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Report on
the

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DRILLING OF WOOD'S MUSSEL ROE RIVER
PROPERTY

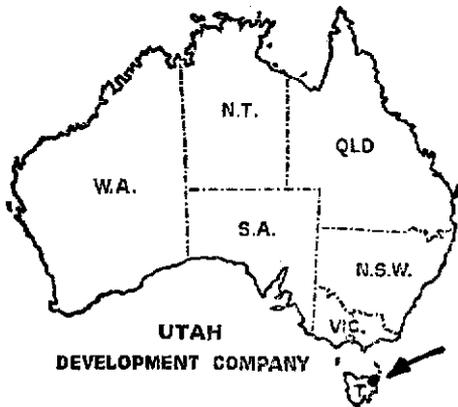
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MICROFILMED

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SUMMARY AND CONCLUSIONS

During March and April, 1964, UDC carried out a drilling programme at an alluvial tin prospect, Wood's Mussel Roe River Property, in north-east Tasmania. During the programme the property was held under an option from Mr. Wood.

Eighty-four holes aggregating 2187 feet were drilled to test the tin content of accumulations of Tertiary fluviatile sediments at two localities, Wood's Flat and the Eastern Terrace. Mr. Wood is presently mining Wood's Flat on a moderate scale; the Eastern Terrace area was the scene of limited mining activity at the turn of the century.

The Tertiary sediments at Wood's Flat and the Eastern Terrace occur in separate depressions in a granite bedrock surface and are thought to be remnants of separate drainages. The tin occurs as detrital cassiterite grains believed to have weathered from the surrounding granite particularly during the early and middle Tertiary when a hot, wet climate prevailed. The tin values are concentrated in the basal gravel at Wood's Flat but in an upper gravel in the Eastern Terrace.

The drilling indicates that Wood's Flat contains 1,231,000 cubic yards of material, averaging 24 ft. deep, with a grade of 0.27 lb Sn/cu. yd.; and that the unworked ground in the Eastern Terrace aggregates approximately 500,000 cubic yards of material averaging 9 ft. deep with a grade of 0.28 lb Sn/cu. yd.

Initial feasibility studies (Rodgers, 1963; Pratt, 1963) made before the option was entered into, were based on the supposition that Wood's Flat and the Eastern Terrace might together contain about $4\frac{1}{4}$ million cubic yards of material with a recoverable grade of 0.43 lb Sn/cu. yd. These studies showed that such a property could be profitable if mined at a rate of 1,000,000 cubic yards annually by a combination of dry mining of the barren overburden and sluicing of the ore. The indicated yardages and grades are so far below these figures that by the close of the drilling it was clear that the property could not be profitably mined by the Company and the option was relinquished.

The programme has been of considerable value, as it has given a greatly increased understanding of the regional geology and assisted our search for workable deposits elsewhere in the tinfield. Previously it had been thought that little disturbance or disruption of drainage had taken place since early Tertiary times, and that therefore it would be possible to trace the lead system by careful mapping. The drilling established beyond doubt, however,

that the earliest Tertiary drainage, the lead system in which the bulk of the tin was concentrated, was broken up by late Tertiary faulting and then buried under late Tertiary reworked sediments. These late Tertiary sediments and their drainage pattern are comparatively easily recognised and mapped, but the early Tertiary drainage system exists now only as obscured, disconnected lead remnants below the late Tertiary material.

The programme has also been of value in alerting us to the difficulties inherent in boring and sampling in unconsolidated, water-logged sediments for an erratically distributed mineral. A thorough investigation of available drilling techniques is being made ready for our testing of other prospects in the field.

INTRODUCTION

Wood's Mussel Roe River Property was first brought to the notice of the Company by the Chief Geologist, Mr. Don King, after a visit to Tasmania in September and October of 1963. Mr. King, in reviewing the tin potential of Tasmania as a whole, was particularly impressed by the possibility of developing the alluvial tin deposits in the North-East Tasmanian tinfield; accordingly he recommended that the Company take up an Exploration Licence covering the major part of the tinfield and in addition negotiate an option agreement with Mr. Vernon Wood, of Pioneer, over the latter's Mussel Roe River property.

The property is situated $7\frac{1}{2}$ miles (direct distance) south-south-east of Gladstone, and 8 miles east-north-east of Pioneer, N.E. Tasmania. Access is by a $3\frac{1}{2}$ mile unformed gravel road that branches off the Forestry Commission Pioneer-St. Helens road about 7 miles from Pioneer. The N.E. Tasmanian Highway passes about 5 miles south-west of Pioneer. The nearest rail-head is at Herrick, 4 miles south-west of Pioneer.

The area was visited by Mr. Ellett and Dr. Howard with Mr. Hryneiwski, an estimator of Utah Construction and Engineering Pty. Ltd., on October 8. Preliminary estimates at Wood's property appeared promising, and immediate action was taken to implement Mr. King's suggestion of an option. An agreement was drawn up and signed by Mr. Ellett and Mr. Wood on October 17. It provided for a six months' free option with the right to extend the option period for a further six months for a payment of £1,000, and the right to purchase the property for £95,000.

Between November 5 and 18, Dr. Howard, Staff Geologist with the Company, mapped the deposits and the immediately adjacent areas. He recommended two areas, Wood's Flat and the Eastern Terrace (see Plate 2) for a limited drilling programme provided that a feasibility study, based on production records, showed the possibility of a sufficiently profitable proposition. (Howard, 1963).

A study, based on estimates of grade from past production and of yardages from Dr. Howard's inspection, was made by Mr. N. Pratt, consultant (Pratt, 1963), and the data were critically re-examined by Mr. T.A. Rodgers (Rodgers, 1963). As the studies indicated that an attractively profitable mining venture might exist, it was decided to proceed with the drilling programme proposed by Dr. Howard.

The first of the two areas, Wood's Flat, had been fairly extensively drilled by the Endurance Tin Mining Company, and the results of their drilling were

made available to the Company. The second area, the Eastern Terrace, had been bored along a single traverse line, but the results and the positions of the bores were no longer available. The aim of the programme was two-fold:

- (1) To obtain an estimate of the grade of the stanniferous material of Wood's Flat as a check against the drilling by Endurance Tin Mining Company, and
- (2) To ascertain the nature and grade of material in the Eastern Terrace area.

The programme was to be completed before April 24, 1964, the expiration date of the free option period of the Company's agreement with Mr. Wood.

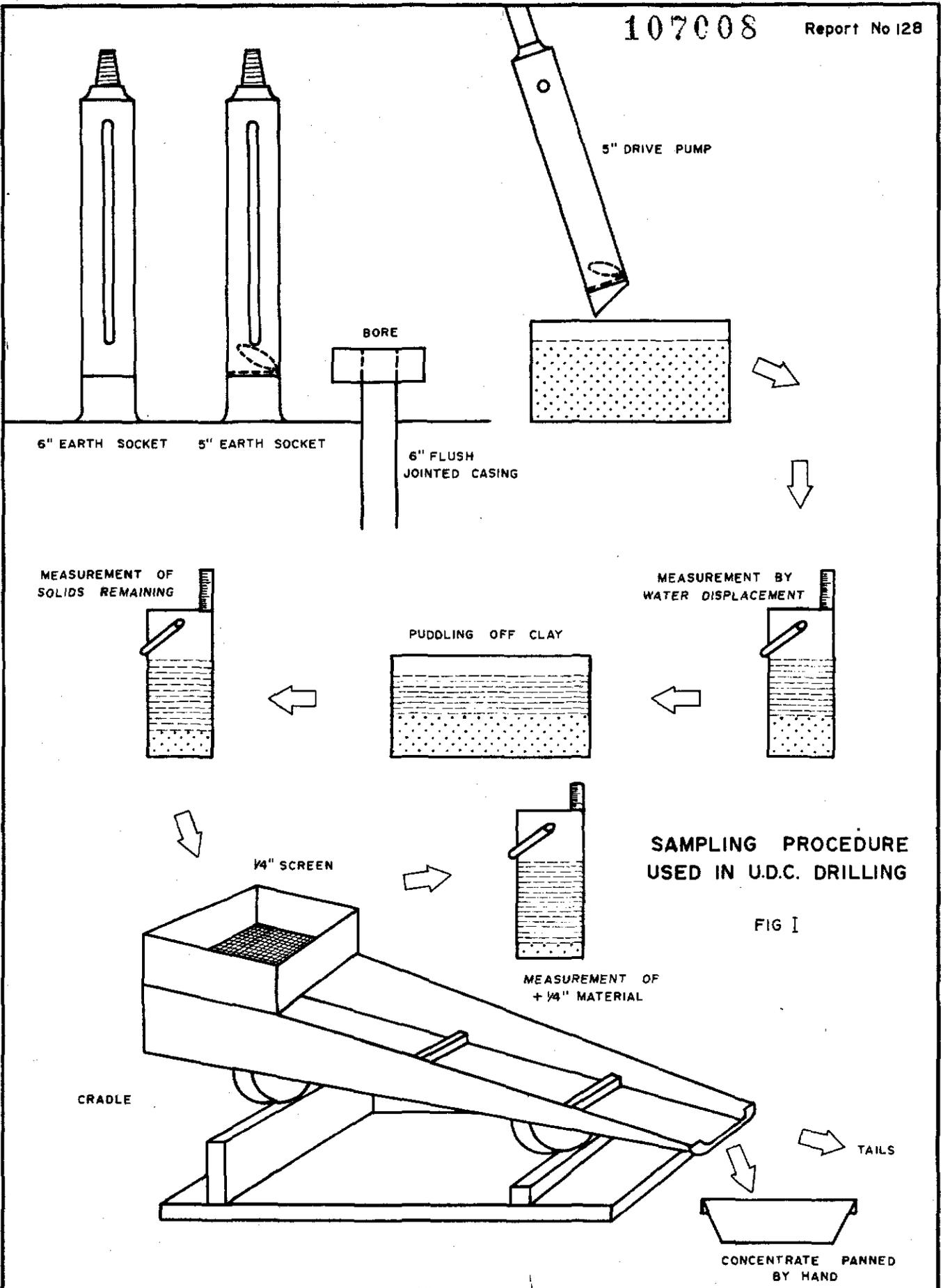
The drilling was carried out during March 13 to April 24, using a Goldfields G 33 Cable Tool percussion drill under contract. Staff employed on the programme included Dr. Howard, W.R. Appleby, one geological assistant, one panner and one field assistant. The drill crew consisted of one driller and one assistant. Geological assistant J.G. Bartlett was drill site representative during part of the programme.

Dr. Howard supervised the programme and compiled a memorandum "Preliminary Appraisal of the Drilling Programme on Wood's Mussel Roe Property" (April 21, 1964), which provided a valuable framework for this report. The author would like also to thank Mr. D. King (Chief Geologist) and Mr. O. Warin (Project Geologist) for valuable discussion and criticism of the text.

U.D.C. DRILLING AND SAMPLING PROCEDURES

Mr. N. Pratt (consultant) designed the drilling method and supervised the drilling for the first ten days of the programme. The subsequent procedure employed varied very little from the method he devised.

The drilling was carried out by a contractor using a truck-mounted Goldfields G 33 Cable Tool Percussion Rig. Although the vehicle had four wheel drive, difficulty was experienced in moving about in all but the driest conditions, particularly on the Eastern Terrace. In any subsequent drilling programme preference should be given to a vehicle with low surface loading (possibly tracked) if work is to be undertaken during the wet season or winter.



A six inch O.D. flush-jointed casing with 6-3/8 inch drive shoe and a six inch earth socket with 6-3/8 inch shoe was used. A 5 inch earth socket with 5-3/8 inch shoe (with or without clack valve) and a 5 inch drive pump with clack were the principal means used in recovering material from within the casing. The procedure generally was to drill to approximately four feet with the 6 inch socket to commence the first section of the casing. The 5 inch open earth socket was then used in consolidated and semi-consolidated ground changing to the drive pump in loose unconsolidated sands and gravels. During the programme a trial was made of a sampling tube with vacuum head and a spring basket type of core catcher, hired from the Department of Mines, South Australia. The tool was found to be unsuccessful in loose, unconsolidated material.

An essential feature of the method was to keep the casing driven ahead of the sampling tool at all times. The advance of the casing and the advance of the drive pump were recorded as drilling progressed to ensure that the casing was always in advance of the sampling. These precautions were necessary to prevent unconsolidated material rising into the casing. The distance the casing was driven ahead varied from 3 inches to 20 feet, depending on the material encountered. The optimum distance was found by experience to be about 2 feet.

The sampling procedure is shown schematically in Fig. I. The samples were subdivided where possible at changes of lithology or otherwise into sections approximating five feet of penetration. The recovered material from each section was transported in half 44 gallon drums from the drill to the panning site. The amount of material recovered in each section was measured by water displacement in standard measuring cylinders. If the material contained clay the percentage of clay was obtained by difference; i.e., the sample was measured in the normal way then puddled, the clay washed out, and the material remaining again measured.

A rough concentrate was obtained in a hand cradle, and the final concentrate panned by a panner. No attempt was made to pan to a specific concentrate as all concentrates were quartered and sent for assay.

