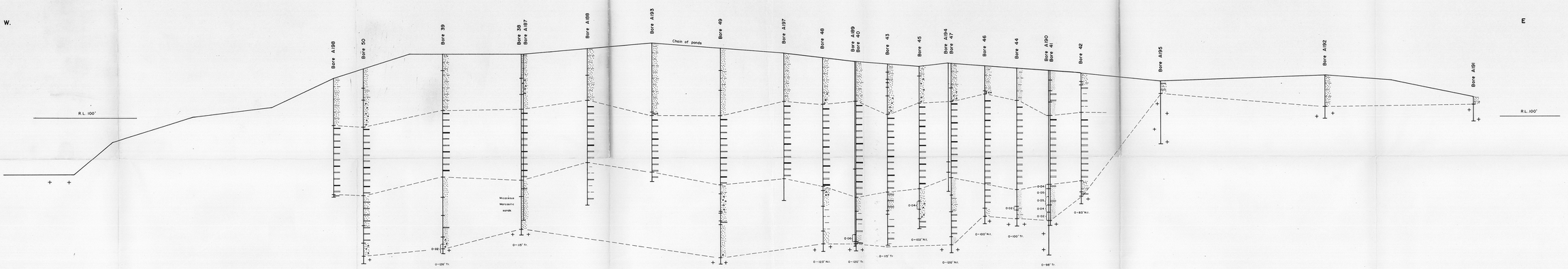
1000 500 0 1000 2000 3000

Geology by : W. R. Appleby.
Drawn by B. Wilson.

