MINERAL EVALUATION REPORT 800178

BECKER HAMMER DRILLING PROJECT
TINA GROUP

MIDDLE AND UPPER OTTER CREEK

SURPRISE LAKE AREA

ATLIN GOLD PLACER GROUP

NORTH WESTERN BRITISH COLUMBIA

(ATLIN MINING DIVISION)

FOR

K.A. O'CONNOR
112C-255 WEST FIRST
NORTH VANCOUVER B.C.

BY

M.D. KIERANS P. Eng.

059 37' North Latitude
133 23' West Longitude

December 15, 1983 MDK

Tina: O'Connor: Dec. 23, 1983: MDK:

MINERAL EVALUATION REPORT

BECKER HAMMER DRILLING PROJECT, TINA GROUP, MIDDLE AND UPPER OTTER CREEK, SURPRISE LAKE AREA, ATLIN GOLD PLACER CAMP, BRITISH COLUMBIA

M.D. Kierans P. Eng. Dec. 23, 1983

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SUMMARY

The Tina Placer Claim Group of 5 claims is located along the Middle and Upper reaches of Otter Creek, about 20 km east of the town of Atlin in northwestern British Columbia. The claims are owned by K.A. O'Connor of West Vancouver, B.C.

Atlin gold placer camp, in a glaciated area, has, in general, rich and relatively narrow Tertiary channel gravel placers under unfrozen glacial deposits of varying thickness. There is a known placer deposit of this type (Drain Lease Mine) presently being exploited in a Tertiary channel under about 80 feet of till and clay to the east of the present creek bed and about 2000 feet from Surprise Lake.

The writer supervised a Becker hammer drilling project (in six holes) between September 10 and September 16, 1983, consisting of 622.5 feet of drill hole. As a result of that program, the channel was located, and blocks of probable and possible placer ore have been assigned along the drilled trend of the old channel. In addition, potential for the rest of the creek upstream has been estimated. A few notes on bedrock mineral potential and exploration are offered.

For the drilled part of the Tina claim, the northernmost part of the claim group, the writer estimates there are 125,000 cubic yards of probable pay in two horizons at average grade of 0.11 oz/C.Y. There are also estimated to be 125,000 C.Y. of possible pay of the same grade in the 1300 foot drilled zone. This means about 27,5000 ounces are in the probable and possible category at Tina claim. Upstream from the drilled zone, exploration drilling with a Becker drill should test a potential of about 1.8 million cubic yards with an estimated potential of 155,000 ounces.

It is estimated that overlying the buried old channel and pay zones are about 8.0 million C.Y. of glacial deposit and inter-pay gravels to be stripped using mechanical methods along the 5 claim length of Otter Creek covered by Tina Group. The net operating profit before taxes, if indeed the potential is verified by drilling, is estimated to be about $30.0 million at $400 US per ounce. A drilling project of about 9,000 feet in about 90 holes at a cost of about $500,000 is recommended.

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MINERAL EVALUATION REPORT
BECKER HAMMER DRILLING PROJECT, TINA GROUP, MIDDLE AND UPPER OTTER CREEK, SURPRISE LAKE AREA, ATLIN GOLD PLACER CAMP, BRITISH COLUMBIA.

M. D. Kierans P.Eng. Dec. 22, 1983

INTRODUCTION

The intent of this report is to present the results of a six-hole Becker hammer drilling program on the Tina claim of the Tina Group of placer claims, on Middle and Upper Otter Creek of Atlin Mining Division, in Northwestern British Columbia. In addition, the potential of the upstream section of the Tertiary bedrock channel, on the remaining four claims of the group, will be assessed. The Tina placer claim group is owned by K.A. O'Connor of West Vancouver.

The drilling program began on September 10, 1983 and was terminated on September 16, after 622.5 feet of hole were put down at six separate drill stations in the creek valley. There were no abandoned holes and all of the footage drilled was effective footage.

The Tina drill program was paid for by K.A. O'Connor but was, in effect, the upstream testing of the Otter Creek Tertiary channel that had been drilled, by the writer, for another client, on what is called the Dan Group of placer claims. Some of the data from that program has been used in the interpretation of channel location, as described below, and also the characteristics of the stream gravels, as shown in both drill programs, was used in this assessment of reserves and potential of the Tina group.

In what follows, an assessment of the bedrock mineral potential of the claim group will be offered. The main thrust of the report concerns placer potential of the group, but because of some unusual drilling results in some holes, the possibility of bedrock exploration, on certain sections of the creek, will be briefly discussed.

Because stream diversion of Otter Creek will be required before exploitation of the placer potential of Tina Group, or the downstream Dan Group, is possible, the feasibility of a joint venture with Dan Group owners should be investigated.

Some aspects of placer geology and other aspects of placer operations at Atlin Camp were discussed in other reports, by the writer, for Mr. O'Connor. If possible, these reports should be at hand in reading what follows.

LOCATION, ACCESS, PHYSIOGRAPHY AND CLIMATE

The Tina five-claim group is located on Otter Creek, about 20 km east of the town of Atlin, and about 4 km up the Creek. Atlin is located in northwestern British Columbia. The regional transportation and supply center for Atlin is at Whitehorse in the Yukon Territory. Please see Figures 1 to 4 for property location.

Access to most of the claims, along the course of Otter Creek, is by 4X4 rough roads on both sides of the creek. One road on the east side does reach the site of the old storage dam about mid-way in the group. Elevations in the vicinity range from about 3000 feet at Surprise Lake and the mouth of Otter Creek to about 3600 feet at the southern or upstream end of the claim group. In general, foot travel on the claims is not difficult because of the open and in some places, parklike vegetation.

There are, in the writer's opinion, many unanswered questions concerning the origin of the placer deposits of Atlin Camp. Not the least of such questions, concern the epeirogenic and physiographic history of the region. No attempt will be made to discuss such problems here, except to note that the writer has assumed uplift at the end of the Tertiary which produced the old bedrock channel in which Otter Creek placer deposits have been found. There is some doubt about the timing of the uplift. It may have occured in one of the interglacial periods. Discussion of these aspects of the physiography of the camp must be deferred until more general studies of the camp have been completed by other geologists. For additional notes on the physiography of the district the reader is referred to other reports by the writer for Mr. O'Connor.

Sluicing at Otter Creek can be carried out from about May 20 to October 1. These dates may vary considerably from year to year and also on elevation of the operation. On the average there are about 200 frost free days per annum.

OWNERSHIP AND PROPERTY

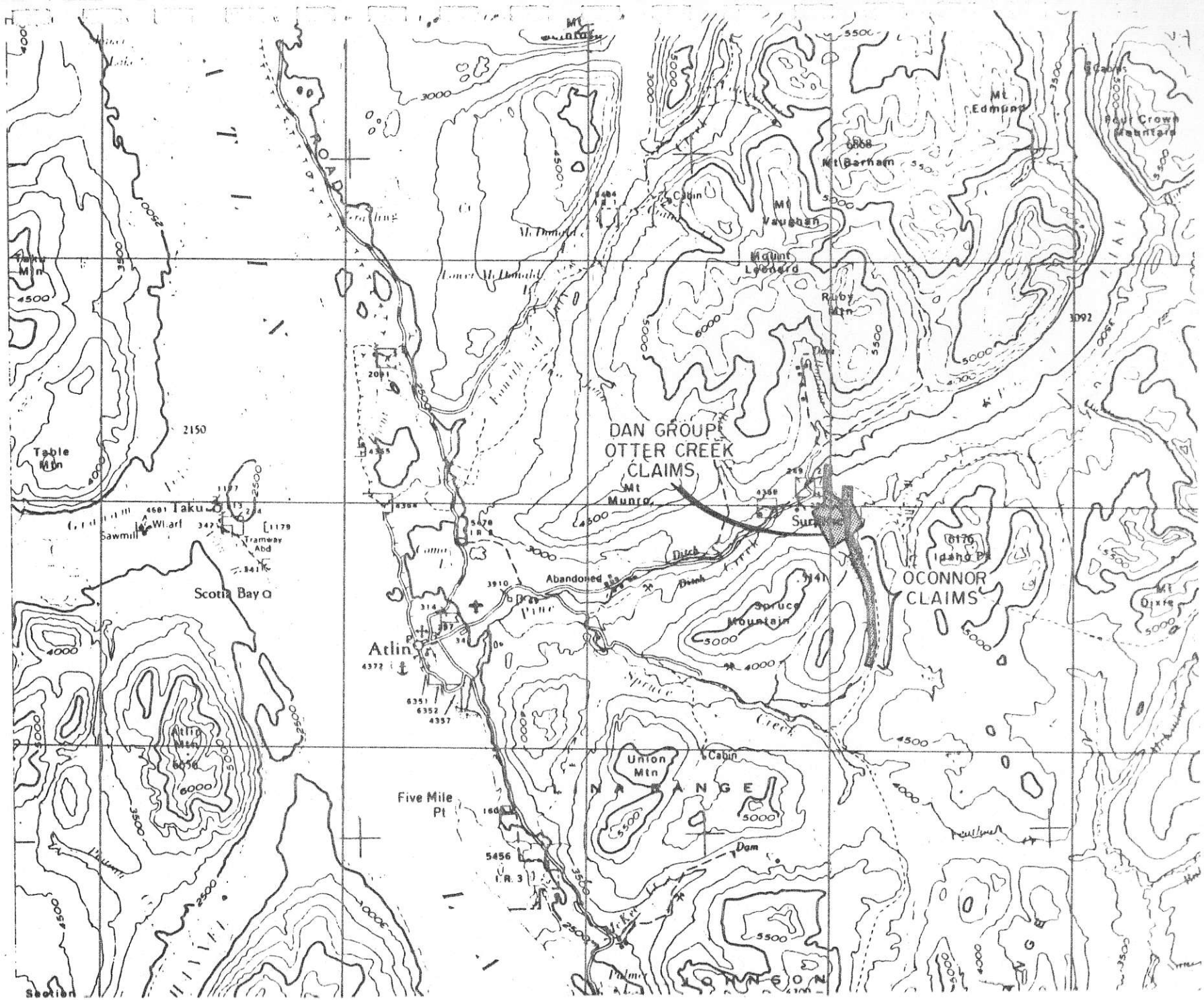
The placer claims and leases of Tina Group are listed in Appendix B. I have been informed by Mr. O'Connor that at

