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NEEL PLACER.

Notes by G. M. Colvocoresses,
October, 1937.

This property is quite worthless. The reports by Slak and Morgan are rubbish and Vahrenkamps results proved to be entirely untrustworthy.

The samples taken after my report was made were located at points where it was claimed that the gravel would run $1.00 per yard or better. The results varied from 18¢ near bedrock to a trace, and I was informed that the average of the area sampled was less than 10¢ per yard, and this should have been at least four times as rich as the average of the entire deposit.

NEEL PLACER

Letter dated June 17th, 1935, from G. M. Colvocoresses.

Dear Sir:

As per telegraphic arrangement I accompanied Messrs. Berchert and Niles to the Néel Placers in Graham County, Arizona, and herewith submit a brief summary report which will later be followed by more details.

The Neel Placer holdings are located on the East bank of the Gila River and are said to comprise 2160 acres of unpatented placer mining claims, all in good standing.

These claims lie in a large area of alluvial plain formed by the Gila River and its tributaries at a time when these streams were overloaded and built up banks and benches of boulders, pebbles, and sand now largely cemented with lime and forming the Gila conglomerate, caliche, and gravel and sand banks. The bed-rock under the placer gravel is probably largely Gila conglomerate, into which it shades gradually, but some of the gravel may lie directly on the older volcanic rocks and more recently flows of basalt have cut through the gravel in places and elsewhere have flowed over them forming a capping.

The alluvial area surrounding the Gila River and including the conglomerate probably contains minute traces of gold throughout, but the country drained by the river and its tributaries has never been a gold producer of any importance and placer mines or deposits in this section are not mentioned either by the United States Geological Survey or the Arizona Bureau of Mines.

I could find no evidence on these claims of any old channel of the Gila River or Bonita and Spring Creeks, which might have permitted a concentration of values, but I did find certain lava flows in the vicinity of Bonita Creek and at some distance further to the South and East and these flows may have acted as riffles while the river was building up its banks and permitted the formation of bars in which some concentration of values may have

taken place and this in my judgment is the only possible reason which might account for commercially valuable placer ground in this section.

I could find few pebbles of quartz or other normally gold bearing rocks and no traces of iron sulphide, although iron oxide and jasper were noted. A few pans which were washed while we were on the property showed small colors of gold representing at most only a few cents per cubic yard, and on the face of my investigation I should be inclined to state that the property has no commerical value whatever.

However, I was furnished with a feport by F. H. Vahrenkamp, who is an engineer of long experience and who spent over three months on the property assisted by a dozen or more men and sinking a number of test pits which were visited. Vahrenkamp states very positively that the average value of the gravel sampled by him was in excess of $1.00 per yard at present prices of gold and a similar report came into my possession sometime ago made by a man named John Slak, but for good reasons I have never attached any importance to Slak's statements.

Near the camp and river some mining operations have previously been conducted on a very small scale and particularly at two points from which, according to Neel, a total of over 600 cubic yards of gravel was mined and yielded an average recovery also in excess of $1.00 per yard.

It therefore seems obvious that either the statements quoted above are absolutely incorrect or that there has actually been some concentration of values by the lava flows mentioned and that this may have resulted in the enrichment of a substantial portion of the bank in this vicinity, possibly amounting to several million yards.

Under all these circumstances it appears to me that before any definite conclusion is drawn regarding the Neel Placer and your future policy in respect to same it is proper and justifiable to carry out a preliminary sampling for the purposes of checking the statements of Vahrenkamp and Neel, and I have made this re-

commendation to Mr. Berchert, who estimates that considering the equipment and men which you have available the total cost of this work will be approximately $1,400.00.

In examining the pits and trenches on the property it did not appear that the bed-rock had ever been reached in any of this work and since it is almost invariably a fact that the values in any placer deposit are far larger in the vicinity of bed-rock and at any point above I have also recommended that two or three of the present pits or trenches should be deepened so as to reach bed-rock if this is possible and thus permit the sampling of the lower gravel which should certainly be more valuable than any material that has so far been accessible.

