

QUEENSTAKE RESOURCES LTD.

MOYIE RIVER EXPLORATION PROJECT - CRANBROOK, B.C.

Fort Steele Mining District

N.T.S. 82F/SE

**Placer Leases #1902, 1080, 1775, 1773
Queenstake Resources Ltd.**

**Placer Leases #1080 and 1081
Hamilton Klinkhammer Option**

by

MICHAEL P. HENRICK, Ph.B.

**Covering work carried out during the period:
June 11, through September 23, 1986**

FILMED

November, 1986

**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

15,766

NELSON

OCCURRENCE !

FAME REPORT (EZ14)

15766



Province of British Columbia

Ministry of Energy, Mines and Petroleum Resources

ASSESSMENT REPORT
TITLE PAGE AND SUMMARY

TYPE OF REPORT(SURVEY(S))	TOTAL COST
PHYSICAL; GEOCHEMICAL	439,256.84

AUTHOR(S) M.P. Henrick SIGNATURE(S)

DATE STATEMENT OF EXPLORATION AND DEVELOPMENT FILED Dec-10/86 YEAR OF WORK 1986

PROPERTY NAME(S) MOYIE RIVER

COMMODITIES PRESENT Placer Au

B.C. MINERAL INVENTORY NUMBER(S) IF KNOWN 82F/9E-

MINING DIVISION Fort Steele NTS 82F/8E

LATITUDE 49° 23' 22" LONGITUDE 116° 1' 8"

NAMES and NUMBERS of all mineral tenures in good standing (when work was done) that form the property. (Examples: T.A. 14, PIRE 2 (12 units), PHOENIX (Lot 1706), Mineral Lease M 120, Mining or Carbonate Mining Lease ML 12 (claims involved).)

Placer Lease 1775

OWNER(S) (1) Queenstake Resources Ltd. (2)

MAILING ADDRESS

OPERATOR(S) (that is, Company paying for the work) (1) as above (2)

MAILING ADDRESS

SUMMARY GEOLOGY (lithology, age, structure, alteration, mineralization, size, and attitude)
The property is underlain by Proterozoic Aldridge Formation sediments and a diorite sill. Tertiary channel gravels parallel the northwest bank of the Moyie River. The channel is buried beneath 10.6 - 14.0 metres of till and gravel.

REFERENCES TO PREVIOUS WORK A.R. 15622

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	COST APPORTIONED
GEOLOGICAL (scale, area)			
Ground			
Photo			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for ...)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres; number of holes; size)			
Core			
Non-core			
RELATED TECHNICAL			
Sampling/assaying			
Petrographic			
Mineralogic			
Metallurgic	META 2. Bulk samples	Placer Lease 1775	
PROSPECTING (scale, area)			
PREPARATORY/PHYSICAL			
Legal surveys (scale, area)			
Topographic (scale, area)			
Photogrammetric (scale, area)			
Line/grid (kilometres)			
Road, local access (kilometres)			
Trench (metres)			
Underground (metres)	RECL	Placer Lease 1775	
			TOTAL COST 439,256.84

FOR MINISTRY USE ONLY	NAME OF PAC ACCOUNT	DEBIT	CREDIT	REMARKS:
Value work done (from report) 439,256.84				
Value of work approved				
Value claimed (from statement)				
Value credited to PAC account				
Value debited to PAC account				
Accepted Date Feb 24/88	Rept No. 15766			Information Class (3)

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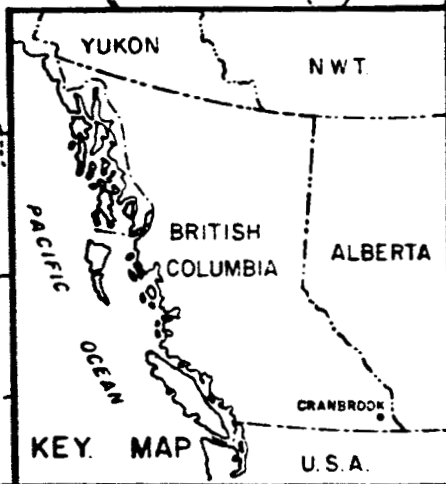
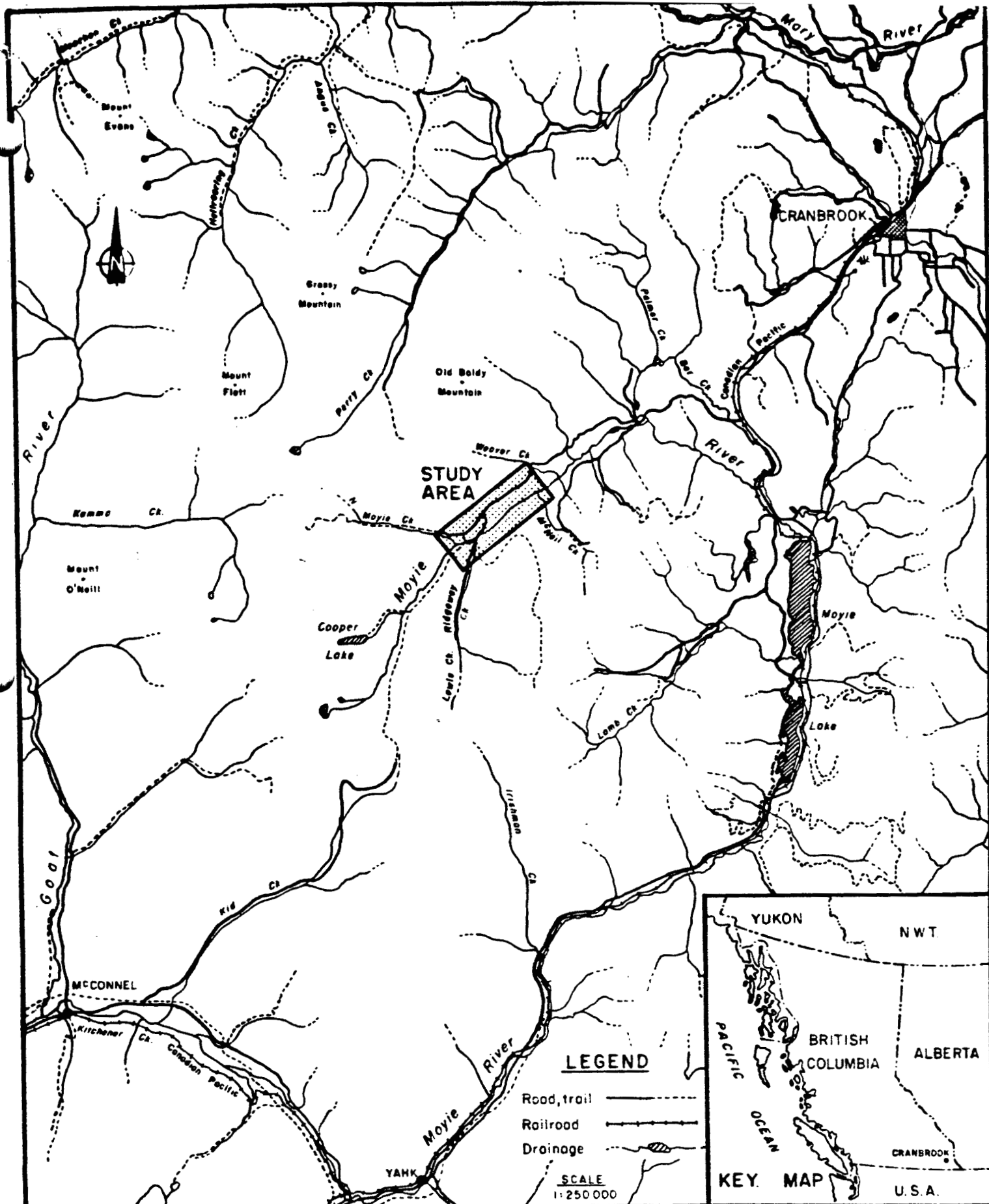
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(5)