LOCATION MAP

SCALE: 1" = 140 MILES APPROX

Miles 100 0 100 200 300 Miles

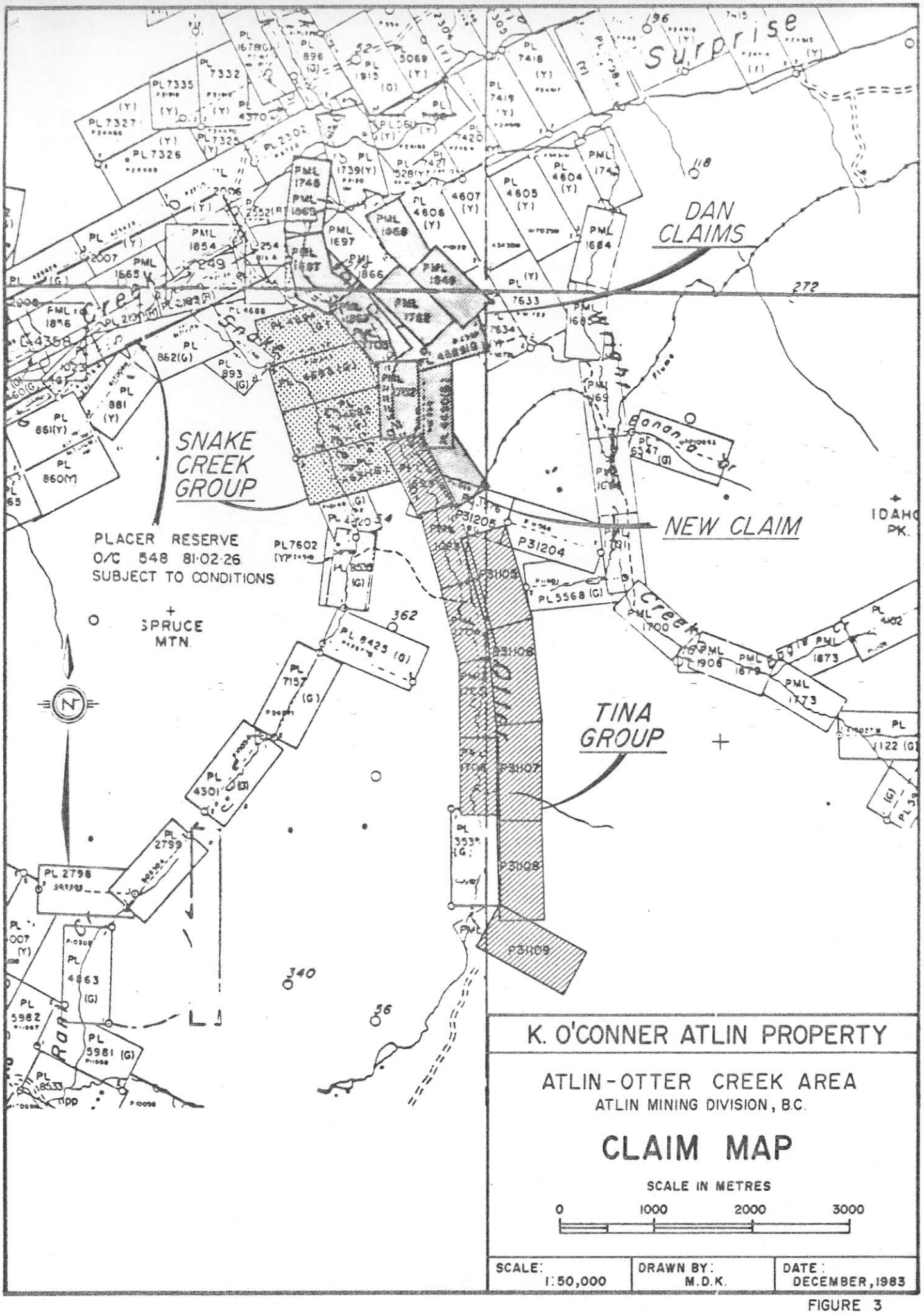
FIGURE 1



TOPO MAP, ATLIN AREA

SCALE 1: 250,000

FIGURE 2



K. O'CONNER ATLIN PROPERTY

ATLIN-OTTER CREEK AREA

ATLIN MINING DIVISION, B.C.

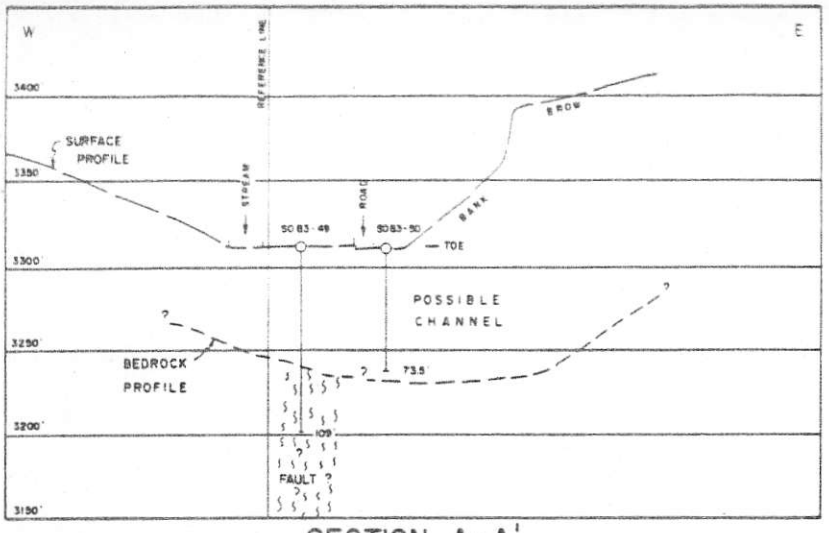
CLAIM MAP

SCALE IN METRES

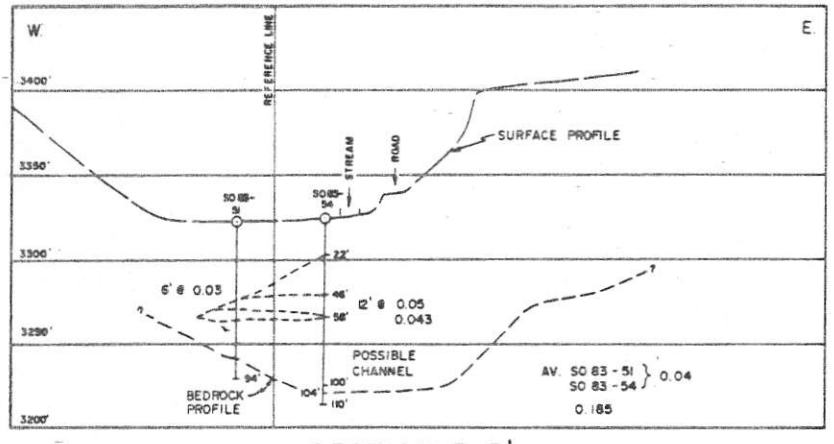
0 1000 2000 3000

SCALE:	DRAWN BY:	DATE:
1:50,000	M.D.K.	DECEMBER, 1983

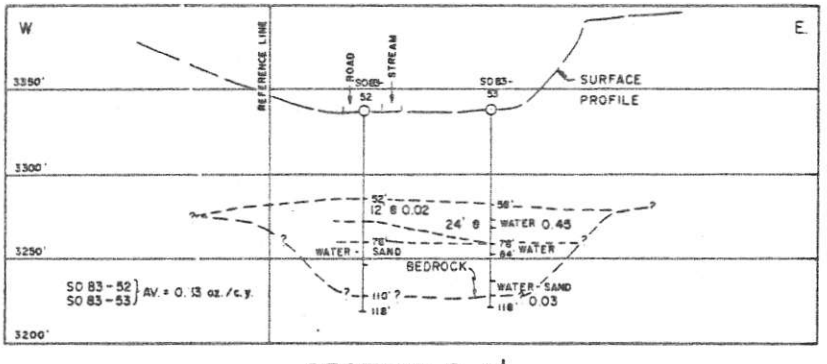
FIGURE 3



SECTION A-A'
LINE T-1
(LOOKING NORTH)



SECTION B-B'
LINE T-2
(LOOKING NORTH)



SECTION C-C'
LINE T-3
(LOOKING NORTH)

FIGURE 7

K. O'CONNER ATLIN PROPERTY

TINA GROUP

CROSS-SECTIONS

ATLIN-OTTER CREEK AREA

ATLIN MINING DIVISION, B.C.

FEET

0 25 50 100 150

M. D. K. DEC., 1983

present he is the sole owner of the claim group. He purchased the placer leases and claims from Mrs. T. Connolly of Atlin B.C. In addition to the purchased claims Mr. O'Connor arranged for the staking of five additional protection bench claims along the east side of the creek. Please see Figures 3 and 4 for claim locations.

PLACER GEOLOGY

Despite the above mentioned uncertainties about broad and general physiographic controls for placer depostion in Atlin camp, there do remain a number of placer geological factors useful in exploration at the camp. These are:

1. Most of the productive creeks have been underlain by rocks of the " Gold Series". These creeks are underlain by rocks of the Cache Creek Group of Pennsylvanian age. They have been intruded by, usually serpentinized, sills, dikes and irregular plugs of ultrabasic composition.

2. The "Gold Series" include chert, argillite, chert-pebble conglomerate, and derived quartzite and schist and some limestone. Greenstone, volcanic greywacke and derived amphibolite are considered by the writer to be the main source rocks for the gold mineralization of the placers. Shear zones, quartz veins and veinlets, pyritized zones and other gold-enriched alteration zones of varying widths in these rocks contributed most to placer deposition during long periods of gentle uplift, combined with erosion in warm climates.

3. If one is justified in generalizing from experience at Otter Creek, then gold placers at Atlin are found in U-shaped bedrock channels produced by renewed vigorous uplift at the end of a long period of gentle uplift--possibly at the end of the Tertiary.

4. These channels are usually narrow and may contain several layers or horizons of cobble-boulder gravels containing unusually high amounts of coarse raw gold. In addition to the higher horizons there is almost always a very rich bedrock layer. The rimrock, where weathered, as well as the bedrock in the channel bottom, may often contain high amounts of gold in the fractures and schist or bedding foliation planes. The channels may be as wide as 200' at the bottom, at least in the lower reaches of a creek, to an average of about 100'. The depth of the channel, which in places can be gorge-like, is seldom over 80 feet.

5. Clayey till strata overlying the productive horizons usually contain non-commercial amounts of fine gold.

6. Finally, the glacial episodes of the late Cenozoic have buried or modified the channels, mainly by deposition of thick sequences of either fluviatile sediments or unsorted till. In some cases, it is possible that glacial scouring has removed old placers from the channels. Some glacial deposits overlying the rich old channels have been measured to be in excess of 300 feet. In most places barren glacial material has seldom exceeded 100 feet above the channels.

7. Gold fineness for Atlin placers averages about 800. Coarse gold and large nuggets are characteristic of Atlin placer creeks, indicating, of course, short transport distance from primary sources.

8. I cannot vouch for the accuracy of the following placer geology principle for Atlin camp, but workers in the camp for the earliest productive periods have believed that middle and upper parts of creeks tended to be richer than lower sections.

DRILLING METHOD

The truck-mounted Becker hammer drill of 6 5/8" pipe capacity was used for drilling the test holes. Please see Appendix C for description of the Becker method of drilling and description of the truck-mounted drill. In addition to the compressor mounted on the drill truck we used an auxiliary or booster compressor of 750 cfm capacity. This compressor was mounted on a truck. A third truck was used for pipe and water tank transportation and pipe handling. My experience with the drilling of about 5,000 feet of hole in similar material on Dan Group had been most favorable.

Below are some of the advantages of the Becker hammer drill system:

1. Rapid drill advance is inherent in the system. The writer has drilled as much as 400 feet in one shift, in very favorable formations. Our average rate of advance per shift during Phase I drilling at Dan Group was about 70 feet. Average rate of advance was about 100 feet per shift for the Tina Drilling Project.

2. The system is rugged and there was very little down-time during the drill program because of mechanical failures.

3. The drill advances the "casing" in step with the bit advance so that the pitfalls in valuing placer deposits with

uncased holes are avoided. Also the bit advance is never ahead of "casing" --except in special cases when percussion drilling is used inside the inner pipe. The outer pipe is, of course, the "casing".