If the preliminary sampling as outlined above should give no satisfactory results I feel that you could abandon the property without danger of loss, but if any average value in excess of 50¢ per yard should be established then I think it will be in order to make a further investigation and endeavor to delimit the yardage in which similar values might be obtained.

The general conditions for operating this property are distinctly unfavorable. The gravel is to a large extent cemented and will have to be shaken up by explosives before mining. The Neel Placer Company owns no water rights and according to information obtained from the local water commissioner it will not be possible for them to obtain such rights in respect to any quantity of water sufficient to permit hydraulic operations. Moreover the grade of the river channel, which is given as only 14 feet to the mile, would not permit hydraulicking and especially the disposal of tailings or debris would be prohibitively expensive.

Dredging might be employed on certain portions of the ground if good values are found in the vicinity of the river and the low bench along its right bank, but the larger portion of the property will, in my opinion, have to be worked by mechanical means such as steam shovels or drag lines and the dirt treated in one or more washing plants for the recovery of the gold. Sufficient water for such procedure could probably be obtained at reasonable expense

and satisfactory means of stacking or storing the tailings could also be provided and therefore if any large body (say 20,000,000 yards or more) of gravel carrying 50¢ or better per yard really exists on this property the mining of same should be a profitable operation in spite of the generally unfavorable conditions.

The above will indicate my reasons for recommending the preliminary sampling and further conclusions and recommendations should be deferred until this work is completed.

Yours very truly,

(signed) G. M. Colvocoresses.

Notes Re: Neel Placer:

Assuming the lay of the bed rock to be as indicated from the surface and the statements of Neel and Vahrenkamp the lower terrace might have an average depth of about ten yards of gravel and contains about thirty acres which at 5,000 yards per acre to a depth of one yard represents a total of 1,500,000 cubic yards. The second terrace may be figured to have an area of sixty acres and an average depth of about twenty yards, equal to 6,000,000 cubic yards. The third or upper terrace comprises several hundred acres and the depth of the gravel may well exeeed thirty yards so that total yardage may run up to several hundred million, but the value of this material is practically unkown and almost certainly not commercial.

The black sand concentrate obtained from this property is said by Neel to amount to 200 pounds per cubic yard with a value of $12.00 per ton., at old price or better than $20.00 per ton at present price. This would reppesent a value of over $2.00 per yard in addition to the value in free gold figurdd at over $1.00 per yard and present total value of $3,000,000 which seems ridiculous. I do not think it probable that the black sand concentrate would amount to more than ten pounds per yard or would have anything like the quoted value.

The elevation at Safford is 3100 feet above sea level and at the Neel Placer about 3400 feet. The road distance between the two is twenty-two miles,, of which fifteen miles is on the paved highway going to Clifton.

The grade of the river according to C. A. Firth, the Water Commissioner at Safford, is 14' to the mile and therefore to gain a head of 200' (allowing for the slope of the flume) water for

hydraulicking on the Neel Placer would have to be taken out of the stream some twenty miles further up, which would be entirely out of the question. The fall of Bonita Creek is much more rapid, but there is only a little water to be obtained from this source so that the requirements for a washing plant could probably be best pumped from wells located on the property and near to the level.

In the Neel gravel there are few large boulders, but the boulders have a diameter of more than one foot, probably representing 10% of the total dirt and the cobbles, and pebbles with a diameter exceeding one inch, about 70% of the dirt, leaving 20% of the excavated material to be washed after passing through one inch screens. The great bulk of the gravel is cemented butthere is practically no clay.

The cost of Vahrenkamp's examination is said by Neel to have been about $7,500 (paid for by Judge Ainsworth) excluding any fee to Vahrenkamp who was working for a stock interest in the property. At that time (1930) Ainsworth applied for two water rights, one on the Gila River and one on Bonita, but these applications have since lapsed.

Neel says that the assessment work on these claims is all done and recorded for the current year.

The old lava (andesite?) bed rock noted along the river a short distance above the camp dips about 30 degrees to the west or northwest.