**QUEENSTAKE RESOURCES LIMITED
MOYLE RIVER PLACER LEASES
STUDY AREA LOCATION PLAN**

CGI2078

FIG 1

82 F/8 E
GRASSY
MOUNTAIN

82 G/5 W

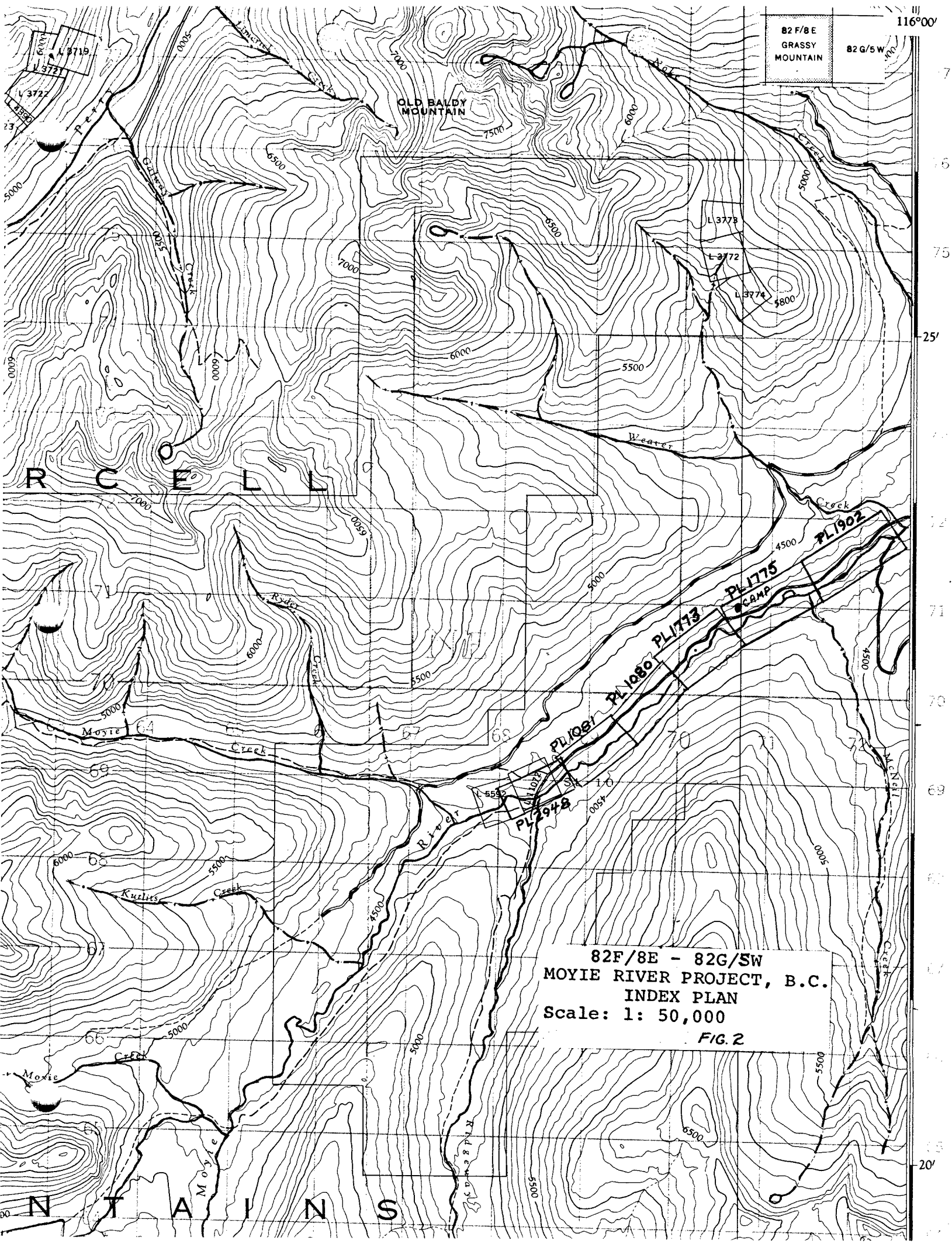
OLD BALDY
MOUNTAIN

R C E L L

N T A I N S

82F/8E - 82G/5W
MOYIE RIVER PROJECT, B.C.
INDEX PLAN
Scale: 1: 50,000

FIG. 2



INTRODUCTION

The 1986 bulk sampling testing programme was undertaken to determine actual gold grade within the tertiary channel as a follow up to the 1986 Drill Programme. The programme was supervised by the author on behalf of Queenstake Resources Ltd.