4. There is no chemical contamination of the sample from drilling additives. Only air and water touch the sample.

5. The effective size of the drill pipe is greater than 5 and a half inches, when using a 'crowd-in' bit. This gives a valid sampling volume or weight for gravel penetrated.

6. My experience with the drill is that it undoubtedly lifts coarse gold particles, in fact, almost 2 grams of gold mainly as small nuggets, for a six foot sample were actually lifted during this Tina project (hole SO83-53).

7. Finally, provided there is a geologist at the drill during the drilling operation, it is possible to prepare logs from which valuable gravel section interpretions can be made.

The samples from the drill hole were collected in large rubber tubs below the cyclone and bagged every two feet of drill advance. The samples were 'air-flushed' every two feet and water-flushed at the hole bottom. In critical sections of a holes water-flushing can be done every two feet.

All of the gravel bagged was processed during Tina Drilling Project. The sluice box used was a "live-bottom" "clean-up" box which was locally purchased. The riffle area was about 4 square feet and the riffles pulsated in unison at rate usually about 150 times per minute. A 1 1/2" gasoline pump provided sluicing and washing water. A vibrating screen classified the gravel to under 1/4" before sluicing.

We found that we could sluice a six foot sample before packing the riffles. This varied somewhat with clay content of the sample. Normally a 200 pound six-foot sample was reduced to about 25 pounds of concentrate. This concentrate was then mechanically panned using a 20" Morfee spiral mechanical panner or "wheel". The final concentrate from the "wheel", usually only a few ounces, was hand panned in a gold pan and the raw gold "colours" and specks placed in a plastic vial. The gold content for each sample was weighed with an electronic scale. The sample bags were also weighed using a simple bathroom scale.

Appendix A shows the detailed results of the sluicing

and panning for the holes drilled on the project. The weighting formulae used for these computer generated tables are shown in Appendix D. The computations for the tables were made using an spreadsheet program prepared by the writer.

Drill sites and drill roads were made by a D8 bulldozer. Drill hole control was by picket line base line and tape and compass. Survey points, established during a location line survey of the claims by McElhenney Surveying Ltd. of Vancouver, were also used. Vertical control was by hand held clinometer and home-made levelling rod.

DRILLING RESULTS

Drilling results will be described in the next three sections of this report. This section will be concerned with the qualitative descriptions of the section of gravels in the creek valley and their relative gold content, as determined by drill holes. The section following will use information from this section and from maps of previous owners and operators of the property to assess the potential of the claims, using all available detailed and general information. In the next section I will attempt to quantify the data and information from the two preceding sections in order to offer an estimate of probable and possible reserves for the claims.

It was part of the instructions from Mr. O'Connor, with which I agreed, that the creek valley on Tina Claim should be drilled on sectional lines 400 feet apart. Because the valley of the creek became narrower upstream from the boundary with Rose Claim (please see Figure 4, 5 and 6) only two holes could be drilled per line at roughly 50 foot centers. This limited, of course, the program to an exploration and not a development venture. That is , with so few holes it would not be possible to determine proven reserves.

The total length of the explored section of the old channel is thus about 1200 feet. Because a section line, drilled during the Dan Group program is actually on Tina Ground, we have drill information for about 1300 feet of the channel on Tina claim.

As it turned out, my interpretation of the old channel indicates that we tested the full width of the channel only on line T-3. The other lines (Lines 1 and 2--see Figures 5 and 6) were on the margins of the channel.

Table I shows a timetable of the drill holes and depths, etc. Appendix A is a computer-generated summary of the sluicing and panning results in grades per cubic yards per interval. Appendix F is the logs of the holes.

There are two horizons of potential pay gravel indicated by the cross-sections of Figure 7 . The upper horizon will be called the "B" horizon. It is about 30 feet thick and about 30 to 60 feet below the surface of the creek valley. The second horizon is at bedrock, or just above it, in weathered bedrock and gravel. This horizon is considered to be about 12 feet thick and is made up of about 6 feet of pay gravel and 6 feet of weathered bedrock. Within the bedrock channel of presumed Tertiary origin--due to uplift at the end of the Tertiary--there is a layer of mostly barren "water sand". The bedrock pay horizon occurs just below this "water sand" layer or strata.

This coarse "water sand" layer--so named by the drillers--consists of a heavily water charged layer of coarse sand of variable thickness. It varies from about 10 to 20 feet thick. Occasionally there are two layers of this "water sand".

The presence of this "water sand" layer is diagnostic of the presence of the U-shaped bedrock Tertiary channel. This is so because water seepage into the channel cannot escape and must go downstream above the impervious bedrock or the somewhate clayey layer just above bedrock. Water flow during penetration of the "water sand" was very high and resulted in very heavy two foot samples. Air pressure in the pipes forced up about triple the amount of normal drill return material.

The geological relations found above on Tina claim were consistent with relations found downstream on the Rose claim of Dan Group. More study will be needed to detemine the geological relationship of the "B" horizon with other gravels of the creek cross-section. I suspect that there is a relation between the "B" horizon and a clayey silty brown layer within or just below the "B" horizon .

There may be a third layer of pay in the till above the creek valley. This weak possibility may be indicated by some values found in the till in the Dorflinger shaft high up in that old opening.

Lines 1 and 2 were really not tests of the whole channel at all. And so a grade average based, in any way, on averaging the drill results for the two horizons on the three lines cannot be valid.

It must be noted that the results on drill line 1 of Rose claim drilling, for the Dan drilling project, (but actually on Tina ground) indicated very good grade material in two holes. There was a high grade section just above bedrock and there was a high grade "B" horizon section indicated in the easternmost hole of the section. Between were holes of very low to negligible grade. There is no doubt that the gold recovered in the drill holes of both projects is coarse gold. In this respect it is important to note some comments by A.F. Dailly in his 1946 report on page 19 (7). "Coarse gold is a characteristic of the pay gravels of this vicinity and is also normally present in placer deposits containing a large percentage of boulders as at Otter Creek. Experience in a number of places where coarse gold was present has demonstrated that true average values are not determined by drilling and that such ground is therefore grossly under-valued. Shafts or caissons are the only satisfactory method of prospecting."

Today shafts or caissons are not practical methods of exploration at Tina group. Even if shafts were put down an the assignment of proven grade from these openings would remain somewhat hazardous. It is always dangerous to assign grade to coarse gold deposits before a bulk mining test. Of course, the problem is that bulk testing requires almost as much costly preparation work and equipment as a full scale mining operation. One way out of the dilemma may be to use 9" Becker drill holes. Or, if possible, to design an intermediate size pipe (say 7 1/2") and drill longer drill lines and deeper holes at closer intervals. Another solution could be to simply consider a bulk mining test as a form of development and/or exploration expense. From the tax point of view this approach may have some advantages.

Nevertheless, we are not at a total impasse in assignment of grade to the two horizons of the old bedrock channel. Some of the holes returned remarkably good grade in the two horizons. Other holes returned much lower grade, in fact, below commercial grade in the two horizons. In my opinion, it would be as grievous an error to dismiss the potential of the creek because of this, as to assign too optimistic a grade to the placer deposits of the old channel. Somewhere in between, and keeping in mind the Dailly principle cited above, is the proper approach. So in what follows I have summed all that is known about the history of production at Otter Creek, both upstream and downstream of the drilled zone, and assigned probable blocks and possible blocks to the presumed trend of the old channel.

POTENTIAL, PLACER AND BEDROCK

Above, or upstream of the drilled zone of Tina Group, on Tina claim it is not possible to talk of reserves of any category. The far broader category of assessment of the economic value of any placer creek, that is, the potential of a creek is used.

As mentioned above the drilling results do warrant some consideration of the bedrock potential of the property. This assessment is warranted because of some impressive sulphide mineralization found in bedrock in some holes. Also analysis of indicated gougey shear zones coupled with obvious photo linears (and other lineaments) do indicate an intersectional zone within the claim group.

The trend of the ancient channel will more than likely parallel the present Otter Creek. However, it may, for some sections of the creek, diverge from it. Drilling will be essential for locating this channel. In this respect, it is not clear why the costly Dorflinger shaft (please see Figure 5) was located where put down in the late 1930's. It does seem clear from drill results and projections upstream from other drill lines that the shaft is, at least, 400 feet from the channel. In fact, the shaft was probably intended to serve as a site from which drifts would be put westward towards the channel. It is known that the shaft was eventually lost due to excessive water flow which could not be adequately controlled. It was bottomed at about 100 feet. A short drill hole was put down at shaft bottom. This found bedrock at a total depth of 127' below surface. One hole of about 100 feet in depth, put down about 400 feet to the west, found bedrock but significant gold values were not encountered in the drill hole. The shaft and the drill holes constituted Drill line #2. Please see Figures 4 and 5. Values in the shaft were essentially negligible but Dailly (7) does report some values in the upper part of the shaft. Because of the 1983 drill program it does now seem clear that the negative results of Line # 2 are readily explained. That old drill line was too far east of the presently interpreted channel location.

Line #4 which was probably put down in late 1930's, on the contrary did encounter significant values. Please see Figure 4 for location of the drill line. For the detailed logs of the eight holes drilled on this line, provided by Dailly, please see Appendix E. Some of the holes were negative but others did show some significant values both for the bedrock horizon and possibly the "B" horizon. It is not possible to calculate a value per cubic yard from the old results but they were probably over 0.05 oz/C.Y.

Most of the values are indicated to be close to bedrock but some must have come from higher in the holes. The section on the channel, as shown in Dailly's illustrations for his report, is narrower than indicated by the 1983 drilling for downstream portions of the channel. Nevertheless, it is considered highly significant for the economic potential of the creek that an old line of churn drill holes about 6000 feet upstream from Line T-3, found the channel and there was gold in it. The drill line is about 1000 feet upstream from the old storage dam.

In this connection, when I worked on the claims in March of this year, for another client, I was told by a local and former placer mine operator that, near an old drill shack another line of drill holes were put down. If this is indeed so, then there was an unreported drill line only about 3000 feet upstream from line T-3.

There are three important factors in considering the potential of the creek. The first is, unsuspected and known, confluence zones. These zones, theoretically, should be enriched zones. There is a most obvious one where the West and the East Forks of Otter Creek meet at the southern end of the claim group. North of this zone, within the Otter Creek stream valley, in the old channel, for some distance downstream the gravels should be enriched by both the effects of possible gradient changes, and also the drainage from sizable basins being united in the one valley of Otter Creek. It would seem reasonable to expect that old pups or tributaries of Otter Creek could enrich the old valley by confluence. The possibility of such zones does enhance the potential of the group.

The second factor is the bedrock geology. It is the writer's opinion, backed by some others, that the most favorable bedrock at the camp is greeenstone volcanics, whether schistose or not. It is instructive to note that the most productive bedrock of Klondike placer camp is the Klondike Schist formation. This formation is mainly schistose andesitic volcanics. By comparing the claim map with Aitken's geological map of the area it appears that the greenstone part of the "Gold Series" starts about Drill Line T-3 and ends about at old Drill Line #4. Please see Figure 5 and also Aitken's map.