The present flow of the Gila River according to Firth is about 75 second feet, i. e. 3000 miners inches, which is a little more than normal for this time of year.(June)

The minimum flow is only 1000 inches, but these figures do not include the underflow which may be considerable.

The flow of Bonita is normally about 160" of which 80" have been filed on by the City of Safford. All surplus water in the Gila system has been appropriated by the Indian Service and a suit is now in court to determine the respective amounts of water whichshould be allotted to Safford and the Duncan Valley..

The United States Government plans to erect three more dams on the Gila River above Coolidge Dam, one of these will be located about four or five miles above Bonita and will be 225' high.

Any application for new water rights should be made to the State WaterrCommission in Phoenix, which would take the matter up with the Federal Authorities. There are some ranges above the Neel Placer which have established water rights that could probably be purchased for water for a washing plant might perhaps be taken out of wells without any special application or one of the placer claims might be converted into a millsite and limited rights acquired in this manner.

If good values are found in the lower bench a further sampling of the property might be accompanied by a geophysical survey to determine the contour of the bed rock.

The area between the lava flows near the camp which may reasonably have been enriched is approximately 20 acrea and if the depth of this gravel should prove to average ten yards it is possible that about 100,000,000 cubic yards might have such values as would be represented by the preliminary sampling now in progress.

Addresses in connection with this property are:

A. O. Smith Corporation, Milwaukee, Wis.

L. R. Smith, South Pasadena (present head of A.O. Smith Corp. Out West for health)

W. J. Zimmers, Attorney, Hotel Green, Pasadena.

Raymond Borchert and Harold Niles. In charge of field work H. S. Neel, 1174 South Ninth Street, Phoenix, (also operating a small mine or prospect in the White Tank Mountains.)

Supplementary to my report of June 17th 1935 on the Neel Placer I wish to submit the following data and opinion. This property appears to have been investigated principally by the late Judge Ainsworth and his Engineer, Mr. Vahrenkamp whose report is in your possession. I cannot agree with the findings or conclusions of Mr. Vahrenkamp's report nor with those contained in the report by Slak, of which I sent you copy.

GEOLOGY:

Without attempting to give details which could only be based upon a careful study I may say that all of the gravel of the Neel Placer appears to have been formed during the Quaternary Period., i. e. during the last one million years, and it results from the building up of benches of the Gila River and its tributary creeks and from the changing courses of these streams during intervals when their flow was temporarily dammed or altered by lava flows. The gravel appears to rest in part on a bed of Gila conglomerate formed during the late Tertiary or early Quaternary, and it may also rest in part upon the eruptive rocks of the Tertiary period, principally diorite, andesite, rhyolite, and basalt, some of which is to be noted near the camp and upon which the Gila conglomerate also was laid down prior to t the gravel.

From a practical standpoint it would appear to me most important to explore these gravel benches down to the bed rock where there would naturally be a concentration of gold values, but this procedure may only be justified in case there is a substantial value in gold found in the upper portions of the gravel pits.

During the up-building of the stream banks and benches

flows of lava continued from the then active volcanoes lying to the north and west of the property and these flows probably followed the courses of the gulches and streams filling them with flows of lava, one of which is noted near Bonita Creek and another appearsa mile away, i. e. about one-fourth of a mile southwest of the camp. It seems to me quite possible that these flows of lava acted as riffles and may have caused a local concentration of gold values responsible for the richer samples which are said to have been taken on the property. In places some of these laval flows have capped the gravel and protected it from erosion.

The gravel itself is mainly composed of boulders of all sizes representative of the older rocks which were eroded in this district. The boulders, cobble, pebbles and sand have been to a large extent cemented with lime precipitated from the river waters and now form a cemented gravel which would have to be broken up with explosives before it could be mined by either hydraulic or mechanical methods.

Unquestionably there is some gold present in all of this gravel and in the Gila Conglomerate, this metal having been derived from ~~the many~~ some small gold bearing quartz veins which have been noted in the Gila mountains. On the present surface of the placer areas there is a small concentration of values formed by wind action, as is usual in nearly all of these desert placers, and below this I believe that the values are extremely light until bed rock is approached at which point there naturally would be a concentration of free gold and also of black sand from which good gold values have been reported.

