All Dredges - 1950-1959 incl.

Dredge	Cubic Yards		Production	
	Estimated	Actual	Estimated	Actual
1955				
6	7,786,632	8,010,275	$1,495,315	$1,205,866
8	7,267,965	7,469,173	2,229,608	2,220,849
9	5,020,412	5,482,481	1,099,406	1,331,924
10	6,381,188	7,078,233	1,325,467	1,479,257
11	6,892,528	7,730,761	1,699,669	2,357,873
Totals	33,348,725	43,249,156	$7,849,465	$8,598,769

36,170,923

Average Value

Estimate 23,540 ÷ 23.77

Actual 19,880 ÷ .234

5.66

1 original
8 copies

The Yukon Consolidated Gold Corporation Limited

DAWSON, Y.T.
CANADA

March 26th, 1962.

The President and Board of Directors,
The Yukon Consolidated Gold Corporation, Ltd.

Gentlemen:

I present herewith a Study of Future Operations, prepared with the view of extending the life of the Company and widening the scope of its operations, as requested by the Board of Directors in Montreal last November.

In making this Study, I have felt that we had to have some basic information to start with, and that would have to be our prospect drilling information. Our examinations, therefore, have been conducted on the following basis, listed in what I consider to be their order of importance:

1. Calculations based on drill hole values.
2. The application of historical data and information
3. Statistical information, based on geological studies of bedrock and past records.

The final figures obtained are a consideration of all three factors.

All areas remaining ahead of the dredges and of our present bench operations have been re-calculated, using our usual method of valuation by triangles from drill hole values. Statistical data was assembled and charts were prepared to show the relation between volume and values per cubic yard. Historical data was then assembled, on the basis of the operation of the dredges over the last twelve years, using the total number of cubic yards dredged and the values recovered in each year as one unit, and obtaining an average length of season, average yardage dug per hour, and average cents per cubic yard recovered, then projecting the averages for each year ahead one year for estimating purposes.

Following along these lines, data was assembled and a comparison was made, using drill hole values and actual recovery values for each dredge for each year over the past seven years, and an average was computed on a cents per cubic yard, plus or minus, basis for each dredge area. This was the method used for estimating the production for the years 1963-4-5 and 6. We thought it best to leave the 1962 Budget figures unchanged. These production estimates are somewhat lower than those obtained when considering the whole as one unit, but are also somewhat higher than those obtained when using a plan factor for each dredging area.

We have broken down the operating costs into variable and non-variable items applicable to these estimates and, as all service charges and Dawson overhead have remained fairly constant over the last ten years, we have assumed that there will be little change in the next five years. It is felt that any new operation or extension of our present operations would not have any appreciable effect on this aspect of our costs, and that as long as the operation broke even, it would at least be assuming a share of these costs.

For this reason, a study was made of the tailings on Lower Hunker Creek to ascertain if we could extend the life of Dredge No. 11 for another three years.

An examination of the recoveries made by the Yukon Gold dredge and the few drill holes shown on the Yukon Gold maps, showed that there were, originally, very good values in this area. From past information, it is known that this ground had not been well thawed, and it was thought that we might obtain fair values on re-dredging. To obtain some idea as to what recoveries we might expect in this area, we checked Dredge No. 11 recoveries when working in old dredge tailings above Hester Creek, at which point the dredge was constructed and started digging in 1939. At this time Dredge No. 11 operated for three months in old Yukon Gold tailings, and again for two months in 1947. We found that the dredge recovered an average of 20.6 cents per cubic yard in dredging these tailings. From this we assumed that we might expect to recover as much, and possibly more, from the lower Hunker tailings, due to the fact that the ground in this area was originally of higher grade. A recovery of 20.6 cents per cubic yard is estimated as being sufficient to provide for the necessary thawing, and in addition could be expected to cover at least a portion of the fixed charges and overhead. No stripping costs would be applicable to this area.

The overall dredging cost for No. 11 for the past five years, during which we had both thawing and stripping, amounted to 27 cents per cubic yard, with stripping costs averaging 4.1 cents per cubic yard dredged, and Dawson General Overhead averaging 5.7 cents per cubic yard, making a total of 9.8 cents. This would reduce the actual cost of operating No. 11 Dredge to 17.2 cents per cubic yard, without considering Head Office expense or the constant service charges. Even if the cost of thawing this area should be increased by a cent or more per cubic yard,

we feel that this operation would be of benefit to the overall position. We could also expect a depletion allowance in the neighborhood of $20,000.00 per year, which would help our income tax position. Two seasons will be required to thaw this area, commencing in 1962 and finishing in 1963. Immediate authorization for this extension of Dredge 11 reserves will be necessary in order to prepare for thawing during the coming season.

NO. 6 DREDGE:

No. 6 Dredging area was examined and re-valued, and a considerable amount of ground ahead of this dredge is estimated to be profitable. This additional yardage would make it possible to project the dredge into 1968, but it is very doubtful that the physical condition of this dredge will enable it to operate beyond 1966. The superstructural timbers are in very poor condition, and we have already attached the maximum number of steel pontoons to the dredge in order to keep it afloat. We have estimated that the present reserves will carry Dredge 6 to the middle of the 1965 operating season, so that in order to extend its life to the end of 1966, it will be necessary to both strip and thaw additional ground, sufficient for one and one-half season's dredging operation.

The stripping of this area would start in 1963 and, provided we were able to complete the stripping in one season, we would thaw in 1964. If unable to complete the stripping in one season, it would be necessary to postpone the thawing of this additional area until 1965. Stripping of this additional ground cannot be commenced in 1962, due to the thawing plant which will be operating at the lower end of this area.

NO. 8 DREDGE:

Dredge No. 8 area has ample reserves ahead, with sufficient ground already prepared to carry the dredge through to the end of 1965. In order to project this dredge through to the end of 1966, it would be necessary to prepare additional ground, sufficient for one full dredging season. We would have to allow two years for stripping in this area, owing to the small amount of water which would be available, and the depth of muck which is known to be present. Thawing would have to be scheduled for 1965.

We have not re-examined this area beyond 1966, as, according to our present reserves, we have ample ground available to project this dredge through to 1969. There is also the possibility of an additional year or more by continuing the dredge into its own tailings at the point where it started operating in 1938, and where, due to frozen bedrock, the dredge only recovered about 60% of the estimated values for that area.

NO. 9 DREDGE:

In the Dredge No. 9 area, I believe we will have enough ground stripped at the end of this season to carry the dredge through to the end of 1966. This is due to the fact that the dredge has not been able to dig the larger yardages originally estimated, as it has encountered a hard, reefy bedrock and several areas of frozen ground. It is, therefore,

possible that the life of this dredge could be extended at least one year, to the end of 1967, and in the event of present recoveries being maintained, even further, although drill hole values are not encouraging, and the area has extensive 'old workings'.

NO. 10 DREDGE:

The area ahead of Dredge No. 10 was re-examined, and was found to be uneconomic. This operation will use up its present reserves by the end of 1964, or the middle of 1965, depending on digging conditions and the amount of extra ground it may be able to dig along the Jensen Bench. Should the prospect drilling scheduled for this season (1962), along the right limit of this area, produce encouraging results, or if this dredge continues to over-run its estimated recoveries, then this area will be re-examined. Even if additional ground were available in this area, we would not be able to do any stripping this coming season, as all available water is required for other operations.

NO. 12 DREDGE:

There has been no change made in the projection for Dredge No. 12 in the No. 17 Bench area, and this dredge is expected to complete its operation in this area in three years, i.e. 1963, 1964 and 1965. At the upper end of this area there is a small section which the dredge may not be able to mine. This section will be handled by our bulldozer mining.

DOMINION CREEK BENCHES:

The remaining bench areas on Dominion Creek consist of Areas Nos. 15 and 16; a small area below No. 14; an area of old workings above No. 15; and another area of old workings between Nos. 15 and 17. These areas have been examined and, subject to further sampling of the 'old workings' this summer, I believe that we can obtain a life of four seasons' bulldozer mining on these benches.

GOLD RUN CREEK:

The limits along the Yukon Gold Company tailings on Gold Run Creek were examined, and there are several areas with very good values indicated. These areas are estimated to contain over 1,000,000 cubic yards, having a value of 117.2 cents per cubic yard. I am of the opinion that these areas could be mined by the use of bulldozers, in a manner similar to that being used in our operations on the Dominion Benches, with the possible addition of a dragline to be used for stacking tailings. Should the prospect drilling planned for this coming season, in the area between Gold Run Creek and Granville, prove to be of interest, the possibility of substantial additional reserves may change the entire outlook for this area.

NO. 4 DREDGE:

Consideration was also given to the possibility of raising Dredge No. 4 and putting it into operation. From 1942 to the end of 1959, leaving out the year 1945, when the dredge did not operate, and 1947, when the dredge was returning through the Trail hydraulic tailings, the average recovery for Dredge No. 4 was at the rate of 13.78 cents per cubic yard. The lowest recovery in any one year, disregarding 1959, was 8.64 cents per cubic yard in 1943, and the second lowest was 9.17, in 1955. The highest

value recorded was in 1950, when recoveries were at the rate of 49.94 cents per cubic yard. On this basis, if we had five or six years of thawed ground ahead, I would recommend that the dredge be put back into operation. Under the circumstances, however, it does not seem advisable that any action be taken in respect to Dredge No. 4 unless it can be established that substantial improvements in grade can be anticipated higher up the creek.

The break-even point for the operation of Dredge 4, disregarding Dawson overhead and power costs of approximately $70,000, is estimated at 7 cents per cubic yard. If No. 4 were to operate with recoveries better than this figure, we could expect a small gain in our cash position and a small depletion allowance for tax purposes, but we would lose part of this gain if we were in a position to receive assistance under Emergency Gold Mining Assistance, due to the lowering of our costs per fine ounce. Another adverse factor is that there are two adverse claims just ahead of the present location of the dredge. Leases previously held on these claims have been dropped and would have to be re-negotiated, probably at a 5% royalty.

SUMMARY:

To summarize the result of the Study so far, we feel that the operating life of the dredges, with the exception of No. 10, can be projected, with reasonable economic probability, to the end of 1966, with further possibilities beyond that point, depending upon results obtained from the prospect drilling to be carried on during the coming summer.

No additional reserves have been found for Dredge No. 12 in its present location, and at the moment we know of no area in the immediate vicinity to which it could be moved.

Some extension to the bench areas on Dominion should provide about four years of bulldozer mining in that location. The possibilities on Gold Run Creek are not yet fully analysed, but it is known that substantial values exist in that area, which will unquestionably be mined, either by bulldozer or some other method.

EXPLORATION:

Consideration is being given to the Sixty-mile River, a tributary of the Yukon River, containing what is probably the only large potential dredging area left in this vicinity. At present there are some prospecting leases held on this river which, unless renewed, will expire during the current year. In the event of this ground becoming open, it is my opinion that we should consider the staking of extensive leases on this river, with the object of conducting a prospect drilling programme. The area is located well within reach of our power plant and, if found to contain the necessary values, would provide a very large dredgable area. The new Territorial Tote Road Policy would provide some assistance in building a road to the property for the initial prospecting period.

Consideration of the Stand-to mineral claims in the Mayo area will continue, and further examinations will be conducted during the coming summer.

EXPLORATION (Cont'd.):

We have had some correspondence with the Peso Silver Company, also in the Mayo area, and Mr. Hester will be visiting the property during the latter part of March, at the invitation of the Peso Silver management.

Two prospecting parties will be in the field during the coming season, and will examine areas of interest within the range of our power plant.

Bonanza Creek is believed to have some bench ground in the vicinity of Grand Forks which may prove of interest. This, and other situations in that area, will be examined during the coming summer.

A more accurate estimate of yardages and values believed to be contained in the Jackson Hill gravels will also be made.

COMMENTS:

Statements of Costs and Revenue (Profit and Loss) were prepared, chiefly to show the possible effect on E.G.M.A. and Income Tax, one being a projection based on our present reserves to 1965, and the other projected with additional reserves to 1966. (See Schedules I and IA, Mr. Taylor's report.)

It will be noticed that there is practically no difference in the over-all income tax position between the two projections, whilst slightly less assistance under E.G.M.A. can be expected for the longer period. The 1966 projection can also be expected to result in a greater cash gain.

Consideration was not given to any possible reduction of costs in the service departments and Dawson General Overhead for the purpose of this comparison. These costs could be expected to reduce, in approximately the same proportion in each statement, as the various stripping, thawing and dredging operations come to a close. This will result in a further improvement in the cash position. These reductions in costs will also affect the E.G.M.A. and Income Tax position.

CONCLUSION:

We feel that the Study has provided us with a valuable extension of one year, to 1966. Commencing in 1967, we are of the opinion that we should have at least three dredging areas with workable ground remaining, and that we now have sufficient information to suggest that there are possibilities of additional operations being brought in, probably in the Gold Run area, to justify a further extension. The Study will continue, with this objective in mind, and much will depend upon the results of this summer's prospect drilling and exploration.

I wish to express my appreciation and thanks to members of the Dawson Staff, who have co-operated most whole-heartedly and to the fullest extent possible.

Respectfully submitted,

A. G. Barrett

A. G. Barrett,
Manager.

AGB:w

The Yukon Consolidated Gold Corporation Limited

DAWSON, Y.T.
CANADA

EVALUATION AND EXPLORATION OF PLACER GOLD RESERVES IN THE DAWSON AREA

SUMMARY:

1. An outline is given of the suggested manner in which the placer deposits were formed.

2. Features of the distribution of gold values, as evinced by actual recovery figures, is described. This distribution is compared with that indicated by drill hole data, and it is concluded that the latter are not sufficiently specific to permit precise estimating under any circumstance.

3. Estimating procedures are examined and the suggestion is made that historical data be used to a greater extent than is present practice. A procedure based on cumulative frequencies of historical data appears to have application.

4. Areas which appear, as a result of the application of the principles outlined, to hold promise of containing gold in economic amounts, are listed.

5. An outline of the proposed programme for continuing this aspect of the study is given.

SOURCE OF THE GOLD:

Regional mapping in the Dawson area during 1961 indicated that the source of the gold now found in placer deposits was the coarse, pseudo-porphyritic, silicious, sedimentary rock which occurs in thick bands in a monotonous series of schists of sedimentary origin. The rock was probably an arkose. No occurrences of volcanic rocks of greenstone-type, iron formation, or large scale faulting, with which economic gold deposits are frequently associated, were found. Most of the known occurrences of gold in veins in the area lie on or near the crests of folds in the supposed arkoses. Several specimens of very coarse gold in white quartz cobbles of the type found in the placer deposits were examined in 1961. It is assumed that the gold occurs with quartz in gash veins of this type, in an irregular manner throughout the arkoses. The fold crest areas represent too large a target to permit consideration of drilling. Outcrop is too scant to allow any detailed structural study of these areas. Both a geochemical approach and an approach based on panning soil are vitiated in large areas on account of a superficial veneer of frozen muck.