SUMMARY

During the period from June 11 through September 23, 1986 a total of 144,542 cubic yards of gravel was stripped and transported from the pit on placer lease PL1775. Between August 18 and September 23, a bulk sample of 17,729 cubic yards of this gravel was washed in a portable trommel-sluice washing plant. A total of 7,040.7 square yards of bedrock was exposed within the tertiary channel. The grade of the bulk sample was 0.012 crude ounces per yd³ or 0.012 fine ounces per yd³.

The gravel stripping and the processing of the bulk sample was carried out by Fiorentino Bros. Contracting Ltd. of Cranbrook, B.C. The contract work was done very efficiently and there was virtually no down time because of mechanical problems.

CONCLUSION

The bulk testing programme encountered grades that were less than 15% of expected values. This was due to a diorite reef which narrowed the channel midway in the cut. This had the effect of increasing the water velocity in this section which in turn scoured the channel bottom. The effect was compounded by the fact that the bedrock directly upstream from the diorite contact was a hard resilient quartzite. The quartzite was smoothly polished with very few cracks to trap and concentrate the gold. The ridges encountered within the quartzite were smooth and rounded offering no traps for the placer gold moving down the stream channel. The diorite was a relatively blocky bedrock with ridges and cracks as compared with the Alldridge Quartzite. The coarsest gold encountered was located in the northwest corner of the pit where the channel began to widen within the diorite sill.

The drilling program did not identify the nature of the bedrock and because of the drill line configuration the holes did not indicate the narrowing of the channel. The excavation of the pit has allowed for a detailed examination of the bedrock conditions that are not suitable for gold entrapment and a comparison can now be made with the very favorable bedrock conditions for gold entrapment that were found in the previous mining operation 5,000 feet upstream. At this location the gold was concentrated in highly fractured argillite bedrock, the gradient of the channel was low and the channel was 30% to 40% wider than the 1986 test section.

More detailed drilling than originally contemplated is required to interpret the configuration of the channel. Drilling will also indicate whether the bedrock is a highly siliceous quartzite (poor gold trap) or argillite (good gold trap). In the upstream area that was previously mined the highest grade was found in an oxidized, highly fractured argillite. The oxidized material can be easily identified in the drill cuttings.

Placer gold similar to that found in the upstream mined section has been mined eight miles downstream from the 1986 test pit. The coarse gold recovered from both the upstream and downstream areas is identical to the coarse gold found in the 1986 test pit. There is no geological reason that concentrations of placer gold will not occur in economic quantities if the bedrock conditions are suitable for gold entrapment either above or below the 1986 test pit.

It is concluded that there is a high probability of outlining economic reserves between the 1986 test pit and the upstream section previously mined and that detailed exploration is definitely warranted.

RECOMMENDATIONS

It is recommended that a drilling programme be carried out utilizing a downhole hammer to delineate the tertiary channel. This programme should be in conjunction with or followed by a drill programme which will produce representative samples for grade determination.

If the Phase I drill programme indicates a potentially economic reserve area, a Phase II bulk sampling programme is recommended to determine recovered grade as compared to drill indicated grade. These results can then be factored against the drill results to establish drill indicated reserves.

1987 DRILL PROGRAMME

The Phase I drill programme should be undertaken in two steps taking all precautions to ensure that an adequate and reliable assessment of gold values and accurate position of the tertiary channel can be made.

Phase I(a) consists of drilling three lines as outlined on the proposed 1986 drill programme map Plan #3 in the back of this report. Each line will have 6 holes, three on either side of the channel to delineate the tertiary channel and determine channel gravel depths. These holes will be drilled by a lower cost drilling system - preferably a down hole hammer. Once the channel location has been determined, three additional holes will be drilled within the channel on each line. These holes will be sampled and assessed. Barber Industries is presently in the process of constructing a placer bit that will compliment their casing drive bit. This bit will facilitate a quick, cheap and accurate system for drilling this ground. Barber Industries expects to have this bit ready towards the end of November. A total of 27 holes will be completed during Phase One.

Phase I(b) will follow as a fill in to better prove up reserves and delineate the channel within the area of best values achieved from Phase One above. A total of nine holes along one line should be adequate. No location for this line has been denoted as its locations will depend on values achieved from Phase One.

1987 Drill Programme Budget

Phase I (a & b)

		<u>Lower cost holes downhole hammer</u>	<u>Barber Dual Placer Drill</u>	<u>Total</u>
Total holes drilled	=	24	12	36
Average depth per hole	=	37 feet	55 feet	45 feet
Average cost per foot for both down hole hammer and Barber dual drill plus supervision	=	\$ 10.50/foot	\$ 27.68/foot	\$ 17.50/foot
Total cost of drilling and supervision	=	\$ 10,080.00	\$ 17,976.00	\$ 28,350.00
Incidental costs, propane, gas, supplies, rentals	=			<u>\$ 1,455.00</u>
				\$ 29,805.00
Contingencies at 10%				<u>2,980.00</u>
TOTAL				\$ 32,785.00

This program would take 20 days to complete.

1987 WINTER STRIPPING PROGRAMME

Phase II(a) - Stripping

The estimated pit size of 140 feet by 600 feet by 45 feet would result in a total of 161,778 cubic yards of material being stripped. The estimated cost of this programme would be \$360,765.00 based on an average stripping cost of \$2.23 per cubic yard.

Stripping Schedule:

January 2 through February 28, 1987

Total of 58 days @ 2,413.8 cubic yards per day operating 24 hours per day.

Phase II(b) - Sampling

The 21,778 cubic yards of gravels stripped from the bottom of the pit will be stock piled for sampling when the weather conditions permit. This material could be treated starting June, 1987. The estimated costs of treating this material would be \$30,271.00 based on an average washing cost of \$1.39 per cubic yard.

Sampling Schedule:

June 1, through July, 1987

Total of 28.25 days @ 770.84 cubic yards per day.

LOCATION AND ACCESS

The property is located in the Fort Steel Mining district of south central British Columbia N.T.S. 82F/SE, Map Sheet Moyie Lake. Moyie River flows to the northeast through the property and empties into Moyie Lake. Access to the property is via vehicle south from Cranbrook on Highway 3 and 95 to the Lumberton turn off thence via the Moyie River Road to Semlin Creek road - a distance of 20 miles.