TEST OF DRILLING AND SAMPLING TECHNIQUES

At the completion of the drilling programme the generally low tin values, compared to those of Endurance, raised some doubt about the ability of the drilling and sampling procedures to achieve a representative sample. To test drill hole recovery, two dummy samples of drift and wash were mixed, salted with a weighed amount of assayed tin concentrate, and separately

poured down a cased hole, then drilled out as if they were material in place. On mixing the dummy samples it became immediately obvious that small differences in the amount of interstitial water in the sample could make quite large differences to the volume of the sample. For example, 8 cubic feet of coarse drift measured dry was found to occupy 12 cubic feet when dampened. Also when each dummy sample (wet) was poured down the hole a difference was found between its volume measured above ground and the space it occupied in the hole. Sample one was found to occupy 90% of the measured volume; sample two 120%. Presumably this factor reflects differences in the degree of compaction of the sample inside the casing. Since the degree of compaction of the sub-surface Tertiary sediments is unknown and may vary, this adds a further uncertainty to results.

The results of the test are shown in Table A. On drilling the dummy samples 100% by volume was found to have been retrieved. However, after panning the concentrate was assayed and only 77 and 73% of the tin respectively in the two samples had been recovered.

A further dummy sample (sample 3) was made up and given directly to the panner, who recovered 97.6% of the tin. Unfortunately the panner knew of the test and may have made a greater than normal effort to recover all the concentrate.

The cassiterite recoveries shown in these two tests are alarmingly low; if the results could fairly be applied to all the UDC drilling we would have a simple explanation of the apparently low UDC drilling results. Although this is tempting, it is felt that two tests are insufficient evidence in themselves to propose a factor which could be applied to all the UDC results.

With the ending of the contract it was not possible to make more tests. It is recommended that future calls for tenders specify a number of tests be run to determine the cassiterite recoveries.

HISTORY

Mining Activities.

Previous mining and drilling results were reported fully by King (1963) and Howard (1963); a summary is given here.

The earliest recorded mining in the southern Mussel Roe River area was at the Eastern Terrace (see Plate 2). The upper shallow stanniferous ground, was worked intermittently to a maximum of 12 ft. depth by a number of

Report No.128.TABLE A.RESULTS OF TEST DRILLING AND SAMPLING

| <u>Sample No.</u> | <u>Weight of Sn added (grams)</u> | <u>Weight of Sn recovered (grams)</u> | <u>Percentage recovery</u> |
|-----------------------|---|---|--------------------------------|
| 1 | 23.458 | 18.082 | 77.08 |
| 2 | 18.002 | 13.075 | 72.6 |
| 3 | 18.573 | 18.119 | 97.6 |

operators from as early as 1890 until 1959. The principal operator was the Great Mussel Roe Proprietary Company, who abandoned the area in 1901. From the size of the pits it appears that in all 750,000 cubic yards of material of unknown grade were mined.

The first recorded mining activity on Wood's Flat was by M. H. Groves and F. D. Richardson, who held the ground in 1946 (Keid, 1946). No production figures are given by Keid, but a recovery of 1 lb Sn/cu. yd. is quoted. In the period 1948-1957 the property was leased by the Lanka Tin Mining Company who treated 270,000 cu. yds. of material. In 1957 Dunn and Park began operating Pit No. 1 (see Plate 2) and treated 22,000 cu. yds. In 1959 Wood and Bartels acquired the property and from 1960 operations have continued under the sole ownership of V. Wood, the present Lessee.

A calculation of yardage based on pit surveys carried out during the Company's option show that, to February 1964, Mr. Wood worked 334,000 cu. yds. of material with an average recovered grade of 0.56 lb Sn/cu. yd.

Drilling.

A line of six holes was drilled by the government in 1902 across the Eastern Terrace (Twelvetrees, 1916). The positions of these holes are not accurately known, and are only approximated on Plate 2. On Wood's Flat a number of local companies and individuals are known to have carried out some drilling; namely, Endurance Tin Mining Company N. L., Storey's Creek Tin Mining Company N. L., Lanka Tin Mining Company N. L., the Star Hill Syndicate (Mr. Lawry), and Mr. Wood. Of these only the testing by the Endurance Tin Mining Company was extensive; these results were made available to the Company.

The Endurance drilling consisted of 80 holes aggregating 2061 feet; the holes varying in depth from 4 to 63 feet with an average of 26. The holes were drilled on eight traverse lines spread over a distance of 2,000 feet along the river flat. The drilling delineated two distinct channels or gutters in the basement underlying the flat and suggested that the tin values lay in one major and two minor runs.

The average grade of all the Endurance drill holes was 0.204 lb Sn/cu. yd., while the average of holes in the stanniferous runs was 0.71 lb Sn/cu. yd. The indicated material in Wood's Flat from the Endurance drilling was thus 8,000,000 cu. yds. of 0.204 lb/cu. yd. or 1,360,000 cu. yds. of 0.71 lb/cu. yd.

GEOLOGY

The cassiterite of Wood's Flat and the Eastern Terrace is in fluvial sediments of Tertiary age filling depressions in the bedrock surface. The present Mussel Roe River flows to the west of the Eastern Terrace across Wood's Flat. The country rocks beneath and surrounding the Tertiary alluvial deposits are granitic rocks of probable Devonian age. The main rock type is a coarse-grained biotitic adamellite but, in common with other granitic areas of the N.E. Tasmanian tinfield, close search reveals a number of other granitic types, particularly a late stage leucogranite, intrusive into the main mass. The granitic rocks are strongly jointed and in places veined by thin quartz, pegmatite and greisen. The exposed granite is generally hard and weathers along joints into large rounded boulders. Below the Tertiary cover, the granite is commonly weathered, chiefly by decomposition of the feldspars to a pasty, incoherent, gritty mass, containing angular quartz fragments and some unweathered biotite. The weathering is sometimes in excess of 25 feet in depth.

The present day drainage is sharply angular in plan and is evidently controlled by joints and faults. The earlier drainage revealed by drilling and in pits below the Tertiary accumulations has the same characteristics.

Cassiterite, evidently derived from the weathering of granite and of greisen veins, is found as a heavy mineral concentrate particularly towards the base of the Tertiary valley fill. Jurassic dolerite, though not seen at Wood's, is known to exist to the east and south, and is the source of the large quantities of ilmenite concentrated with the cassiterite in the Tertiary deposits.

GEOLOGICAL HISTORY AND DESCRIPTION OF TERTIARY SEDIMENTS

Generalised geological sections revealed by drilling at Wood's Flat and the Eastern Terrace are shown in Table B. Before the present drilling it was generally thought that the Eastern Terrace was a continuation of the lead of Wood's Flat, and that the two constituted a portion of the Tertiary Mussel Roe River channel. The drilling has clearly indicated that for the greater part, at least of Tertiary time, the two deposits were separate entities. The EASTERN LEAD is a narrow (maximum 600 feet wide), deeply incised channel with headwaters rising to a watershed separating the lead from Wood's Flat to the south (see section, Plate 7). The Eastern Lead contains abundant marcasite throughout, and the basal wash contains minor tin with almost no ilmenite. In comparison the WOOD'S FLAT LEAD is broader (average 1,000 feet wide) in cross section and its floor has a less marked slope in long section. The alluvial contains little marcasite and its basal wash contains tin with an approximately equal quantity of ilmenite.

Because there is no physical continuity between Wood's Flat and the Eastern Terrace, and because no precise dating of individual beds has yet been attempted, any correlation of one to the other is speculative. A preliminary examination of specimens of clay from Wood's Flat and of the laminated siltstone from the Eastern Terrace has revealed that both carry well-preserved spores. Correlation of the spores with Tertiary micro-floras from Victoria suggests that the Wood's Flat clay is not older than lower Miocene and that the Eastern Terrace siltstone is of Eocene to lower Miocene age (work by J. Douglas, University of Melbourne). Thus the deposits may be of the same age, or the Eastern Terrace material may be older.

In a rough way it appears that the deeper section at the Eastern Terrace deposits are either the same age or somewhat older than the whole Wood's Flat section, but that the upper sections of the Eastern Terrace (all above the siltstone) is part of a more extensive sheet-like cover which remains at Bald Hill and on the west bank of the Mussel Roe River at the North Mussel Roe Proprietary pits (see Plate 2). It is assumed similar deposits have been eroded from Wood's Flat by the action of the present Mussel Roe River.

The above data suggest the formation of the stanniferous leads in the Mussel Roe area began in the lower Middle Tertiary with a pronounced uplift of the land, probably due to block faulting. The primal Tertiary drainage incised deeply into the granite terrain, gouging out channels in which the deep leads, such as the Eastern Lead and the Wood's Flat lead, formed. During this initial uplift only the heaviest detrital material, the heavy minerals and the coarse boulders (wash) were retained in the channels. Later, after the land surface ceased to rise, the drainage lost grade and the stream channels filled with fluvial coarse sand (drift), silt and clay.

The heavy mineral concentrate of the wash at Wood's Flat contains abundant fine and coarse grained tin with an approximately equal quantity of ilmenite, minor tourmaline, zircon and garnet. The basal wash of the Eastern lead, however, contains only trace amounts of tin and no ilmenite or other heavy minerals. This difference suggests that the two leads had markedly different source areas.

The finest-grained sediment in the Eastern lead is a distinctive laminated brown carbonaceous siltstone with marcasite and some fragments of lignitised wood that seems to indicate a lacustrine environment with strongly reducing bottom conditions. The carbonaceous material of the siltstone forms thin laminae (.05 inch) between the laminae of silt (.2 inch average) and is probably formed of leaves and other debris settling in quiet periods between floods.

In Wood's Flat the fine-grained sediments intersected in drilling or exposed in the pits, are clays, commonly light to dark grey, massive, non-bedded, and containing small carbonaceous fragments (possibly rootlets) and occasionally wood (e.g., bore 17, line 11). These clays probably represent quiescent lacustrine deposition when the stream channel had been largely filled.

In Wood's No.2 Pit the upper part of the exposed clay (the lower clay in the generalised section, Table B) is pierced by narrow (.2 inch diameter) vertical holes descending as much as 9 inches from the upper surface of the clay. The holes seem clearly to be root holes, but the upper surface of the clay does not appear to have been exposed as a soil; probably the clay formed a lake floor and the root holes were formed by a water plant.

In one place the root holes and fractures in the clay are partly filled with a bright blue earthy material in which vivianite (hydrous ferrous phosphate) has been recognised by X-Ray analysis (Report by R. J. McLaughlin, University of Melbourne).

Above the main clay horizons in Wood's Flat is a thick sequence of coarse drift containing abundant lignitised logs in one distinct, apparently continuous horizon, and some lignitised wood in a second indistinct horizon. The coarse drift indicates conditions of rapid erosion of the mantle of weathered rock from the interflaves and headwaters with rapid deposition and burial of the eroded material in the channels. In this sequence the wood horizons seem to imply major single events - catastrophic floods bringing down masses of logs - rather than any prolonged change in the type of environment.

In Wood's Flat the thick section of coarse drift containing the lignitised wood horizon is overlain by fine drift, fine sand, silt and clay complexly inter-fingered. The sequence is considered to represent sediments deposited by a river migrating laterally across the broad valley floor. At the south end of the Eastern Lead (Bore No. 46) the sediments above the brown laminated siltstone are sand, silt and clay.

Overlapping all the lower sequence of the Eastern Terrace is a broad spread of clayey drift. This drift is seldom more than 12 ft. thick and is generally capped by 12 to 18 inches of silicified drift immediately below the topsoil. Underlying the clayey drift and filling gutters in the surface of the lower sequence, is a lenticular basal wash. The upper sequence of wash and drift evidently indicates a short period of rejuvenation of the drainage during which a new pattern developed, probably much closer to the present drainage than the early Tertiary drainage of the deep leads.

The tin concentrate from these gutters is coarse, nuggety in nature, and contains a high proportion of chats and minor ilmenite. The source area for this tin appears to be the exposed granite immediately surrounding the Eastern Terrace as small quantities of high grade tin have been found in the eluvial granite in the head waters of the gutters (Bore 14, line 1 and bores 32 and 33, line 5).

The present cycle of erosion was initiated by renewed uplift; and the Mussel Roe River eroded a channel to the west of the Eastern Terrace but within its previous course in the Wood's Flat area.

The unexpected lack of any deep connection between Wood's Flat and the Eastern Terrace leads, that became obvious as drilling proceeded, is a feature for which a number of explanations can be offered - none of them entirely satisfactory. The most likely is that block faulting in the late Tertiary disrupted the early Tertiary lead system, stripping some sections and preserving others in down-faulted blocks, and allowed a second drainage to develop. In the Mussel Roe River area the Wood's Flat lead and the deep part of the Eastern Terrace lead would be parts of the early Tertiary lead system while the upper sequence in the Eastern Terrace is a remnant of the second drainage. Uplift at the north end of the Flat may have been along east-north-east trending faults.

Three other possibilities can not be entirely disregarded:

- (1) A deep, very narrow channel, obscured by alluvium, may exist as a northern outlet to Wood's Flat. This appears very unlikely as granite crops out and forms an almost continuous barrier between the Flat and the Terrace; however, narrow areas of alluvium do exist and the possibility of a narrow channel cannot be entirely dismissed.
- (2) The Flat may have been closed at the northern end by a granite bar over which the river had to spill. Both the sediments and the present topography make this appear unlikely.
- (3) The area may have been subjected to a regional tilt to the north and the two leads may have been part of systems flowing to the north and to the south respectively. The present Mussel Roe River in Wood's Flat has a grade of 1 in 200 to the north, while the granite basement beneath it has a grade of only 1 in 470 to the north. The grade of the Eastern Lead basement is 1 in 54 to the north. If a regional southerly tilt of 1 in 360 is applied, the grade of the basement in the Flat would change to 1 in 240 to the south, while the Eastern Deep lead would still assume a grade of 1 in 67 to the north (see Plate 7).