The manner in which economic placer deposits terminate where a creek cuts a band of this supposed arkose is striking.

FORMATION OF THE PLACER DEPOSITS:

The concentration of the gold into placer deposits of economic grade has been the result of a combination of a number of both tectonic and climatic events. Recent tectonic history of the area is mostly connected with vertical movements in the Ogilvie Mountains, which lie north of the Dawson area. There, uplift has been very great, and continues at present. Two stages of valley formation are evident in these mountains, and there are nick points on most streams. The Ogilvie mountains are separated from the Dawson placer area by the Tintina Valley Fault, which is a major structural feature of continental proportions. L. Green, of the Geological Survey of Canada, reports evidence of movement on this fault throughout geological time. He has been unable to correlate rocks of any age across this fault anywhere in the Yukon.

Climatic history of the period immediately before, and during, the Pleistocene glaciation, has had an important effect on the placer deposits. At its epoch, the ice sheet extended to within a few miles of the Dawson area. Variations in the flow of outwash water from melting glaciers and ice sheets, and wind-blown dust from the outwash fans, have played important parts in the form of the deposits as they are known today.

The chronological sequence of events, as they are at present interpreted, which led to the formation of the placer deposits in their present form, may be expressed best in numerical order, as follows:

1. Broad valley erosion in a warm humid climate occurred at the end of the Tertiary period. Material was carried away by solution, as result of chemical, rather than mechanical erosion. Deep weathering effects developed in the country rocks and laterites formed, even in the valley bottoms. Quartz and heavy minerals, including gold, resisted the tendency to dissolve, and were left on the surface as residuals. Most of the gold found its way to the valley floors, where much of it worked its way into cracks in the lateritized bedrock. The quartz remained on the flanks of the valleys.

2. In Pliocene time, the area tilted slightly down to the north, and up on its southern side, along a hinge line parallel to Indian River. The centres of the broad valleys of the northward-flowing streams filled in with the residual gravels from the valley flanks. The matrix of these gravels is a white clay which adheres to the tongue and is probably of the kaolin group. This clay material was derived from the laterite soils of the valley flanks. On account of their white appearance, these gravels are known as "white channel". Due to the tilting, the gradient of the southward-flowing streams was decreased, with the result that they do not have the same great thickness of "white channel" gravels as the northward-flowing streams. While the valleys of the northward-flowing streams were being filled in with the "white channel" gravel, the valleys of those

streams which flow southward received only a thin veneer of gravel. From the Indian River valley, the southward-flowing streams started to cut back upstream from the fault scarp on the north side, or right limit, of the valley. This accounts for the youthful cross-section of the Dominion River valley just before it enters that of Indian River, while the upstream sections of both Sulphur and Dominion Creeks are those of mature valleys.

3. With the onset of glaciation in the Pleistocene, the climate became cold and there was a rush of "Klondike River" gravels of glacial outwash origin into the valley of the Klondike. The narrow "Klondike Spillway" just upstream from Dawson on the Klondike began to develop at this time. Benches of "white channel" covered with layers of "Klondike River" gravels were left on either side. Four separate glacial epochs are recognized. Between each was a warm interglacial period, during which the ground tilting movement along the same hinge line along Indian River was reversed in sense. The north-flowing streams were rejuvenated and cut down into their valley floors. In this way the thick benches of "white channel" gravel were left high on the present valley walls, e.g., Bonanza and Hunker Creeks. On the southward-flowing streams, low benches were developed in some of the valleys, as on Dominion Creek. The climate was sufficiently warm and humid in interglacial time to permit development of laterites on the valley floors.

4. As the ice sheet advanced and retreated during the last glacial epoch, so extensive areas of dry, outwash debris were exposed. The finer portion of this material was carried by wind and deposited over the Dawson area, and especially in the valleys, as a mantle of "muck" which may exceed 80 feet in thickness. On account of the very cold climate at that time, permafrost formed in the ground, which became insulated by a vegetation layer as the climate moderated.

With the successive reworking and depositing of gold which followed the destruction of benches by erosion, the fineness of the gold and the grade of the deposits increased. Very little seems to be known about the method of transport of gold in placer deposits like these, nor is there much known about the mechanism by which nuggets form. Both mechanical and chemical processes have been suggested.

It is of interest to note that important deposits of gold bearing gravels were found at Fairbanks, Alaska, under thicknesses of muck greater than the maximum noted around Dawson so far. In the enclosed plan of "Operations on Middle Dominion Creek" it will be noted that the configuration of the valley, as indicated by contours on the bedrock, is not coincident with that of the present water course which is being followed by Dredge 10. This situation is to be investigated during the 1962 season. There is strong evidence that the valley on bedrock has become obscured by either muck or slide debris on the right limit.

DISTRIBUTION OF GOLD WITHIN THE PLACER DEPOSITS:

The distribution of gold within the deposits has been under investigation for over a year. For this purpose it is more convenient to consider the distribution of gold in terms of dust ounces, or dollars recovered per square yard of bedrock than in terms of cubic yards. In most areas the value of the ground dredged per month, in terms of square yards, has been found sufficiently accurate to give a good picture of the distribution of gold. However, in wide areas, such as the Granville Flat, the time interval has been shortened and recoveries plotted from successive clean-ups. A map, prepared by Nemesvari, of this area is appended. For a number of reasons, outlined later, it is probably better to use "dust ounces recovered" per yard rather than dollars, although for this immediate purpose the loss in accuracy is probably slight.

In the map of the Granville area, the way in which the trends of gold values follow old channels on the bedrock is remarkable. Many of the areas of higher than average values have the form of remnants of meanders. It is thought that the gold was deposited from a large number of anastomosing rivulets, the courses of which were constantly changing, and which flowed over the wide, flat area. Very little of this gold appears to have been brought from the drainage of Sulphur Creek.

A feature of the map of the Granville area which is probably of great importance economically, is that the trends in the higher grade distributions of gold cut the edges of the dredge cuts at high angles in many cases. This remark applies equally to the whole of the lower Dominion Creek area up to Gold Run Creek. Nemesvari's map of this area is appended. With no drill hole information, or knowledge of the configuration of the bedrock in much of this area, it is impossible to make any estimate of the extent of these values beyond the edges of the present dredge cuts. An idea of the dimension of this marginal area is obtained when it is realized that the dredge cut between the mouth of Gold Run Creek and the present position of Dredge 6 on lower Dominion Creek, represents almost forty years of continuous dredging. Some drilling is planned during 1962 in this marginal area along the left limit of lower Dominion Creek, but, on the evidence of gold distribution shown in these two maps, it would seem that an extension of the dredge limits is justifiable on this basis alone. The problem here is not one of deciding whether a marginal area constitutes dredgable ground or not, but is one of determining a limit.

Close contouring the bedrock valley on Dominion Creek has indicated a number of steps in the surface on which the gold was deposited. At the top of each one of these there is a sudden increase in the value of gold recovered per square yard. This value falls off gradually to the next step, where there is a sudden increase in values recovered. The distance between steps is in the order of roughly five hundred to one thousand feet. With a knowledge of the configuration of the bedrock, it is a simple matter to predict the position of these steps, and thus of any expected increase in recoveries.

Gold now in the placer deposits of the creek valleys has been derived from the erosion of higher benches. In most cases there does not appear to have been much migration downstream in this process, as it is generally a simple matter to relate an unusually high grade area in a creek bottom to a nearby bench on which good grade gravel occurs. On Parker's plan of Lower Hunker Creek, which is appended, the high grade streak along the left limit of the Yukon Gold Company dredge cut can be related to the bench deposits of white channel gravel along this same limit. Below this cut the original valley of the white channel gravel crosses from the left to right limit of the present Hunker Creek valley. A very large volume of white channel gravel must have been destroyed during the process of erosion. On a smaller scale, a similar instance of gold derived from a bench is seen in No. 16 Bench Operation. (See plan of Operations on Middle Dominion, appended). The gold in an area of higher than normal recoveries in the valley appears to have been derived from the adjacent No. 16 Bench. On this basis, it would seem advisable to examine the possibility of extending the present limits of mining on this bench upstream sufficiently to include this possible source.

SAMPLING PLACERS BY DRILLING:

For the exploration and evaluation of placer deposits, two techniques of churn drilling have been employed, depending on whether the ground is frozen or not. In thawed ground the technique is that generally used for churn drilling in unconsolidated material, and involves the use of casing. Where the ground is frozen, open hole drilling is used. These methods are fully explained by A. M. Nordale in C.I.M.M. Bulletin No. 425 of September, 1947. This same technique has been employed very extensively at both Nome and Fairbanks, in Alaska.

Both drilling and sampling in the Dawson area have been carried out with as great care and diligence as anywhere. In spite of this, there is a considerable disparity between estimates made of recoveries based on results of drill samples, and actual recoveries. This is not a unique feature of the Dawson camp. At Fairbanks, where the drilling of the Fairbanks Exploration Company was to a comparative standard of performance as that at Dawson, the over-all recovery to estimate ratio for the entire operation from 1928 to 1960 is about 118%. Similar results were obtained earlier in the placer goldfields of California. With so much information on actual recoveries now available, it is important that the estimating procedures be examined for means of improvement. Since the application of churn drilling to placer deposits was first made in the Dawson area, there have also been important applications of statistics to mine sampling theory.

There are inherent errors in any sampling procedure. For successful sampling it is generally conceded that the following conditions should be fulfilled:

1. Assay data must constitute a statistically homogenous series. Such homogeneity is lacking in the drilling of "old works", for instance.

2. The larger the number of samples, the better the estimate of the mean, and thus the evaluation.

3. Data must be obtained by random sampling. This condition is probably fulfilled at Dawson by the rigid grid pattern on which the holes were layed out.

4. Samples must be of uniform size, especially in low grade deposits. The only way this condition may be fulfilled in our case is to consider the sample to be one of area rather than volume. To use figures of cents per cubic yard is to invite errors from this source.

5. The presence of a trend within a series of samples impairs the validity of an estimate of their mean. This is clearly a consideration in Dominion Creek, where the steps described above are responsible for very definite fluctuations in gold values, and in Sulphur Creek (see Graph I), where there is a downward trend in values.

6. A bias is introduced into the sampling data if there is a density contrast between the materials which constitute the sample. This is an unavoidable feature in sampling placer gold deposits.

Further specific sources of possible error in sampling by the method used at Dawson are as follows:

1. By using one method of drilling thawed ground, and another for frozen ground, two different bias errors are introduced, one for each method.

2. Increases in the value of a sample can only be by the presence in the sample of another particle of gold. Wide fluctuations in value of a hole may be brought about by the presence or absence of only one or two discrete grains of gold. The extent to which such fluctuations may influence a valuation may be appreciated when it is realized that a sample represents about 1/100,000 of the material sampled.

3. Holes drilled in frozen ground show wide variations in diameter from the average. This variation has been employed in weighting the values in each hole for determination of values per cubic yard. This is a questionable procedure. It might be better, statistically, to consider each hole, provided it was drilled with a standard size of bit, to be a "per square yard sample of bedrock", and to consider any changes in the diameter of the hole to constitute sampling error. Any measurement has three fundamental components, viz., the true value, the bias error inherent to the process employed, and the sampling error, peculiar to the individual measurement. The magnitudes of these two errors is unknown.

4. Variations in fineness of gold within the deposit can give appreciable errors in evaluation by drilling. An example of this is the Gold Run examination. A standard value for fineness of gold for the creek was taken as 805.346 for the evaluation of gold recovered by drilling. The arthmetic average fineness of 75 bars of gold actually recovered by dredging is 838.19. On the basis of these two figures, it would appear reasonable to suggest increasing the valuation of undredged portions of Gold Run Creek by a factor of $\frac{838.19}{805.35}$ or 104.4%.
Variations of this order are common, and must be held responsible in part for the differences between recoveries and estimates.

5. When casing is used in a hole in unconsolidated material, an estimate must be made of the true cross-sectional area of material forced inside the casing by the driving shoe. Either the inside or the outside diameter of the driving shoe may be used to calculate this area. Both figures are commonly used in placer drilling practice, as are other figures in between these two limits. This factor is known as the "Radford Factor". This factor is 0.3068 square feet when the outside diameter of the driving shoe is used, and 0.27 when the inside diameter is used. The larger factor gives a more conservative value per cubic yard, since it effectively increases the volume of the material removed by the drill. Standard practice at Dawson has been to use this larger figure consistently. This gives an estimate of value per cubic yard of roughly 12% less than would have been obtained had the smaller figure been used as a factor. Which factor is the better is a debatable point.

6. The effectiveness of hole spacing on success in exploration for a target of specific shape has been examined by Slichter. (Economic Geology, Anniversary Volume 2, 1955). If this treatment be extended to the problem of evaluation by considering each band of material of different metal content to be a separate target, then Slichter's concept may be used to test the effectiveness of a drilling grid for evaluation. On this basis, the hole spacing used on most of the examinations of the various creeks is found to be about 75%. An exception is the Granville Flat area of lower Dominion Creek, where an unusual spacing pattern was employed. Holes were drilled at the apices of equilateral triangles with sides 600 feet long. With this spacing, and the knowledge of gold distribution from Nemesvari's map (appended), the effectiveness of the drilling may be determined to have been of very low order, probably between 30 and 40%. It is worthy of note that, when the area which had been drilled on this equilateral pattern was mined by Dredge 6, the complete lack of relation between estimates and recoveries was a matter for some concern. There was no previous mining in the area, which would have complicated the evaluation. If it be accepted that the spacing of the holes seriously affected evaluation in this particular area, then it must be a significant factor in other areas too.

TECHNIQUES USED FOR EVALUATION AND ESTIMATION:

In the evaluation of reserves, several premises have been observed consistently. These are:

1. Any ground which has been worked by undergound methods will repay dredging.

2. Ground which has been dredged previously, but which was thawed by steam, as opposed to the cold water method now used, will repay dredging. Profit may be very small, but operating costs will generally be returned.

3. In any drill hole, the gold recovered is assumed to be exactly proportional to the volume of gravel and gold-bearing bedrock removed from the hole. The value of the dredgable section in any hole is quoted in cents per cubic yard, and this value is assumed to vary linearly between adjacent holes.