PREVIOUS WORK

This property has been prospected and mined sporadically since before the turn of the century. Mining consisted of sniping on shallow bedrock areas. Evidence of four old shafts was noted. Careful scrutiny of the washed tailings around the shafts indicates that bedrock was never reached in any of the shafts presently on this property.

During 1939 and 1940 Cominco carried out an extensive drilling programme under the supervision of Mr. Frank Marleau. Marleau is reported to have later returned and sunk a shaft and drifted in the vicinity of the Moyie Mining Company 1981 pit area. It is reported he recovered 70 ounces of gold. No other work of any consequence was carried out until the Moyie Mining Company mined for four seasons between 1980 and 1983. A total of 1.25 million dollars (or 4,000 ounces) is reported to have been recovered during this period giving an average grade of .06 ounces per cubic yard for all of the material washed.

Queenstake Resources Ltd. of Vancouver acquired the property on August 1, 1985. During August and September of 1985 a total of 36,296 feet of base and picket lines were cut on all six leases. All of the lines were mapped and surface elevations were measured at 100' station and at every major break in elevation. A total of fifteen lines were surveyed with an Oyo MCSeis 1500 seismic unit to try and outline a definitive tertiary channel.

Twenty holes totalling 906 feet of overburden drilling was completed on three lines on placer leases 1902 and 1775. The drillings was laid out to outline the tertiary channel on lines 24+00S, 28+00S and 32+00S.

WORK COMPLETED

Stripping of Overburden

Initially a D9G Cat bulldozer was used to strip and stack the timber in rows. All wasted timber was covered with stripped gravels along the periphery of the pit. The Cat stripped off from 6 to 12 feet of material moving the gravels laterally to the outer edges of the pit. The Cat 245 hydraulic excavator then dug a perimeter ditch around the entire pit. The ditch was dug into consolidated material and averaged a depth of 17 feet. A total length of 1500 feet of ditch was dug at an average slope of from (1 to 1½) to 1 producing an accumulated yardage of 16,802 cubic yards.

Once the ditch was completed and stabilized, a pumping station was constructed in the north east corner of the pit. Two timber bridges were built across the perimeter ditch to facilitate the stripping operation with the 2 Cat 627 scrapers allowing access into and out of the pit. The Cat 245 hydraulic excavator was used to top load the scrapers. It took five excavator buckets and from 1.25 minutes to 2.5 minutes to top load a scraper. Once loaded the scrapers came out of the pit up the ramp in the south east corner of the pit. This material was dumped and dozed with the D7E Cat to contour the flood dyke along the river and the settling ponds just downstream from the pit. This process was continued, stripping to a depth of 12 feet per lift over the entire portion of the lower half of the pit. Three such lifts were required to reach the gold bearing portion of the channel. Due to the competency of the consolidated material the pit walls were almost vertical. Survey points were established as the work progressed and once a depth of between 43 and 45 feet had been reached, the stripping ceased.

The paydirt from the bottom half of the pit was then mined to bedrock and washed in the portable washing plant. When the lower half of the pit was mined out the washing plant was shut down. The remaining waste material in the upper portion of the pit was stripped utilizing the D9 Cat which dozed the upper gravels into the lower mined out portion of the pit, wasting all gravels to a depth of from 43 to 45 feet.

The Cat stripping operation took a total of ten days between August 31 and September 9 inclusive. During this period the Cat was run for a period of 20 hours per day utilizing a double shift. Once the stripping was completed the remaining paydirt was washed in the portable washing plant. A total of 126,814 cubic yards of gravels were excavated, transported and wasted. A total of 17,728 cubic yards, which includes 1,561 cubic yards of upper channel gravels, was washed. This gave a stripping ratio of 7.15 to 1.

Dyke and Pond Construction and Reclamation

A flood dyke along the south side of the pit adjacent to the river was constructed from material stripped from within the pit. The dyke was constructed with a 1 to 1 slope ratio. The bottom portion of the dyke along the river was riprapped with extra large boulders excavated from the pit. The entire dyke has been fertilized and planted with grass seed. New grass growth was evident before leaving the area at the end of the mining season.

Two large settling ponds were constructed directly downstream from the pit and washing plant. They were constructed from waste material from the pit. Initially there was a problem to get the ponds to seal. Fine clay was hauled in and bentonite was added. The problem still existed with the final settling pond seeping under the primary pond and discharging into the creek. The discoloured water was channeled along the creek and pumped back into the settling pond. A polyurethane liner was purchased and installed in the final settling pond. This sealed the pond and stopped all seepage. All the settling pond berms and dump areas below the pit and washing plant have been fertilized and seeded.

Washing of Paydirt

A total of 17,728 cubic yards of auriferous gravels were washed in twenty three days between August 18 and September 23, 1986 averaging 771 cubic yards washed per 8 hour day.

The auriferous gravels within the pit were mined from 8 feet to 10 feet above bedrock utilizing the Cat 245 hydraulic excavator which top loaded the Cat 627 scrapers for transportation to the washing plant. The Cat 245 excavator was used to clean and breakout the bedrock. It was more than adequate and did an excellent job of cleaning bedrock as evidenced by the manual bedrock cleaning programme which recovered only 3.741 ounces from the entire exposed bedrock surface of 7,040.7 square yards.

The transported paydirt was dumped adjacent to the washing plant by the Cat 627 scrapers. A Cat 235 hydraulic excavator was used to load the grizzly hopper and clear away any oversize boulders. The undersized material entered the trommel by way of a belt feeder. Water for the washing plant was supplied by a 6" x 6" Ford diesel Gorman-Rupp pump which pumped from the re-cycled water in the final settling pond. The trommel washed the gravels and rejected all 3/4" plus material onto the radial belt stacker. This oversize material was dozed back into the lower end of the pit. The minus 3/4" material was allowed to discharge over a self cleaning hungarian riffle rotating sluice which advanced the riffles at a rate of 8.72 inches per minute allowing clean riffles to be present at all times. The heavies trapped in the riffles were dumped and spray washed under the sluice run. This material thus collected ran into a smaller (live) bottom sluice which further concentrated the heavy minerals. The fine discharge from the two sluice runs was dozed into stacks and allowed to dewater before being used as fill and road material.