THE DRILLING RESULTS

The complete Field Record Sheets and Log Sheets of all the holes drilled in the UDC programme have been prepared, and copies have been filed in UDC's Melbourne Office. Summaries of the drilling on Wood's Flat and the Eastern Terrace are included here as Appendix I and Appendix II. The position of all holes is shown on Plate 2.

Wood's Flat.

From the drilling carried out by the Company and from exposures in present pits, a generalised section of the alluvial cover at Wood's Flat has been prepared (Table B).

There are three depositional breaks within this sequence; a, b, and c on Table B. Breaks b and c were probably minor rather than major interruptions-typical of this type of fluvial environment. The lower break, c, is marked by a 2 ft. thick lignitised wood horizon and is consistent over most of the area of the Flat; it probably was formed in a single catastrophic flood. Break a, at the top of the clay and silty clay horizon, is thought to mark the contact between the Tertiary sequence and present river alluvium.

Depth and Distribution of Values: In 1951 the Endurance Tin Mining Company drilled 80 holes in Wood's Flat varying in depth from 4 to 63 feet. This drilling showed two main, nearly parallel channels in the bedrock with other smaller tributary channels. It also indicated one major and two subsidiary stanniferous runs, which are not contained in the basement channels but are on the flanks of the channels and in part on the high between them.

UDC has drilled 63 holes on the Flat varying in depth from 6 to 36 ft. revealing greater complexity in the basement configuration than was suggested by the Endurance drilling (see Plate 6). Two distinct stanniferous runs are indicated which are only roughly coincident with the deposits found by Endurance. Their relationship to the basement channels is not entirely clear, as some high values are found in the channels but most are on the channel flanks, probably on the inside of bends. The relative positions of the stanniferous gravels and gutters is not sufficiently consistent to enable us to project their position between drill lines with any real hope of accuracy.

Fine-grained ilmenite is present in minor quantities throughout the sequence, but the maximum concentration is in the lower 15 ft. of the wash. Mr. Wood rejects an equal weight of ilmenite to the cassiterite retained in the final cleaning of the concentrate. Coarse-grained, well rounded tourmaline and fine-grained reddish garnet are also present in the rough concentrate.

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GENERALISED LITHOLOGICAL SECTIONS - WOOD'S FLAT AND
EASTERN TERRACE.

| <u>WOOD'S FLAT</u> | | <u>EASTERN TERRACE</u> | |
|--------------------|--|--|--|
| <u>Thickness</u> | <u>Lithology</u> | <u>Thickness</u> | <u>Lithology</u> |
| | | 6" to 1' | Sandy topsoil. |
| | | 0' to 2' | coarse-grained clayey sand. |
| | | 1' to 1.5' | cemented clayey sand. |
| | | 2' to 6' | coarse-grained clayey sand. |
| | | 0' to 6' | wash |
| | | ----- | |
| | | (granite basement in shallower ground) | |
| a. 6" to 6.5' | black to dark brown silty topsoil. | | |
| 0' to 15' | light to mid-grey massive non-bedded clay. | 0' to 10' | creamy siltstone and claystone. |
| 4' to 13' | silty fine sand, silt and clay. | 0' to 10' | fine-grained quartz sand. |
| b. 0' to 10' | fine drift. | 0' to 37' | medium to coarse-grained quartz sand. |
| 0' to 8' | coarse drift. | 10' to 27' | brown laminated siltstone with marcasite. |
| c. 0' to 2' | wood. | 6" to 10' | off-white to greyish siltstone with marcasite. |
| 0' to 12.5' | coarse drift. | 0' to 12' | coarse drift with marcasite. |
| 0' to 14' | clay and fine drift. | 4' to 15' | lower wash with marcasite. |
| 0' to 9.5' | coarse drift with occasional wash bands. | | |
| 0' to 3.75' | wash | | |
| | granite basement (17'3" to 35'11") | | granite basement (53'6" to 71') |

Cassiterite occurs in trace amounts throughout the sequence but the higher concentrations are restricted to the wash horizon at the bottom. Values from a trace to 0.09 lb Sn/cu. yd. have been recorded from the upper clay, silt and fine-grained and coarse-grained drift. Values in the wash horizon vary from 0.09 to 4.1 lbs Sn/cu. yd. Where significant cassiterite appears to exist in the lower sections of coarse drift (e. g., holes 1 and 9 in line 12), the values are due to the inclusion of part of the wash horizon within the drift.

Grade and Yardage: The results of all UDC's drilling on Wood's Flat are given in Appendix I. The weighted grade of all UDC's holes on Wood's Flat is 0.15 lb Sn/cu. yd. and the average depth of all holes is 24.5 feet.

The results of the holes intersecting the stanniferous runs are summarised in Table C. In the left hand part of the table the depth and the weighted grade of each hole is given and these are combined to give an average depth and a weighted grade for each bore line. On the right hand side of the table two calculations of overall grade are made; (1) by averaging the values of the five lines (weighted by the average depth of each line), and (2) by averaging the values for the nineteen holes (weighted by the actual depth of each hole). The grade of the stanniferous runs weighted by lines is 0.403 lb Sn/cu. yd. and by holes is 0.36 lb Sn/cu. yd.

In evaluation the overall grade by holes has to be used as the number of holes per line and the spacing of holes within each line varies. Considering the stanniferous runs only (Plate 6) the total yardage (vertical walls) indicated is 1,091,500 cu. yds. The ground holds well but allowing a 60° batter for the pit walls increases this figure to 1,231,000 cu. yds. This dilution would also lower the grade to 0.319 lb Sn/cu. yd.; which, allowing for a recovery of 85% of the cassiterite, has to be still further lowered to 0.27 lb Sn/cu. yd.

Appraisal: Table D shows a summary of the Endurance Tin Mining Company's drilling of the Wood's Flat area treated in the same way as UDC's drilling results are treated in Table C. The overall average grade (weighted by holes) of the Endurance drilling is 0.71 lb Sn/cu. yd., which has to be compared to the UDC figure of 0.36 lb Sn/cu. yd. Between these two lies the figure of 0.56 lb Sn/cu. yd. obtained by calculation of treated yardage and tin returns of Mr. Wood's present operation on the Flat.

The discrepancy between the three figures is not readily explained. In considering them the following factors should be noted:

- (1) The UDC drilling was closely supervised and all concentrates were sent to a laboratory for assay. The Endurance drilling, on the other hand, is thought to have been less strictly supervised and concentrates were

panned by hand to a visually estimated 70% SnO₂ and weighed without assay. Because of the quantity of ilmenite present, local panners doubt the accuracy of dressing a concentrate to this high concentration. If Endurance concentrates did contain considerable ilmenite, their grade figure would, of course, be artificially high.

- (2) In two tests (see pages 5 and 6) carried out at the completion of the UDC drilling programme under almost ideal conditions, only an average of 74.8% of the tin from a dummy sample was recovered. Insufficient tests were made to justify applying the results to the whole of the UDC drilling programme; however, if the tests had any validity, the overall average grade would be greater and nearer to Wood's production.

The UDC drilling and sampling technique has been commented on favourably by officers of the Tasmanian Mines Branch who have had a long experience in drilling for tin in this area. They were, however, not in favour of the drive pump method of recovering the sample - they recommended a vacuum pump.

- (3) The Endurance drilling results indicate a grade of 0.71 lb Sn/cu. yd. Based on the above grade, mine production would be lowered to 0.629 if allowance is made for a 60° pit wall, and lowered further to 0.535 if mine recovery is assumed to approximate 85%. This figure approximates Mr. Wood's mined grade of 0.56%.
- (4) Local operators report that the cassiterite is confined to narrow intermittent runs commonly occurring in isolated very rich "pools". Mr. Wood's miners are actively "prospecting with the nozzle" during sluicing operations, trying to follow runs and locate the rich pools. It follows that the recovered grade is likely to be higher than the overall grade from drilling, as patches of barren ground are left as work proceeds.
- (5) The very discontinuous nature of the tin mentioned above may be the principal reason for the difference between the various estimates of the average grade. UDC's hole could be fortuitously located in the poorer zones of the stanniferous runs, and Endurance drilling may have encountered the richer pockets; however, check drilling as near as possible to the plotted position of old Endurance holes (e. g. , UDC line 12, whole line, and UDC bores 80, 82 and 24 of line 10), did not compare with the Endurance results as regards grade.

Whatever may be the relative weight that should be given to the above factors in reconciling the three conflicting estimates of grade for Wood's Flat, it is clear that before more drilling is undertaken an attempt must be made to eliminate the uncertainties of the drilling method.

Eastern Terrace.

A generalised lithological section revealed by pit exposures and the UDC drilling is given in Table B. The old pits on the Eastern Terrace are less than 15 ft. deep and taken to a siltstone "false bottom" rather than to bedrock. The aim of the UDC drilling was twofold: (1) to establish if the stanniferous upper wash zone was present in confined gutters or as a sheeted deposit of more or less uniform grade, and (2) to establish if payable tin existed in deeper ground below the siltstone false bottom.

Depth and Distribution of Values: Six holes drilled in the northern part of the Terrace penetrated a narrow, deep, sharp-sided channel whose floor varies from $53\frac{1}{2}$ to 88 ft. below the surface. The maximum width (north end) is 600 ft. (see line 7, Plate 4). To the south the floor of the valley rises steeply south of line 6 to a watershed (see Plate 7). A lower wash horizon varying from 2 to 15 ft. in thickness occurs on the granite basement in which the channel is incised. The siltstone and drift of the deeper Tertiary sequence contains nil to a trace of tin, but large quantities of nodular and disseminated marcasite. The lower wash of the deeper channel also contains abundant marcasite and tin values from 0.02 to 0.19 lb Sn/cu. yd.

UDC drilling has shown that the tin in the upper part of the sequence is contained in narrow gutters rather than in a sheeted uniform horizon. Previous operators mined some of the narrow gutters following the richer values, e. g. pits at lines 1, 3, 4 and 5. The total thickness of the Tertiary fill in these gutters varies from 5 feet 6 inches to 13 feet 9 inches. The stanniferous concentrations occur primarily in the wash horizon, the overlying clayey drift containing nil to a trace of cassiterite only. The wash varies to 6 ft. in thickness, though for the greater part it is thin. Values of up to 2.08 lb Sn/cu. yd. were recorded in this wash. In one hole (Bore 38, line 6) the lowermost 5 feet 4 inches of the hole contained no recognisable wash, but gave a value of 0.50 lb Sn/cu. yd. Minor quantities of high grade cassiterite have been detected in the eluvial material in the headwaters of some of the gutters (e. g., bore 14, line 1 and bores 32 and 33 of line 5). The cassiterite of these shallow gutters is coarse and nuggety and contains a high proportion of chats.

Ilmenite occurs in small quantities with the cassiterite of the upper wash, but only trace amounts have been detected in the lower marcasitic sequence and/or the lower wash.

Grade and Yardage: It is difficult to assess the yardage of the stanniferous material in the upper part of the Tertiary sequence on the Eastern Terrace, as it is known to occur in confined, irregular gutters. Insufficient drilling

has been done to prove the number and extent of these gutters. Possibly about 500,000 cubic yards with a grade of 0.28 lb Sn/cu. yd. and an average depth of 9 ft. remains in the northern part of the area adjacent to lines 6 and 7. To the south isolated gutters containing up to 30,000 cubic yards with a possible grade of 0.5 lb Sn/cu. yd. may be located.

In the deep Tertiary lead to the north, the 6 holes drilled give an average grade of 0.06 lb Sn/cu. yd. over an average depth of 69 feet 8 inches. No yardage is calculated for this area.

Appraisal: UDC drilling on the Eastern Terrace has shown that the stanniferous ground does not exist as a sheeted body but as narrow, shallow gutters of limited extent, which are in the main coincident with present day drainage. The majority of these gutters have been located and mined by previous operators, and it is considered that only small sections of gutters remain to be mined.

In the deeper Tertiary ground the results were poor and do not encourage further testing.