The suppositions in (1) and (2) above have been more or less substantiated by experience. In neither one is any precision in evaluating to be anticipated. The suppositions which concern drill holes are a different matter. Limits of reserves have been drawn to exclude areas containing holes which showed sub-marginal values but, in many instances, where it has been necessary to mine areas containing such holes in order to bring a dredge into what is apparently better grade material, this has been achieved with no great diminution in gold recovery. Clearly, some holes show no value because they lie beyond the mineralized area, while others contain low values on account of features of the statistics of the gold distribution or sampling method. This is a basic problem of the mining operation, and bears careful study.

It has been argued that, over the years, discrepancies between recovery and estimate "iron out and become part of the law of average". Such an assertion makes no provision for valuable ground which might have been left on the margins of the dredge cuts, nor does it give an idea of precisely how many years might be involved in fulfillment. That it must be held suspect over at least a five year period is well demonstrated by the following figures, which represent gross recovery to estimate for the five-year period 1957 to 1961, inclusively, in percentage form:

Dredge Number:	6	8	9	10	11
Recovery/Estimate	91	89	136	118	145

Annual figures show even wider fluctuations. These figures of estimates are derived from drill hole information in the area actually dredged. The volumes of material involved in estimate and actual recovery figures are virtually identical.

In pre-season estimating for budgetary purposes, the value of the area which it is predicted will be dredged, is frequently adjusted by multiplying the expected gross by a factor based on recent experience with the recovery to estimate percentage in the particular area. In an effort to rationalize this procedure, a series of plan factors was suggested. (See "Notes on the Evaluation of Placer Ground in the Klondike Area" - B.W. Hester, 1st May, 1961). A specific factor was suggested for each of a number of

arbitrarily selected divisions in the range of values per cubic yard of ground most commonly encountered in mining. On a purely overall-average basis, the employment of these factors showed some improvement in estimates, but there were severe restrictions in their application, and wide discrepancies were still not unusual between actual recovery and estimate.

For both geological and statistical purposes, it is better to consider the gold values to be distributed on an areal basis, rather than on a volume basis. In this way the parameter of the variable dredging section is removed. For the initial steps in valuation, it seems preferable to continue this procedure and to involve the third dimension only when the problem of gold distribution has been solved adequately, when the problem of evaluation descends to one concerned with the practicability of mining. At this stage only should the concept of cents per cubic yard be introduced. It is intended here to discuss some features of the gold distribution as illustrated by actual recoveries compared with results from previous drilling. Clearly, any estimate should be coloured by the geological considerations already outlined.

Before the discussion of actual recovery figures is allowed to proceed further, it is necessary to outline the method by which these figures are determined, and to point out sources of error which they themselves contain. It has been the practice for many years to combine all the raw gold dust recovered from all operations, into a common melt. The fine ounces recovered from this are then distributed among the operations in proportion to the dust ounces multiplied by a factor. This factor, which remained unchanged between 1942 and 1961, is supposed to incorporate an adjustment for fineness variation between operations. Assays of bars made entirely from gold mined on leased ground show the extent of fineness variations in the deposit within a creek. Operations on Hunker Creek provide an outstanding example of the manner in which fineness variation influences both estimates and recovery figures. Fineness determinations of individual bars from leased, or lay ground on the creek have been obtained from 737 to 824, yet no change was made in the appropriate factor. In drilling, and so in estimating value, a fineness of 800 was assumed. The subject of fineness is examined more elaborately in my report of 27th January, 1961, on "The Effect of Variations in Bullion Fineness on the Evaluation of Gravels". On account of the practice of quoting production in terms of money instead of fine ounces, it is not always possible to determine the precise physical amount of gold recovered from an operation, on account of exchange variations. There is thus room for both bias and sampling errors within the actual recovery figures.

It has already been stated that there is good reason for considering the values from drill holes on an areal rather than volume basis, and for regarding variations in diameter of holes as sample errors, rather than attempting to correct them by weighting. If this procedure is followed, it is convenient to consider the actual weight in milligrams of gold dust recovered from each hole as a measure of the material present. This procedure removes any errors due to fineness variations from the estimating, although these may still be present in the recovery figures.

While the values in a single, specific hole are suspect, the combined value of a group of adjacent holes has, over a considerable period, provided a good criterion, in the vast majority of cases, on which to base a decision to dredge. The most convenient group of holes to consider is that presented by a line of holes drilled across a valley. An area involving over three miles of lower Sulphur Creek, which has been mined by Dredge 8, was selected for study. The average recovery of gold in terms of dollars per square yard of bedrock was calculated for each line of drill holes. Figures obtained show a well defined decrease in the value of the ground on successive downstream section lines. (see Graph I). Because it was decided to consider the values from drill holes as a group, rather than individually, the mean of the milligrams of gold recovered from all the holes was chosen as representative of the value of the group of holes. To minimize the effect of the very high values which occur occasionally, the geometric, rather than the arithmetic, mean was used. The logarithms of these means are plotted in Graph I for comparison with the values per square yard actually recovered. It will be noticed that, while the values per square yard show a definite trend as the creek is followed downstream, the milligram values do not. In fact, the logarithm of the geometric mean appears to be normally distributed. The successive recovery to estimate percentages for square yards of bedrock were not plotted, but they show a marked tendency to exceed 100% at the upstream end of the area examined, and to be below 100% at the downstream end. This substantiates the evidence from the "milligram" distribution that the estimated value tends to remain constant, in this instance, and in no way reflects the trend to be discovered in actual values.

Section lines 200 feet apart were drawn through the Granville Flat area of lower Dominion Creek, where Dredge 6 has been mining in recent years. These lines are much closer than the drill hole lines, which were widely spaced here. The average recovery of gold in terms of dollars (gold at $35 per ounce) per square yard was calculated for each line, and plotted on Graph II, to show any trends in a downstream direction. The effect of minor channels, which enter the area roughly at right angles to the section lines, is very apparent. It would appear that these minor water courses have introduced some of the gold into the area which has been dredged, and that the margins of the cut would bear investigation. This was suggested earlier when reference was made to the map of distribution of gold in the Granville area. Only those section lines on which mining has been completed were used in the construction of this graph. However, several further lines have been cut, but not yet completely mined. The averages obtained so far from these lines lie within the range of values usual for completed section lines. Thus, the general tendency for the values to fluctuate between fairly well defined limits of $2.00 and $3.00 per square yard may be expected to continue beyond the present position of the dredge to a point below the last side channel. The logarithms of the geometric means of milligrams recovered in drill hole lines across the direction of flow of the creek show a tendency to be normally distributed about a mean, much as they do in lower Sulphur Creek. Individual drill hole values do not reflect the position of the side channels, nor do they show any relation to actual gold dust recoveries which is at all apparent. Graph IV shows a comparison between the distribution of milligrams recovered in drilling three different areas.

From the above evidence, it appears that all that is provided by a group of drill holes is a threshold figure, which, if obtained, signifies that economic values exist. Indications of grade are, at best, generalities from which no precision should be expected. That very little precision is, in fact, received is well demonstrated by the recovery-to-estimate figures. Reference to the gross recovery-to-estimate percentages for 1961 shows that these figures lie between 106½% and 189½% for the five dredges operated in that year. It is pertinent here to examine other methods of estimating gross recoveries which have been developed where it is impossible to sample ahead, as in agriculture and fishing, for example.

Taylor has already pointed out that, without recourse to any maps or drill results, he is able to predict the actual recovery by exterpolating historical averages. Both for individual dredges and for the operation as a whole the estimates he made show a remarkable resemblance to the actual results obtained. For the five dredges, Nos. 6, 8, 9, 10, 11, for the period 1952 - 1961, the following table clearly indicates that this method, before refinement, came very close:

AU. @ $35.00 PER OZ.	ACTUAL ¢ PER CU. YD.	TAYLOR ¢ PER CU. YD.	PRE-SEASON ¢ PER CU. YD.
1952	43.8	40.9	39.1
1953	40.3	41.8	41.4
1954	41.7	41.4	39.3
1955	39.9	41.4	36.2
1956	43.8	41.2	33.7
1957	36.1	41.5	37.0
1958	35.4	40.9	38.0
1959	43.1	40.3	42.1
1960	44.5	40.5	35.1
1961	37.1	40.9	33.3
10 Year Av.	40.5	41.1	37.5

On the basis of 37,200,000 cubic yards actually dredged in the period, the overall results would be:

	ACTUAL	TAYLOR	PRE-SEASON
	$15,060,000	$15,289,000	$13,950,000
Difference from Actual:		+ $ 229,000	- $ 1,110,000
% Variation from Actual:		+ 1.5%	- 7.4%

In only two years did this method vary from the actual by more than 7%, and then only by 15% and 14% respectively.

An attempt has been made to refine this technique by substituting cumulative probabilities for the averages, and, based on this procedure, a forecast was made of the 1961 production from both individual dredges and from

all dredges taken together. The basic operations of the technique are outlined in Graph III. In an attempt to forecast expected production for all dredges for 1961, the actual figures for this amount for the period 1950-1960, inclusive, have been considered. In the upper curve, the probability that a given number of fine ounces, or less, will be produced is expressed graphically. Clearly, the steeper the curve, the greater is the probability of occurrence within any particular range. In the lower curve, the actual amount of slope has been plotted on the ordinate. The most probable value, and thus the best estimate, is that which occurs at the peak of this curve. From this, the best estimate of 1961 fine ounces to be produced is read as 41,800. The actual figure obtained was 42,955. The technique was applied to the individual dredges. The sum of the estimates for each dredge is 43,395 ounces. The closeness of these estimates is remarkable, but it must be realized they represent a purely statistical value, which must be modified in the light of any geological evidence. A comparison of the various estimates for 1961 production in fine ounces is given in the following table. All percentages are for the value of actual recovery to estimate.

	DREDGE NUMBERS					AVERAGE DIFFERENCE OF R/E
	NO. 6	NO. 8	NO. 9	NO. 10	NO. 11	FROM 100%
Actual Recovery In Ounces (R)	9,431	9,579	6,057	7,131	10,757	
Pre-Season Estimate From drill holes (E)	7,888	6,449	4,647	4,509	5,611	
R/E %	120	148	130	158	191	49.8%
Pre-Season Estimate For Budget	8,677	6,449	5,809	6,763	7,014	
R/E %	109	148	104	106	153	24%
Post- Season Estimate From drill holes	8,787	6,826	3,337	5,197	5,607	
R/E %	107	139	180	135	190	50%
Post-Season Estimate From drill holes, Using Plan Factors	11,400	8,200	3,660	6,500	7,050	
R/E %	83	116	165	110	152	25.4%
Estimate Based On Cumulative Probability of Historic Data	7,200	10,625	5,830	7,740	12,000	
R/E %	131	90	104	93	90	1.2%

Differences between pre- and post-season estimates based on drill hole values reflect the differences between yardages estimated and actually dug. This aspect of estimating is not considered here.

The estimate of the production to be expected from Dredge 6, made on the basis of cumulative probability, shows the effect of ignoring a geological feature. During the early part of the period for which data was considered, this dredge was in Sulphur Creek. Later it was below the confluence with Dominion Creek. Lower recoveries in Sulphur Creek are responsible for the low estimate for this dredge.

The lower curve of Graph III should be symmetrical, but it shows a pronounced positive skewness. This is interpreted as the effect of Dredge 11, which is located in Hunker Creek. The mode of deposition of gold in this creek was different from that in the other creeks now being dredged, in that Hunker Creek flows northward, while the others all flow southward. A similar effect would be expected from any dredge in Bonanza Creek.

APPLICATIONS TO SPECIFIC AREAS:

1. DOMINION CREEK, BELOW GOLD RUN CREEK:

The maps of the gold distribution in the Granville and lower Dominion Creek areas show that, in many instances, the higher grade pay streaks cut the edges of the old dredge cuts at high angles. Although there is no information on the form of the bedrock under the area which has not been dredged, the form, where known, is fairly regular, and from experience elsewhere in the camp, there is no reason to suppose large irregularities exist. If this is so, then mineable grade material may be expected within this area which has not yet been drilled. The extent and value of this material must remain a matter for conjecture. Should this be to the present position of Dominion Creek, then roughly forty million cubic yards at about 35 cents per cubic yard would be involved. This is in addition to the "Twelt-Peterson Tract", which lies at the mouth of Gold Run Creek, between the two old dredge cuts, and to the lower section of Gold Run Creek itself. These two areas contain another 20 million cubic yards, at least, and are probably of higher grade. Some drilling is planned for 1962 to investigate both the configuration of bedrock and the gold distribution.

2. MIDDLE DOMINION CREEK:

Below claim 125 in this area (see map of Operations on Middle Dominion Creek which is enclosed), the valley on bedrock swings into the right limit and is not discernable again from the drilling information. It appears that the channel of the creek has been swung towards the opposite bank by either a slide or thick deposit of muck. The valley on bedrock generally contains a valuable concentration of gold, so it is important to investigate the position of this channel fully. From the enclosed plan, it can be seen that Dredge 10 is presently working on what appears to be a bench. Values there are not good, and the operation is barely economic. It is hoped that drilling during 1962 will locate the correct bedrock channel, and that values will be found in it to justify the continuation of dredging in this area beyond the present estimate.

The proposed bench operation No. 16 is in the same general vicinity. Dredge 10 cut a section of ground of higher than average gold content just below the upstream continuation of the present

reserves of this bench. Gold for this enrichment probably came from the partial destruction of the bench by erosion, and it appears logical to suggest an extension of the limits of the reserves on what remains of the bench, so that the source of this enrichment is included. This could be effected by using the 855 foot bedrock contour as a limit, unless this is precluded by excessive mining costs.

PLANS FOR FUTURE WORK:

1. Clean-up information will be plotted on plans on a regular basis. Consideration is being given to a convenient method for the recording of size and colour of gold dust, on a systematic and regular basis.

2. Preparation of plans to show the distribution of gold values obtained from past clean-ups will continue. Part of this will be a special study of the recoveries obtained from the white channel gravels on Bonanza Creek. From this it is hoped to obtain information on which to base a better estimate of the contents of the remaining portion of the Jackson-Lovett bench.