If we are to accept the general results of Vahrenkamp's sampling (he gives no details of the various pits) and the record

of the small mining operations which have been previously conducted according to Neel, it would seem that on the lower bench the values from the surface to a depth of about 20 feet will average close to $1.00 per yard through an area near the camp, in which a total yardage of perhaps 3,000,000 may be contained. The principal openings referred to above are a small pit to the north of the camp from which perhaps 500 or 600 yards of gravel was mined with a steam shovel and 140 yards by hand. Values in both cases are reported to have been over 70¢ a cubic yard at old price of gold.

A short distance to the south of the camp a drag line cut was made to a maximum depth of some 15 feet and approximately 215 cubic yards was mined from which Neel told us that upwards of 300 gold were recovered at the present price and two test pits were sunk in the vicinity of this cut which, according to Neel, sampled better than $2.00 per cubic yard. The various pits sunk by Vahrenkamp were noted at intervals throughout this entire area and also occasional pits were found on the second bench and one or two on the upper bench from which Vahrenkamp evidently inferred that the entire area of the placer was uniformly mineralized, but it is my firm opinion that even if good values do exist in the vicinity of the camp these must be attributed to the flows of basalt and cannot be considered as indicative of the value of any other portions of the property including the second and third benches.

As to the methods of operating I find that hydraulic work is entirely out of the question. All of the water rights on the Gila River have already been appropriated and all surplus water is called for by the United States Government for the Indian Reservation served by the Coolidge Dam and even though a large percentage of the water used for hydraulic mining would be returned to the stream yet there is a substantial loss by evaporation which in the case of any

large scale operations might amount to over 1000 miners inches per day and it would be entirely impossible to secure the right to use this amount of water.

An even more serious objection would be found in the disposal of the debris or tailings which if turned loose into the Gila River would silt up the canals serving the irrigation district a short distance below the Neel property and further down would tend to fill up theCoolidge Dam and it is very certain that neither of these situations would be permitted by either the Federal or State authorities.

There remain two other possible methods of operation, namely dredging and mechanical mining, Neither one of which would require the use of any large amount of water beyond the quantity which would be returned to the river and which would be comparatively free of silt. The first method could only be adopted in respect to the lower gravel along the bank of the river and assuming that the bed rock remains below water level for some distance away from the river banks and that the values hold good as far down as the bed rock which would naturally be the case if there are any values at all. I believe that the possibility of using a dredge is worth considering providing good gold values are found in the lower bench, but at best it would probably only be possible to mine one or two million yards by this method.

Mechanical mining would doubtless have to be depended on for the treatment of the great bulk of the gravel on the Neel placer. The mining should be done by steam shovels or some other form of excavators and the tailings, as well as the course boulders, which would be rejected at or near the shovel, could all be stacked and kept out of the river as the work proceeded. The fine gravel would be treated in a washing plant equipped with a tailings stacker and

this plant might either follow along with the excavating machinery or be stationary and served by belt conveyors from the diggings.

The character of the gravel is such that it could practically all be mined b y a large shovel of 2½ or 3 cubic yards capacity after having been shaken up with explosives and while some of it might require grinding in a ball mill or similar machine I think that a great portion of the fine material could be sent to the washing plant after having been run through a trommel to eliminat everything larger than half or quarter inch material. Such a type of mining is obviously much more expensive than hydraulic work and this would be generally true since water would have to be obtained by a two or three mile pipe line from Bonita Creek or pumped from the Gila River and special provision made in stacking the tailings to prevent following the flow of the river below. It is my opinion that including all working costs together with a proper depreciation and interest on capital invested and allowing for a royalty of 10% of the value to the owners it would be unsafe to estimate the total cost at less than 25¢ per yard and it is very doubtful if these operations could be conducted at the rate of as much as 10,000 yards per day. It is therefore, quite obvious that this deposit has no commercial value unless a substantial quantity of gravel running 50¢ a yard or better can be definitely determined to exist and this I consider highly improbable, but worth the cost of investigation in view of the very positive statements of Vahrenkamp which seem hardly proper to dismiss offhand as entirely unreliable.