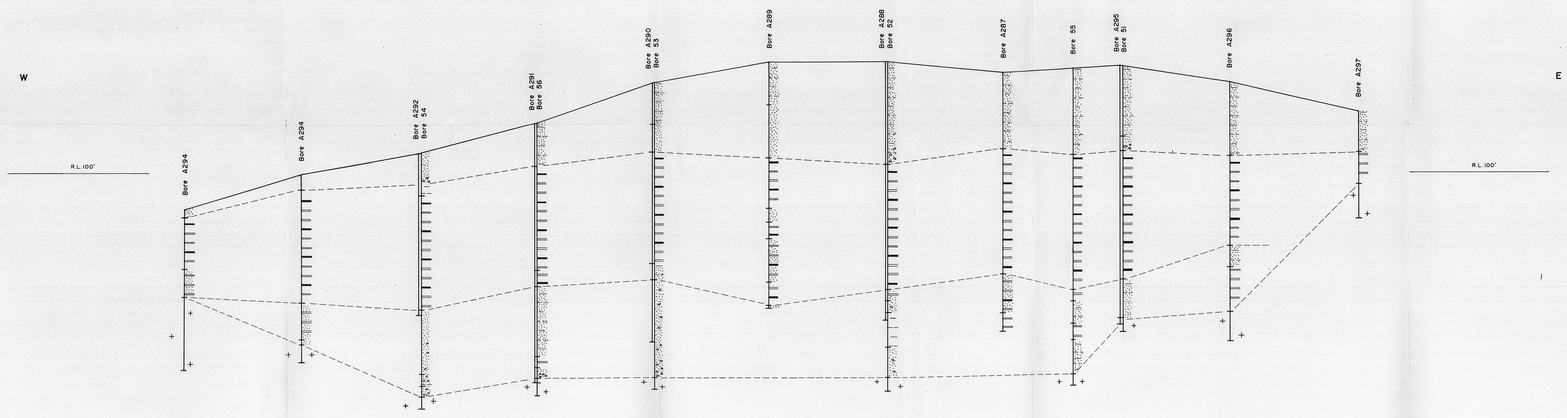
Dec. 1965
Report No. 135

4250

4251



LINE 49A



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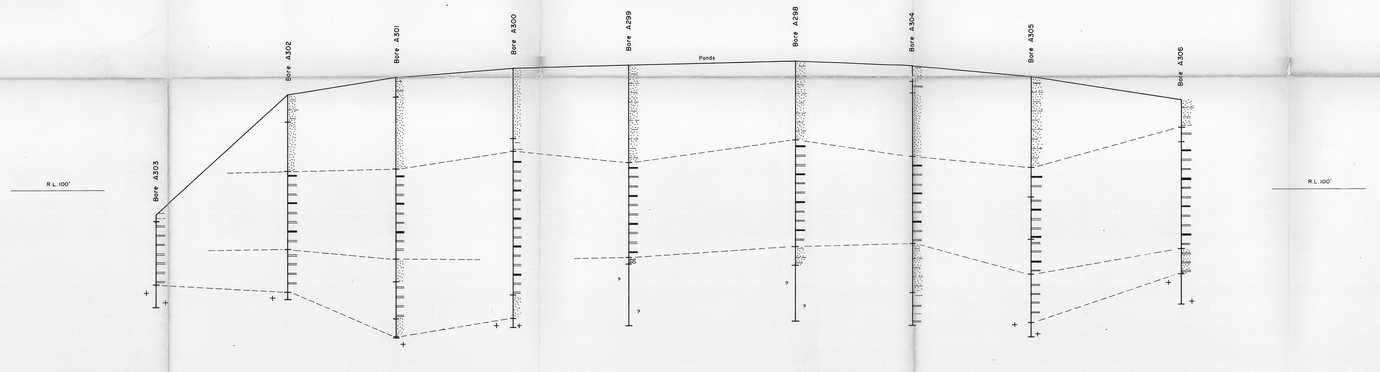

LINE 50

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LITHOLOGICAL SECTIONS SHOWING INDIVIDUAL SECTION AND TOTAL TIN VALUES (INCOMPLETE), TEST AREA 7, SOUTH ANSONS BAY ROAD.

230047

PLATE 18

5 cm

SCALE: Horiz. 1 inch = 200 feet
Vert. 1 inch = 20 feet

Note: Refer to plate 5 for legend.

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LEGEND

QUARTERNARY and RECENT

- Mobile shore sand.
- Stabilized (Pleistocene?) dune system.
- Reed swamps, river flats, shallow water.
- Alluvium, generally button grass flats.

SILURIAN

- Mathinna group — shale, sandstone, very fine sandstone meta-sediments.

DEVONIAN

- Granitic intrusives.

- Tailings.
- Workings.

UTAH DEVELOPMENT COMPANY 65-409

230648

GEOLOGICAL MAP
TEST AREA No. II
DELTA DUGARDS

PLATE 19

5 cm

SCALE: 1 inch = 1,000 feet.

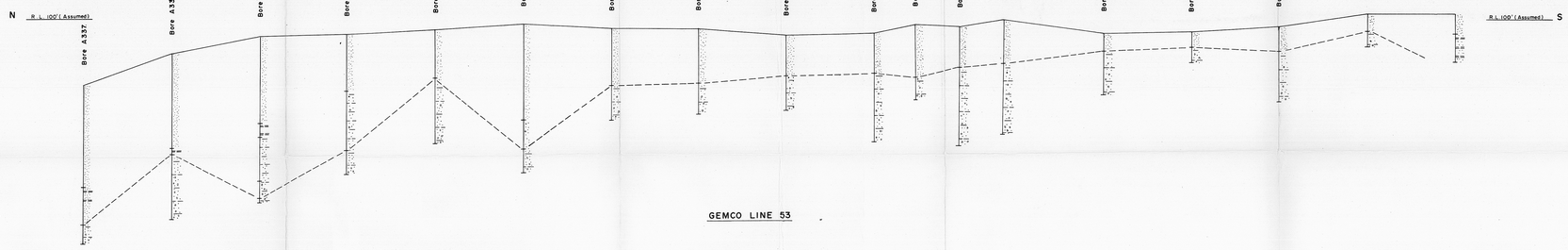
1000 500 0 1000 2000 3000

Drawn by B. WILSON.