SUMMARY OF DRILLING RESULTS - WOOD'S FLAT

| <u>Bore No.</u> | <u>Depth</u> | <u>Depth to Base-ment</u> | <u>Thick-ness of Wash</u> | <u>Grade of Section Contain-ing Wash lb Sn/cy</u> | <u>Grade of Hole lb Sn/cy</u> | <u>Recovery (percent)</u> |
|------------------------------|--------------|---------------------------|---------------------------|---|-------------------------------|---------------------------|
| <u>Line 8</u> | | | | | | |
| 31 | 6' 4" | 6' 4" | - | - | Tr. | |
| 29 | 23' 10" | 22' 6" | 8' 0" | 1.06 | 0.42 | 77% |
| 77 | 20' 9" | 19' 5" | 9" | 4.47 | 0.61 | 79% |
| 30 | 21' 0" | 20' 6" | 1' 0" | .34 | 0.05 | 82% |
| 50 | 22' 2" | 17' 9" | - | - | Tr. | 111% |
| 51 | 20' 6" | 20' 0" | - | - | Tr. | 83% |
| 52 | 21' 11" | 20' 6" | 2' 0" | 0.38 | 0.08 | 79% |
| 55 | 20' 6" | 19' 6" | 1' 0" | 3.98 | 0.33 | 94% |
| 53 | 19' 1" | 18' 0" | 2' 0" | 2.25 | 0.37 | 88% |
| 56 | 22' 6" | 20' 9" | 1' 0" | 0.42 | 0.11 | 82% |
| 54 | 18' 6" | 17' 9" | - | - | 0.01 | 81% |
| 57 | 21' 8" | 30' 4" | 3' 10" | 0.43 | 0.15 | 75% |
| 58 | 27' 3" | 25' 0" | 3' 0" | 0.40 | 0.12 | 74% |
| 59 | 24' 8" | 21' 6" | 3' 4" | 0.05 | 0.03 | 101% |
| 60 | 29' 0" | 26' 0" | 5' 6" | 1.02 | 0.32 | 81% |
| 76 | 9' 3" | 7' 6" | - | - | 0.02 | 63% |
| <u>Average Depth 18' 11"</u> | | | | <u>Grade</u> | 0.18 | |

| | | | | | | |
|-----------------------------|---------|--------|-------|--------------|-------|------|
| <u>Line 9</u> | | | | | | |
| 28 | 20' 6" | 18' 0" | - | - | Tr. | 84% |
| 27 | 17' 3" | 16' 9" | 9" | 1.45 | 0.23 | 89% |
| 78 | 19' 3" | 19' 0" | 6" | 4.09 | 0.39 | 68% |
| 26 | 22' 6" | 19' 9" | 1' 6" | 1.97 | 0.33 | 62% |
| 79 | 23' 9" | 23' 0" | 3' 0" | 0.10 | 0.02 | 94% |
| 61 | 27' 9" | 26' 6" | 3' 6" | 0.90 | 0.12 | 80% |
| 62 | 26' 7" | 24' 6" | 3' 6" | 0.89 | 0.18 | 71% |
| 63 | 20' 0" | 18' 3" | 6" | 0.26 | 0.03 | 81% |
| 64 | 25' 3" | 23' 0" | 1' 0" | 0.07 | 0.02 | 87% |
| 68 | 21' 10" | 19' 0" | - | - | Tr. | 91% |
| 69 | 20' 0" | 16' 0" | 2' 0" | 0.15 | 0.06 | 62% |
| 65 | 20' 0" | 17' 0" | 1' 0" | 0.15 | 0.04 | 92% |
| 66 | 22' 9" | 19' 0" | - | - | 0.03 | 95% |
| 67 | 26' 6" | 24' 0" | 3' 0" | 0.36 | 0.11 | 87% |
| 70 | 23' 6" | 22' 0" | 3' 0" | 0.07 | 0.01 | 101% |
| 71 | 25' 0" | 22' 0" | 7' 0" | - | 0.04 | 69% |
| 72 | 24' 6" | 21' 9" | 2' 3" | 0.05 | 0.01 | 76% |
| 73 | 26' 3" | 23' 0" | 6" | 1.20 | 0.24 | 85% |
| 74 | 26' 0" | 24' 0" | - | - | 0.01 | 91% |
| 75 | 27' 0" | 24' 0" | 3' 6" | 0.26 | 0.04 | 134% |
| <u>Average Depth 21' 0"</u> | | | | <u>Grade</u> | 0.095 | |

| <u>Bore No.</u> | <u>Depth</u> | <u>Depth to Base-ment</u> | <u>Thick-ness of Wash</u> | <u>Grade of Section Contain- ing Wash lb Sn/cy</u> | <u>Grade of Hole lb Sn/cy</u> | <u>Recovery (percent)</u> |
|-----------------------------|--------------|---------------------------|---------------------------|--|-----------------------------------|-------------------------------|
| <u>Line 10</u> | | | | | | |
| 81 | 32' 0" | 29' 6" | 3' 0" | 7.18 | 1.13 | 68% |
| 19 | 28' 2" | 26' 8" | 1' 2" | 0.37 | 0.08 | 70% |
| 82 | 27' 0" | 24' 0" | 2' 0" | 0.18 | 0.04 | 63% |
| 80 | 28' 0" | 26' 4" | 2' 9" | 0.73 | 0.08 | 101% |
| 20 | 27' 0" | 26' 0" | 3' 0" | 1.85 | 0.07 | 93% |
| 21 | 26' 3" | 24' 0" | 1' 6" | 0.80 | 0.14 | 57% |
| 24 | 25' 0" | 24' 0" | 1' 6" | 0.11 | 0.01 | 70% |
| 22 | 27' 10" | 25' 6" | 6" | 0.48 | 0.11 | 79% |
| 23 | 30' 0" | 28' 0" | - | 0.25 | Tr. | 91% |
| 25 | 31' 6" | 30' 0" | 1' 0" | 0.54 | 0.10 | 94% |
| 83 | 29' 4" | 27' 10" | 1' 10" | 4.10 | 0.48 | 66% |
| <u>Average Depth 26' 6"</u> | | | | <u>Grade</u> | 0.216 | |
| <u>Line 11</u> | | | | | | |
| 18 | 17' 6" | 17' 6" | - | - | Tr. | 67% |
| 17 | 35' 11" | 33' 6" | 3' 0" | 3.07 | 0.28 | 106% |
| 11 | 25' 10" | 25' 0" | 2' 0" | 0.60 | 0.09 | 85% |
| 12 | 32' 0" | 32' 0" | 8' 9" | 0.83 | 0.23 | 60% |
| 13 | 18' 0" | 18' 0" | - | 0.4 | 0.04 | 117% |
| <u>Average Depth 25' 1"</u> | | | | <u>Grade</u> | 0.158 | |
| <u>Line 12</u> | | | | | | |
| 10 | 30' 0" | 28' 0" | 3' 6" | 4' @ 1.4 | 0.21 | 73% |
| 9 | 28' 0" | 25' 0" | 1' 6" | 8' @ 2.0 | 0.59 | 72% |
| 1 | 31' 10" | 28' 0" | 2' 0" | 0.26 | 0.20 | 91% |
| 2 | 27' 0" | 26' 0" | 1' 6" | 1.27 | 0.19 | 91% |
| 3 | 27' 0" | 25' 5" | 5" | 0.09 | 0.02 | 105% |
| 4 | 27' 0" | 26' 5" | 4" | 0.48 | 0.02 | 78% |
| 8 | 29' 9" | 27' 6" | 2' 6" | 1.07 | 0.14 | 118% |
| 7 | 28' 4" | 27' 0" | - | - | Nil | 101% |
| 5 | 27' 8" | 27' 8" | - | - | Tr. | 86% |
| 5A | 26' 5" | 26' 5" | - | - | Nil | 164% |
| 6 | 27' 2" | 26' 2" | - | - | Nil | 57% |
| <u>Average Depth 26' 8"</u> | | | | <u>Grade</u> | 0.123 | |
| <u>Total Depth</u> | | 1,547' | | | | |
| <u>Total Average</u> | | 24' 6" | 22' 9" | | 0.15 | 84% |

SUMMARY OF DRILLING RESULTS - EASTERN TERRACE

| <u>Bore No.</u> | <u>Depth</u> | <u>Depth to Basement</u> | <u>Thick-ness of Wash</u> | <u>Grade of Section Contain-ing Wash lb Sn/ cy</u> | <u>Grade of Hole lb Sn/ cy</u> | <u>Recovery (percent)</u> |
|------------------------------------|--------------|--------------------------|---------------------------|--|--------------------------------|---------------------------|
| <u>Line 1</u> | | | | | | |
| 48 | 11' 3" | 8' 6" | 1" | Tr. | Tr. | 116% |
| 47 | 9' 1" | 6' 9" | - | - | 0.02 | 115% |
| 16 | 15' 4" | 13' 9" | 1' 0" | 2.08 | 0.22 | 65% |
| 15 | 12' 9" | 12' 5" | - | - | 0.08 | 76% |
| 14 | 9' 6" | 7' 3" | - | - | 0.01 | 56% |
| <u>Average Depth</u> | | 9' 9" | | <u>Grade</u> | 0.087 | |
| <u>Line 3A</u> | | | | | | |
| 49 | 6' 0" | 3' 0" | 1½" | - | Nil | 77% |
| 49A | 5' 0" | 3' 9" | - | - | - | - |
| <u>Average Depth</u> | | 3' 4" | | | | |
| <u>Line 5</u> | | | | | | |
| 32 | 8' 3" | 4' 0" | - | - | 0.03 | 89% |
| 33 | 12' 0" | 3' 0" | - | - | Tr. | 91% |
| 34 | 4' 6" | 3' 6" | - | - | 0.25 | 106% |
| <u>Average Depth</u> | | 3' 6" | | <u>Grade</u> | 0.095 | |
| <u>Line 6</u> | | | | | | |
| | | <u>Upper Wash</u> | | | | |
| 46 | 87' 10" | 12' 0" | 2' 0" | 0.3 | 0.16 | 124% |
| | 87' 10" | 86' 9" | 2' 9" | 0.02 | 0.03 | 87% |
| 35 | 14' 1" | 7' 0" | 2" | 0.08 | 0.10 | 116% |
| 36 | 20' 0" | 8' 0" | 1" | 0.21 | 0.19 | 71% |
| 37 | 12' 9" | 5' 0" | 3" | 1.15 | 1.15 | 118% |
| 38 | 17' 0" | 14' 0" | - | 0.50 | 0.17 | 75% |
| 39 | 15' 3" | 13' 0" | - | - | 0.01 | 100% |
| <u>Average Depth to Upper Wash</u> | | 9' 10" | | <u>Grade</u> | 0.208 | |
| | | <u>Upper Wash</u> | | | | |
| <u>Bore 40</u> | 71' 6" | 11' 9" | 2' 6" | 2.35 | 0.93 | 94% |
| | 71' 6" | 69' 0" | 4' 0" | 0.8 | 0.21 | 96% |

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APPENDIX II

Page 2.

| <u>Bore No.</u> | <u>Depth</u> | <u>Depth to Base-ment</u> | <u>Thick-ness of Wash</u> | <u>Grade of Section Contain-ing Wash lb Sn/cy</u> | <u>Grade of Hole lb Sn/cy</u> | <u>Recovery (percent)</u> |
|------------------------------------|--------------|---------------------------|---------------------------|---|-------------------------------|---------------------------|
| <u>Line 7</u> | | Upper Wash | | | | |
| 41 | 55' 6" | 5' 0" | - | - | Tr. | 89% |
| | 55' 6" | 54' 6" | 1' 6" | Tr. | Tr. | 140% |
| | | Upper Wash | | | | |
| 42 | 62' 0" | 6' 8" | - | - | 0.05 | 106% |
| | 62' 0" | 61' 0" | 2' 6" | 0.04 | 0.01 | 103% |
| | | Upper Wash | | | | |
| 43 | 70' 0" | 5' 6" | 3" | 0.08 | 0.08 | 91% |
| | 70' 0" | 66' 0" | 3' 0" | 0.19 | 0.03 | 117% |
| | | Upper Wash | | | | |
| 44 | 73' 0" | 10' 0" | 2' 0" | 0.30 | 0.29 | 119% |
| | 73' 0" | 71' 6" | 10' 6" | 0.12 | 0.08 | 112% |
| 45 | 25' 2" | 8' 6" | - | - | 0.05 | 124% |
| <u>Average Depth of Upper Wash</u> | | | 7' 2" | <u>Grade</u> | 0.106 | |
| <u>Average Depth of Lower Wash</u> | | | 64' 3" | <u>Grade</u> | 0.033 | |
| <u>Total Depth</u> | | | 639' 7" | <u>Average Recovery</u> | | 99% |
| <u>Average of all Holes</u> | | | | | | |
| Upper Wash | | | 7' 10" | <u>Grade</u> | 0.189 | |
| Lower Wash | | | 68' 1" | <u>Grade</u> | 0.062 | |

GLOSSARY OF LOCAL TERMS

- CHAT Coarse grains of cassiterite with adherent quartz and therefore a lower specific gravity.
- DRIFT Sub-angular to sub-rounded clean quartz sand, generally unconsolidated but may be cemented (siliceous or ferruginous cement). Evidently derived more or less directly from weathering granite, by removal of the feldspars as clay, drift makes up the bulk of the Tertiary valley-fill. The grain size may be fine, medium or coarse.
- FALSE BOTTOM The upper surface of a clay or other well-marked horizon to which old workings were taken when they were not carried all the way to bedrock. False bottoms generally represent disconformities of which concentrations of stanniferous wash in gutters occur.
- GUTTER Elongate depression in the bedrock surface, generally shallow and narrow, below Tertiary sediments and generally within the broader depression forming a lead.
- LEAD An ancient river valley, now largely filled with fluvial sediments, towards the bottom of which occur concentrations of cassiterite.
- POOL More or less circular patch of high tin values generally along a run.
- PUG Clay, particularly a very tenacious, heavy clay.
- RUN Occurrences of higher tin values in sinuous gravel bodies elongated along the old stream course, but commonly along one side, rather than in the bottom, of a gutter.
- WASH An unconsolidated gravel of sub-rounded to rounded pebbles, cobbles or boulders, generally of quartz, with more or less drift matrix. Cemented wash bands are known from other parts of the tin field.