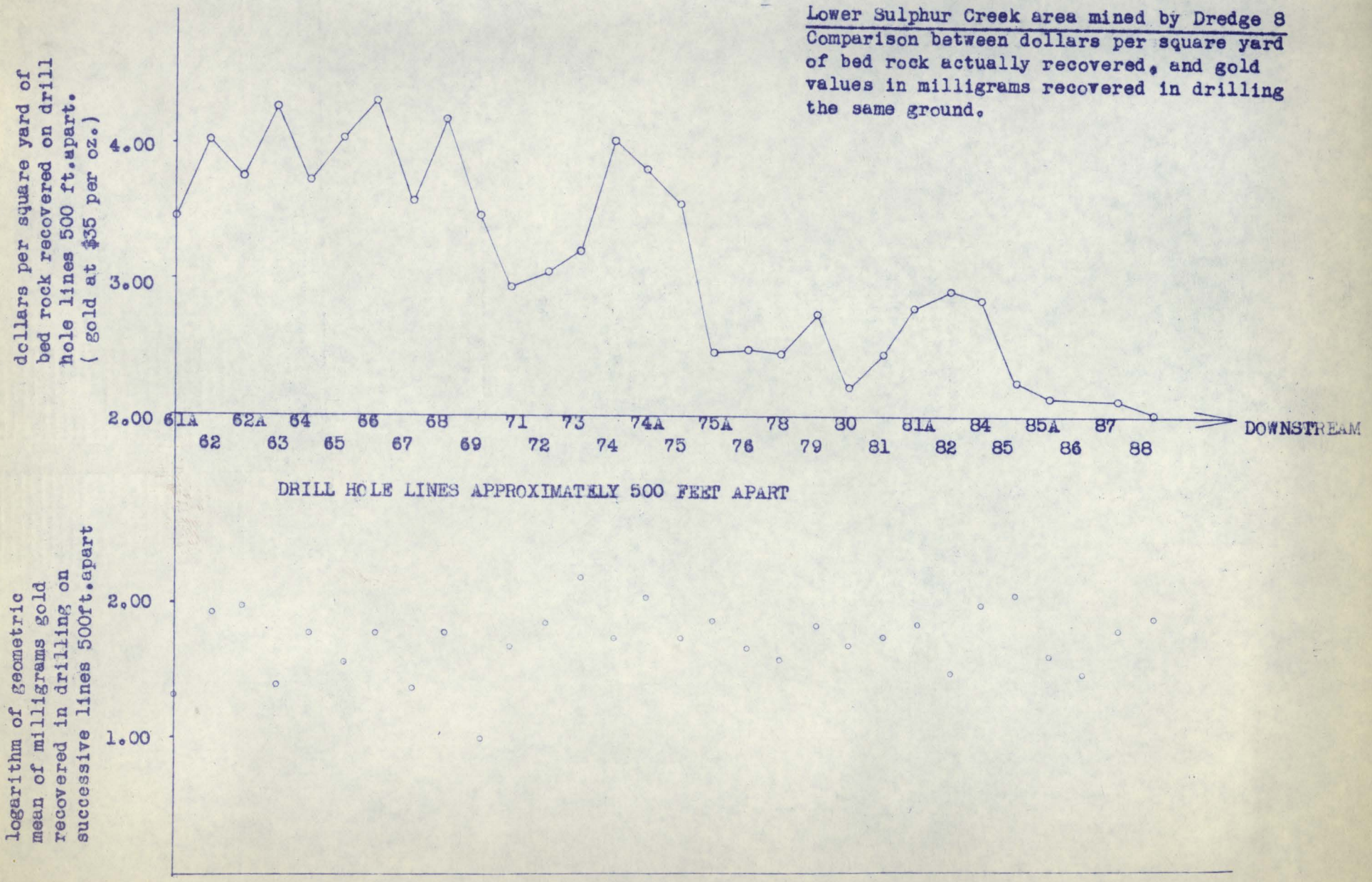
3. Estimating procedures will be kept under continuous review, in the hope that improvements will be found.

4. The possibility of using rotary, instead of churn, drills is to be studied. Should this prove possible, drilling speed should be increased and costs reduced.

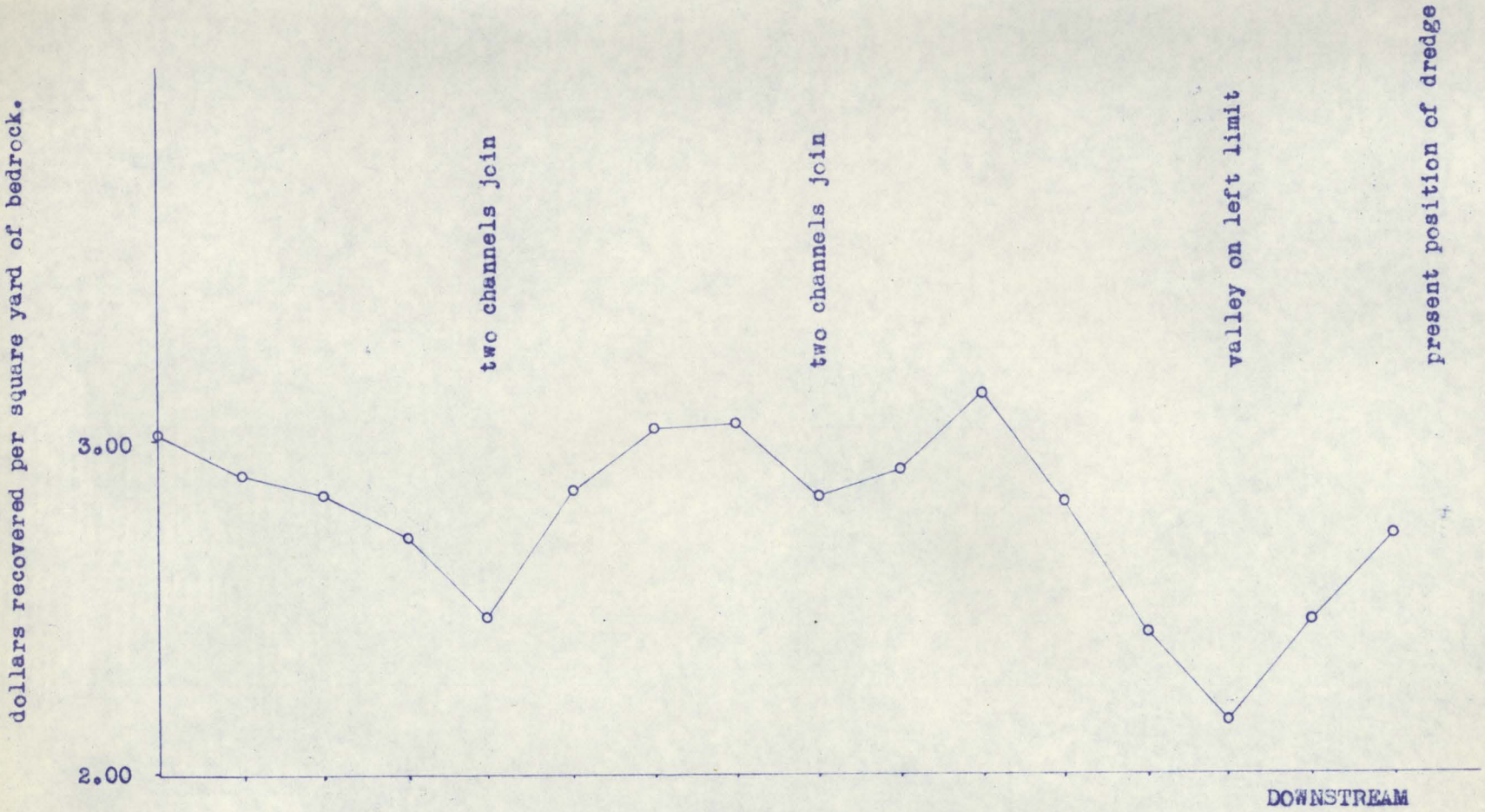
B. W. Hester,
Assistant Manager.

BWH:w

DAWSON, Y. T.
MARCH 21ST, 1962

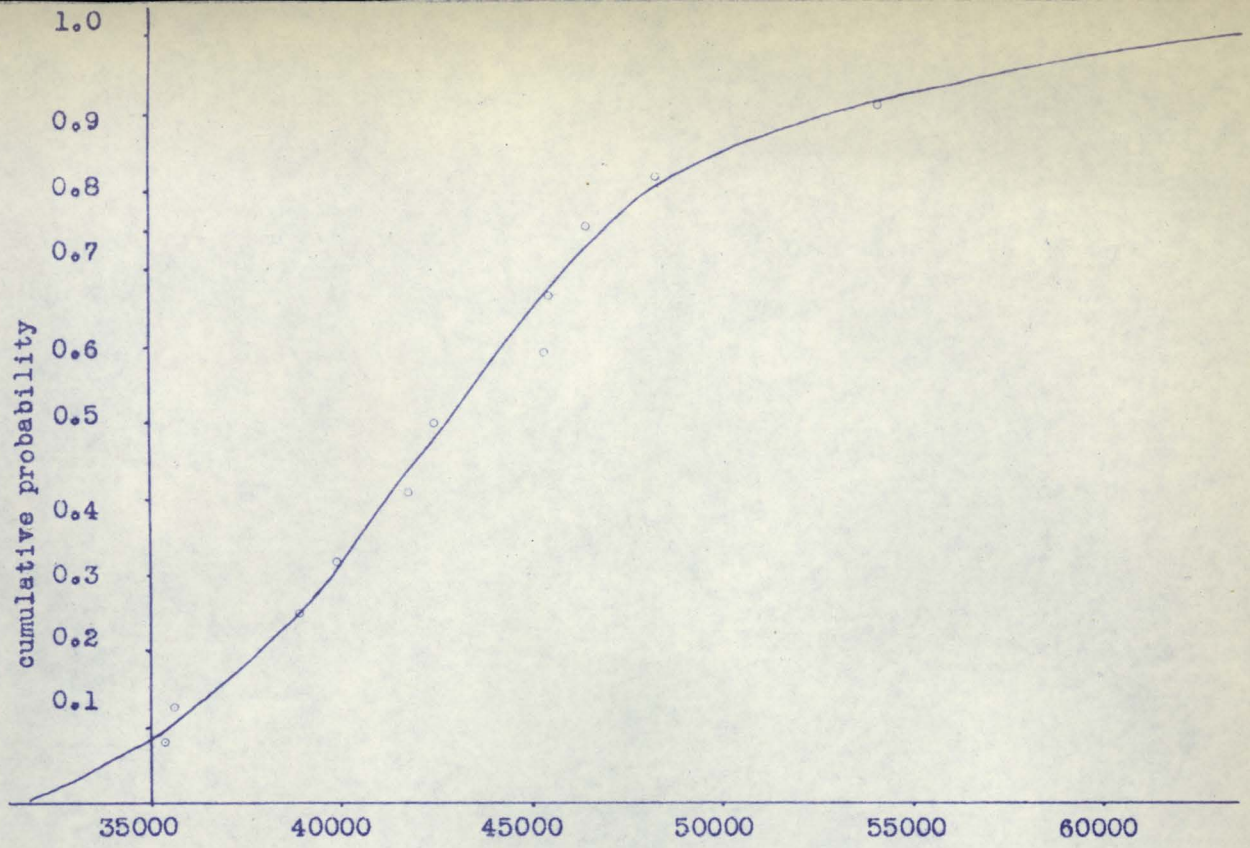

Lower Sulphur Creek area mined by Dredge 8
Comparison between dollars per square yard of bed rock actually recovered, and gold values in milligrams recovered in drilling the same ground.
dollars per square yard of bed rock recovered on drill hole lines 500 ft. apart. (gold at $35 per oz.)
4.00
3.00
2.00
61A 62 62A 63 64 65 66 67 68 69 71 72 73 74 74A 75 75A 76 78 79 80 81 81A 82 84 85 85A 86 87 88
DOWNSTREAM
DRILL HOLE LINES APPROXIMATELY 500 FEET APART
logarithm of geometric mean of milligrams gold recovered in drilling on successive lines 500ft. apart
2.00
1.00

GRAPH I

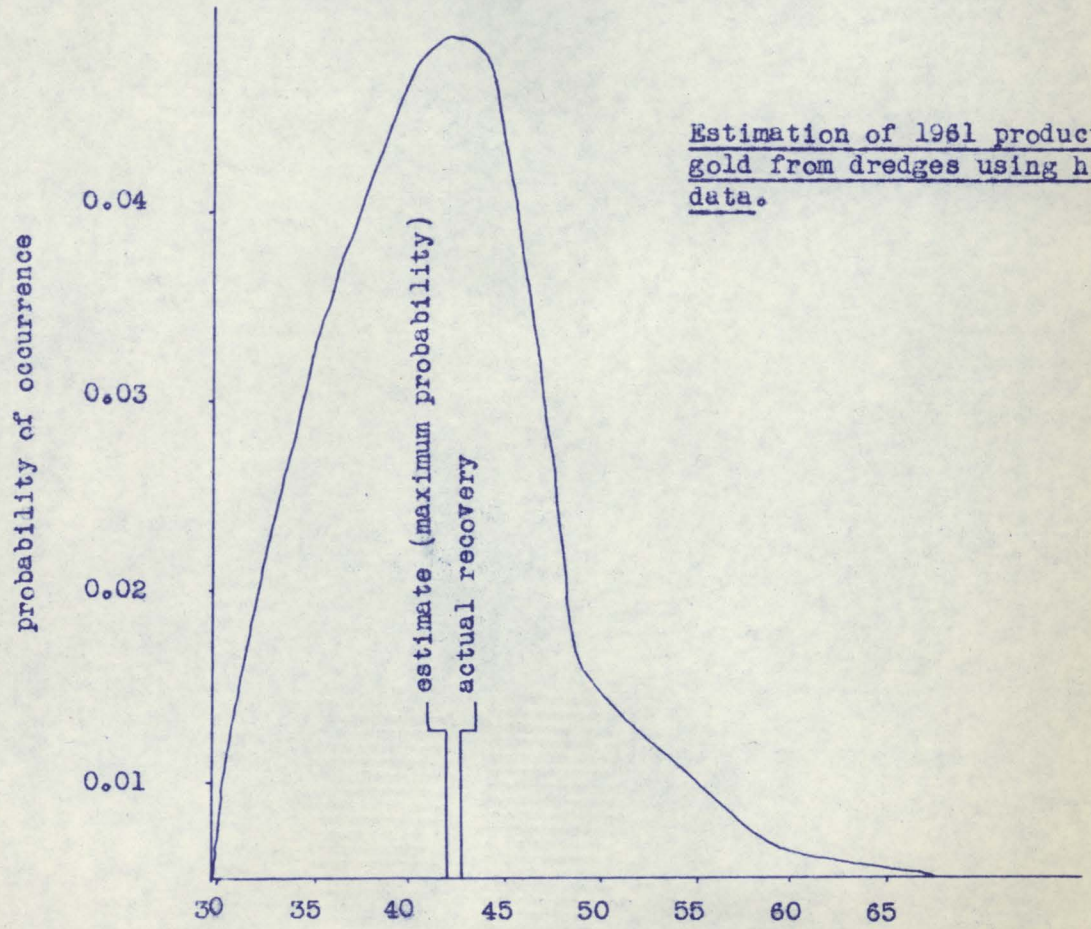


section lines through dredged ground 200 feet apart,
in area mined by Dredge 6, Granville area.