I have therefore recommended that a preliminary testing should be carried on for a wekk or ten days consisting in taking samples of one cubic yard or thereabouts from the old clean sides of various pits and trenches which have already been dug or from

the aroyas which cut through the gravel. The points at which I suggested that these samples be taken are all located in what appears to be the best mineralized area, i. e., enriched throughout the backing up of the water by the lava flows and if twenty or more samples taken in this manner should ~~50¢~~ give an average substantially below 50¢ per yard I believe that no further expenditure should be made and that the property may be unqualifiedly condemned.

On the other hand if satisfactory values should actually be found it will be in order to continue this work and endeavor to delimit the area in which such high values occur and to continue more thorough sampling of all which would very likely require four or five months work and involve an expense of $15,000 to $20,000 if it is desired to determine the value on as much as 20,000,000 yards of gravel. Even suggestions along these lines are hardly in order until the results of the preliminary work are known.

In further reference to the geology I wish to say that the conditions do not favor the formation of any valuable placer. Only a little gold has been found in the area drained by the Gila River and its tributary and these do not contain any large gold deposits nor any ~~hill~~ of small gold bearing quartz veins such as exist in the Sierras Mountains and in parts of British Columbia and Alaska.

In the gravel the absence of quartz pebble is noticeable and I could find no fragments of sulphide minerals which generally accompany all gold placers. The black sand may very likely have been derived from the basic igneous rocks and although it is stated that the pebbles of jasper and silicious hemitite have been found to carry gold I am very skeptical regarding this most unusual statement.

The Gila River now runs through a great valley and conglomerate and more or less cemented gravel, all of which might

logically be quite as rich as the Neel Placers except for the basalt riffles mentioned above, and I could find no evidence on this ground of any old channel which might have cut down from the banks and concentrated the gold values in the eroded mineral. To the best of my knowledge no commercially valuable placer deposit has ever been found in such a formation as exists in the vicinity of the placer where the river was building up ground through being overloaded with dirt and rocks and forming a broad flood plane with constantly changing channels, and it is also obvious that after a channel has been filled to any considerable depth there is no further opportunity for the gold to settle down or concentrate at any particularl points.

(4)

REPORT ON THE NEEL-GILA RIVER PLACER PROPERTY, PLACER DEPOSITS. OWNED BY NEEL PLACER CO., INC. PHOENIX, ARIZONA.

LOCATION OF PROPERTIES

The Neel-Gila River Placer Deposits are located in Township 6, South, Range 28 East, of the Gila and Salt River Base and Meridian in the County of Graham, State of Arizona. The Gila River flows through the eastern and southern boundary of the property; Bonita Creek, a tributary to the Gila River, flows through the north east corner of the property; Spring Creek forms the western boundary of the property.(See Map No. 1)

The property is located at an elevation of 3332 feet above sea level. Following are listed the various mining claims, areas, and status of title.

CLAIM NAME	AREA	UN-PATENTED. STATUS
Gold Spot No. 1	160 acres	160 acres
Gold Spot No. 2	160 "	160 "
Gold Spot No. 3	160 "	160 "
Gold Spot No. 4	160 "	160 "
Gold Spot No. 5	160 "	160 "
Gold Spot No. 6	160 "	160 "
Gold Spot No. 7	160 "	160 "
Gold Spot No. 8	160 "	160 "
Gold Spot No. 9	160 "	160 "
Gold Spot No. 10	160 "	160 "
Gold Spot No. 11	160 "	160 "
Gold Spot No. 12	160 "	160 "
Gold Spot No. 13	160 "	160 "
Banner	120 "	20 "
Bonny	20 "	20 "
Red Bird	20 "	20 "
Gold Nugget	20 "	20 "
	2160 acres	2160 acres

STATUS OF TITLE

The mining claims are held under U. S. Government possessory title, located on unsurveyed U. S. Government lands, to legal subdivision. The annual assessment work required under the U. S. Mining Laws, in order to hold title has been duly performed by the owners every year since the date of location, and notice of performance of such yearly work by the owners having been duly filed for record, as required by law , in the County Recorder's office at Safford the

county Seat of Graham County, Arizona.