The (live) bottom sluice box was cleaned daily by the author and the gold thus collected was further concentrated, cleaned and recorded on the daily gold calculation and tally sheet, Appendix 3 at the back of this report.

Sampling and Tests

As the pit stripping progressed, areas of washed gravels within the sequence were checked and washed in a portable sluice run. The sluice run consisted of a washing tray with a water manifold elevated above a 4 foot by 14 inch sluice run. The bottom of the sluice run was covered with coarse astroturf held in place by 3/4" elevated expanded metal. The entire sluice run was inclined at 2 inch to the foot. Approximately 1.5 cubic feet of gravel was washed from each area sampled, values were found to be low running around .0007 and up to .0025 crude ounces per yard. All samples washed yielded gold. A

total of 9 samples were checked in this fashion. On two separate occasions values of .007 and .009 were achieved. This material was dumped and stockpiled as feed for the washing plant. A total of 1,561 cubic yards of this material was treated on August 18th. It was mixed with the auriferous tertiary gravels from the pit and produced a composite grade of .009 crude.

On two separate occasions, the entire discharge from the self cleaning Hungarian riffle rotating sluice was allowed to accumulate in the bucket of a front end loader. This material was washed in a 17 foot x 14 inch long tom with astroturf and 3/4" elevated expanded metal. No gold was found to be present in this material.

As an added protection four 2½" x 3" Hungarian riffles were added to the run just below the discharge from the self cleaning Hungarian riffle rotating sluice. Two three foot sections with Cocoa Matting and 1½" elevated expanded metal were added below the riffles. The Cocoa Matting was cleaned after 2,985 cubic yards of material had been run through the plant and no significant gold was noted. A further test on the discharge run was done after a large volume was processed and at this time 0.36997 ounces of gold was collected. It should be noted that on two separated occasions prior to the test the spray bars that clean the riffles under the sluice run had plugged and the plant had continued to operate for a time before the operator noticed the problem. The riffles had not been properly cleaned and consequently when they rotated to the top of the sluice run they contained concentrate that would have been flushed out onto the discharge run below. This problem was eliminated by installing a settling drum cyclone in the line ahead of the spray bars to remove wood chips and debris before it plugged the small spray bar holes. The loss of the gold which was trapped in the check run below the sluice proved to be .477% of the total production indicating a recovery rate of 99.523% despite the spray bar problem. Subsequent tests on the check produced only insignificant gold. All gold that was trapped in the check run was very thin and flat and consequently had a large surface area to weight ratio making it nearly impossible to settle out.

Gold Cleanup Process

The concentrate collected daily from the live bottom box was transported to the gold room and further concentrated. The concentrate was carefully shoveled into a 14 inch by 17 foot sluice run. The entire bottom of the sluice run was covered with coarse astroturf matting held in place by 3/4" elevated expanded metal. This sluice run was elevated at 2" to the foot. The gold and concentrate thus collected was then further concentrated and cleaned using pans and a 3 foot rotating spiral riffle concentrator. All steel and magnetite was removed in the spiral concentrator and saved for future amalgamation. The concentrate was run through the spiral concentrator several times to aid in cleaning the gold. The discharge from the spiral concentrator was saved and jigged through a 12" water pulsator jig operating with a 16 foot head. All discharge material from the jig was run over the long tom mentioned above. The jig concentrate was panned, cleaned and weighed along with the gold from the spiral concentrator at the end of each cleanup. These values were then recorded on the daily gold calculation and tally sheet, Appendix 3 at the back of this report.

The steel and heavy concentrate collected throughout the entire operation was amalgamated in a small portable amalgam mill at the end of the operation. The amalgam thus collected was retorted and the gold collected was weighed and recorded. A total of .743 ounces of fine crude gold was collected in this manner. All of the gold collected was then sieved, cleaned, weighed and recorded on the gold size distribution sheet, Appendix 4 at the back of this report. This process was not done until August 30, 1986 when it was apparent that the gold was becoming finer and less abundant. The gold was sieved and recorded as: Fines not cleaned, Fines, #14+, #8+, #6+ and #4+. It was originally thought that a distribution of size would indicate where the gold came from in the pit and in fact all it did was indicate bedrock changes. In areas of softer rubbly bedrock the size fraction increased. In areas of polished hard quartzite, the size fraction decreased.

Bedrock Cleanup

As bedrock was cleaned and exposed by the Cat 245 hydraulic excavator, the bedrock cracks were pried apart with bars and the trapped material remaining was washed through a 4 foot x 14 inch sluice run elevated at 2" to the foot. The sluicerun was covered with coarse astroturf held in place with 3/4" elevated expanded metal. The Bruce Brothers, working on a royalty percentage basis, spent six days cleaning bedrock and secured a total of 3.741 ounces. The 245 Cat excavator did an excellent job of bedrock cleaning having enough breakout force to fracture and remove chunks of bedrock that were friable or fractured.

Bruce Brothers Tailings Wash Test

Between the 16th of July and August 7th, 1986, the Bruce Brothers set up their fine gold recovery plant. The plant consisted of a boil box washer feeding over 3/8" punch plate discharging the undersize material into three revolving oscillating riffle tubes that concentrated and transported the heavies and fed them into an 8" water pulsating jig with a 16 foot water head. The jig discharge material continued on over two small water cyclones and onto a small stepped sluice run with astroturf and 3/4" elevated expanded metal riffles. The lower end of the three riffle tubes discharged into a 10 inch x 19 foot sluice run which in turn discharged out the back of the unit. This sluice run had astroturf and expanded metal simply as a back up check. It was noted immediately that the jig, water cyclones and stepped sluice run had little or no gold, but did contain abundant black sand to the point of choking the system. Additional water was added to help alleviate this problem. On closer examination, it was noted that the back up check sluice run under the riffle tubes contained abundant flat flakes of gold (up to 1/8" square). These chunks of gold had a low weight to surface size ratio and thus hydroplaned right through the system only to be trapped when the plant was shut down and the water allowed them to settle out upon the matting. Once water and slurry was added, the gold continued on its way right out of the plant.

This gold, although abundant is impossible to handle with conventional systems as it virtually floats on water. The Bruces' removed the revolving riffle tables and built three wooden sluice runs 18 feet x 2 feet which they installed in their place. A slightly better recovery occurred after the sluice runs were installed mainly because there now was more surface area for the flat gold to settle on once the plant was shut down. Several tests on specific volumes of the fine tailings indicated that the grade of the material washed ran up to \$2.50 per cubic yard. It was determined that this would be subeconomic and the operation was terminated.