GRAPH II



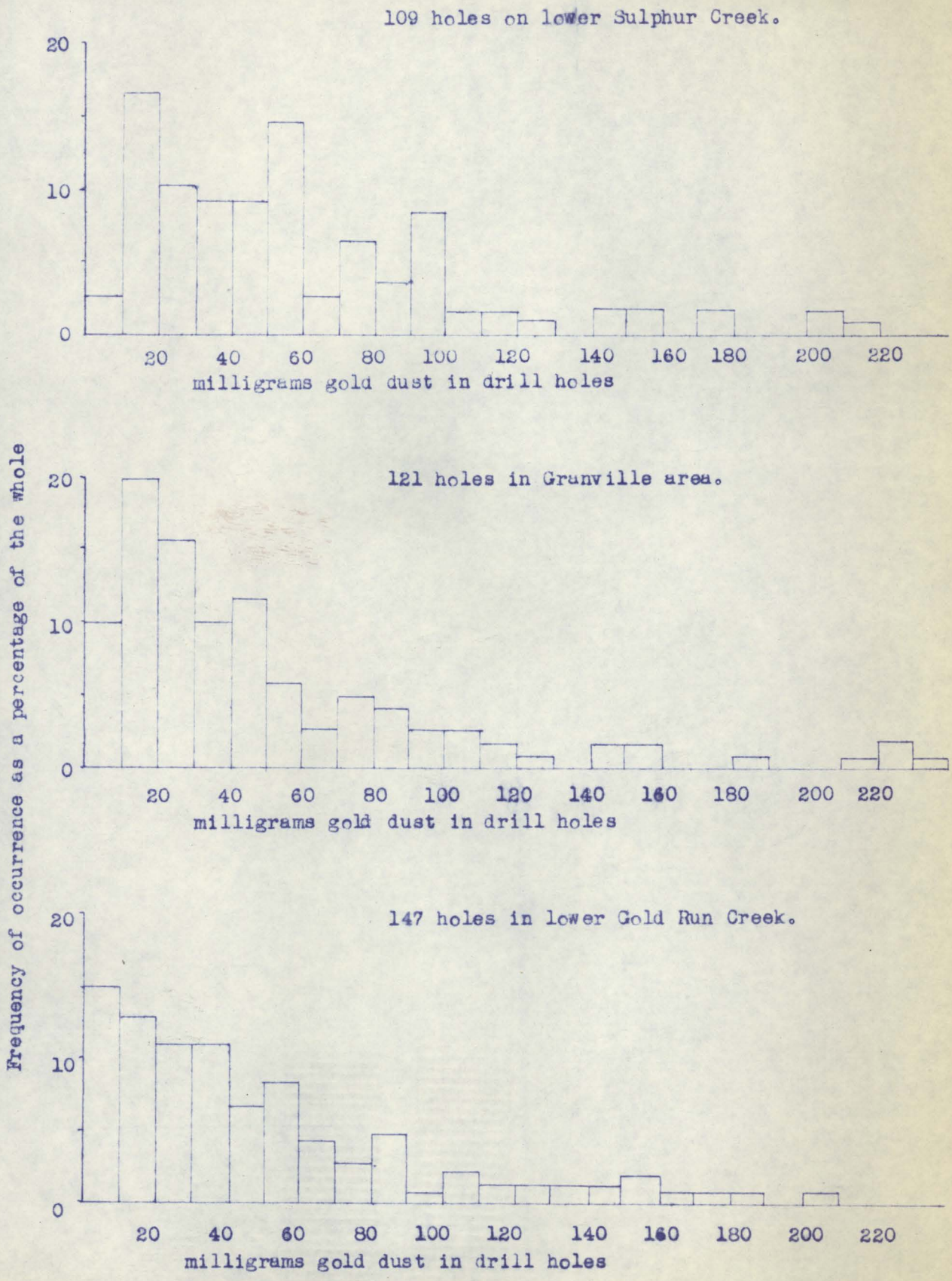
Total annual production of gold in fine ounces from dredges



Total annual production of gold in thousands of ounces from all dredges (6,8,9,10,& 11).

Estimation of 1961 production of gold from dredges using historical data.

GRAPH III


109 holes on lower Sulphur Creek.
121 holes in Granville area.
147 holes in lower Gold Run Creek.
Frequency of occurrence as a percentage of the whole
0
10
20
20 40 60 80 100 120 140 160 180 200 220
milligrams gold dust in drill holes

GRAPH LV

The Yukon Consolidated Gold Corporation Limited

INTER - OFFICE CORRESPONDENCE

Dawson, Y. T.
March 23, 1962.

From: W. D. TAYLOR

To: A. G. BARRETT

PRELIMINARY REPORT ON VARIOUS ASPECTS RELATING TO EXTENDING AND EXPANDING LIFE OF Y. C. G. C.

As requested by yourself, I have prepared projections of Profit and Loss, Cash Position, E.G.M.A. and Income Tax for the period 1962 - 1966, and similar statements for the period 1962 - 1965. These projections are not intended to indicate the future life of the Company, but are merely preliminary projections, based on areas you consider feasible to mine as a complex before the inclusion of new areas, some of which may extend the overall life of the Company by a number of years. In addition to these projections, I also submit other data and opinions which I feel must be considered before we extend the present known life.

SUMMARY AND CONCLUSIONS

1. It is imperative that we derive a method of closely estimating production. Large variances from estimates would make projections and optimum profit planning virtually impossible. Indications are that we can arrive at a better method than used in past estimates.

2. Fixed costs at approximately 46% of total Dawson costs are excessive. A cost reduction programme should be instituted, as there are apparent potential savings, not only in fixed, but in operating costs as well.

3. We must have a large scale operation (if profitable values exist) to efficiently absorb the fixed overhead and to obtain other operating economies. Indications are that we should double our present annual capacity to do this.

4. Management must take an active participation in our budgetary control and cost systems, and utilize them to pin point problem situations.

SUMMARY AND CONCLUSIONS (Cont'd.):

5. E.G.M.A. benefits will not be material unless we commence major ground preparation work. Deferred charges on the books of $1,381,000 must be deducted from costs for E.G.M.A. purposes. (See also 7.)

6. Income Tax deferrals now over, for same reason above (See also 7.)

7. A mining plan can be devised to give the optimum profit, maximum E.G.M.A. and minimum income tax for any given situation, but detailed programming would require the use of a computer and programmer.

8. I am of the opinion that the Lower Dominion and Gold Run Creeks should receive priority over all other areas, due to favorable preliminary information, in particular, the recent plotting by grade of clean-up recoveries on the fringes of this area.

PRODUCTION ESTIMATING:

The production figures supplied to me are drill hole values, adjusted by the % of overrun or underrun, averaged over the last seven years, with the exception of 1962, where present budget figures were used. I am of the opinion that a combination of historical and statistical methods of estimating grade might be more accurate.

It is important that we estimate our grade and yardage as closely as possible, since our projections at this stage show little profit. If we under-estimate our production, in the manner of the past number of years ($1,373,500 for period 1957 - 1961), then the result will be to pull in our economic limits. I do not wish to suggest the proper estimating procedures, but I would like to point out that with only the historical data in hand, and without recourse to drill hole information, I could have estimated grade much closer than the pre-season estimates over the last number of years. For a comparison of these methods over the period 1950 - 1961, inclusive, for the Dredges 6, 8, 9, 10 and 11, see Table II.

Approximately 72% of the total variance between estimated and actual production has arisen because of under-estimating yardage. I have reviewed the operating history of each dredge for the period 1950 to 1961, and some definite patterns arise in the length of mining season, yards dredged per hour and fine ounces recovered. This data is attached. (Table #12). For these five dredges, according to this data, we are under-estimating yardage by about 250,000 for 1962. I believe that control of yardage is not too difficult, and I feel that a further refinement of the historical method of estimating grade can be made by using probability statistical methods, as used by Hester, and which are described in some detail in his report of valuation procedures.

COST STUDIES:

I have reviewed in detail the makeup of our costs over the last twelve years. From this analysis and other data obtained, I have used the profit and loss projection 1962 - 1966 (Schedule 1) as a total cost feature to mine 20 million cubic yards over a five-year period. You will note I have changed the format of the profit and loss to segregate all Dawson costs into these few basic departments:

Mining	See Schedule (2) and (3)
Ground Preparation	(4) and (5)
Service Departments	(6)
Dawson General Overhead	(7)

All redistributed service accounts were taken out of the mining and ground preparation costs, in order that the basic cost of wages, supplies and other direct charges only are shown for all departments. Schedules 2 to 7 will indicate this.

On the basis of 20 million cubic yards mined in five years, our operating costs in cents per cubic yard then can be tabulated as follows:

Costs:	¢ Per Cu. Yd.	
Fixed:		
Deferred Charges on books Dec. 31/61	6.9	
Dawson Service Departments	10.6	
Dawson Overhead	5.9	
Head Office	2.2	
Depreciation	1.4	
Claims renewals and royalties	.4	27.4
Variable:		
Mining	10.5	
Ground Preparation	3.5	
Bullion	.7	14.7
Total Cost to Mine:		42.1

I definitely feel that if we were to double our present yardage, then our fixed costs in total dollar cost would not be increased by any appreciable amount, and these costs per cubic yard would drop from 27.4¢ to 20.0¢. Dawson Service Accounts, Dawson General Expense and Head Office Overhead (See Schedule "1") total approximately $750,000 for 1962. In the above table they represent 18.7¢ a cubic yard. Percentage-wise, Servicing and General Overhead represents 46% of the Dawson costs. An analysis of the period 1950 - 1961, inclusive, showed these costs to average 44% of Dawson costs, so that the relationship of these costs has remained steady over a span of 12 years.

COST STUDIES (Cont'd.):

In my opinion, fixed costs of this magnitude are out of all proportion to our total costs. We must make a concerted effort to reduce all costs, but as a first step, I would suggest we examine our service and overhead costs. I feel sure they could be reduced by 10% or more. See Graph #13, which shows the effect of a reduction of fixed costs. A key management tool in this respect is a budgetary cost control system.

BUDGETARY CONTROL SYSTEM:

The primary purpose of budgetary control is to plan all operations in order to secure the maximum profit from a minimum investment in working and fixed capital. Almost as important, in my opinion, is that a budget represents a standard with which to measure the accomplishment of the various activities of our operations. By using the budget in this manner, we receive three important benefits:

1. We instill the habit of analysis and advance planning.

2. Reviews at various levels provide opportunities not otherwise available to secure the best suggestions and counsel from the entire group.

3. If periodic comparative reports are issued, the unfavorable variances indicated will signal problem situations that need corrective action. This action can be taken before significant loss occurs, or if it is a result of external conditions beyond management control, the budget can be revised to keep it realistic.

In addition to the necessary accounting controls, detail budgets, etc., which I have instituted, certain other basic requirements must be met in order that such a system will give the results as outlined above. These are:

1. That we re-draft our organization chart to show who is responsible for controlling certain costs not presently allocated.

2. For a cost reduction feature, a work order system should be instituted, in order that all service work is done by authority of a work order. A standard charge-out rate would be used for each department.

3. Problem situations indicated by control charts, etc. must have immediate management inquiry and prompt corrective action, if needed.

I would emphasize that any budgetary cost control system is a management function which requires planning, co-ordination of activities, and constant focus on the objectives desired.

EMERGENCY GOLD MINING ASSISTANCE (See Schedule I)

The prime consideration to be kept in mind is that ground preparation costs are allowed in the year incurred, less ground preparation costs charged to mining in that year.

The foreseeable expected benefits from E.G.M.A. will not be material, because of the $1,381,000 of prepared ground already charged out as a cost for E.G.M.A. purposes, and now must be taken in as a credit to costs. Unless we can conduct a very large scale ground preparation operation (say, Jackson Hill), then we can expect very little E.G.M.A. assistance, as the deferred charges written off to mining will exceed by $200,000- $300,000 our actual stripping and thawing expense each year. Briefly, we have already reaped the most we can out of E.G.M.A. In a similar manner, we have also reaped the benefits of large income tax deferrals.

It is possible to phase operations for the best E.G.M.A. advantage. There are limitations to this phasing, such as:

(a) The inflexibility of thawing operations preclude mid-season changes in plans. We could cut down stripping costs, but to increase them in a hurry we would need to put in additional plants and also resort to top stripping by tractors. In any event, I think it would be quite difficult, say at mid-year, to raise costs by more than approximately $25,000, which would not be a material amount.

(b) We would need more new tractors if we were to have sufficient flexibility to mine new ground or to do extensive top stripping.

(c) Any additional placer operations would have to be within the Dawson Complex to qualify without being treated as a separate mine.

(d) Placer prospecting out of our present complex is a non-allowable cost.

At this stage of the study, it appears to me that E.G.M.A. can improve marginal prospects in only a minimum manner. However, phasing of necessary expenditures into one year instead of several can increase our E.G.M.A. costs in that year to a point where we would receive benefits. Subject to technical limitations, we should schedule our ground preparation work accordingly.

If we were to start a new large operation, like Lower Dominion, Jackson Hill, etc., we would have large E.G.M.A. recoveries in those years of ground preparation, but when this preparation work was completed, we would then be in the same position as now -- with a large deduction from costs for E.G.M.A. purposes, and therefore very little assistance.

EMERGENCY GOLD MINING ASSISTANCE (Cont'd.)

Phasing, both for expenses and fine ounces produced, for maximum E.G.M.A. benefits, as part of a planned program for an optimum profit per cubic yard mined, can be done by means of a mathematical formula. The indications at present show that the number of variables coming into this formula would mean a computer job, and I do not believe we are qualified to set up such a programme. It can be done, and by means of nomograms prepared for any specific situation, we could read off our estimated production, yards, etc. for the best profit position.

OPTIMUM PLANT PRODUCTION AND BREAK-EVEN POINT:

The ideal situation which every business should strive for is the maximum possible profit attainable from its present resources and plant capacity. This ideal will not be attained merely by increasing sales or digging more yardage. In every business there is an optimum capacity which, if exceeded, will not increase profits.