UTAH DEVELOPMENT COMPANY DRILLING ON WOOD'S FLAT
DEPTH AVERAGE OF HOLES IN THE STANNIFEROUS RUNS

| | <u>Hole No.</u> | <u>Depth Feet</u> | <u>Grade lb Sn/cy</u> | <u>Grade x Depth</u> |
|-------------------------|-----------------|-------------------|-----------------------|----------------------|
| Line 12 | 1 | 30 | 0.20 | 6.00 |
| | 2 | 26 | 0.19 | 4.94 |
| | 9 | 27 | 0.14 | 3.78 |
| | 10 | 30 | 0.59 | 17.70 |
| | | <u>113</u> | | <u>32.42</u> |
| | Av. | 28.25 | 0.287 | |
| Line 11 | 11 | 25.83 | 0.09 | 2.32 |
| | 12 | 32 | 0.23 | 7.36 |
| | 17 | 35.92 | 0.28 | 10.05 |
| | | <u>93.75</u> | | <u>19.73</u> |
| | Av. | 31.25 | 0.21 | |
| Line 10 | 81 | 32 | 1.13 | 36.16 |
| | 83 | 29.33 | 0.48 | 14.08 |
| | | <u>61.33</u> | | <u>50.24</u> |
| | Av. | 30.42 | 0.82 | |
| Line 9 (Western Run) | 26 | 21 | 0.33 | 6.93 |
| | 78 | 19.25 | 0.39 | 7.51 |
| | 27 | 17.25 | 0.23 | 3.96 |
| | | <u>57.5</u> | | <u>18.40</u> |
| | | Av. | 19.17 | 0.32 |
| (Eastern Run) | 73 | 26.25 | 0.24 | 6.3 |
| | | Av. Line 9 | 0.295 | |
| Line 8 (Western Run) | 29 | 23.83 | 0.42 | 10.00 |
| | 77 | 20.75 | 0.61 | 12.66 |
| | | <u>44.58</u> | | <u>22.66</u> |
| | | Av. | 22.25 | 0.51 |
| (Central Run) | 53 | 19.08 | 0.37 | 7.05 |
| | 55 | 20.50 | 0.33 | 6.76 |
| | 56 | 22.50 | 0.11 | 2.47 |
| | | <u>62.08</u> | | <u>16.28</u> |
| | Av. | 20.67 | 0.26 | |
| (Eastern Run) | 60 | 29 | 0.32 | 9.28 |
| | | Av. Line 8 | 0.355 | |

OVERALL AVERAGE WEIGHTED BY LINES

| | <u>Depth</u> | <u>Grade lb Sn/cy</u> | <u>Depth x Grade</u> |
|---------|--------------|-----------------------|----------------------|
| Line 12 | 28.25 | 0.287 | 8.11 |
| Line 11 | 31.25 | 0.21 | 6.56 |
| Line 10 | 30.42 | 0.82 | 24.94 |
| Line 9 | 20.83 | 0.295 | 6.14 |
| Line 8 | 22.60 | 0.355 | 8.02 |
| Av. | <u>26.67</u> | <u>0.403</u> | |

OVERALL AVERAGE WEIGHTED BY HOLES

| | <u>Depth</u> | <u>Grade lb Sn/cy</u> | <u>Depth x Grade</u> |
|---------|--------------|-----------------------|----------------------|
| Line 12 | 113 | 0.287 | 32.42 |
| Line 11 | 93.75 | 0.21 | 19.73 |
| Line 10 | 61.33 | 0.82 | 50.24 |
| Line 9 | 83.75 | 0.295 | 24.7 |
| Line 8 | 135.67 | 0.355 | 48.2 |
| Av. | <u>25.66</u> | <u>0.36</u> | |

ENDURANCE DRILLING ON WOOD'S FLAT
DEPTH AVERAGE OF HOLES IN THE STANNIFEROUS RUNS

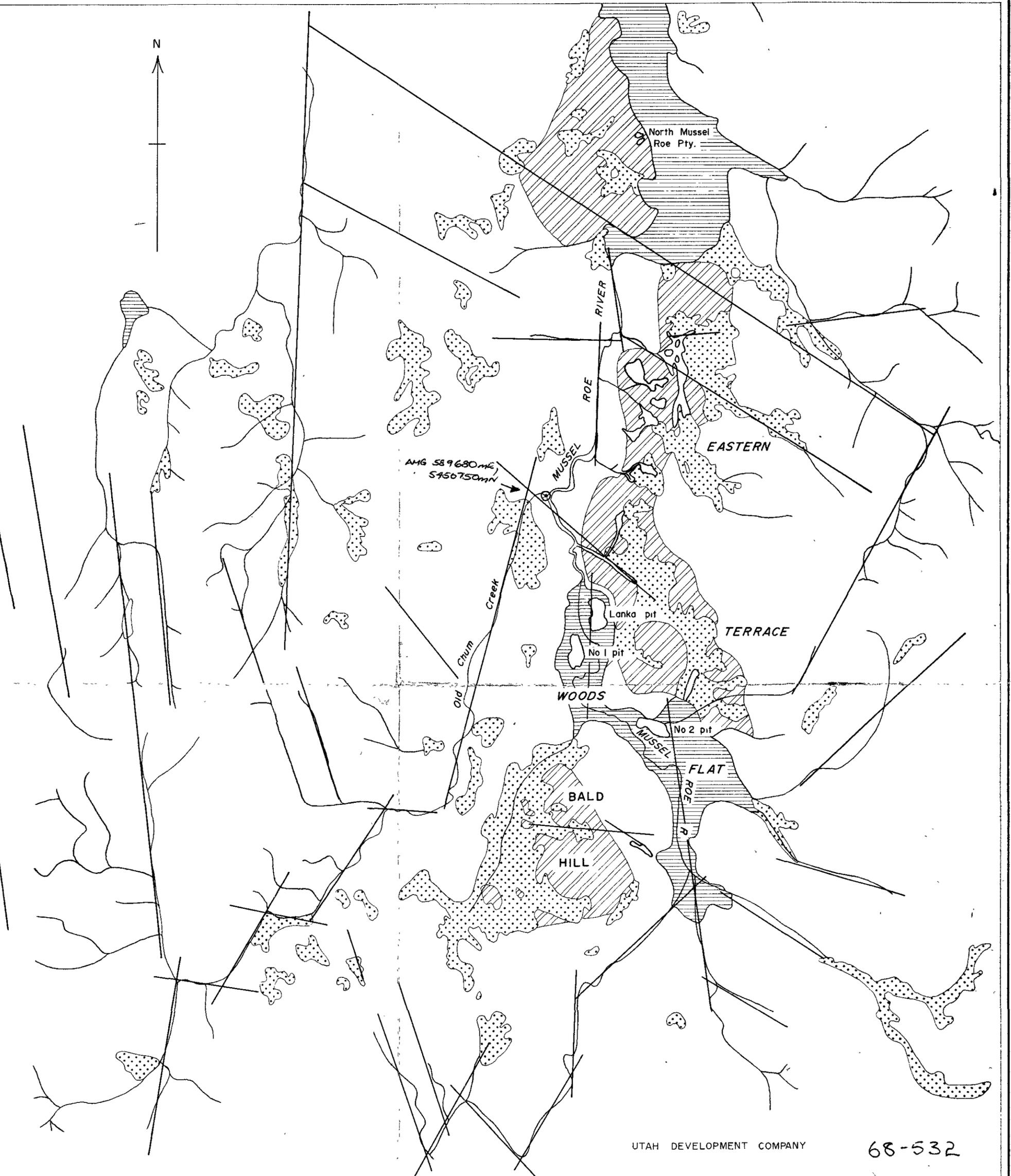
| | <u>Hole No.</u> | <u>Depth Feet</u> | <u>Grade lb Sn/cy</u> | <u>Grade x Depth</u> |
|-------------------------|------------------|-------------------|-----------------------|----------------------|
| Line 1 (Western Run) | 4 | 24 | 0.50 | 12.00 |
| | 5 | 21 | 1.60 | 33.60 |
| | 6 | 18 | 0.17 | 3.06 |
| | | <u>63</u> | | <u>48.66</u> |
| | <u>Av. 21</u> | <u>0.772</u> | | |
| (Eastern Run) | 8 | 18 | 0.13 | 2.34 |
| | 9 | 12 | 0.54 | 6.48 |
| | | <u>30</u> | | <u>8.82</u> |
| | | <u>Av. 15</u> | <u>0.294</u> | |
| Line 2 | 15 | 28.5 | 1.4 | 39.90 |
| | 16 | 27.5 | 1.41 | 38.77 |
| | | <u>56</u> | | <u>78.67</u> |
| | | <u>Av. 28</u> | <u>1.405</u> | |
| Line 3 | 21 | 33 | 1.05 | 34.65 |
| | 22 | 19.5 | 0.22 | 4.29 |
| | 23 | 31 | 0.31 | 9.61 |
| | | <u>83.5</u> | | <u>48.55</u> |
| | <u>Av. 27.83</u> | <u>0.581</u> | | |
| Line 4 | 31 | 28 | 0.64 | 17.92 |
| | 31A | 33 | Nil | - |
| | 32 | 26 | 3.71 | 96.46 |
| | 32A | 30 | 0.72 | 21.60 |
| | | <u>117</u> | | <u>135.98</u> |
| | <u>Av. 29.25</u> | <u>1.162</u> | | |
| Line 5 | 43 | 31 | 0.73 | 22.63 |
| | 44 | 30 | 0.15 | 4.50 |
| | | <u>61</u> | | <u>27.13</u> |
| | | <u>Av. 30.5</u> | <u>0.4447</u> | |
| Line 6 | 54 | 33 | 0.44 | 14.52 |
| | 55 | 33 | 0.06 | 1.98 |
| | 56 | 39 | 0.10 | 3.90 |
| | | <u>105</u> | | <u>20.40</u> |
| | | <u>Av. 35</u> | <u>0.194</u> | |

OVERALL AVERAGE WEIGHTED BY LINES

| | <u>Depth</u> | <u>Grade lb Sn/cy</u> | <u>Depth x Grade</u> |
|------------|--------------|-----------------------|----------------------|
| Line 1 | 21 | 0.772 | 16.21 |
| | 15 | 0.294 | 4.41 |
| Line 2 | 28 | 1.405 | 39.34 |
| Line 3 | 27.83 | 0.581 | 16.17 |
| Line 4 | 29.25 | 1.162 | 33.99 |
| Line 5 | 30.5 | 0.445 | 13.57 |
| Line 6 | 35 | 0.194 | 6.79 |
| <u>Av.</u> | <u>26.65</u> | <u>0.70</u> | |

OVERALL AVERAGE WEIGHTED BY HOLES

| | <u>Depth</u> | <u>Grade lb Sn/cy</u> | <u>Depth x Grade</u> |
|------------|--------------|-----------------------|----------------------|
| Line 1 | 63 | 0.772 | 48.66 |
| | 30 | 0.294 | 8.82 |
| Line 2 | 56 | 1.405 | 78.67 |
| Line 3 | 83.5 | 0.581 | 48.55 |
| Line 4 | 117 | 1.162 | 135.98 |
| Line 5 | 61 | 0.4447 | 27.13 |
| Line 6 | 105 | 0.194 | 20.40 |
| <u>Av.</u> | <u>27.1</u> | <u>0.714</u> | |



UTAH DEVELOPMENT COMPANY

68-532

LEGEND

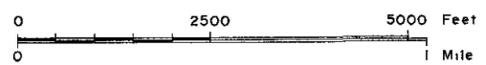
-  Alluvium generally button grass covered
-  Alluvium river flats, subject to flooding
-  Granite
-  Tertiary Sandy rises derived directly from Tertiary drifts.
-  Lineaments- Joints and ? Faults
-  Pits
-  Present day drainage