APPENDIX (1)

PIT VOLUME CALCULATIONS

SECTION A

$$\begin{aligned}\text{Average width} &= 153.5' \\ \text{Total length} &= 170.0' \\ \text{Average depth} &= 53'\end{aligned}$$

$$153.5 \times 170 \times 53 = \frac{1383035}{27} = 51,223.5 \text{ cubic yards}$$

Ramp Calculations:

$$\frac{(36 \times 30 \times 175)}{\frac{27}{2}} = \frac{18900}{\frac{27}{2}} = \frac{7,000}{2} = 3,500 \text{ cubic yards}$$

Total yardage removed Section A = 51,223.5 cubic yards less ramp allowance of 3,500 cubic yards = $51,223.5 - 3,500 = \underline{47,723.5}$ cubic yards

SECTION B

$$\begin{aligned}\text{Average width} &= 139' \\ \text{Total length} &= 60' \\ \text{Average depth} &= 53'\end{aligned}$$

$$\frac{139 \times 60 \times 53}{27} = \frac{442020}{27} = \underline{16,371.1} \text{ cubic yards}$$

SECTION C

$$\begin{aligned}\text{Average width} &= 128.5' \\ \text{Total length} &= 245' \\ \text{Average depth} &= 53'\end{aligned}$$

$$\frac{128.5 \times 245 \times 53}{27} = \frac{1668572.4}{27} = \underline{61,798.9} \text{ cubic yards}$$

Bedrock Calculations:

$$\begin{aligned}\text{Average width} &= 20' \\ \text{Average height} &= 15' \\ \text{Total length} &= 170'\end{aligned}$$

$$\frac{170 \times 20 \times 15}{27} = \frac{45,900}{27} = 1,888.8 \text{ cubic yards}$$

Total yardage removed Section C = 61,789.9 cubic yards less bedrock reef allowance of 1,888.8 cubic yards = $61,798.9 - 1,888.8 = \underline{59,910.1}$ cubic yards.

Total bank run yards removed in pit area = $59,910.1 + 16,371.1 + 47,723.5 = 124,004.6$ cubic yards.

DITCH VOLUME CALCULATIONS

- * A ditch 17 feet deep with a bottom width of 4 feet and a 1 to 1 slope dug in unconsolidated boulder gravels will produce 1,322 cubic yards per 100' of length when dug with a hydraulic excavator.
- * A ditch 17 feet deep with a bottom width of 4 feet and a 1 to 1½ slope dug in unconsolidated boulder gravels will produce 1,857 cubic yards per 100' of length when dug with a hydraulic excavator.
- * This data was taken from: Estimating Manual for Hydraulic Excavators Second edition, September, 1975, pages 146 and 148.

Thus a ditch 1,500 feet long dug to a depth of 17 feet on a 1 to 1 slope will produce $1,500 \times 1,322 = 19,830$ cubic yards. Less the volume previously stripped by the Cat which equals 201.85 cubic yards per 100 feet of ditch or $15 \times 201.85 = 3,027.7$ cubic yards. Thus the total yards stripped by the excavator equals $19,830 - 3,027.7 = \underline{16,802.23}$ cubic yards.

Thus a ditch 1,500 feet long dug to a depth of 17' on a 1½ to 1 slope will produce $1,500 \times 1,857 = 27,855$ cubic yards. Less the volume previously stripped by the Cat which equals 238.88 cubic yards per 100' of ditch or 3,583.32 cubic yards. Thus the total yards stripped by the excavator equals $27,855.0 - 3,583.32 = \underline{24,271.68}$ cubic yards.

It was estimated by both the contractor and the author that the 1,500 feet of ditch line around the entire perimeter was approximately 50% 1 to 1 slope and 50% 1½ to 1 slope. Thus the total yardage removed by the 245 Caterpillar excavator is $16,802.23 + 3,734.725 = \underline{20,536.95}$ cubic yards. The 3,734.725 being ½ the difference between 16,802.23 cubic yards and 24,271.68 cubic yards.

Total yardage including ditch and pit is equal to 124,004.6 cubic yards calculated in Sections A, B, and C plus 20,536.95 cubic yards calculated above for 144,541.55 cubic yards.

APPENDIX (2)

PERSONNEL AND EQUIPMENT

Fiorentino Bros. Contracting Ltd. of 2401 Cranbrook Street, Cranbrook, B.C. V1C 3T3 supplied all personnel and equipment for the project. All personnel used on the project were skilled, competent, aggressive, punctual and pleasant.

Equipment Used on Project

- 1 Cat D9G with ripper
- 1 Cat D7E with ripper
- 1 Cat 235 Excavator
- 1 Cat 245 Excavator
- 2 Cat 627 Scrapers
- 2 3" x 3" Perkins diesel pumps
- 1 6" x 6" Ford diesel pump

Queenstake Resource Ltd. equipment

1 trommel, washing plant with rotating hungarian riffle sluice box and live bottom cleaning box.

APPENDIX (3)

DAILY GOLD CALCULATION AND TALLY SHEET

<u>Individual Paydirt Cut Designation</u>	<u>Date</u>	<u>No. of Buckets</u>	<u>Yardage</u>	<u>Crude Weight</u>	<u>Crude Grade</u>	<u>Remarks</u>
a	August 18	670	1,005	9.43 1.31	.00938	(1561 c.y.) Test material included
b	19	864	1,296	15.013	.01158)	Pay material only Pay material bottom
c	21	600	900	11.367	.01263)	
d	22	347	520.5	11.472	.022)	Taken to bank safe keeping
e	23	850	1,275	18.99	.01489)	
f	25	280	420	4.687	.01116)	Average grade this section
g	26	540	810	12,528	.01547)	
h	27	765	1147.5	18.577	.01619)	.01449 crude
i	28	745	1117.5	12.346	.011)	
j	29	756	1134.0	13.125	.01157)	Upper gravels
k	30	295	442.5	7.985	.018)	
l	Sept. 10	650	975	2.64	.0027)	Average grade this section
m	11	800	1,200	4.489	.0037)	
n	12	540	810	3.934	.0048)	.006697 crude
o	13	355	532.5	3.39	.0063)	
p	15	416	624	8.612	.0138)	Mixed upper and lower gravels
q	16	346	519	5.064	.00975)	
r	17	205	307.5	2.37	.00583)	Average grade this section .014555 crude
s	18	66	99			
t	19	436	654	9.892	.01512)	(Includes .374 oz. Au from Bruce's clean up)
u	20	425	637.5	8.125	.0127)	
v	22	480	720	12.205	.01643)	(Pit and clean up material includes .743 oz. accumulation from Amalgam)
w	23	388	582	8.879	.01397)	
					Overall Average .011795	