At present, because of our high fixed overhead, the break-even point for any new mining operation added to our present mining complex is that point where the added production equals the operating costs of wages, supplies and depreciation for stripping, thawing and mining the new operation, less beneficial effects from E.G.M.A. and tax depletion allowances. The question of arriving at both the break-even point and optimum production then revolves around the number of variables, as explained under E.G.M.A, above. Although a mathematical formula can be derived, no matter how many variables, the complexity of preparing same, the preparation of nomograms to fit all situations so we could readily choose the best mining plan, and the man hours required in the preparation of such a programme, lead me to believe that we are not qualified to go into this aspect without the aid of a computer. I believe such an operations research programme is necessary if we are to enlarge and take in all the economic ground available for an optimum profit. The aspects of this part of the study are continuing, including an investigation of the form in which such information should be presented for computer programming.

I will list a few specific variables to indicate the complexity of this problem:

1. The addition, deletion or phasing of one stripping or thawing plant affects the whole operation.

2. The addition, deletion or phasing of one dredge affects the whole operation.

3. There can be numerous combinations of 1, likewise 2, and various combinations of 1 and 2.

4. E.G.M.A. can only be applied on total costs of all operations so that imposed on No. 3 are the E.G.M.A. features.

OPTIMUM PLANT PRODUCTION & BREAK-EVEN POINT (Cont'd.)

5. Income Tax variables arise in the same manner as E.G.M.A., and are further complicated by the depletion allowance of $4.00 a fine ounce, which is a very important factor.

6. To be effective, all preceding points would have to fit into a long range programme.

FUTURE PROJECTIONS:

Projecting the future life of this Company for a number of years will have to be on the basis of a much larger annual yardage, since our present yardage and grades are too low in relation to the size of our fixed costs.

One of the large remaining dredging areas of which we have considerable knowledge is the Gold Run - Lower Dominion region. Additional information obtained in the last few weeks, from plotting past gold recoveries on the fringe of the lower Dominion area, indicates a possible large dredging area of about 35¢ a cubic yard. At this stage, of course, costs and recoveries for this area are speculative. If this ground proves up as far as values go, then we should consider two large dredges for this area to obtain any real advantage. I have tabulated what might be expected, on Table #14, which shows a comparison of your basic plan to one modified by the addition of two large dredges. I append also nomograms #13 and #15, which show dramatically the effect of an increased yardage on profits and fixed costs. Since the lower Dominion and Gold Run areas have a tremendous yardage potential, I believe our immediate attention should be focused on this area.

The following schedules, tables, graphs, etc. are appended:

EXHIBIT NO.	
1	Schedule of Profit and Loss, Income Tax, E.G.M.A. Recoveries and Cash Gain - Period 1962 - 1966.
1A	Schedule of Profit and Loss, Income Tax, E.G.M.A. Recoveries and Cash Gain - Period 1962 - 1965.
2	Schedule of Expenses - Dredging - 1962 - 1966.
3	Schedule of Expenses - Bench Mining - 1962 - 1966.
4	Schedule of Expenses - Stripping - 1962 - 1966.
5	Schedule of Expenses - Thawing - 1962 - 1966.
6	Schedule of Expenses - Service Departments - 1962 - 1966.
7	Schedule of Expenses - Dawson General Overhead - 1962 - 1966.
8	Schedule of Other Charges on Books, as at December 31, 1961.
9	Schedule of Estimate of Depreciation - 1962 - 1966.
10	Schedule of Gold Returns and Yardage - 1962 - 1966.
11	Table showing Historical Method, Pre-season and Actual Grade Recoveries - Years 1952 - 1961.

EXHIBIT NO.	
12,12A-B	Table showing Actual Yardage, Digging Hours and Recoveries - Years 1950 - 1961
13	Nomogram, Effect of reduction of fixed costs and increased yardage.
14	Table comparing Costs, Recoveries and Profits of Basic Plan (present capacity) to modified plan (addition of 2 large dredges).
15	Nomograms, showing possible profit potential of two large dredges, compared to present operating capacity.

Respectfully submitted,

Wm. D. Taylor

Wm. D. Taylor,
Chief Accountant.

WDT:w

1966 Projection

Summary of Profit and Loss and Cash Flow

(Excluding Exploration expenses and Investment Income)

	Ref. No.	1962	1963	1964	1965	1966	Total	Cents Per Cubic Yard
Operating Costs:								
Mining								
Dredges	2	$ 395,600	$ 431,800	$ 443,400	$ 336,400	$ 335,200		
Benches	3	36,200	36,200	36,800	24,100	24,700	$2,100,400	10.5
Ground Preparation								
Stripping	4		32,200	32,000	41,500	155,900		
Thawing	5		87,400	87,500	141,200	119,400		
Moving Dredge 12	5		900				698,000	3.5
Service Department Costs	6	422,700	422,700	422,700	422,700	422,700	2,113,500	10.6
Dawson General Overhead	7	237,000	237,000	237,000	237,000	237,000	1,185,000	5.9
Deferred as of December 31, 1961	8	445,900	355,000	327,100	168,000	85,600	1,381,600	6.9
Bullion expense (1.7% of Production)		25,700	29,200	34,000	21,300	24,600	134,800	.7
Royalties		12,000	3,000		5,000		20,000	.1
Claims renewals & expense		10,000	10,000	10,000	10,000	10,000	50,000	.3
Total Dawson Costs		1,585,100	1,645,400	1,630,500	1,407,200	1,415,100	7,683,300	38.5
Head Office Expense		90,000	90,000	90,000	90,000	90,000	450,000	2.2
Depreciation	9	59,000	59,000	59,000	59,000	59,000	295,000	1.4
Total Costs:		1,734,100	1,794,400	1,779,500	1,556,200	1,564,100	8,428,300	42.1
Revenue:								
Gold Returns	10	1,494,700	1,717,200	1,998,500	1,266,100	1,660,900	8,137,400	40.8
Lay Productions		15,000	15,000	15,000	15,000	15,000	75,000	.4
Power and Sundry		50,000	50,000	50,000	50,000	50,000	250,000	1.1
		1,559,700	1,782,200	2,063,500	1,331,100	1,725,900	8,462,400	42.3
Profit or (Loss) before E.G.M.A. and Income Taxes		(174,400)	(12,200)	284,000	(225,100)	161,800	34,100	.2
E.G.M.A. Assistance		190,000	90,300		114,800		395,100	
Profit or (Loss) before Provision for Taxes		15,600	78,100	284,000	(110,300)	161,800	429,200	
Provision for Taxes on Income		10,600	31,200	206,400	31,700	163,500	443,400	
Net Profit or (Loss) for the period		$ 5,000	$ 46,900	$ 77,600	$ (142,000)	$ (1,700)	$ (14,200)	
Cash Gain for period							$1,662,400	

Summary of Profit or Loss Finish in 1965 with Present Reserves

(Excluding Exploration Expenses and Investment Income)

	1962	1963	1964	1965	Total
Operating Costs					
Mining					
Dredges	$ 395,600	$ 431,800	$ 363,400	$ 283,400	$1,474,200
Benches	36,200	36,200	36,800	24,100	133,300
Ground Preparation					
Stripping				111,900	111,900
Thawing				228,900	228,900
Moving Dredge 12				900	900
Service Department Costs	422,700	422,700	422,700	422,700	1,690,800
Dawson General Overhead	237,000	237,000	237,000	237,000	948,000
Deferred as of Dec. 31, 1961	445,000	445,000	245,800	245,800	1,381,600
Bullion Expense (1.7% of Production)	25,700	35,000	31,000	21,400	113,100
Royalties	12,000	3,000		5,000	20,000
Claims Renewals & Expense	10,000	10,000	10,000	10,000	40,000
Total Dawson Costs	1,584,200	1,620,700	1,346,700	1,591,100	6,142,700
Head Office Expense	90,000	90,000	90,000	90,000	360,000
Depreciation	73,800	73,800	73,700	73,700	295,000
Total Costs:	1,748,000	1,784,500	1,510,400	1,754,800	6,797,700
Revenue:					
Gold Returns	1,494,700	2,061,600	1,823,500	1,121,100	6,500,900
Lay Production	15,000	15,000	15,000	15,000	60,000
Power & Sundry	50,000	50,000	50,000	50,000	200,000
	1,559,700	2,126,600	1,888,500	1,186,100	6,760,900
Profit or (Loss) before E.C.M.A. & Income Taxes	(188,300)	342,100	378,100	(568,700)	(36,800)
E.C.M.A. Assistance	196,000			119,000	315,000
Profit or (Loss) before Provision for Taxes	7,700	342,100	378,100	(449,700)	278,200
Provision for Taxes on Income	41,500	184,000	204,200	14,600	444,300
Net Profit or (Loss) for the period	$ (33,800)	$ 158,100	$ 173,900	$ (464,300)	$ (166,100)
Cash Gain for period					$1,510,500

1966 PROJECTION

EXPENSES–DREDGING 1962 – 1966

Dredge 6	1962	1963	1964	1965	1966
Wages	$60,400	$60,400	$62,200	$62,200	$64,000
Major Replacements	14,400	14,400	14,800	14,800	15,200
Supplies	7,900	8,000	8,000	8,000	8,000
Utility Credits	(300)	(300)	(300)	(300)	(300)
	82,400	82,500	84,700	84,700	86,900
Dredge 8					
Wages	61,600	61,600	63,400	63,400	65,300
Major Replacements	13,300	13,300	13,700	13,700	14,100
Supplies	7,300	7,300	7,300	7,300	7,300
	82,200	82,200	84,400	84,400	86,700
Dredge 9					
Wages	56,000	56,000	57,700	57,700	59,400
Major Replacements	9,900	10,000	10,300	10,300	10,600
Supplies	5,200	5,200	5,200	5,200	5,200
	71,100	71,200	73,200	73,200	75,200
Dredge 10					
Wages	58,600	58,600	60,300		
Major Replacements	12,000	12,000	12,400		
Supplies	7,300	7,300	7,300		
	77,900	77,900	80,000		
Dredge 11					
Wages	62,300	62,300	64,100	64,100	66,000
Major Replacements	11,600	11,600	11,900	11,900	12,300
Supplies	8,100	8,100	8,100	8,100	8,100
	82,000	82,000	84,100	84,100	86,400
Dredge 12					
Wages		30,000	30,900	30,900	
Major Replacements		3,500	3,600	3,600	
Supplies		2,500	2,500	2,500	
		36,000	37,000	37,000	
ALL DREDGES TOTAL:	$395,600	$431,800	$443,400	$363,400	$335,200

1966 PROJECTION

OPERATIONS 15 - 16 - 17 (Pt.)

	1962	1963	1964	1965	1966
Wages	$20,500	$20,500	$21,100	$21,100	$21,700
Supplies	2,000	2,000	2,000	2,000	2,000
Other (Incl. Equip. rental to 1964)	13,700	13,700	13,700	1,000	1,000
	$36,200	$36,200	$36,800	$24,100	$24,700

1966 PROJECTION

STRIPPING EXPENSES

		1962	1963	1964	1965
# 6	Wages		$ 36,800		
	Supplies		600		
	Other		100		
			37,500		
# 8	Wages		44,700	$44,300	
	Supplies		600	600	
	Other		100	100	
			45,400	45,000	
# 9	Wages	$15,200			
	Supplies	300			
	Other	100			
		15,600			
# 11	Minor amount included in Thawing.				
# 12	Wages	$30,000			
	Supplies	600			
	Other	100			
		$30,700			
Benches:	Wages	21,300	21,100	21,100	21,100
	Supplies	600	600	600	600
	Other	100	100	100	100
		22,000	21,800	21,800	21,800
TOTAL:		$68,300	$104,700	$66,800	$21,800

1966 PROJECTION

THAWING & MOVING DREDGE 12 EXPENSES

		1962	1963	1964	1965
# 6	Wages	$ 51,000		$50,700	
	Supplies	1,500		1,500	
	Other	300		300	
		52,800		52,500	
#8	Wages				$37,200
	Supplies				800
	Other				200
					38,200
#9	Wages	3,400	$ 51,600		
	Supplies	500	1,200		
	Other		300		
		3,900	53,100		
#10	Wages	52,600			
	Supplies	1,500			
	Other	300			
		54,400			
#11	Wages	58,200	54,700		
	Supplies	1,200	1,200		
	Other	300	300		
		59,700	56,200		
#12	Wages	30,600	31,700		
	Supplies	1,000	1,000		
	Other	200	200		
		31,800	32,900		
TOTAL:		$202,600	$142,200	$52,500	$38,200

Moving Dredge 12

Wages	$ 800
Supplies	100
	$ 900

1966 PROJECTION

1962 SERVICE ACCOUNTS

	WAGES	SUPPLIES	OTHER	BOARD DEDUCTIONS	TOTAL
Power	$ 71,400	$ 4,200	($300)		$ 75,300
Garage	37,200	2,800			40,000
Tractors		50,100	400		50,500
Trucking		12,200	800		13,000
Pickups		11,300	800		12,100
Cars		1,700	400		2,100
Transportation Labour	44,200				44,200
Machine Shop	63,600	2,400	500		66,500
Gas House	6,000	1,600	200		7,800
Electric Shop	12,900	300			13,200
Engineering	15,200	500			15,700
Gold Room	15,400	900	200		16,500
Pole Line	18,500	300			18,800
Mess, Camp & Laundry	70,300	65,000	700	($89,000)	47,000
Grand Total Service Accounts	$354,700	$153,300	$3,700	($89,000)	$422,700

1966 PROJECTION

1962 GENERAL OVERHEAD

	Wages	Supplies	Other	Refunds	Net
Supervision	$ 64,500				$ 64,500
Management	18,200	$ 500			18,700
Offices	28,600	2,800	$ 1,100	($5,100)	27,400
Warehouse	15,500	400			15,900
Yards & Buildings	2,600	1,200	600	(3,700)	700
Government Roads	1,900	400		*(15,000)	(12,700)
School Bus			4,000	(2,600)	1,400
Vancouver Purchasing Office		100	4,100		4,200
Doctor and Hospital			10,000		10,000
Fire Insurance			22,000		22,000
Other Insurance			700		700
Scavenger			1,700		1,700
Unemployment Insurance			7,500		7,500
Telegrams and Telephone			3,300		3,300
Licenses and Permits			500		500
Property Taxes			35,500		35,500
Sick Leave			5,000		5,000
Motion Pictures			700		700
Bank Charges & Loan Interest			3,000		3,000
Legal (Dawson only)			2,000		2,000
Compensation Insurance			24,300		24,300
Misc. Donations, etc.			700		700
	$131,300	$5,400	$126,700	($26,400)	$237,000

* Refunds – covers service costs in addition.