**PHOTO GEOLOGICAL MAP
OF WOODS PROPERTY & ENVIRONS
SHOWING JOINT CONTROL OF DRAINAGE.**

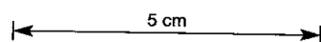
107031

AMG REFERENCE POINTS ADDED

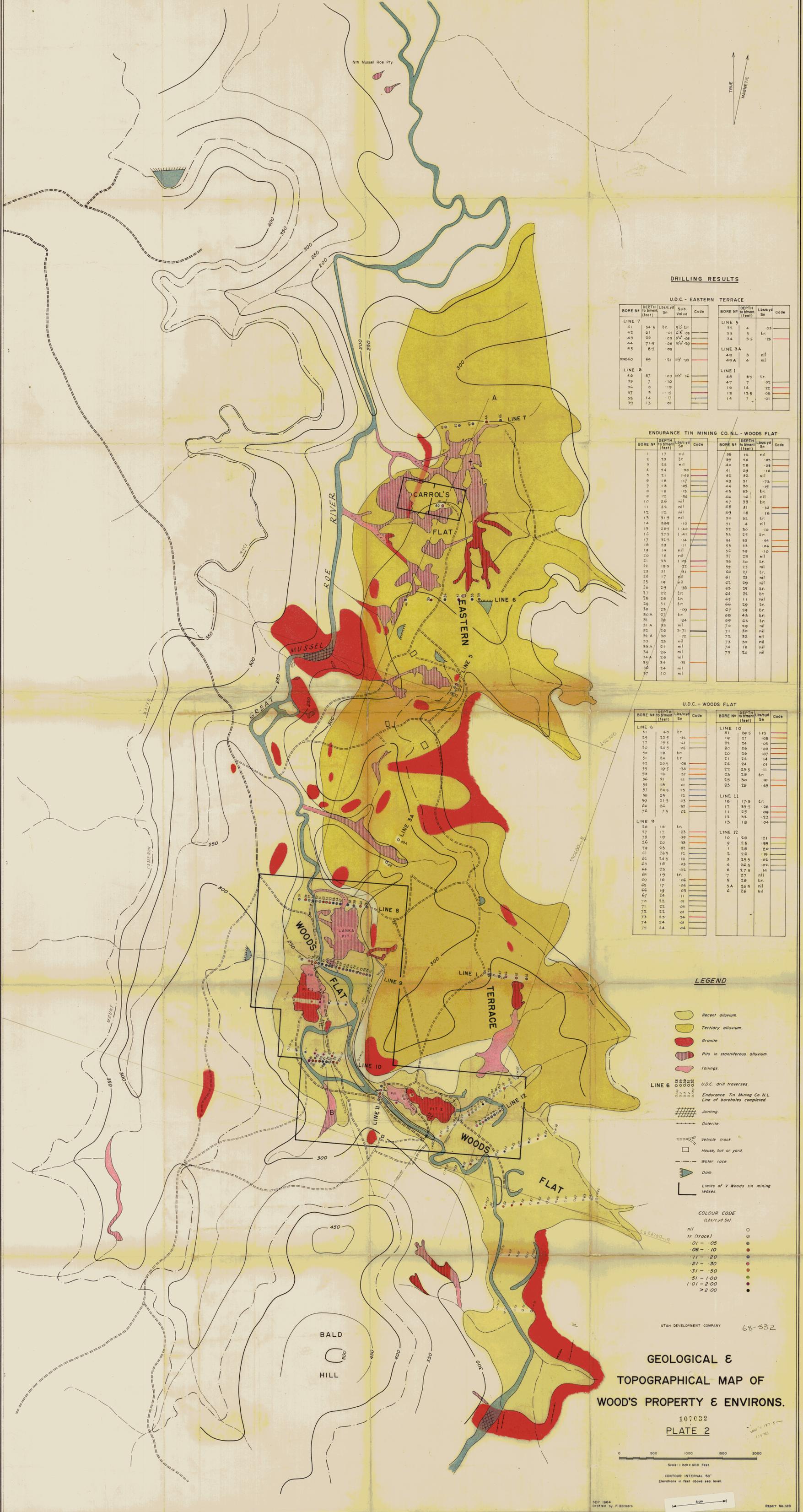
PLATE 1



SCALE 1" = 2000 FT



AUG 1964
Drafted by B Madex



DRILLING RESULTS

U.D.C. - EASTERN TERRACE

| BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Sub Value | Code | BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Code |
|---------|------------------------|-----------|-----------|------|---------|------------------------|-----------|------|
| LINE 7 | | | | | LINE 5 | | | |
| 41 | 54.5 | tr | 5.0 | tr | 32 | 4 | | |
| 42 | 61 | .01 | 6.8 | .05 | 33 | 3 | tr | |
| 43 | 66 | .03 | 5.0 | .08 | 34 | 3.5 | | .25 |
| 44 | 71.5 | .08 | 10.0 | .39 | | | | |
| 45 | 8.5 | .05 | | | LINE 3A | | | |
| 46 | 69 | .21 | 1.4 | .35 | 49 | 3 | nil | |
| | | | | | 49A | 4 | nil | |
| LINE 6 | | | | | LINE 1 | | | |
| 46 | 67 | .03 | 2.0 | .16 | 48 | 6.5 | tr | |
| 39 | 7 | .10 | | | 47 | 7 | .02 | |
| 36 | 8 | .19 | | | 16 | 14 | .22 | |
| 37 | 5 | .15 | | | 19 | 12.5 | .05 | |
| 38 | 14 | .17 | | | 14 | 7 | .01 | |
| 39 | 13 | .01 | | | | | | |

ENDURANCE TIN MINING CO. N.L. - WOODS FLAT

| BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Code | BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Code |
|---------|------------------------|-----------|------|---------|------------------------|-----------|------|
| 1 | 17 | nil | | 38 | 15 | nil | |
| 2 | 23 | tr | | 39 | 14 | .03 | |
| 3 | 25 | nil | | 40 | 18 | .08 | |
| 4 | 24 | .50 | | 41 | 29 | .18 | |
| 5 | 21 | 1.40 | | 42 | 32 | nil | |
| 6 | 18 | .17 | | 43 | 31 | .73 | |
| 7 | 13 | .05 | | 44 | 30 | .19 | |
| 8 | 18 | .13 | | 45 | 33 | tr | |
| 9 | 12 | .54 | | 46 | 16 | nil | |
| 10 | 26 | nil | | 47 | 35 | tr | |
| 11 | 22 | nil | | 48 | 31 | .10 | |
| 12 | 15 | nil | | 49 | 18 | .19 | |
| 13 | 31.5 | .10 | | 50 | 32 | tr | |
| 14 | 28.5 | .10 | | 51 | 4 | nil | |
| 15 | 28.5 | 1.40 | | 52 | 30 | .10 | |
| 16 | 21.5 | 1.41 | | 53 | 25 | tr | |
| 17 | 32.5 | .14 | | 54 | 33 | .44 | |
| 18 | 29 | .11 | | 55 | 33 | .06 | |
| 19 | 14 | nil | | 56 | 39 | .10 | |
| 20 | 18 | nil | | 57 | 25 | nil | |
| 21 | 35 | 1.05 | | 58 | 30 | nil | |
| 22 | 19.5 | .25 | | 59 | 25 | nil | |
| 23 | 31 | .31 | | 60 | 27 | tr | |
| 24 | 17 | nil | | 61 | 23 | nil | |
| 25 | 19 | nil | | 62 | 29 | nil | |
| 26 | 29 | .38 | | 63 | 25 | tr | |
| 27 | 22 | tr | | 64 | 22 | tr | |
| 28 | 28 | tr | | 65 | 11 | nil | |
| 29 | 31 | tr | | 66 | 29 | tr | |
| 30 | 23 | .09 | | 67 | 29 | tr | |
| 30A | 27 | tr | | 68 | 43 | tr | |
| 31 | 28 | .04 | | 69 | 68 | tr | |
| 31A | 35 | nil | | 70 | 29 | nil | |
| 32 | 26 | 3.71 | | 71 | 30 | nil | |
| 32A | 30 | .72 | | 72 | 32 | nil | |
| 33 | 23 | nil | | 73 | 30 | nil | |
| 33A | 21 | nil | | 74 | 18 | nil | |
| 34 | 26 | nil | | 75 | 20 | nil | |
| 34A | 26 | nil | | | | | |
| 35 | 34 | .31 | | | | | |
| 36 | 24 | nil | | | | | |
| 37 | 10 | nil | | | | | |

U.D.C. - WOODS FLAT

| BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Code | BORE No | DEPTH to bottom (feet) | Lbs/cy Sn | Code |
|---------|------------------------|-----------|------|---------|------------------------|-----------|------|
| LINE 8 | | | | LINE 10 | | | |
| 51 | 25.5 | tr | | 81 | 29.5 | 1.13 | |
| 52 | 19 | .42 | | 82 | 24 | .04 | |
| 77 | 19.5 | .61 | | 83 | 26 | .08 | |
| 80 | 20.5 | .05 | | 84 | 26 | .07 | |
| 85 | 18 | tr | | 85 | 24 | .14 | |
| 91 | 20 | tr | | 86 | 24 | .01 | |
| 92 | 20.5 | .08 | | 87 | 22 | .11 | |
| 95 | 19.5 | .33 | | 88 | 29.5 | .11 | |
| 96 | 16 | .37 | | 89 | 23 | tr | |
| 98 | 21 | .11 | | 90 | 25 | .10 | |
| 94 | 18 | .01 | | 91 | 28 | .48 | |
| 97 | 20.5 | .19 | | | | | |
| 98 | 25 | .12 | | LINE 11 | | | |
| 99 | 21.5 | .03 | | 18 | 17.5 | tr | |
| 60 | 26 | .32 | | 17 | 33.5 | .28 | |
| 76 | 7.5 | .02 | | 11 | 25 | .09 | |
| | | | | 12 | 32 | .23 | |
| | | | | 13 | 18 | .04 | |
| LINE 9 | | | | LINE 12 | | | |
| 28 | 18 | tr | | 10 | 28 | .21 | |
| 27 | 17 | .23 | | 9 | 25 | .99 | |
| 78 | 19 | .39 | | 1 | 28 | .20 | |
| 26 | 20 | .33 | | 2 | 26 | .19 | |
| 79 | 23 | .02 | | 3 | 25.5 | .02 | |
| 81 | 26.5 | .15 | | 4 | 26.5 | .02 | |
| 82 | 24.5 | .18 | | 5 | 27.5 | .14 | |
| 83 | 18 | .03 | | 6 | 27 | nil | |
| 84 | 23 | .02 | | 7 | 27 | tr | |
| 85 | 19 | tr | | 8 | 27.5 | nil | |
| 86 | 16 | .06 | | 9 | 28 | tr | |
| 87 | 17 | .04 | | 10 | 26.5 | nil | |
| 88 | 19 | .03 | | 11 | 26.5 | nil | |
| 89 | 24 | .11 | | 12 | 26 | nil | |
| 70 | 22 | .01 | | | | | |
| 71 | 22 | .04 | | | | | |
| 72 | 22 | .01 | | | | | |
| 73 | 23 | .04 | | | | | |
| 74 | 24 | .01 | | | | | |
| 75 | 24 | .04 | | | | | |

LEGEND

- Recent alluvium
- Tertiary alluvium
- Granite
- Pits in stanniferous alluvium
- Tailings
- U.D.C. drill traverses
- Endurance Tin Mining Co. N.L. Line of boreholes completed
- Joining
- Dolerite
- Vehicle track
- House, hut or yard
- Water race
- Dam
- Limits of V Woods tin mining leases

COLOUR CODE (Lbs/cy Sn)

- nil ○
- tr (trace) ○
- .01 - .05 ●
- .06 - .10 ●
- .11 - .20 ●
- .21 - .30 ●
- .31 - .50 ●
- .51 - 1.00 ●
- 1.01 - 2.00 ●
- > 2.00 ●

UTAH DEVELOPMENT COMPANY 68-532

GEOLOGICAL & TOPOGRAPHICAL MAP OF WOOD'S PROPERTY & ENVIRONS.

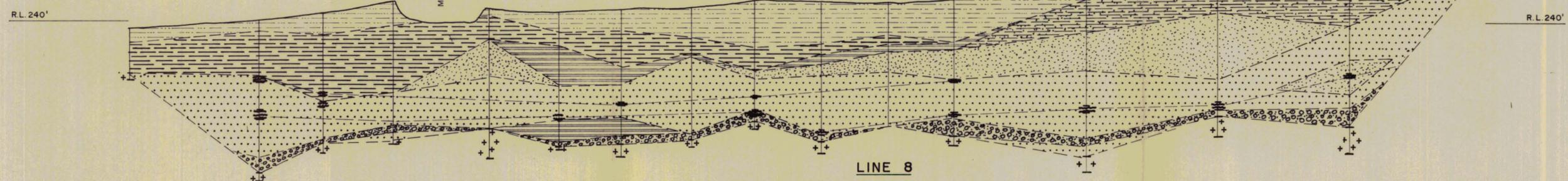
107032 PLATE 2

Scale: 1 inch = 400 Feet. CONTOUR INTERVAL 50' Elevations in feet above sea level.

W

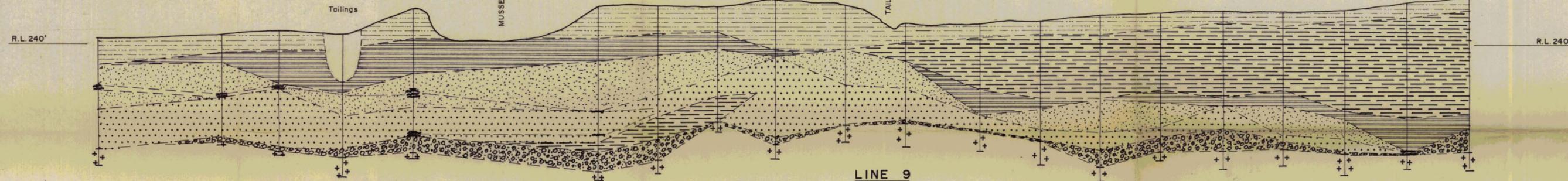
E

BORE N° 31 29 77 30 MUSSEL ROE RIV. 50 51 52 55 53 56 54 57 58 59 60



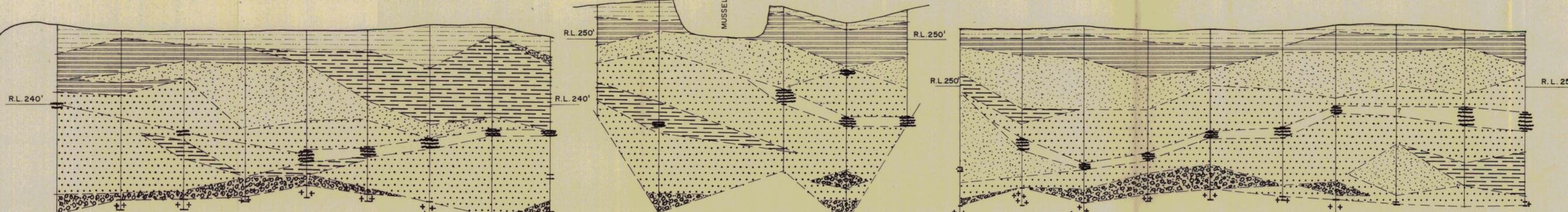
Tr. -42 -61 -05 Tr. Tr. -08 -33 -37 -11 -01 -15 -12 -03 -32 -02

BORE N° 28 27 78 26 79 MUSSEL ROE RIV. 61 62 63 64 68 TAIL RACE 69 65 66 67 70 71 72 73 74 75



Tr. -23 -39 -33 -02 -12 -18 -03 -02 Tr. -06 -04 -03 -11 -01 -04 -01 -24 -01 -04

BORE N° 81 19 80 20 21 22 23 25 83 MUSSEL ROE RIV. 18 17 11 12 13 10 9 1 2 3 4 8 7 5 6



1-13 -08 -08 -07 -14 -11 Tr. -10 -48 Tr. -28 -09 -23 -05 -21 -59 -20 -19 -02 -03 -14 Nil Tr. Nil

LEGEND

- Topsail
- Clayey coarse grained quartz sand.
- Clay.
- Silt.
- Fine grained quartz sand & drift.
- Coarse grained quartz drift.
- Wood.
- Wash.
- Granite basement.