The final factor affecting the potential of the group is the interpretation, from the drilled bedrock mineralization and lineament analysis, that the Otter Creek may have in fact followed a gold mineralized shear zone for a good part of its course. It is not expected that the shear

zone will contain significant gold for all of its length (any more than the Larder Lake Break of Ontario carries gold for all of its length) but it is an important controlling factor. Concentrations of gold mineralization could be expected at intersectional or flexure zones along the suspected shear zone.

It is of some interest that the writer observed an apparently active fault, of some two or three feet thrust displacement within the Drain Lease open pit. This pit is about 2000 feet from Surprise Lake and east of the present course of Otter Creek. It is unusual to see an active fault in unconsolidated sediments. The strike of the fault was about N-S and dip was almost vertical. This fault would line up with gouge zones that the writer found in many of the drill holes on Tina and Rose claims on the west side of the creek. The shear zone, indicated by the drill results in the creek valley, is about 2500 feet long in a N-S direction.

Air photo study indicates that the upper Snake Creek valley actually follows an important lineament and this lineament intersects the favorable rocks and the N-S shear zone upstream of line T-3. It is also most important, not only for placer deposition that there is a possibility of relatively rich source rocks for the gold, but there is also the possibility that there could be an important bedrock zone of gold mineralization within, or near, Otter Creek valley on the Tina Group.

Finally, for this non-qualitative assessment of the potential of the creek, it should be mentioned that in drilling the bedrock of holes S083-52 and 53 some very black 'return' water was found in the holes. Chips of schistose andesite bedrock here showed heavy fine grained pyrrhotite, arsenopyrite and pyrite mineralization (over 30% sulphides). No samples were taken for assay of this mineralization. This type of mineralization was not seen in any of the other holes. Obviously the placer operator who mines to bedrock and can assess this mineralization in place and also sample it, will be in a good position for exploration of the bedrock potential of the Otter Creek valley on Tina Group. K. A. O'Connor does not control the bedrock mineral rights on Tina ground.

The upstream end of old hydraulicking operations on the Creek coincides with about the position of line T-3. The depth of till in banks above the creek valley is markedly less than downstream on Rose Claim, where the hydraulicked banks are as high as 100 feet above the stream of Otter Creek. This a favorable development in that, possibly, we will be able to drill from the banks to the old channel bottom. This could not be done with the hammer drill that was used in the downstream program.

The claims are each about one half mile in length or about 2600 feet. The possible length of the creek covered by Tina Group claims is about 2 and 1/2 miles or about 13,000 feet. Of these one half of Tina claim will be discussed in terms of probable and possible ore. The remaining 2 and 1/4 miles or about 12,000 feet will be discussed in terms of potential of the creek.

There are two separate main sections of the creek in terms of potential. The first section comprises about two and three quarter claim lengths or about 7000 feet. The second section is about two claim lengths and is about 5,000 feet long. The first section is just upstream of the Tina claim and below the storage dam. Here it is expected that the favorable greenstone bedrock will result in richer placer deposits. Upstream of this section, not only should the bedrock be the less favorable sediments, but gradient should be less and the channel narrower. It is expected that placer deposits here will be somewhat lower grade and lower in volume per foot of channel.

It is expected, based on drilling results, not only on T-3 but on other lines of Dan Group, that width of "B" horizon will be about 120 feet with thickness of about 30 feet. For a length of the channel of 100 feet this means about 13,000 C.Y. per hundred feet of channel. There are about 70 such lengths or a potential for "B" horizon of about 0.9 million C.Y. The bedrock horizon should have a similar width and about 12 feet thickness. This results in about 5,000 cubic yards per hundred feet of channel or about 400,000 C.Y. for the first section. The total potential in cubic yards for the first section is about 1.3 million cubic yards for both potential horizons.

Upstream, for the upper two claims it seems reasonable to reduce the size of the potential channel. This reduced size is indicated in the cross-section for Line #4 of Dailly's map. I have reduced the cubic yards of both horizons to about 10,000 cubic yards per hundred foot of channel. This means that about 0.5 million cubic yards of potential pay in the channel may be proven by drilling on the two southernmost claims. The total yardage potential is then about 1.8 million cubic yards. The potential grade of this material and the resultant ounce potential will be discussed below after consideration of the probable and possible reserves for the drilled block of Tina claim.

PROBABLE PLACER RESERVES

Because of the results shown in Appendix A and in the cross-sections of Figure 7 it is considered that, despite the poor results of drilling on lines T-1 and T-2, the very good results of "B" horizon in SO83-53 are significant in terms of expected grade. Hole SO83-53 gave 22 feet of 0.48 oz/C.Y. in "B" horizon. Hole SO83-52 gave only 0.02 oz/C.Y. for an equivalent thickness in the same horizon. The average is about 0.23 for the two holes about 70 feet apart. I have conservatively assigned a grade of 0.1 oz/C.Y. for "B" horizon as probable ore. The lower horizon should be richer based on results of other holes downstream in Dan claims and deduced grade from one old hole. I have assigned a grade of 0.15 oz/C.Y. for probable ore to the bedrock horizon. Volume here is considered to be about the same as the volume for potential ore discussed above, that is about 18,000 cubic yards per hundred feet of channel.

The volume for the drilled section of the old channel is then about 250,000 cubic yards. Half of this yardage is considered as probable and half as possible reserve. The grade as worked out using the above assigned grades and 13,000 C.Y. and 5,000 C.Y. for the upper and lower horizons is 0.11 oz/C.Y. This means about 27,500 ounces are assigned as probable plus possible ore in the drilled part of Tina Claim.

As for potential ounces the following calculation can now be made using the yardage potential stated above for the undrilled part of Tina claim. The potential grade is about 0.10 for the 1.3 million C.Y. of the first section. This means about 130,000 ounces may be proven here by drilling. In the second section of about 500,000 C.Y. the average grade is expected to be lower at about 0.05 ounces per cubic yard. This amounts to about 25,000 ounces. The total ounces then amount to about 150,000 as potential for the claims of Tina group. Adding this to the probable ounces means that the total production from the creek could be as high as about 182,000 ounces.

MINING CONSIDERATIONS

The stripping for recovery of the above gold ounces will be somewhat difficult because it will require the diversion of Otter Creek. There are some ditches, old flumes and some 2 foot diameter pipe on the east side of Otter Creek. This was used for hydraulicking operations on the creek at the site of the present Drain Lease Mine. In no way was this ever intended as a diversion of the Creek. The volume of the creek at Tina claim far exceeds the

carrying capacity of this old water supply system. I expect that a wooden, plastic-lined flume on the west side of the creek should provide adequate diversion capacity. In addition to the surface flow there will certainly be a very large subterranean flow. This will mean that bedrock drains and large capacity pumps will be needed to clear the bedrock horizon. This horizon will most likely require large ripper-equiped tractors for mining and the excavation bottom will have to be clear of water.

The sub-valley stripping ratio is very roughly estimated at about 2.5 to 1. This is determined by the sectional relationships shown in Figure 7. There are about 30 feet of barren material above the "B" horizon and about 40 feet of barren till and sand below that horizon and above the bedrock pay zone. The "B" horizon is about 30 feet thick. The depth ratio is about 70:30 or slightly less than 2.5:1. In addition to the sub-valley overburden there is the till material above the stream in the valley walls. Not much information is available on the thickness of the till for this stripping task. It is assumed that about 75 feet of thickness (when the channel is totally outside the stream valley) will have to be stripped. However, it is not considered likely that this will occur often. So an average thickness of about 50 feet is a more reasonable figure for the stripping of the till material on the valley sides. This puts the depth ratio at 120:30 or 4:1. The total pay material is about 2.0 million cubic yards. In very rough figures then about 8.0 million cubic yards will have to be stripped to mine that amount of pay. There are estimated as potential,and probable and possible ore, to be about 182,000 ounces in the pay zones on the Tina Group. If the stripping costs are set at about $3.00 per cubic yard then total stripping costs may be about 24.0 million dollars. Mining costs should be not more than $10 per C.Y. for a mining oost of about $20.0 million. At about $400 per ounce the gross value of the gold potential of the property is about $73.0 million. The net operating profit could be in the range of about $30 million. It is considered that the stripping costs are perhaps too high. In any case, the above numbers give in very rough numerical form, some idea of the possible exploitation result of a sucessful exploration program on the Tina Group.

Because of the amount of stripping needed per year the rate of progress of mining will be slow . It is most likely that the mining of the five claims, if the drilling exploration results are positive, will take over six years and may take as long as ten years. Of course, gold price changes in that time may make the overall venture much more (or less) profitable than indicated above.

SUMMARY OF PROBABLE, POSSIBLE RESERVES AND POTENTIAL IN C.Y.

SECTION	PROBABLE	POSSIBLE	POTENTIAL	OUNCES
1/2 OF DRILLED ZONE	125,000	125,000		27,500
BELOW DAM			1,300,000	130,000
ABOVE DAM			500,000	25,000
TOTALS	125,000	125,000	1,800,000	182,500

DRILLING PROPOSAL

The above assessment of the potential of the Tina Group warrants the exploration drilling of the property on sectional lines about 400 feet apart as soon as possible. The truck-mounted Becker hammer drill with auxiliary compressor should be used. There may be need, in some cases, to go to the 9" drill. About 30 lines will be required to test the entire length of the group. This plan will mean the drilling of about 300 feet of hole per line. A total of about 9,000 feet of drill hole, in about 90 holes should test the course of the ancient channel. Our costs for the 1983 program were about $50 per foot, including sample processing. So the drilling program should cost about $500,000. In addition to the drill a D8 cat will be needed as standby machine throughout the program and for drill road and drill site construction.

CONCLUSIONS

1. The drill program tested about 1300 feet of the ancient channel on the north end of Tina Claim.

2. About 125,000 cubic yards of pay in two horizons in the drilled zone are assigned as probable reserves at grade of 0.11 oz/C.Y.

3. About 125,000 cubic yards of pay are assigned as possible ore in the drilled zone at the same grade as above.

4. About 1.8 million cubic yards of pay are considered as the potential for the upper reaches of Otter Creek on Tina Group. The grade for the section above the storage dam is considered to be about half the grade of the section below the dam. This is because the lower section is in favorable structures and rocks. The potential for the undrilled sections is set at about 155,000 ounces.

5. There are considerable grounds, because of heavy sulphide mineralization in bedrock, on one drill line (and structural reasons) for assuming good bedrock mineralization potential near the channel of Tina Group. This potential can be explored after the bedrock has been reached and sampled during the course of placer mining.

6. The net operating profit for mining of the entire group, if the recommended exploration program is carried out successfully, is calculated at about $30.0 million, before taxes, with gold at $400 US per ounce.

RECOMMENDATIONS

It is recommended that the drilling program outlined above be carried out as soon as possible and that the necessary financing be arranged as soon as possible. Also every effort should be made to acquire options on the mineral rights to the bedrock mineral claims covering the middle part of the group, below and slightly above the storage dam.

Respectfully submitted,

M.D. Kierans

M.D. Kierans P.Eng.

CERTIFICATE

I, Martin D. Kierans, of 1503-1616 Pendrell Street, Vancouver, B.C. do hereby certify that:

1. I am a Geological Engineer.

2. I am a Resident Member of the Association of Professional Engineers of the Province of British Columbia.

3. I am a graduate in Geological Sciences of the University of British Columbia (M.A. 1952) and McGill University (B.Sc. 1949).