1966 PROJECTION

OTHER CHARGES ON BOOKS AS AT DECEMBER 31, 1961

	TOTAL 31/12/61	1962	1963	1964	1965	1966
Deferred Stripping	$ 882,000	$225,900	$229,000	$249,000	$144,400	$ 33,700
Deferred Thawing	480,600	216,200	122,100	74,300	19,800	48,200
Deferred #16 Mining	12,000	2,400	2,400	2,400	2,400	2,400
Moving #9 Buildings	5,600	1,100	1,200	1,100	1,100	1,100
Moving #12 Dredge	1,400	300	300	300	300	200
TOTAL:	$1,381,600	$445,900	$355,000	$327,100	$168,000	$85,600

1966 PROJECTION

DEPRECIATION

			1962	1963	1964	1965	1966
Net Book Value of Assets, as per Balance Sheet December 31, 1961		$225,325					
Add:							
Purchase New Cat. 1962	$45,000						
Vehicles - 1962	25,000	70,000					
		$295,325					
Amortized to 1966 (say)			$59,000	$59,000	$59,000	$59,000	$59,000

GOLD RETURNS

	1962		1963		1964		1965		1966	
	Cu. Yds.	Value	Cu. Yds.	Value	Cu. Yds.	Value	Cu. Yds.	Value	Cu. Yds.	Value
# 6	862,900	$ 292,800	950,000	$ 301,300	950,000	$ 321,100	950,000	$ 258,300	950,000	$ 313,800
# 8	800,300	234,000	850,000	259,400	850,000	270,900	850,000	220,300	850,000	488,100
# 9	472,000	219,900	450,000	214,600	450,000	277,800	450,000	164,800	450,000	164,600
# 10	839,200	205,200	850,000	327,900	850,000	353,100				
# 11	783,700	305,400	850,000	175,000	850,000	175,000	850,000	175,000	900,000	519,400
# 12			269,200	264,000	269,200	425,600	269,200	272,700		
Benches	244,800	237,400	250,000	175,000	250,000	175,000	250,000	175,000	250,000	175,000
TOTAL YARDAGE	4,002,900		4,469,200		4,469,200		3,619,200		3,400,000	
TOTAL PRODUCTION		$1,494,700		$1,717,200		$1,998,500		$1,266,100		$1,660,900
Fine Ozs.		42,700		49,060		47,100		36,170		47,450

Comparison of Taylor Historical Method
Of Estimating Grade to Pre-Season Estimate

Years 1952 - 1961

For Dredges 6 - 8 - 9 - 10 - 11 Considered as one unit

All data at $35.00 fine oz.

	Actual	Taylor	Pre-Season
1952	43.8	40.9	39.1
1953	40.3	41.8	41.4
1954	41.7	41.4	39.3
1955	39.9	41.4	36.2
1956	43.8	41.2	33.7
1957	36.1	41.5	37.0
1958	35.4	40.9	38.0
1959	43.1	40.3	42.1
1960	44.5	40.5	35.1
1961	37.1	40.9	33.3
Ten Year Average	40.5	41.1	37.5

On the basis of 37,200,000 cubic yards actually dredged in this period, the overall results would be:

Actual	Taylor	Pre-Season
$15,060,000	$15,289,000	$13,950,000
Difference from Actual:	+ 229,000	- 1,110,000
% Variation from Actual	+ 1.5%	- 7.4%

In only 2 years did my method vary from the Actual by more than 7%, and then only by 15% and 14% respectively. (1957, 1958)

(1)

ACTUAL YARDAGE, DIGGING HOURS, AND RECOVERIES

PERIOD 1950 - 1961, INCLUSIVE

Unit	Year	Total Cu. Yards Dredged	Total Dredging Hours	Cu. Yards Dredged Per Hour	Total Fine Oz. Recovered	¢ Per Cu. Yard Recovered
6	1950	727,206	3,852	189	6,322	30.4
	1951	708,199	3,531	201	3,139	15.5
	1952	840,074	3,923	214	5,059	21.1
	1953	700,069	3,552	197	4,535	22.7
	1954	900,768	4,433	203	6,980	27.1
	1955	484,805	2,476	196	2,651	19.1
	1956	789,122	3,610	219	7,429	32.9
	1957	1,139,803	4,481	254	7,704	23.7
	1958	1,100,585	4,400	250	6,965	22.1
	1959	1,019,644	4,378	233	8,037	27.6
	1960	1,115,643	4,585	243	9,557	30.0
	1961	983,885	4,061	242	9,431	33.5
1950-1961 Total			47,282	2,641	77,809	305.7
1950-1961 Average			3,940	244	6,484	25.5
			(2)	(3)		
8	1950	821,630	4,043	203	12,747	54.3
	1951	738,509	4,216	175	11,726	55.6
	1952	735,086	4,377	168	12,510	59.6
	1953	565,162	4,039	140	9,624	59.6
	1954	731,082	4,458	164	13,423	64.3
	1955	724,706	4,154	174	10,395	50.2
	1956	677,145	3,998	169	8,417	43.5
	1957	947,278	4,336	218	11,516	42.5
	1958	749,377	3,719	201	9,991	46.7
	1959	789,578	4,015	197	8,957	39.7
	1960	892,749	4,225	211	8,565	33.6
	1961	922,380	4,162	222	9,579	36.3
1950-1961 Total			49,742	2,242	127,450	585.9
1950-1961 Average			4,145	210	10,621	48.8
			(2)	(3)		

NOTES:

(1) Recoveries at $35.00 per Fine Ounce.
(2) Average dredging hours over 12 years to take in seasonal weather factor.
(3) Average cubic yards per hour for period 1957 - 1961, inclusive only on account of decided visual improvement.

Other averages over 12 years.

(1)

ACTUAL YARDAGE, DIGGING HOURS, AND RECOVERIES

Period 1950 - 1961 Inclusive

Unit	Year	Total Cu. Yards Dredged	Total Dredging Hours	Cu. Yards Dredged Per Hour	Total Fine Oz. Recovered	¢ Per Cu. Yard Recovered
9	1950	561,191	4,112	136	6,799	42.4
	1951	550,873	4,259	129	5,948	37.8
	1952	612,044	4,605	133	7,746	44.3
	1953	581,223	4,196	139	6,038	36.4
	1954	552,056	4,200	131	4,725	30.0
	1955	565,986	4,236	134	5,085	31.4
	1956	522,520	4,097	127	9,601	64.3
	1957	546,864	4,362	125	7,832	50.1
	1958	559,506	4,261	131	5,291	33.1
	1959	430,418	4,081	105	4,984	40.5
	1960	444,070	4,200	106	4,951	39.0
	1961	336,153	4,156	81	6,037	63.1
1950 - 1961 Total			50,765	1,477	75,057	512.4
1950 - 1961 Average			4,230 (2)	110 (3)	6,255	42.7
10	1950	745,704	4,089	182	8,533	40.2
	1951	806,054	4,175	193	8,073	35.1
	1952	843,802	4,463	189	10,603	44.0
	1953	688,122	4,278	161	5,461	27.8
	1954	649,601	4,475	145	5,832	31.4
	1955	558,125	4,173	134	5,282	33.1
	1956	583,587	4,087	94	5,187	29.1
	1957	887,980	4,558	195	6,847	27.0
	1958	772,014	4,528	170	7,664	34.7
	1959	745,244	4,246	176	10,096	47.4
	1960	915,196	4,628	198	12,799	48.9
	1961	911,591	3,996	228	7,131	27.4
1950 - 1961 Total			51,698	2,065	91,508	426.1
1950 - 1961 Average			4,308 (2)	193 (3)	7,626	35.5

Notes:
(1) Recoveries at $35.00 per fine oz.
(2) Average dredging hours over 12 years to take in seasonal weather factor.
(3) Average Cu. Yds. per hour for period 1957 - 1961 inclusive only.
Other averages over 12 years.

ACTUAL YARDAGE, DIGGING HOURS AND RECOVERIES (1)

Period 1950 - 1961 Inclusive

Unit	Year	Total Cu. Yards Dredged	Total Dredging Hours	Cu. Yards Dredged Per Hour	Total Fine Oz. Recovered	¢ Per Cu. Yard Recovered
11	1950	790,295	4,138	191	10,863	48.1
	1951	813,331	4,334	188	10,848	46.7
	1952	835,564	4,504	186	12,257	51.3
	1953	527,282	4,138	127	9,610	63.8
	1954	716,016	4,458	161	11,395	55.7
	1955	777,225	4,117	189	11,913	53.6
	1956	741,148	4,142	179	10,165	48.0
	1957	860,721	4,463	193	11,309	46.0
	1958	910,764	4,283	213	11,472	44.1
	1959	769,810	3,837	201	14,293	65.0
	1960	912,208	4,464	204	18,294	70.2
	1961	887,013	4,179	212	10,757	42.4
1950 - 1961 Total			51,057	2,244	143,176	634.9
1950 - 1961 Average			4,255 (2)	205 (3)	11,931	52.9
All Units	1950	3,644,026	20,234	180	45,264	43.4
	1951	3,616,966	20,515	176	39,735	38.5
	1952	3,866,570	21,872	177	48,175	43.8
	1953	3,061,858	20,203	152	35,268	40.3
	1954	3,549,523	22,024	161	42,355	41.7
	1955	3,110,847	19,158	162	35,325	39.9
	1956	3,113,322	19,934	156	38,799	43.8
	1957	4,382,646	22,200	197	45,209	36.1
	1958	4,092,246	21,191	193	41,383	35.4
	1959	3,754,694	20,557	183	46,367	43.1
	1960	4,279,866	22,102	194	54,166	44.5
	1961	4,041,022	20,556	197	42,955	37.1
1950 - 1961 Total			250,546	2,128	515,001	487.6
1950 - 1961 Average			20,879 (2)	193 (3)	42,900	40.6

Notes:
(1) Recoveries at $35.00 per Fine Oz.
(2) Average dredging hours over 12 years to take in seasonal weather factor.
(3) Average Cu. Yards per hour for period 1957 - 1961 inclusive only on account of decided Visual improvements.
Other averages over 12 years.

Effect on costs of doubling yardage at various production volumes and the effect of reducing overhead 10%.

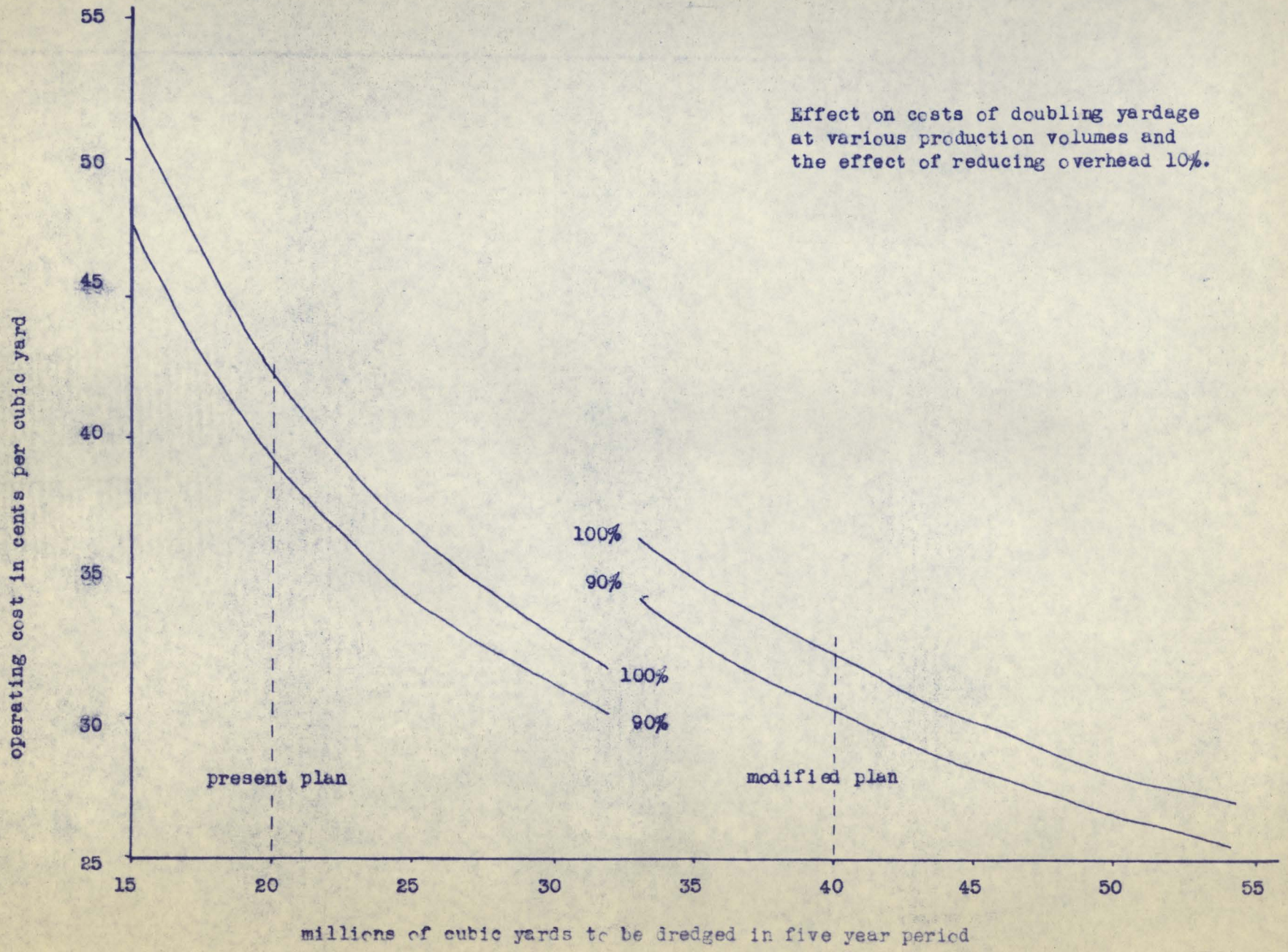


Exhibit 13

WDT
24/3/62

Comparison of Present Projection of 5 Years and 20 Million Cubic Yards to a Projection of 40 Million Cubic Yards for the same Period by the Addition of two large Dredges on Lower Dominion

		Basic Plan 20,000,000		Modified Plan Add 2 large Dredges 40,000,000	
	Cubic Yards Mined				
	Costs		¢ Cu. Yd.		¢ Cu. Yd.
	✱ Mining	$2,100,400	10.5	$ 3,200,000	8.0
	✱ Ground Preparation	698,000	3.5	(3) 1,400,000	3.5
(1)	✱ Service Departments	2,113,500	10.6	2,113,500	5.3
(1)	Dawson General Overhead	1,185,000	5.9	1,185,000	3.0
(1)	Deferred as at Dec. 31/61	1,381,600	6.9	1,381,600	3.5
	Bullion	134,800	.7	254,500	.6
(1)	Royalties	20,000	.1	20,000	
(1)	Claims renewals and expense	50,000	.3	50,000	.1
(1)	Head Office expense	450,000	2.2	450,000	1.1
	Depreciation	295,000	1.4	(2) 2,800,000	7.0
	Total Costs	8,428,300	42.1	12,854,600	32.1
	Revenue:				
	Gold Returns	8,137,400	40.8	(4)14,969,400	37.4
	Lay Production	75,000	.4	75,000	.2
	Power and Sundry	250,000	1.1	250,000	.6
	Total Revenue	8,462,400	42.3	15,294,400	38.2
	Net Profit before E.G.M.A. Income Tax, exploration and Investment income.	$ 34,100	.2	$ 2,439,800	6.1

✱ Represents Wages & Supplies, etc. but no redistributed service departments.