APPENDIX (4)

GOLD SIZE DISTRIBUTION FROM AUGUST 30, - SEPTEMBER 23, 1986

Cut K through Cut W

<u>Individual Paydirt Cut Designation</u>	<u>Date</u>	<u>Total Weight</u>	<u>#4+</u>	<u>#6+</u>	<u>#8+</u>	<u>#14+</u>	<u>FINES</u>
k	August 30	7.985	.406	1.518	2.366	2.266	1.429
	September						
l	10	2.64	.246	.260	.440	.475	1.219
m	11	4.489	.944	.816	.961	.925	.843
n	12	3.934	1.099	.934	.655	.661	.585
o	13	3.39	.576	.616	.815	.692	.691
p	15	8.612	.518	1.788	2.292	2.385	1.629
q	16	5.064	.204	.810	1.338	1.662	1.05
r	17						
		2.37	.131	.346	.455	.772	.668
s	18						
t	9	9.892	.586	2.067	2.702	2.832	1.705
u	20	8.125	.748	1.353	2.223	2.458	1.949
v	22	12.205	.893	1.999	3.599	3.765	1.949
w	23	8.879	.735	1.443	2.390	2,479	1.832

APPENDIX (5)

STATISTICS SHEET

Total days stripping	=	71	Daily stripping average	1,786.09 cubic yards/day
Total days washing	=	<u>23</u>	Daily washing average	770.84 cubic yards/day
		94		

Average overall crude grade = .0115 ounces/cubic yard

Pit length 475'

Average pit width 140.3'

Average pit depth 53.0'

Perimeter ditch length 1,500.2'

Average ditch depth 17.0'

Average ditch slope between (1 to 1½) to 1

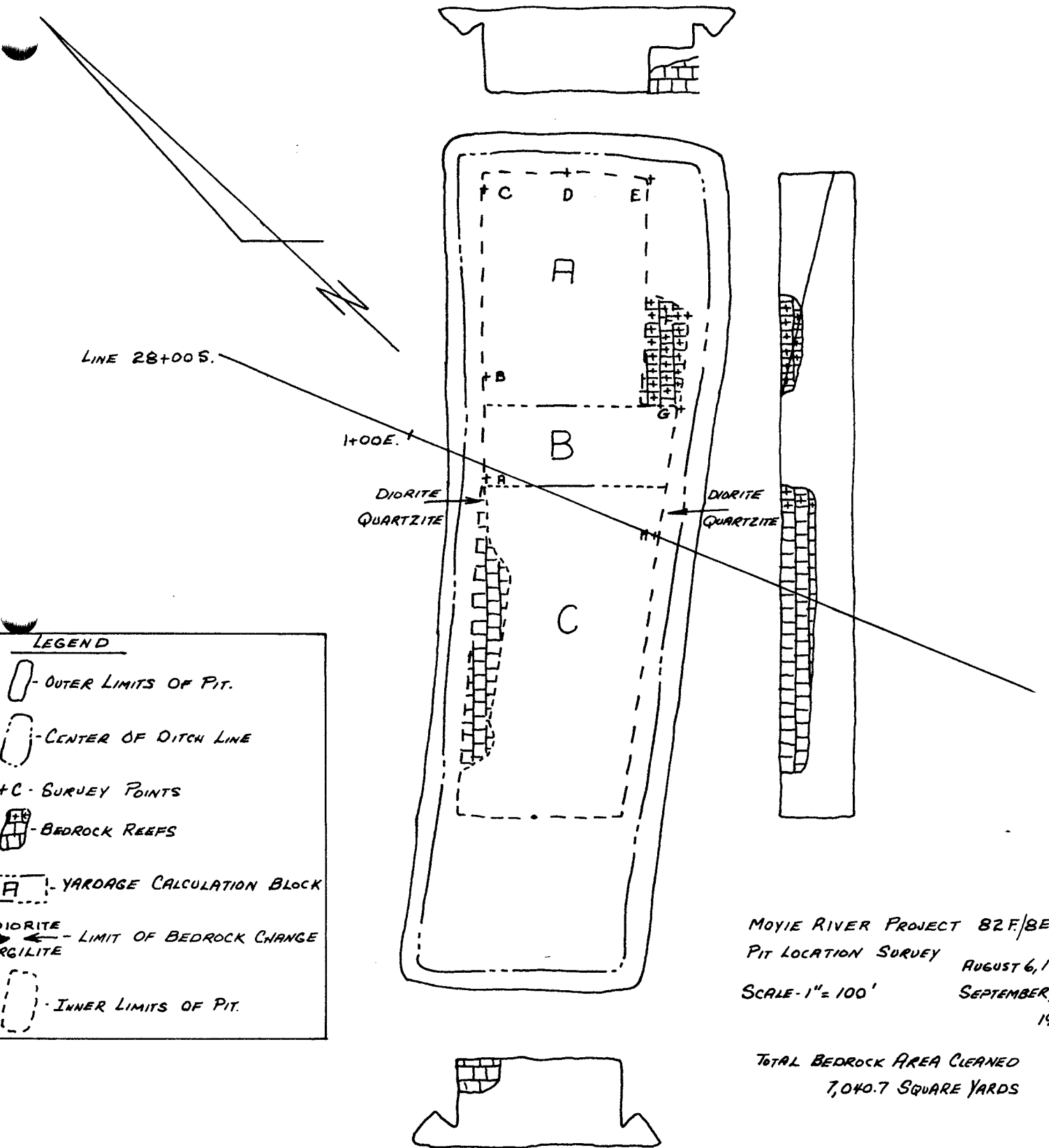
APPENDIX (6)

STATEMENT OF QUALIFICATIONS

I, Michael P. Henrick of R. R. 1, Site 39, Comp. 11, Okanagan Falls, B.C.; do hereby certify that:

- 1) I am a graduate from the University of North Dakota (1970) with a Bachelor of Philosophy degree in Geology.
- 2) From 1970 to 1982, I worked as a geologist in mineral exploration in British Columbia, the Yukon Territory, Saskatchewan, Manitoba, Ontario and Quebec as well as in Oregon, Arizona and California.
- 3) From January, 1983 to the present, I have worked as a geological consultant, concentrating mainly on placer evaluation and production.
- 4) I supervised the field work on the Moyie River Project during the 1986 program and have interpreted all data resulting from this work.
- 5) I am a fellow of the Geological Association of Canada.