4. I have practiced my profession of Geological Engineer and Mine and Exploration Geologist for 31 years.

5. My knowledge of the property discussed in this report is based on short visits in 1982 and a longer two week period in March 1983 when I supervised a surveying and road clearing operation on downstream claims. I also supervised a 109-day Becker hammer drilling project on the downstream claims, below Tina Group, of the Dan-Drain Group of claims from May 22 to October 19, 1983. It is alsc based on study of numerous private reports on the past exploration, development and mining work on the lower and middle Otter Creek (see Bibliographic References), study of relevant government geological maps and publications and on verbal communications with some local prospectors and placer operators.

6. I have no interest in this or any other property of K.A. O' Connor, nor do I expect any.

DATED December 23, 1983 at Vancouver, British Columbia.

M. D. Kierans

M.D. Kierans P. Eng.

Tina: O'Connor: Dec. 23, 1983: MDK:

TABLE 1

TINA GROUP DRILLING PROJECT, ATLIN MINING DISTRICT

SUMMARY OF BECKER HAMMER DRILL HOLES

HOLE NO.	ZONE	LINE	DATE STARTED	DATE FINISHED	COLLAR ELEV. (FEET)	TOTAL LENGTH (FEET)	REMARKS
SO83-49	TINA	1	SEPT 10 1983	SEPT 10 1983	3313	109	STOPPED IN FAULT ZONE
SO83-50	TINA	1	SEPT 10 1983	SEPT 10 1983	3313	73.5	STOPPED FLT ZONE BEDROCK?
SO83-51	TINA	2	SEPT 11 1983	SEPT 12 1983	3324	94	STOPPED IN FAULT ZONE
SO83-52	TINA	3	SEPT 12 1983	SEPT 13 1983	3338	118	STOPPED IN FAULT ZONE
SO83-53	TINA	3	SEPT 13 1983	SEPT 14 1983	3338	118	STOPPED IN FAULT BEDROCK
SO83-54	TINA	2	SEPT 15 1983	SEPT 16 1983	3324	110	STOPPED IN BEDROCK AT 104

BIBLIOGRAPHIC REFERENCES

Below is a partial list of the government and other references consulted for this report by the writer.

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APPENDIX A

DRILL SAMPLE SLUICING AND PANNING RESULTS : OTTER CREEK DRILLING PROJECT

FROM FEET	TO FEET	INTERVAL FEET	CUMUL'TE INTERVAL	MOISTURE RELATIVE	SAMPLE WEIGHT LBS	GOLD WT. MILLIGMS	WT. OF GRAVEL LBS/C.Y.	ADJUSTED GOLD WT. GRAMS	ADJUSTED GOLD WT. OZ./C.Y.	FEET*GRADE	INTRVL GRADE OZ/C.Y.	FACTOR ADJUSTED GRADE OZ/C.Y.
SO83-49												
0	10	10	10	DRY	61	BL.SAND	3500	-----	----	-----		-----
10	16	6	16	DRY	101	.01	3500	3.465E-4	1.112E-5	6.674E-5		
16	22	6	22	DRY	95	.3	3500	.0110526	3.548E-4	.0021287		
22	28	6	28	DRY	162	5.1	3500	.1101852	.0035369	.0212217		
28	34	6	34	DRY	131	.4	3500	.0106870	3.431E-4	.0020583		
34	40	6	40	DRY	204	5.4	3500	.0926471	.0029740	.0178438		
40	46	6	46	DRY	227	SAND	3500	----	----	----		
46	52	6	52	DRY	304	SAND	3500	----	----	----		
52	58	6	58	DRY	205	SAND	3500	----	----	----		
58	64	6	64	DRY	256	SAND	3500	----	----	----		
64	70	6	70	DRY	238	SAND	3500	----	----	----		
70	76	6	76	DRY	270	SAND	3500	----	----	----		
76	82	6	82	DRY	259	SAND	3500	----	----	----		
82	88	6	88	DRY	326	SAND	3500	----	----	----		
88	94	6	94	DRY	244	SAND	3500	----	----	----		
94	100	6	100	DRY	321	SAND	3500	----	----	----		
100	106	6	106	DRY	322	SAND	3500	----	----	----		
106	109	3	109	DRY	227	SAND	3500	----	----	----		
SO83-50												
0	10	10	10	DRY	93	.1	3500	.0037634	1.208E-4	.0012081		
10	16	6	16	DRY	97	10	3500	.3608247	.0115825	.0694948		
16	22	6	22	DRY	134	1.5	3500	.0391791	.0012576	.0075459		
22	28	6	28	DRY	95	6.3	3500	.2321053	.0074506	.0447035		
28	34	6	34	DRY	127	14	3500	.3858268	.0123850	.0743102		
34	40	6	40	DRY	164	5.87	3500	.1252744	.0040213	.0241278		
40	46	6	46	DRY	169	4.7	3500	.0973373	.0031245	.0187472		
46	52	6	52	DRY	135	7.2	3500	.1866667	.0059920	.0359520		
52	58	6	58	DRY	165	25.5	3500	.5409091	.0173632	.1041791		
58	64	6	64	DRY	149	30.6	3500	.7187919	.0230732	.1384393		
64	70	6	70	DRY	201	17.8	3500	.3099502	.0099494	.0596964		
70	74	6	74	DRY	216	1.3	3500	.0210648	6.762E-4	.0040571		
52	70	18	18							.3023148	.0167953	.0226736
SO83-51												
0	10	10	10	DRY	71	.7	3500	.0345070	.0011077	.0110768		
10	16	6	16	DRY	115	BL.SAND	3500	---	---	---		
16	22	6	22	DRY	64	BL.SAND	3500	---	---	---		
22	28	6	28	DRY	160	.1	3500	.0021875	7.022E-5	4.213E-4		
28	34	6	34	DRY	147	.5	3500	.0119048	3.821E-4	.0022929		
34	40	6	40	DRY	155	.2	3500	.0045161	1.450E-4	8.698E-4		
40	46	6	46	DRY	207	.4	3500	.0067633	2.171E-4	.0013026		
46	52	6	52	DRY	163	28.9	3500	.6205521	.0199197	.1195183		
52	58	6	58	DRY	257	11.2	3500	.1525292	.0048962	.0293771		
58	64	6	64	DRY	387	1.8	3500	.0162791	5.226E-4	.0031353		
64	70	6	70	DRY	277	.9	3500	.0113718	3.650E-4	.0021902		

APPENDIX A

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FROM FEET	TO FEET	INTERVAL FEET	CUMUL'TE INTERVAL	MOISTURE RELATIVE	SAMPLE WEIGHT LBS	GOLD WT. MILLIGMS	WT. OF GRAVEL .LBS/C.Y.	ADJUSTED GOLD WT. GRAMS	ADJUSTED GOLD WT. OZ./C.Y.	FEET*GRADE	INTRVL GRADE OZ/C.Y.	FACTOR ADJUSTED GRADE OZ/C.Y.
70	76	6	76	DRY	350	8.1	3500	.081	.0026001	.0156006		
76	82	6	82	DRY	259	BL.SAND	3500	----	----	----		
82	88	6	88	DRY	287	BL.SAND	3500	----	----	----		
88	94	6	94	DRY	280	.9	3500	.01125	3.611E-4	.0021668		
SO83-52												
0	10	10	10	DRY	127	.2	3500	.0055118	1.769E-4	.0017693		
10	16	6	16	DRY	114	.1	3500	.0030702	9.855E-5	5.913E-4		
16	22	6	22	DRY	102	BL.SAND	3500	----	----	----		
22	28	6	28	DRY	159	.3	3500	.0066038	2.120E-4	.0012719		
28	34	6	34	DRY	111	.9	3500	.0283784	9.109E-4	.0054657		
34	40	6	40	DRY	86	.7	3500	.0284884	9.145E-4	.0054869		
40	46	6	46	DRY	130	.2	3500	.0053846	1.728E-4	.0010371		
46	52	6	52	DRY	107	.1	3500	.0032710	1.050E-4	6.300E-4		
52	58	6	58	DRY	150	35	3500	.8166667	.0262150	.1572900		
58	64	6	64	DRY	155	20.7	3500	.4674194	.0150042	.0900250		
64	70	6	70	DRY	107	1.3	3500	.0425234	.0013650	.0081900		
70	76	6	76	DRY	336	25.1	3500	.2614583	.0083928	.0503568		
76	82	6	82	DRY	330	.3	3500	.0031818	1.021E-4	6.128E-4		
82	86	4	86	DRY	571	BL.SAND	3500	----	----	----		
86	92	6	92	DRY	297	17	3500	.2003367	.0064308	.0385848		
92	98	6	98	DRY	124	5.5	3500	.1552419	.0049833	.0298996		
98	104	6	104	DRY	120	4.9	3500	.1429167	.0045876	.0275257		
104	110	6	110	DRY	176	13.2	3500	.2625000	.0084262	.0505575		
110	116	6	116	DRY	273	92.9	3500	1.191026	.0382319	.2293915		
116	118	2	118	DRY	124	46.1	3500	1.301210	.0417688	.0835377		
52	76	24	24							.3058618	.0127442	.0172047
SO83-53												
0	10	10	10	DRY	83	.7	3500	.0295181	9.475E-4	.0094753		
10	16	6	16	DRY	88	BL.SAND	3500	----	----	----		
16	22	6	22	DRY	125	BL.SAND	3500	----	----	----		
22	28	6	28	DRY	188	.1	3500	.0018617	5.976E-5	3.586E-4		
28	34	6	34	DRY	139	BL.SAND	3500	----	----	----		
34	40	6	40	DRY	105	2	3500	.0666667	.0021400	.0128400		
40	46	6	46	DRY	95	.1	3500	.0036842	1.183E-4	7.096E-4		
46	52	6	52	DRY	132	.5	3500	.0132576	4.256E-4	.0025534		
52	58	6	58	DRY	132	.1	3500	.0026515	8.511E-5	5.107E-4		
58	64	6	64	DRY	65	122.7	3500	6.606923	.2120822	1.272493		
64	70	6	70	DRY	235	710.6	3500	10.58340	.3397273	2.038364		
70	76	6	76	DRY	221	1362.7	3500	21.58122	.6927572	4.156543		
76	80	4	80	DRY	250	192.3	3500	2.6922	.0864196	.3456785		
80	86	6	86	DRY	340	3.9	3500	.0401471	.0012887	.0077323		
86	92	6	92	DRY	138	31.24	3500	.7923188	.0254334	.1526006		
92	98	6	98	DRY	107	.168	3500	.0054953	1.764E-4	.0010584		