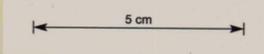
- Nil.
- Tr.
- 01 - .05 lbs Sn/cub.yd.
 - 06 - .10
 - 11 - .20
 - 21 - .30
 - 31 - .50
 - 51 - 1.00
 - 1.01 - 2.00

Scale
 Horiz. 1" = 50 Ft.
 Vert. 1" = 10 Ft.

UTAH DEVELOPMENT COMPANY

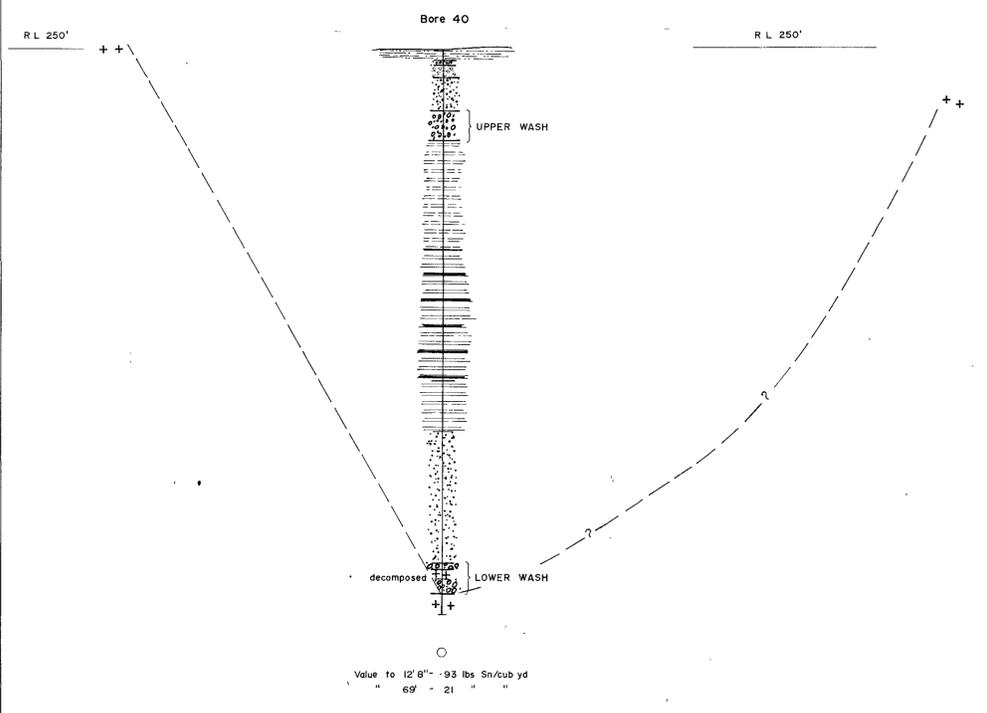
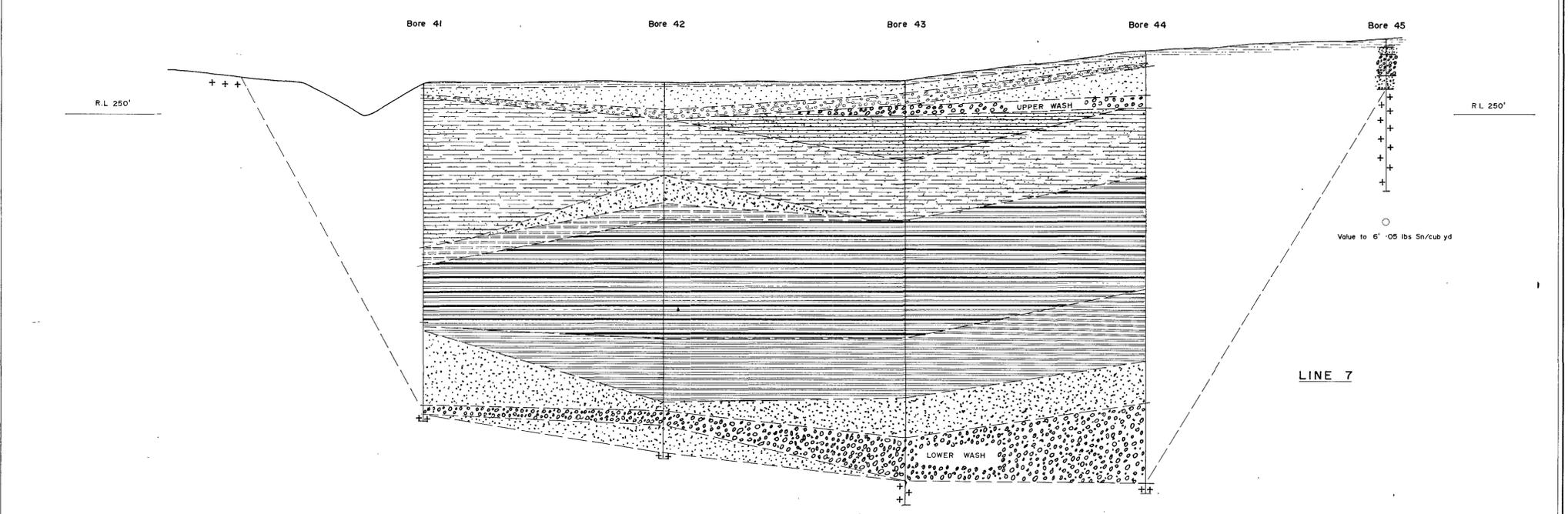
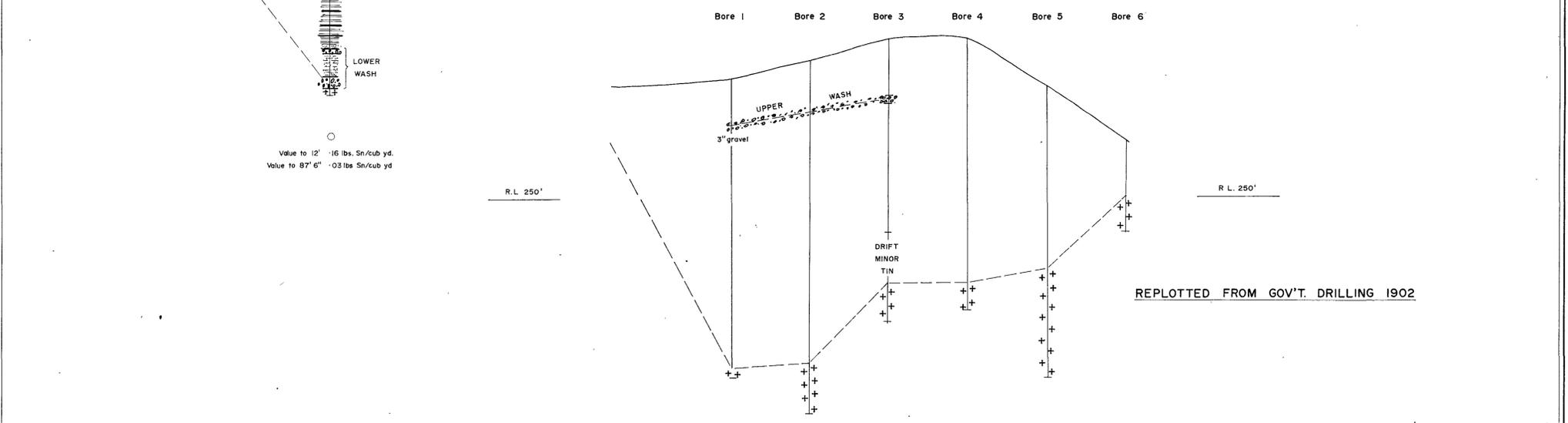
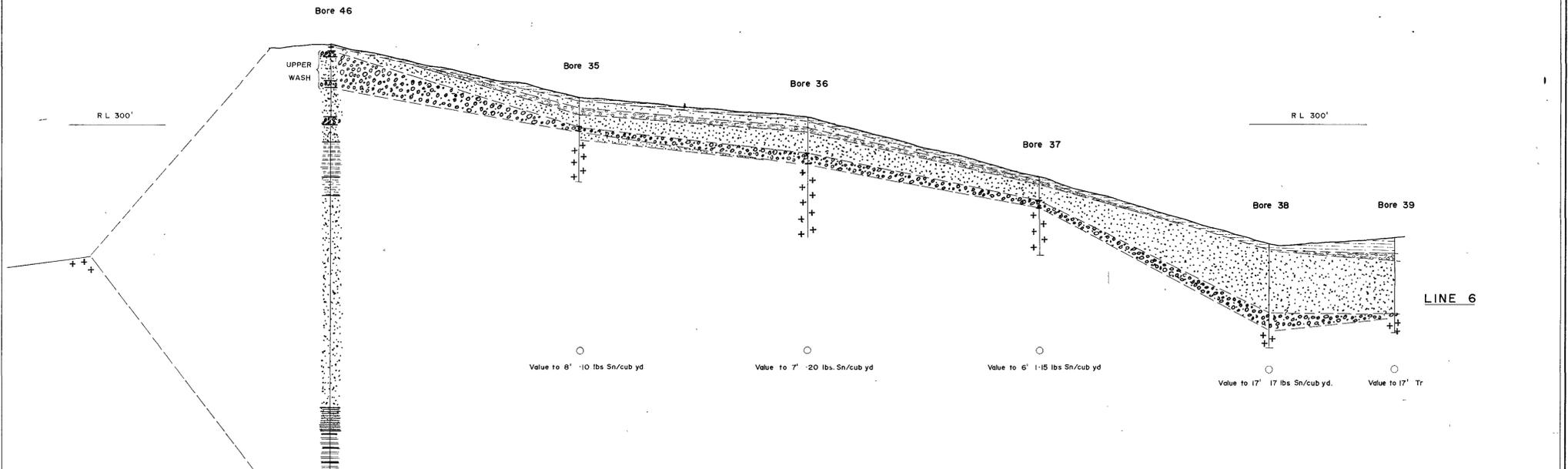
CROSS SECTIONS SHOWING LITHOLOGY & TOTAL TIN VALUES ALONG DRILL TRAVERSES AT WOOD'S FLAT.

PLATE 3 107033 68-532



4740

AUG 1964
Drafted by F. Barbaro.



- LEGEND**
- Topsoil
 - Medium to coarse grained quartz drift with or without clay matrix.
 - Cemented coarse grained clayey drift
 - Siltstone (non carbonaceous)
 - Laminated carbonaceous siltstone
 - Off white to light grey siltstone to claystone
 - Fine grained sandstone and clayey sandstone
 - Fine grained carbonaceous sandstone.
 - Wash
 - Granite

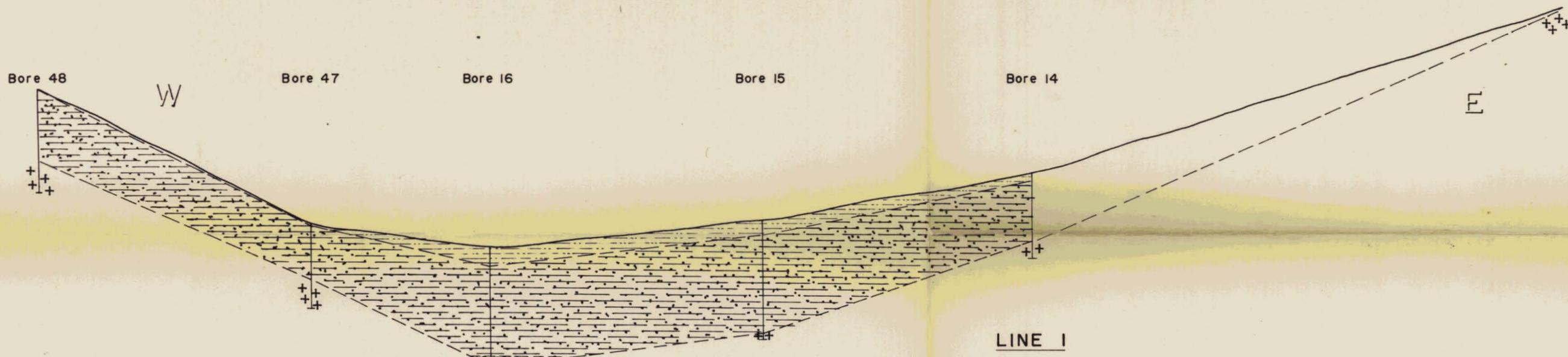
SECTIONS ACROSS THE EASTERN MUSSEL ROE DEEP LEAD SHOWING UPPER AND LOWER WASH HORIZONS.