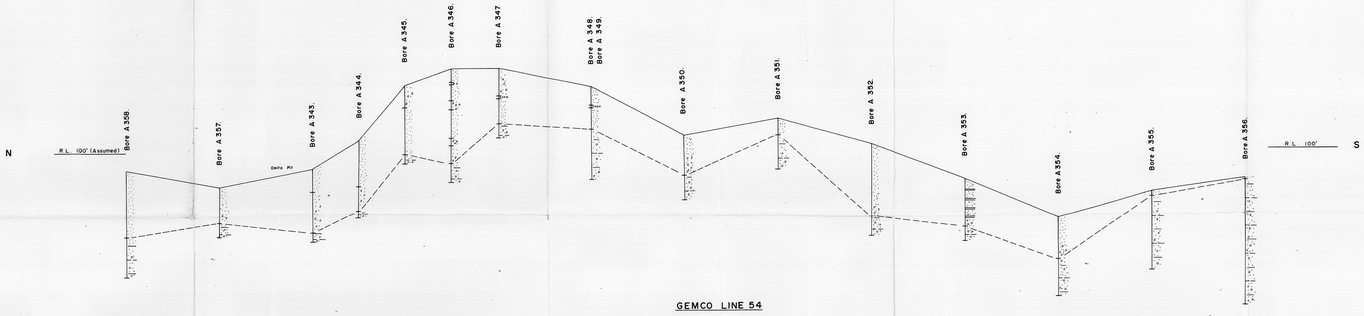
Dec, 1965
Report No. 135

4252

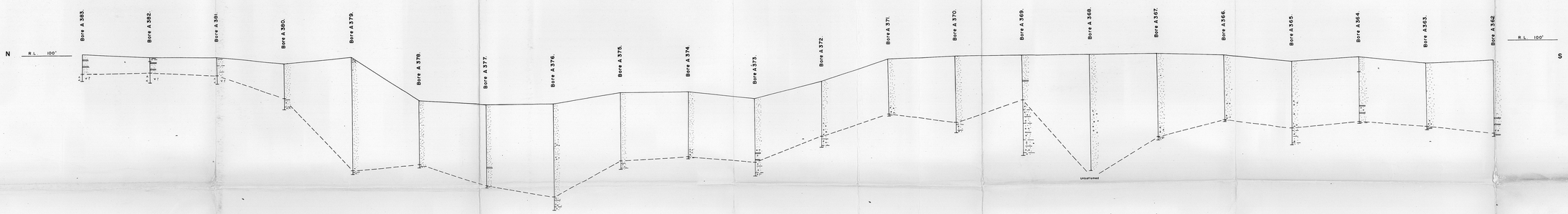
4253



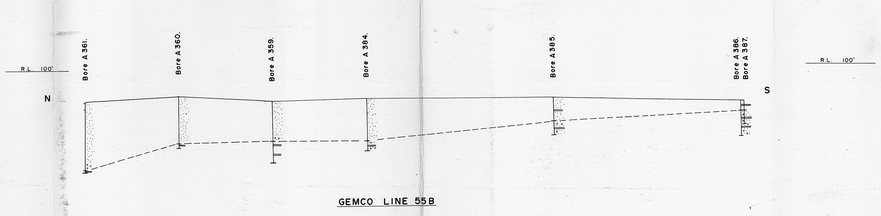
GEMCO LINE 53



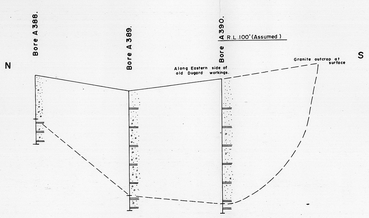
GEMCO LINE 54



GEMCO LINE 55A



GEMCO LINE 55B



GEMCO LINE 55C

Note
Refer to plate 5 for legend.

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GEMCO SECTIONS
DELTA DUGARDS
TEST AREA II.

5 cm

PLATE 20

SCALE: Horiz. 1 inch = 200 feet.
Vert. 1 inch = 20 feet.

Drawn by B.Wilson.

Dec. 1965.
Report No. 135.

4253