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FROM FEET	TO FEET	INTERVAL FEET	CUMUL'TE INTERVAL	MOISTURE RELATIVE	SAMPLE WEIGHT LBS	GOLD WT. MILLIGMS	WT. OF GRAVEL LBS/C.Y.	ADJUSTED GOLD WT. GRAMS	ADJUSTED GOLD WT. OZ./C.Y.	FEET*GRADE	INTRVL GRADE OZ/C.Y.	FACTOR ADJUSTED GRADE OZ/C.Y.
98	104	6	104	DRY	489	.2	3500	.0014315	4.595E-5	2.757E-4		
104	110	6	110	DRY	450	14.5	3500	.1127778	.0036202	.0217210		
110	118	8	118	DRY	345	80.3	3500	.8146377	.0261499	.2091990		
58	80	22	22							7.813079	.3551400	.4794389
SO83-54												
0	10	10	10	DRY	93	.5	3500	.0188172	6.040E-4	.0060403		
10	16	6	16	DRY	131	.3	3500	.0080153	2.573E-4	.0015437		
16	22	6	22	DRY	78	.5	3500	.0224359	7.202E-4	.0043212		
22	28	6	28	DRY	75	BL. SAND	3500	----	----	----		
22	28	6	28	DRY	130	70.2	3500	1.890000	.0606690	.3640140		
28	34	6	34	DRY	146	4.8	3500	.1150685	.0036937	.0221622		
34	40	6	40	DRY	119	19	3500	.5588235	.0179382	.1076294		
40	46	6	46	DRY	91	1.5	3500	.0576923	.0018519	.0111115		
46	52	6	52	DRY	352	206.3	3500	2.051278	.0658460	.3950762		
52	58	6	58	DRY	265	69	3500	.9113208	.0292534	.1755204		
58	64	6	64	DRY	272	8.2	3500	.1055147	.0033870	.0203221		
64	70	6	70	DRY	105	.5	3500	.0166667	5.350E-4	.0032100		
70	76	6	76	DRY	233	.2	3500	.0030043	9.644E-5	5.786E-4		
76	82	6	82	DRY	87	.1	3500	.0040230	1.291E-4	7.748E-4		
82	88	6	88	DRY	147	.1	3500	.0023810	7.643E-5	4.586E-4		
88	94	6	94	DRY	287	.5	3500	.0060976	1.957E-4	.0011744		
94	100	6	100	DRY	211	.1	3500	.0016588	5.325E-5	3.195E-4		
100	106	6	106	DRY	218	96.8	3500	1.554128	.0498875	.2993251		
106	110	4	110	DRY	149	13.5	3500	.3171141	.0101794	.0407174		
22	58	36	36							1.075514	.0298754	.0403318
100	110	10	10							.3400426	.0340043	.0459057

APPENDIX B

The Tina Group comprises the following leases:
K. A. O'Connor is the present owner:

Lease No.	Name	Expiry Date	Former Owner
PML 1699	Tina	Sept 30/84	Connolly Holdings
PML 1688	McGinty	Sept 30/84	Connolly Holdings
PML 1704	Doris	Sept 30/84	Connolly Holdings
PML 1705	Betty	Sept 30/84	Connolly Holdings
PML 1706	Suzie	Sept 30/84	Connolly Holdings

PL No.	-----	----------	Present Owner
10170			K.A. O'Connor
10171			K.A. O'Connor
10172			K.A. O'Connor
10173			K.A. O'Connor
10174			K.A. O'Connor

APPENDIX D

FORMULAE USED
IN APPENDIX A

I Column 9=

(Column 8 / Column 6) X Column 7 / 1000

II Column 10=

(Column 9 X 0.0321)

III Column 11=

(Column 3 X Column 10)

APPENDIX E

Exh. "C"

(TOM CREEK - STEWARTING DIVISION - B.C.

SUMMARY OF DIAMOND DRILLING

ATLIN RUFFNER, LTD. (A.R.L.) et al - 1939-40; 1945

Date Finished	Line No.	Hole No.	Elevation Surface	Elevation Bedrock	Depth - Ft. B.R.	Depth - Ft. Bot.	Depth - Ft. For Calc.	Au. Value	Recovered Value	Corrected Recovery	Au. Value $/C.Y.	Principal Concentrations
10-26-39	1	1	3504.	3406.	98	105	99	150	14.1	150	16.7	10%-40'; Bal. 95-96'
11-10	1	2	3504.5	3424	84	102	85	460	41.5	460	60.0	33%-35'; 60% - 50'
11-25	2	3	3547	3579.		97		Tr. (Slide metl. 50' to 70')			Tr.	Lost s/c casing bent & broken by shooting.
11-27	2	4	3513	3616	104	124	104	Nil	Nil	Nil	Nil	Sank in bottom 103' shaft.
12-23	1	5	3503	3420	83	88	84	1960	176.0	1960	258.0	6%-75'; Bal B.R.
1-18-40	1	6	3500	3412	88	94	89	201	18.2	201	25.2	10%-19'; 20%-75' Bal BR Quicksand 43 to 72'.
1-25	1	7	3508.5	3430.5	78	90	79	9.5	0.9	9.5	1.3	Scattered Dug.3437-3515
2-8-40	3	1	3464.5	3450	14.5	26	14.6	39	3.5	39	29.6	Near BR
2-12	3	2	3474.4	3443.4	31	39	31	20	1.8	20	7.8	" "
2-16	3	3	3460.3	3424.3	56	64.5	56	55	4.9	55	11.9	Mostly 45'
2-26	3	4	3483.7	3421.2	62.5	69	62.5	39	5.5	39	7.5	60%-35'; 20% - BR
3-19	3	6	3494.2			87.5	87.5	120	10.8	120	16.7	All-44.5-56.5. Hole lost s/c bent casing and collapsed shoe
3-29-40	3	7	3498.3	3384.8	113.5	117.5	115	473	42.6	473	50.4	All lower 2'
4-17	3	9	3512.5	3451.5	61.0	64-64.5	61	1		1	Tr.	
4-22	3	11	3525.8	3491.8	34.0	38.5	34	32	2.9	32	12.0	Mostly 30-34
4-27	3	6a	3491.7	3383.7	108	120	108	903	77.8	864.2	72.0	70% - 44 to 53.5 - Bal BR
7-4	3	8	3504.5	3443.8	60.7	76.	60.7	54	5.4	60	8.9	
7-7	3	5	3489.7	3384.7	105	111	105	147	14.5	160.6	13.7	
7-11	Extra		3461.	3378.	83.2	90	85	930	65.9	732.2	77.5	
5- -40	A	4	3426	3290	136		136	325	29.3	312	21.5	
	A	5	3427	3329	100			Nil	Nil		Nil	
	A	3½	3427	3316	111			Nil	Nil		Nil	
6-18	A	4½	3426	3314	112	128		Tr	Nil		Tr	
6- -40	A	6½	3433	3399.5	97.7			235			21.7	
5-27-40	4	1			31	43		60			21.5	40% - 15' - 50% - 27'
5-30	4	2			29	39					Nil	
5-5	4	3			63	67		Tr			Tr	
5-12	4	4			89	93		345			43.1	70% - 78' - Bal BR
5-22	4	5			106	111.5		114			12.0	30% -94' - Bal BR
5-29-40	4	6				77		Tr			Tr	Unfinished hole
6-1-40	4	6a				89		50			6.8	
6-3	4	7				77.5		Nil			Nil	
6-11-40	4	8				95		248			28.5	

APPENDIX E

Otter Creek - Atlin Mining Division - B.C
Page #2

NOTES:

Value /u estimated at 0.09¢ per milligram equivalent to $35.00 per oz. Troy @ 800 fine
Union drill using 6-7/16" O.D. shoe and 4-7/8" I.D. casing used to 6-22-40.
Keystone 71 drill using 7-½" O.D. shoe and 6" I.D. casing used for all other holes.
Values except ~~lines 1 & 2~~ calculated using Keystone "27" factor of 136 for 6-7/16" shoe and 100 for 7-½" shoe.
Values line 1 & 2 calculated using straight factor of 119.5 for 6-7/16" shoe.
Calculations made by drill engineers.

25 Oct. 1946
San Francisco
A. F. D.

North LINE 1 TINA going South
East W side of Valley
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

APPENDIX F

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number 5083-49
Commenced Sept 10 '83
Finished Sept 10 '83
Purpose Test Tina claim
Page 1/2

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM (Feet)	TO (Feet)	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO (Feet)	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET		
0	7	Fill, O.B. + Glacial Till	0	7	20	WET	54	56	100	DRY	10:23	0	12:57	56
7	10	Grey pebbles 60% sand 30, +	7	10	25	DRY	56	58	100	DRY	10:45	7	1:01	59
		some pea gravel	10	12	25	DRY	58	60	100	DRY	10:57	10	1:05	60
10	12	Chips of grey shale. Possibly boulder	12	14	30	WET	60	62	100	DRY	11:09	12	1:06	62
		then into dark Brown sand and pebbles 50-50	14	16	30	WET	62	64	100	DRY	11:11	14	1:13	64
12	14	As above better WATER 14	16	18	40	WET	64	66	100	WET	11:24	16	1:19	66
14	16	Chips of f.g. dk green Andesite	18	20	30	WET	66	68	100	WET	11:28	18	1:18	68
		hard, Possibly silicified Boulder?	20	22	30	WET	68	70	100	WET	11:35	20	1:23	70
16	22	Cobble pebble till. Angular fragments.	22	24	50	WET	70	72	60	DRY	11:43	22	1:30	72
		Some Sand Improving Recovery. Some chips	24	26	30	WET	72	74	100	DRY	11:50	24	1:32	74
		of grey An or grey sh. Poss. Boulder	26	28	30	WET	74	76	100	DRY	11:53	26	1:37	76
22	28	As above but less sand to only 5%	28	30	5	WET	76	78	100	DRY	12:00	28	1:39	78
28	30	V. poor Recovery Mud and pebbles.	30	32	50	WET	78	80	100	DRY	12:06	30	1:50	80
30	32	Pea gravel, pebbles, 50-50. Minor Sand	32	34	100	WET	80	82	60	WET	12:12	32	1:55	82
32	48	TERTIARY WASH ORANGE brown (l. brown orange colour)	34	36	100	WET	82	84	60	SLOP	12:17	36	2:00	84
		pebbles, cobble sand and mud Poss pay	36	38	100	WET	84	86	40	WET	12:23	40	2:10	86
		even proportions	38	40	80	DAMP	86	88	40	WET	12:2	42	2:18	88
48	49	As above. DRYER. More dust. WASH	40	42	80	DRY	88	90	30	WET	12:28	49	2:22	90
		IS DRY NO GROUNDWATER	42	44	80	DRY	90	92	30	WET	12:31	46	2:27	92
49	52	Wx'd serpentinized peridotite poss	44 46	46 48	100 100	WET wet	92	94	100	DRY	12:40	48	2:30	94
		bedrock + Tertiary wash, pebbles, Wx boulder	48	50	100	WET	94	96	100	DRY	12:47	50	2:40	96
52	66	Back to Tert. Wash gravel	50	52	100	WET	96	98	100	DRY	12:50	52	2:45	98
66	67	More dust, less pebbles. Dust 80%	52	54	100	DRY	98	100	100	DRY	12:53	54	2:50	100

North LINE 1 TINA going south
East West of Valley
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number S083-49
Commenced Sept 10 '83
Finished Sept 10 '83
Purpose TEST TINA CLAIM
Page 2/2