UTAH DEVELOPMENT COMPANY 68-532

PLATE 4 107034

5 cm

SCALE Horiz 1" = 50 Ft
Vert 1" = 10 Ft



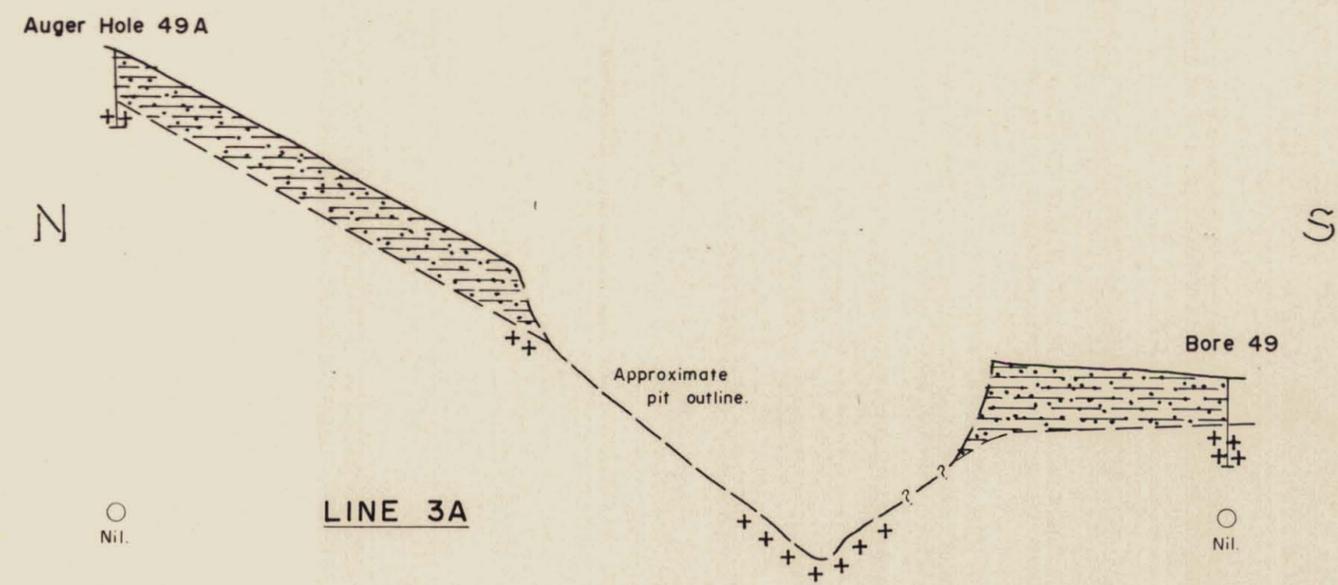
LINE I

○ Tr. ● .02 ● .22 ● .08 ● .01

LEGEND

-  Topsoil.
-  Clayey medium to coarse grained quartz drift.
-  Wash.
-  Granite basement.

○ .08 Value of hole in lbs. Sn/cub yd.



LINE 3A

○ Nil. ○ Nil.

107035

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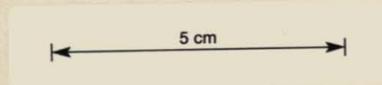
68-532

CROSS SECTIONS ALONG LINES I & 3A,
SHOWING SHALLOW TERTIARY GUTTERS IN GRANITE BASEMENT,
EASTERN TERRACE, N.E. TASMANIA.

PLATE 5

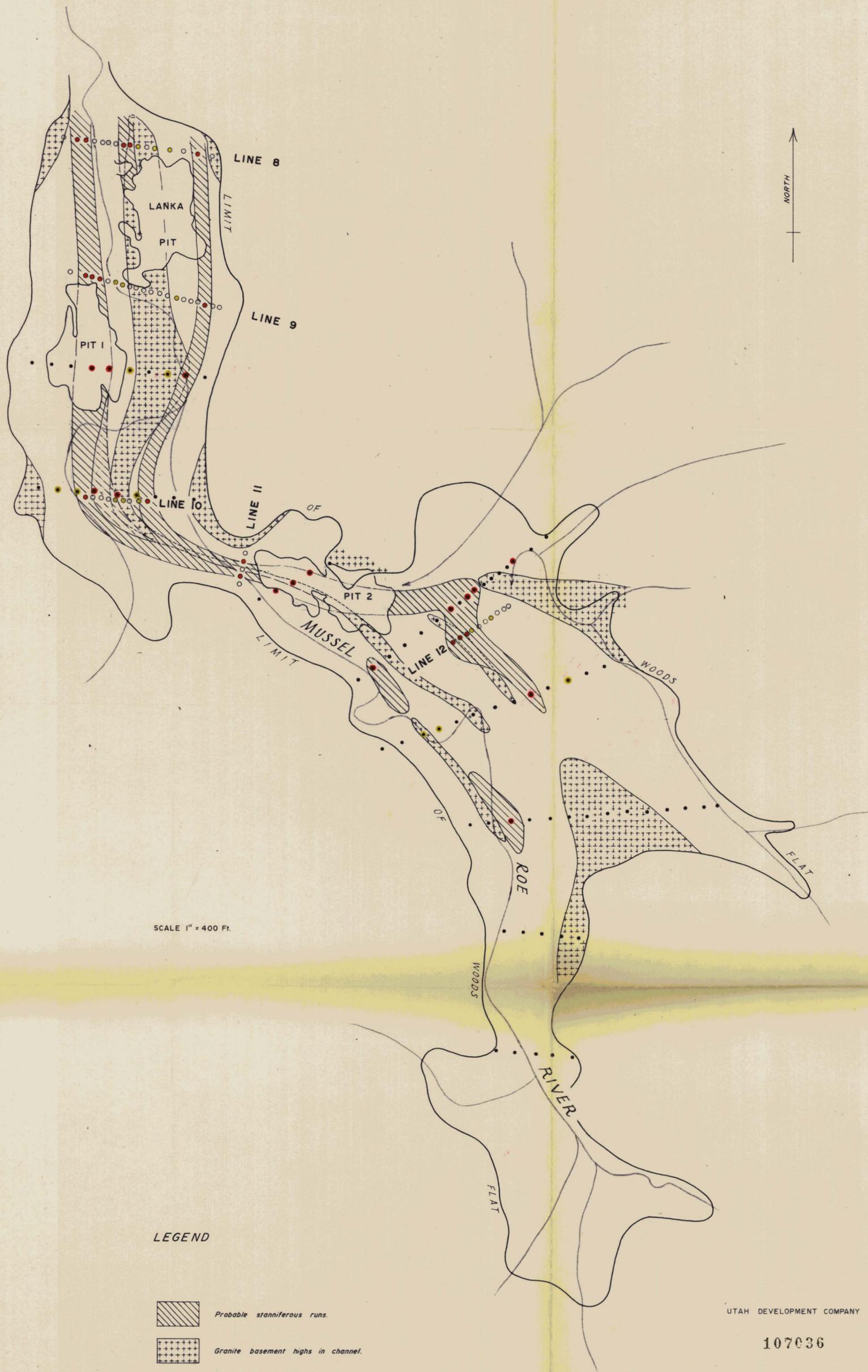
Scale Horiz. 1" = 50 Ft.
Vert. 1" = 10 Ft.

4742



AUG 1964
Drafted by F. Barbaro

Report No. 128



SCALE 1" = 400 Ft.

LEGEND



Probable stanniferous runs.



Granite basement highs in channel.



U.D.C. drill hole.



Endurance Tin Mining Co. drill hole.



Nil - 0.09 lbs. Sn/cub.yd.



0.10 - 0.19 " " "



> 0.19 " " "

TIN VALUES

UTAH DEVELOPMENT COMPANY

68-532

107036

MAP OF WOOD'S FLAT
SHOWING GRANITE BASEMENT HIGHS
AND PROBABLE STANNIFEROUS RUNS.

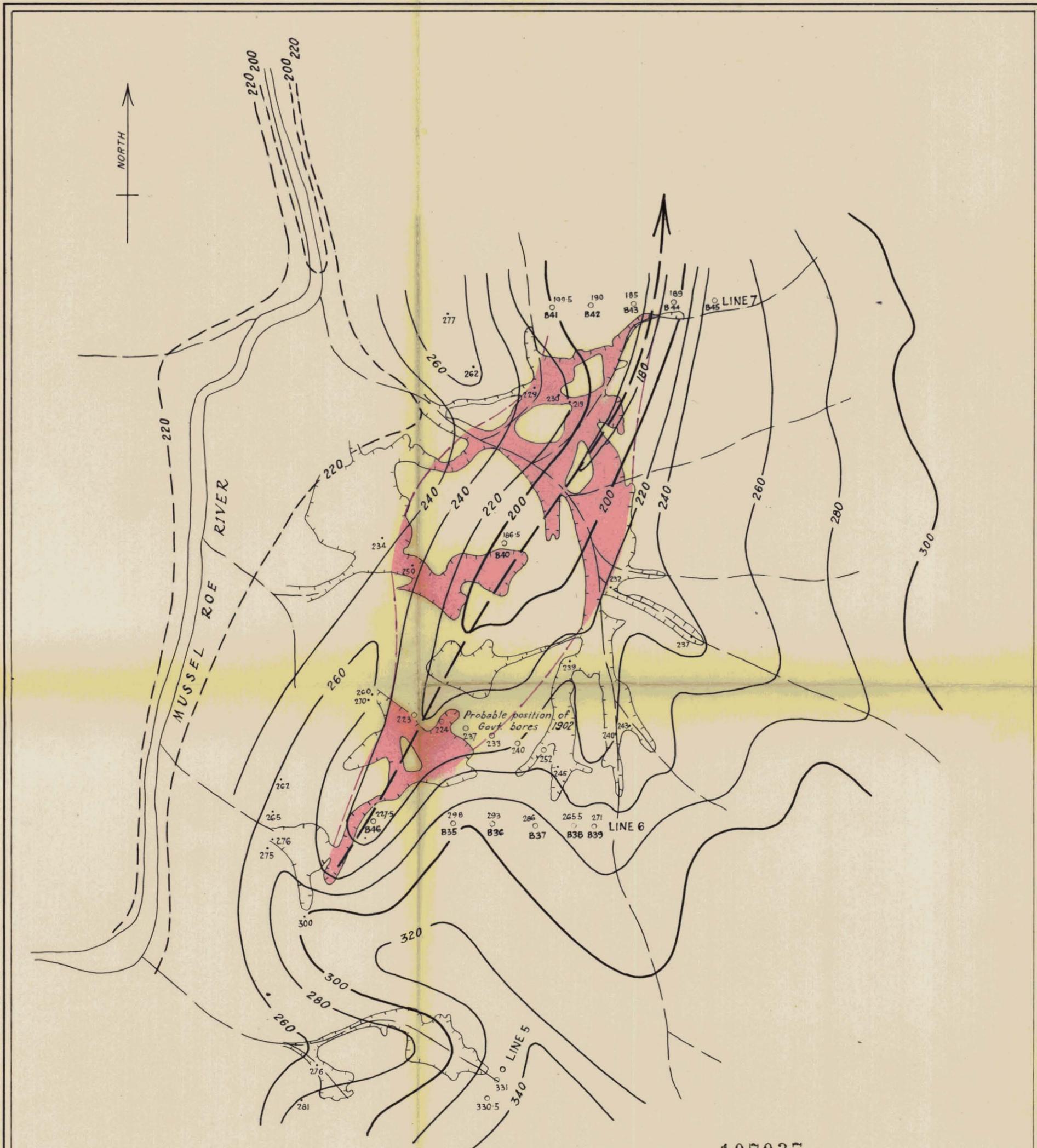
PLATE 6

4743

SEP. 1964
Drafted by F. Barbara.



Report No. 128



- 200 — Beneath tertiary cover
 - - - 200 - - - Exposed in present river
 - 265 Spot heights of basement (feet)
 - B35 Borehole
 - Shallow pit outline
 - — — Gutter in deep lead
 - - - Limit of laminated siltstone
 - Present drainage
- } Contours of granite surface

107037

UTAH DEVELOPMENT COMPANY

68-532

**BASEMENT CONTOUR PLAN
OF THE EASTERN MUSSEL ROE DEEP LEAD.**

PLATE 7

SCALE 1" = 400 FT.



AUG. 1964
Drafted by F. Barbaro.

4744

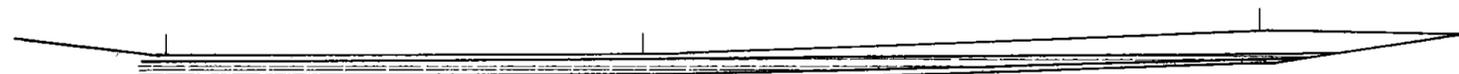
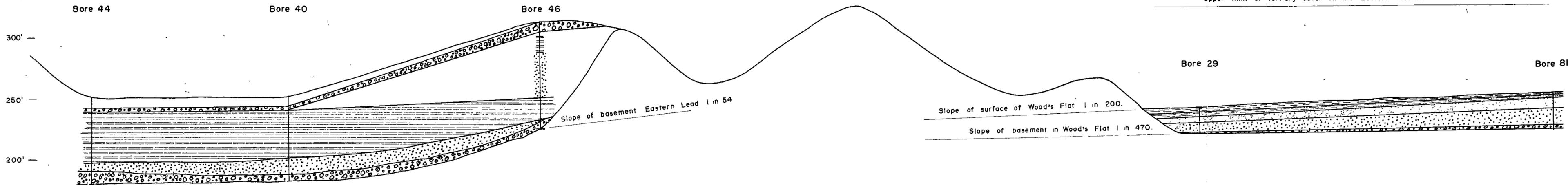
Report No. 128

North

South

A

B



Natural Scale

LEGEND

-  Clay
-  Silty clay
-  Fine drift
-  Laminated siltstone
-  Coarse drift
-  Wash

UTAH DEVELOPMENT COMPANY

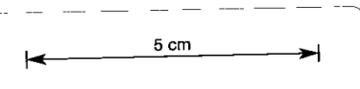
68-532

SECTION A-B ALONG THE EASTERN MUSSEL ROE DEEP LEAD AND THE NORTHERN PART OF WOOD'S FLAT.

PLATE 8

107038

SCALE Horiz 1" = 400 Ft
Vert 1" = 50 Ft



SEP 1964
Drafted by B Madex

4745

Report No 128