(1) An increase of 20 million yards will not raise these costs by any appreciable amount. These are fixed base costs.

(2) Capital Costs for 2 large 13+ Cu. ft. capacity boats on Lower Dominion estimated not to exceed $2,500,000.

(3) New Ground Preparation costs on Lower Dominion (Wages & Supplies only) projected at same cost per yard as basic plan.

(4) Grade for Lower Dominion estimated at 35¢ on basis of preliminary information.

Potential operating profits by doubling yardage with fixed costs and grade at various levels.

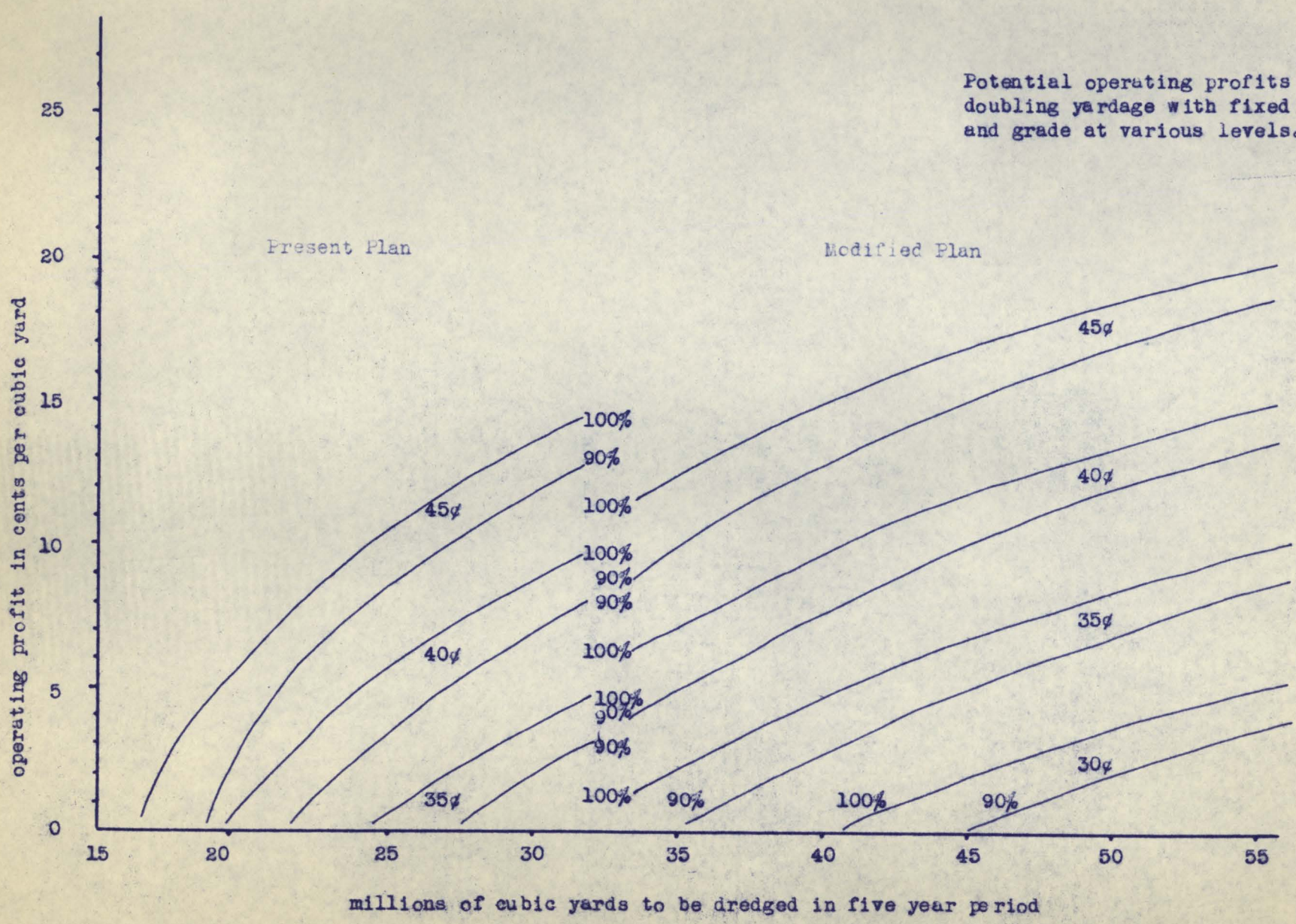


Exhibit 15

WDT
24/3/62

The Yukon Consolidated Gold Corporation, Limited

DAWSON, Y.T.
CANADA

13th August, 1956.

Mr. C.E. McLeod, Managing Director,
The Yukon Consolidated Gold Corporation, Limited,
1919 Marine Building,
Vancouver 1, B.C.

Dear Sir,

Re: Gold Run Creek Placers

A report on the Gold Run Creek Placers and their continuation on Dominion Creek towards the mouth of Sulphur Creek was made by A.M. Nordale in February of 1942.

Mr. Nordale considered three plans of operation and each indicated a fair operating profit but the margin was not considered enough to warrant preparation of the ground and its equipment for mining.

I have been asked to review the situation in the light of present day costs. For this purpose I have taken the figures directly from Mr. Nordale's report but have reduced the values from those based on gold at $38.50 (Canadian) per fine ounce to those based on gold at $35.00 (Canadian) per fine ounce. The following tabulation shows these figures. Plan No. 1155 shows the relative positions of the various blocks:

Block	Muck to be Stripped	Cubic Yards to be Dredged			Value Gold at $35. (Can.)	
		Muck	Dredging Section	Total	Total	¢ per Cu. Yd.
A	653,000	301,000	298,000	599,000	$214,000	35.7
B	1,100,000	472,000	708,000	1,180,000	447,600	38.0
C	411,000	173,000	239,000	412,000	109,100	26.5
D	141,000	62,000	113,000	175,000	30,900	17.7
E	209,000	95,000	191,000	286,000	78,200	27.3
F	832,000	315,000	870,000	1,185,000	586,300	49.5
G	274,000	142,000	297,000	439,000	282,700	64.4
H	384,000	159,000	871,000	1,030,000	519,900	50.4
I	487,000	220,000	1,169,000	1,389,000	600,800	43.8
Total	4,491,000	1,939,000	4,756,000	6,695,000	$2,869,500	42.9
Tailings			6,148,000	6,148,000	884,800	14.4
Total	4,491,000	1,939,000	10,904,000	12,843,000	$3,754,300	29.3
J	2,146,000	724,000	7,714,000	8,438,000	$1,858,900	22.0
K	848,000	279,000	2,780,000	3,059,000	709,000	23.2
L	781,000	300,000	2,583,000	2,883,000	1,024,400	35.7
Total	3,775,000	1,303,000	13,077,000	14,380,000	$3,592,300	24.9
Grand Total	8,266,000	3,242,000	23,981,000	27,223,000	$7,346,600	27.0

The area covered by Blocks "A" to "I" inclusive is that part of the creek which could be mined by a 5-3/4 cu. ft. dredge. In between these blocks is that part of the creek which was dug by Yukon Gold Company Dredge No. 6. According to the estimate made of the value of these tailings, they are too low grade to be redredged by a small dredge under present day costs and they have been excluded from the following tabulation which shows an estimate of the results of such an operation:

Cubic Yards to be Dredged	6,695,000
Average cubic yards dug annually	550,000
Number of years to complete dredging	12

Capital Expenditure

Claims purchases or royalties	$ 100,000
Ditch construction	100,000
Power Line construction	10,000
Dredge construction	400,000
Camp construction	20,000
Road construction	15,000
Unforeseen expense	45,000
Total	$ 690,000

Operating Costs

Stripping - 4,491,000 cu. yds. at .12¢	539,000
Thawing - 6,695,000 cu. yds. at .06¢	402,000
Dredging - 6,695,000 cu. yds. at .25¢	1,674,000
Total	$ 2,615,000

Total Expense	$ 3,305,000
Gross Value	2,869,500
Loss on Operation	$ 435,500

From the above it is obvious that a small dredge cannot be used.

Consideration was then given to the possibility of using one of our large dredges which can be operated at a much lower unit cost. To make this feasible such a boat would have to handle all of the available yardage. At first I thought the problem of ground preparation would prove too difficult but it does not appear to be so. An average of 550,000 cu. yds. of muck would have to be removed annually which would require 55,000 M.I.D. of water. This could be secured from the Sulphur-Australia Ditch and the old Dominion Ditch. The problem of thawing is only a matter of size and two ordinary thawing plants would be ample. The following tabulatioh gives an estimate of such an operation:

Size of Dredge - 16 cu. ft.	
Cu. Yds to be dredged	27,223,000
Average Annual Capacity	1,750,000
Number of years to complete dredging	15.5

Capital Expenditure

Claims purchases or royalties	100,000
Ditch construction	100,000
Power Line construction	10,000
Dredge construction	1,000,000
Camp construction	20,000
Roads	15,000
Unforeseen	95,000
Total	$ 1,340,000

Operating Costs

Stripping - 8,266,000 cu. yds. at .12¢	$ 992,000
Thawing -21,075,000 cu. yds. at .06¢	1,265,000
Dredging -27,223,000 cu. yds. at .10¢	2,722,000
Total	$ 4,979,000
Total Expense	$ 6,319,000
Gross Value	7,346,000
Profit before Taxes	$ 1,027,000

On the above plan mining would be started in Block "L" on Dominion Creek and end on Gold Run Creek.

Stripping could be started in 1957, thawing in 1959 and dredging in 1960.

It was suggested by Mr. Gloslie that it might prove advantageous to thaw and dredge all of the ground on Dominion Creek and to strip only the ground on Gold Run Creek. This idea has the obvious advantage of doing away with the need to remove the large tailings piles in order to get at the underlying muck. The gravels in this area are deep and the muck relatively shallow being only from eight to fourteen feet in depth over a large part of the area. The muck could be thawed with short points spaced at sixteen feet and the gravels with long points spaced at twenty five feet. Under this plan, stripping of Gold Run gravels could be started at once and given a much longer period of time to thaw out. The following tabulation gives my estimate of what such an operation might produce:

Block	Muck to be Stripped	Cubic Yards to be Dredged			Value Gold at $35. (Can.)	
		Muck	Dredging Section	Total	Total	¢ per Cu. Yd.
A	653,000	301,000	298,000	599,000	$ 214,000	35.7
B	1,100,000	472,000	708,000	1,180,000	447,600	38.0
C	411,000	173,000	239,000	412,000	109,100	26.5
D	141,000	62,000	113,000	175,000	30,900	17.7
E	209,000	95,000	191,000	286,000	78,200	27.3
F	832,000	315,000	870,000	1,185,000	586,300	49.5
G	274,000	142,000	297,000	439,000	282,700	64.4
H	384,000	159,000	871,000	1,030,000	519,900	50.4
I	487,000	220,000	1,169,000	1,389,000	600,800	43.8
Total	4,491,000	1,939,000	4,756,000	6,695,000	$2,869,500	42.9
Tailings	-	-	6,148,000	6,148,000	884,800	14.4
Total	4,491,000	1,939,000	10,904,000	12,843,000	$3,754,300	29.3
J	-	2,870,000	7,714,000	10,584,000	$1,858,900	17.6
K	-	1,127,000	2,780,000	3,907,000	709,000	20.2
L	-	1,081,000	2,583,000	3,664,000	1,024,400	28.0
Total	-	5,078,000	13,077,000	18,155,000	$3,592,300	19.8
Grand Total	4,491,000	7,017,000	23,981,000	30,998,000	$7,346,600	23.7

Size of Dredge - 16 cu. ft.

Cubic yards to be dredged (508,000 cu. yds. shrinkage)	30,490,000
Average annual capacity of dredge	1,750,000
Number of years to complete dredging	17.5

Capital Expenditure

Claims purchases or royalties	$ 100,000
Ditch construction	100,000
Power Line	10,000
Dredge construction	1,000,000
Camp construction	20,000
Roads	15,000
Unforeseen	95,000
Total	$ 1,340,000

Operating Expenses

Stripping - 4,491,000 cu. yds. at .12¢	$ 539,000
Thawing - 24,850,000 cu. yds. at .06¢	1,491,000
Dredging - 30,490,000 cu. yds. at .10¢	3,049,000
Total	$ 5,079,000

Total Expense	$ 6,419,000
Gross Value	7,346,000
Profit before Taxes	927,000

While the figures show a slight advantage in favour of stripping all ground I think the operating problems would be simpler in the latter scheme. In actual practice something between the two would be adopted. Where areas were relatively free of heavy tailings, the muck would be removed.

It is clear that no great profit can be expected from this operation but if it is decided to go ahead, it would keep the Dawson activities alive over a longer period. It would require a considerable outlay of cash which, in the past, has been the reason for not going ahead. The following figures give an estimate of the cash outlay required before a return can be expected:

Capital Expenditure	$ 1,340,000
Stripping (2 years)	132,000
Thawing (1 year)	120,000
Total	$ 1,592,000

Yours very truly,

W.H.S. McFarland,
Consulting Engineer.

WHSMcF:g

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ACCESSION _____ VOL 22 PAGE(S) 56
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