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC. %	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET
67	68	Grey chips 50% Boulder or bedrock. Boulder!	100	102	100	DRY					2:55	102
68	70	Grey Tert wash. orange colour ended. @therwise	102	104	100	DRY					3:03	104
		as 52-66'. At 70' back to yellow till +pea-	104	106	100	DRY					3:06	106
		gravel	106	108	100	DRY					3:15	108
70	80	A.A. At 79 grey chips shale	108	109	FLUSH	[redacted]					3:32	109
80	86	Grey chips with yellow sill. Possible bedrock		END								END
		Much water added										
86	92	Poss fault gouge zone. Much white fine milky										
		dust and dk grey ¼" rock chips of shale or										
		peridotite										
92	94	Dry silty white powder 50% +pea sized										
		rock grey chip 50%										
94	96	Coarser angular pebbles in white powder										
96	108	Smaller angular pebbles + chips in white										
		powder. Powder 85% Green f.g. schistose										
		volcanic (andesite?) fragments + chips										
		Serpentinize, talcose rock, Possibly altered										
		peridotite										
108	109	STOPPED BECAUSE HOLE VERY TIGHT										
	END	DANGER OF LOSING THE PIPE STRING										
		STOPPED NEAR EDGE OF POSSIBLE										
		FAULT ZONE WITH GOUGE. IN										
		POSSIBLE FAULT [redacted] FROM NEAR										
		70 FEET										

North TINA LINE 1
East East side of Creek
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number 5083-50
Commenced Sept 10-83
Finished Sept 11-83
Purpose Test Tina channel
Page

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO (Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET				
0	7	Fill O.B. Till	0	7	50	DRY	52	54	25	WET	9:05	7	Sept 10 to 7'			
7	12	Brown sandy Till	7	10	50	DRY	54	56	40	WET	9:16	10	12:06	52		
12	24	Coarse sand 50 dark mud covered	10	12	10	DAMP	56	58	40	WET	9:22	12	12:12	54		
		pebbles 50% WATER 18'	12	14	30	DAMP	58	60	20	WET	9:31	14	12:20	56		
24	26	Cobble pebbles - 50% coarse brown	14	16	30	DAMP	60	62	20	WET	9:40	16	12:22	58		
		sand 50%. Dark brown colour.	16	18	40	WET	62	64	25	WET	9:45	18	12:29	60		
26	36	As above but fewer cobbles lighter brown	18	20	40	WET	64	66	30	WET	9:50	20	12:26	62		
		color. Pea gravel 20%	20	22	40	DAMP	66	68	30	WET	9:54	22	12:29	64		
36	44	More angular fragments but otherwise	22	24	40	WET	68	70	35	WET	10:04	24	12:31	66		
		As above. Possible pay gravel. Possibly	24	26	50	DAMP	70	72	100	DRY	10:09	26	12:33	68		
		TERTIARY WASH but less orange colour	26	28	50	DRY	72	73.5	80	WET	10:11	28	12:35	70		
44	48	Ordinary brown cobble - pebble till.	28	30	50	DRY		END			10:14	30	12:40	72		
		NOT T. WASH. Pebbles + cobbles 50%	30	32	70	DRY					10:19	32	12:48	73		
		pea gravel 30% Coarse sand 20%	32	34	30	DAMP				(10:23?)	10:28	34	1:00	73.5		
48	52	Sand 80% + pea gravel + mud WATER	34	36	40	WET					10:26	36	END			
52	62	A.A. but choc brown color. WASH(?)	36	38	40	WET					10:28	38				
62	70	A.A. but more yellowy choc. Brown	38	40	80	WET					10:45	40				
70	73.5	Grey Serp wx'd peridotite (?)	40	42	60	WET					10:52	42	} REAMING			
	END	bedrock (?) chips of dark grey to	42	44	70	DRY					11:35	42				
		black fresh slightly serpintinized	44	46	60	WET					11:50	44				
		msve peridotite.	46	48	40	WET					11:55	46				
			48	50	30	WET					12:03	48				
			50	52	30	WET					12:05	50				

North LINE 2 TINA
East W Side Creek
Elevation See map
Azimuth vert
Dip vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG
OTTER CREEK DRILLING PROJECT

Hole Number S083-51
Commenced Sept 11 83
Finished Sept 12 83
Purpose Test W. Bank of Otter Creek
Page 1/2

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC. %	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET				
0	7	Fill, Overburden, glacial till	0	7	15	DRY	52	54	80	WET	2:30	7	4:01	56		
7	14	Black ang. pebbles, coarse sand and chips	7	10	30	DRY	54	56	25	WET	2:39	10	4:04	58		
		even proportions	10	12	30	DRY	56	58	50	WET	2:41	12	4:09	65		
14	22	As above but more sand to 40% and brown	12	14	30	DRY	58	60	60	WET	2:42	14	4:11	66		
		color - dark brown. Smaller pebbles.	14	16	30	DRY	60	62	150	WET	2:48	18	4:13	68		
22		Flakey platey fragments 2" x 1/4" of	16	18	5	DRY	62	64	150	WET	2:51	20	4:22	70		
		fissile slate and ang to sub-rounded pebbles	18	20	5	DRY	64	66	150	WET	2:52	22	4:35	71		
		Very dark brown sand (coarse) 50% WATER	20	22	20	DRY	66	68	100	DRY	2:58	24	4:49	72		
22	32	As above. Very ang. fragments. Some Cobbles	22	24	40	DRY	68	70	70	WET	3:01	26	9:35	74	SEPT 12	
32	38	More Rounded fragments, no sand, only	24	26	50	WET	70	72	70	WET	3:04	28	9:40	76		
		pea gravel, chips, cobbles + pebbles, dark	26	28	50	WET	72	74	100	WET	3:08	30	9:50	78		
		brown color.	28	30	50	WET	74	76	100	WET	3:13	32	9:57	80		
38	46	Sand 30% finer gravel, pebbles etc	30	32	30	WET	76	78	100	WET	3:16	34				
46	50	Coarser cobble sandy gravel till.	32	34	30	WET	78	80	100	WET	3:22	36				
50	54	Cobbles, pebbles (rounded to subrounded)	34	36	25	WET					3:25	38				
		some coarse pea gravel.	36	38	40	DRY					3:30	40				
54	60	Pea gravel 60% pebbles 40	38	40	70	DRY					3:33	42				
60	66	Coarse Sand + water yellow — WATER	40	42	70	DAMP					3:38	44				
66	68	WX'd bedrock (?) + gravel 50-50	42	44	50	WET					3:43	46				
68	70	Pea + pebble gravel. little sand	44	46	50	WET					3:48	48				
70	80	Possibly cemented gravel. ORANGE	46	48	50	WET					3:50	50				
		YELLOW WATER	48	50	50	WET					3:53	52				
			50	52	40	WET					3:57	54				

North LINE 2 TINA
East W. side Creek
Elevation See map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG
OTTER CREEK DRILLING PROJECT

Hole Number S083-51
Commenced Sept 11 - 83
Finished Sept 12 - 83
Purpose Test W Bank of Otter Creek
Page 2/2

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO (Feet)	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET
80	90	Waterchange color to grey. Poss fractured	80	82	100	WET					10:05	82
		Bedrock. grey shale. Some white qtz	82	84	100	WET					10:11	84
		Very angular fragments Av 2" some	84	86	100	WET					10:10	86
		coarse sludge. May still be cemented	86	88	100	WET					10:28	88
		pay. Soft dark grey talcose slightly schistose	88	90	100	WET					10:37	90
		f.g. rock. Poss Serpintinized peridotite.	90	92	100	WET					10:42	92
92	94	White powder in water. White sludge	92	94	100	WET					10:48	94
	END	fragments. Fractured rock poss. Fault		END								END
		zone. Possible gouge powder forms										
		MILKY return water Small chips of										
		serp. peridotite										
		HOLE STOPPED AT 94' BECAUSE										
		PIPES STICKING, ALSO ALMOST										
		CERTAINLY FAULT ZONE. Bedrock										
		starts at 80'										

North LINE 3 TINA
East W. side of Creek
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number S083-52
Commenced Sept 12-83
Finished Sept 13-83
Purpose Test 1200's on Creek
Page 1/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET	Delete these	Delete two		
0	4	MOVED 5'S. NO SAMPLE HIT BOULDER	0	7	70	DAMP	52	54	40	WET						
0	7	Fill, Overburden and glacial till	7	10	70	WET	54	56	50	WET	12:15	0	~~2:40~~	~~56~~	2:10	50
7	14	Wet org. grey pebbles and cobbles 90%	10	12	30	DRY	56	58	70	WET	12:38	7	~~2:45~~	~~52~~	2:12	~~54~~ 52
		some pea gravel. 10-12. Dry as above. Poor	12	14	50	DRY	58	60	60	DRY	12:59	10	~~2:22~~	~~54~~	2:15	54
		Rec.	14	16	60	DRY	60	62	50	DRY	1:05	12	~~2:30~~	~~56~~	2:22	56
14	20	Grey pebbles + cobbles 50% black sand	16	18	60	DRY	62	64	90	WET	1:12	14	~~2:30~~	~~58~~	2:30	58
		(coarse) 50% Some chips from a boulder.	18	20	50	DRY	64	66	60	WET	1:17	16	~~2:42~~	~~60~~	2:35	60
		16-18 less sand and dark grey	20	22	50	DRY	66	68	5	WET	1:21	18	~~2:52~~	~~62~~	2:42	62
20	23	Grey black sand 50% chips and pea-	22	24	60	DRY	68	70	25	WET	1:25	20	~~2:54~~	~~64~~	2:52	64
		gravel, grey fragments. 50%	24	26	65	DRY	70	72	50	WET	1:28	22	~~2:55~~	~~66~~	2:54	66
23	38	Brown sand 50% rounded pebbles 50%	26	28	65	DRY	70	72	50	WET	1:39	24	~~2:57~~	~~68~~	2:55	68
		some cobbles. All fragments grey.	28	30	65	DRY	72	74	150	WET	1:38	26		~~70~~	2:57	70
		Brown sand turning slightly lighter color	30	32	45	DRY	74	76	150	WET	1:40	28		~~72~~	3:16	72
		down hole. 37 WATER FLOW	32	34	50	DRY	76	78	150	WET	1:44	30		~~74~~	3:20	74
38	48	Sand 50% rounded pebbles 50%	34	36	50	DRY	78	80	120	WET	1:49	32		~~78~~	3:25	78
		Some wx'd pebbles. Some rounded	36	38	50	WET	80	82	150	WET	1:52	34		~~80~~	3:28	80
		cobble	38	40	80	DAMP	82	84	200	WET	1:54	36		~~86~~	3:50	86
48	58	As above more orange & red pebbles +	40	42	60	DAMP	84	86	200	WET	2:00	38		~~88~~	9:01	88
		fragments. lighter brown sand 50%	42	44	60	DRY	86	88	50	WET	2:01	40		~~92~~	9:07	92
58	66	Possibly Tertiary Wash. Well rounded	44	46	60	DRY	88	90	100	WET	2:02	42		~~94~~		94
		pebbles some yellow red. Sand yellowish-	46	48	60	DRY	90	92	150	WET	2:09	44				
		brown	48	50	80	DRY	92	94	10	WET	2:05	46				
66	68	Sand mostly, some pea gravel	50	52	40	DRY					2:08	48				

North LINE 3 TINA
East W. Side of Creek
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG
OTTER CREEK DRILLING PROJECT

Hole Number SO 83-52
Commenced Sept 12-83
Finished Sept 13-83
Purpose Test 12ee's on Creek
Page 2/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET					
68	74	Gravel: pebbles, sand, pea gravel, even prop's	94	96	100	WET					4:14	96					
		Mixed well rounded fragments.	96	98	30	WET					4:16	98					
74	88	WATER. sand + pea gravel aquifer + pebbles	98	100	30	WET					9:20	100					
88	92	Sand 90% Coarse + fine + pea gravel	100	102	30	WET					9:22	102					
92	94	Coarse ang gravel, pebbles V. ang. grey	102	104	40	WET					4:27	104					
		rock. Cemented pay	104	106	45	WET					9:32	106					
94	96	Cemented pay gravel rounded + coarse sand	106	108	45	WET					4:40	108					
		pebbles + cobbles 70%	108	110	50	WET					4:50	110					
96	100	Pea gravel compact but not hardened	110	112	100	WET					10:15	110	Sept 13				
100	106	As above + cobbles + pebbles 75%	112	114	100	WET					10:30	112					
106	108	Black return water black grey cobbles +	114	116	100	WET					10:32	114					
		pebbles. Very little sand.	116	118	100	WET					10:40	116					
108	110	Heavy f.g. pyrr + asp + pyr in green chl.		END.							10:48	118					
		andesite. Some pebbles but also bedrock chips.										END					
		Near or in bedrock. RESUMED DRILLING															
		SEPT. 13 @ 10:15 am DRILLERS TO TOWN															
		9-10 A.M. FOR PHONE CALL.															
110	116	Some rounded cobbles and pebbles to 20%															
		70% small chips + fragments of rock as above															
		av. ½" 10% as sludge 112-114 as above. but															
		no round fragment all bedrock grey to whitish															
		color of return water. 114-116 Many rounded pebbles															
		of bedrock. Serp. gild. chl'zd peridotite.															