Michael P. Henrick



LEGEND

- OUTER LIMITS OF PIT.
- CENTER OF DITCH LINE
- +C - SURVEY POINTS
- BEDROCK REEFS
- YARDAGE CALCULATION BLOCK
- DIORITE
 - ARGILITE - LIMIT OF BEDROCK CHANGE
- INNER LIMITS OF PIT.

MOYIE RIVER PROJECT 82.F/8E
 PIT LOCATION SURVEY AUGUST 6, 1986
 SCALE - 1" = 100' SEPTEMBER, 16 1986

TOTAL BEDROCK AREA CLEANED
 7,040.7 SQUARE YARDS

SCALE - 1" = 100'

LINE OF 281005





1100E

DIORITE
QUARTZITE

DIORITE
QUARTZITE



LEGEND

-  - BEDROCK REEF
-  - LOCATION OF INDIVIDUAL PAYDIRT CUTS WITH A GRADE OF .014 CRUDE OZ/YD³
-  - LOCATION OF INDIVIDUAL PAYDIRT CUTS WITH A GRADE OF .0067 OZ/YD³
-  - LIMIT OF BEDROCK CLEANED

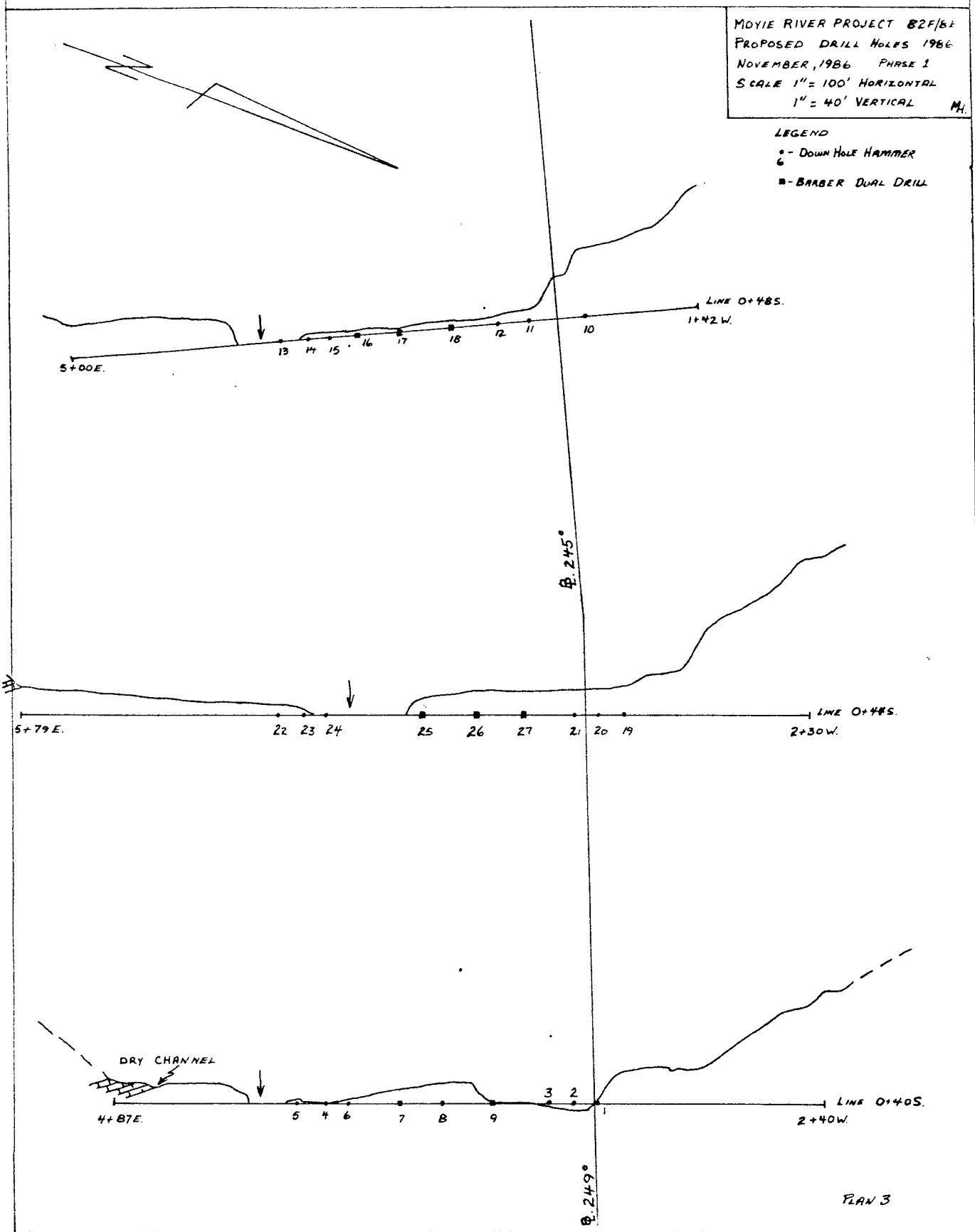
MOYIE RIVER PROJECT 82F/8E
INDIVIDUAL PAYDIRT CUT LOCATIONS

PLAN 2

M.H.

MOYIE RIVER PROJECT 82F/62
 PROPOSED DRILL HOLES 1986
 NOVEMBER, 1986 PHASE I
 SCALE 1" = 100' HORIZONTAL
 1" = 40' VERTICAL M.H.

LEGEND
 ○ - DOWN HOLE HAMMER
 ◻ - BARBER DUAL DRILL



PLAN 3