North LINE 3 TINA
East W Side of Creek
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number S083-52
Commenced Sept 12 - 83
Finished Sept 13 - 83
Purpose Test 1200's on Creek
Page 2/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM (Feet)	SAMPLE RECORD TO Feet	SAMPLE RECORD REL. REC.%	SAMPLE RECORD SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	SAMPLE RECORD TO Feet	SAMPLE RECORD REL. REC%	SAMPLE RECORD SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	TIME AND PENETRATION RATE FEET
116	118	White return water. White powder										
	END	gouge and shear zone in talcose sheared schistose rock										
		HOLE STOPPED IN SOFT SHEAR										
		ZONE OR FAULT.										

North TINA 3
East 80' E of 52
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number S083-53
Commenced Sept 13 - 83
Finished
Purpose Test Tina on E side
Page 1/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO (Feet)	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET				
0	7	Fill Overburden glacial till	0	7	60	DRY	52	54	20	SLOP	12:29	0	1:46	54		
7	14	Brown sand 60% pebbles and pea gravel	7	10	50	DRY	54	56	20	SLOP	12:29	7	1:51	56		
		40% 12-14 90% sand	10	12	50	DRY	56	58	10	SLOP	12:36	12	1:54	58		
14	24	Black sand 90% 16-18 Blacksand	12	14	50	DRY	58	60	10	SLOP	12:37	14	1:59	60		
		+ black gravel, pea + pebble 50-50	14	16	50	DRY	60	62	15	WET	12:40	16	2:04	62		
		18-20 As above. 20-22 AA. 22-24 MUDWATER	16	18	50	DRY	62	64	30	WET	12:43	18	2:09	64		
24	36	As above. Black sand 80%. Gradual	18	20	60	DRY	64	66	50	WET	12:47	20	2:12	70		
		change to dark brown sand. Some cobbles.	20	22	60	DRY	66	68	150	WET	12:50	22	2:15	74		
		26-28 WATER 28. still black sand. 34-36	22	24	50	DAMP	68	70	150	WET	1:01	24	2:17	76		
		As above. Poor Rec.	24	26	75	DAMP	70	72	150	WET	1:05	26	2:20	78		
36	40	Pebbles 80% mud 20% wet by drill	26	28	75	DAMP	72	74	100	WET	1:07	28				
40	44	Conspicuous clay to 30% silt + pebbles	28	30	60	WET	74	76	80	WET	1:12	30				
		dark brown 42-44 A.A.	30	32	50	WET					1:14	32				
44	46	Poor Rec. Pebbles + pea gravel + mud	32	34	60	WET					1:19	34				
46	56	As above. Angular pebbles some rounded	34	36	30	DRY					1:21	36				
		minor sand + pea gravel 20%	36	38	50	WET					1:23	38				
56	62	Mostly silt + water. V. Poor Rec 56-58	38	40	60	WET					1:28	40				
		Angular pebbles. Some sand. Some cobbles	40	42	70	WET					1:32	42				
		V. angular fragments	42	44	30	WET					1:34	44				
62	66	Some brown rounded pebbles + pea gravel	44	46	30	WET					1:37	46				
		poor rec. Some cobbles	46	48	30	WET					1:40	48				
66	72	Sand 72 + WATER FLOW.	48	50	30	DAMP					1:43	50				
72	78	Gravel rounded clean pebbles + cobble	50	52	20	SLOP					1:44	52				
		V minor sand pay gravel (?)														

North _____
East _____
Elevation _____
Azimuth _____
Dip _____
Logged by _____

BECKER HAMMER DRILL LOG
OTTER CREEK DRILLING PROJECT

Hole Number SO 83 - 53
Commenced _____
Finished _____
Purpose _____
Page 2/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC.%	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET
78	84	Heavy WATER FLOW. Gravel. Clean	76	78	150	WET						80
		pebbles 30, pea 30 and Cobbles 40.	78	80	150	WET					2:24	84
		Very heavy water content. Clean gravel pay(?)	80	82	100	WET					2:28	86
		Orange brown water color.	82	84	20	WET					2:37	88
84	86	Orange brown silty + clayey (10%) gravel	84	86	20	WET					2:42	90
		Minor cobbles, pebbles 50% pea 40%	86	88	60	WET					2:45	92
		and coarse sand.	88	90	60	WET					2:50	94
86	88	Hard gravel (cemented slightly) brown water	90	92	30	WET					2:56	96
		return. Cobbles, pebbles + pea 30-30-30	92	94	60	WET					3:00	98
		some clay but very clean (Pay?)	94	96	50	WET					3:06	100
88	94	As above. Very well rounded fragments. Good	96	98	50	WET					3:13	106
		leaking gravel. Hard drilling but not really	98	100	50	WET					3:19	108
		cemented	100	102	200	WET					3:24	110
94	96	Return water gray black Sharp change from	102	104	200	WET						
		orange brown	104	106	200	WET						
96	98	Black gravel. Black rounded pebbles + some	106	108	200	WET						
		angular. Chips + pea gravel. Black pay (?)	108	110	200	WET						
		Some black sand										
98	106	Black Sand. Very heavy WATER FLOW										
106	108	Black gravel 108-110 Black sand WATER										
		NOTE: SOME OF SAMPLES 78-84										
		LOST DUE TO EXTREME WATER FLOW										

North _____
East _____
Elevation _____
Azimuth _____
Dip _____
Logged by _____

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number 5083 - 53
Commenced _____
Finished _____
Purpose _____
Page 3/3

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	SAMPLE RECORD TO Feet	SAMPLE RECORD REL. REC. %	SAMPLE RECORD SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	SAMPLE RECORD TO Feet	SAMPLE RECORD REL. REC%	SAMPLE RECORD SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	TIME AND PENETRATION RATE FEET
110	112	White powder in return water. Schistose	110	112	100	WET					3:30	112
		Softer rock. See 5083-52 at end	112	114	100	WET					3:38	114
112	114	Conspicuous white milky white return	114	116	60	WET					3:45	116
		water. Sheared andesite chloritized and	116	118	100	WET					3:55	118
		gouged with tale. Fault zone?										END
114	116	As above but pebble sized fragments of										
		sheared bedrock are rounded and very										
		soft.										
116	118	Fault zone (?) Very white milky return										
	END	water. Soft bedrock of schistose and										
		talcy altered volcanic. Some qtz										
		HOLE STOPPED IN FAULT										
		BEDROCK AT 118'										

North LINE 3
East E side of Creek
Elevation see map
Azimuth Vert
Dip Vert
Logged by M.D.K.

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

LOG'S FROM FROZEN BAGS

Hole Number 5083 - 54
Commenced Sept 16 83
Finished Sept 16 83
Purpose Test channel
Page 1/2

LOGGED FROM BAGS BECAUSE OF VISITORS

FROM (Feet)	TO (Feet)	DESCRIPTION
0	14	Fill. Overburden and glacial till
14	32	Sand 50% pebbles and peagravel
		50% Brown sand
32	42	As above
42	54	"Water sand" Dry in Bags
54	62	Dark brown sand and pebbles 50-50
62	72	70' Sand Coarse sand 95%
72	80	"Water sand" dry in bags
80	90	Pebbles, cobbles, sand even proportions
		Poss pay gravel. Dry in Bag
90	100	"Water sand" coarse sand 95'
100	104	"Black" sand 95% some pea gravel
104	106	Poss frib of peridotite or boulder
106	110	White powdery gouge and milky water
	END	only angular fragments of bed.
		Bedrock starts at 104' Fault zone
		most likely of considerable width
		HOLE STOPPED IN GOUGE/
		FAULT ZONE

SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC. %	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET
0	2	50	DRY	46	48	100	DRY	9:00	0
2	4	50	DRY	48	50	100	DRY		
4	6	50	DRY	50	52	110	DRY		
6	8	50	DRY	52	54	100	DRY		
8	10	50	DRY	54	56	110	DRY		
10	12	50	DRY	56	58	55	DRY		
12	14	50	DRY	58	60	50	DRY		
14	16	50	DRY	60	62	150	DRY		
16	18	50	DRY	62	64	150	DRY		
18	20	50	DRY	64	66	100	DRY		
20	22	50	DRY	66	68	100	DRY		
22	24	50	DRY	68	70	70	DRY		
24	26	50	DRY	70	72	50	DRY		
26	28	50	DRY	72	74	100	DRY		
28	30	50	DRY	74	76	100	DRY		
30	32	50	DRY	76	78	100	DRY		
32	34	50	DRY	78	80	100	DRY		
34	36	50	DRY	80	82	70	DRY		
36	38	50	DRY	82	84	70	DRY		
38	40	50	DRY	84	86	70	DRY		
40	42	50	DRY	86	88	70	DRY		
42	44	100	DRY	88	90	70	DRY		
44	46	100	DRY	90	92	50	DRY		

North _____
East _____
Elevation _____
Azimuth _____
Dip _____
Logged by _____

BECKER HAMMER DRILL LOG

OTTER CREEK DRILLING PROJECT

Hole Number S083-54
Commenced _____
Finished _____
Purpose _____
Page 2/2

FROM (Feet)	TO (Feet)	DESCRIPTION	SAMPLE RECORD FROM Feet	TO Feet	REL. REC. %	SAMPLE MOISTURE	SAMPLE RECORD FROM (Feet)	TO Feet	REL. REC%	SAMPLE MOISTURE	TIME AND PENETRATION RATE TIME	FEET
			92	94	150	DRY						
			94	96	150	DRY						
			96	98	70	DRY						
			98	100	70	DRY						
			100	102	70	DRY						
			102	104	150	DRY						
			104	106	100	DRY						
			106	108	100	DRY						
			108	110	100	DRY					110	200 Am.
				END								