ACCESSIBILITY

The property is accessible by automobile over a good graveled road following up the Gila River Valley, distance twelve (12) miles from the town of Solomonville, Arizona--a railroad station on the Southern Pacific Railroad.

The distance by automobile from Phoenix to Solomonville, over U. S. National Highways Nos. 80 and 180 is 189 miles. The Southern Pacific Railroad makes connection at Bowie, Arizona, with main line trains for Phoenix, Los Angeles, San Francisco and all points west and El Paso, New Orleans and all points east.

CLIMATE

Climatic conditions are favorable for hydraulic operations throughout the entire year, being moderate and agreeable, except in the months of June, July and August, when the sun becomes very warm during the day, although not oppresive, with pleasant, cool evenings Much more endurable than the heat of eastern cities.

GEOLOGY

The geology of the region is fully described in Professional Paper No. 43, "Morenci and Clifton Quadrangle" by Waldemar Lindgren. It being so thorough and painstaking that it seems of little use to revamp any of its contents. I therefore, shall quote excerpts from his report.

"GENERAL CHARACTER AND DISTRIBUTION: -"The bounders of the conglomerate are of local origin, and their derivation from particular mountain flanks is often indicated by the slopes of the beds. Its cement is calcareous. Interbedded with it are layers of lightly coherent sand and of trass and sheets of basalt; the latter, in some cliffs, predominating over the conglomerate. --Beginning at the mouth of Bonita Creek below which point their distinctive characters are lost, they follow the Gila River for more than one hundred miles toward its source. Below Bonito Creek it merges insensibly with the detritus of Pueblo Viejo Desert. It is, indeed, one of the "Quatenary gravels" of the desert interior, and it is distinguished from its family only by the fact that the water-course which crosses it are sinking themselves into it and destroying it instead of adding to its depth---- The material of the Gila River formation consists almost exclusively of coarse sub-angular gravels, appearing more or less distinctly stratified, by non-persisting streaks of lenses of sand, and containing fragments of all of the older rocks of the mountains. In most places basalt and rhyolites predominate, as is natural when we consider thatat the time when these deposits were being accumulated a much larger part of the quadrangle was covered by volcanic flows than at present. Other rocks may, however, locally preponderate, thus, for instance, below the area of porphyry a few miles southwest of Morenci, where the gravels consist almost exclusively of coarse-diorite-porphyry often indeed, difficult

to distinguis from the deeply weathered outcrops of the same rock. Along the lower part of Eagle Creek volcanic rocks are extremely abundant in the Gila conglomerate, and the dividing line between this and the underlying basaltic and rhyolitic tuffa in places becomes indistinct.--- Along the Gila River from the mouth of Bonita Creek to the mouth of Spring Creek the erosion has in many places produced steep or nearly perpendicular bluffs of Gila conglomerate usually pitted by reason of the gradual weathering out of the large pebbles. Where volcanic rocks predominate the conglomerate is often well cemented. The color of the Gila conglomerate is reddish to grayish white, especially in places where long-continued exposure has had opportunity to oxidize the iron.

MODE OF DEPOSITION:- The Gila conglomerate is unquestionably of fluviatile origin, and was deposited during an epoch in which the lower reaches of the rivers gradually lost their eroding and transporting powers, while disintegration progressed rapidly in the mountains. Especially was it active among the loose masses of lava, which then covered so much of the quadrangle, from which intermittently torrential streams brought down vast masses of the crumbling rocks. The climatic conditions were then probably very similar to what they are at present The volcanic outbursts of the Tertiary took place under conditions of active erosion, the different flows being often deeply dissected before the eruption of the next mass. This epoch of erosion doubtless continued for a short time after the close of the igneous activity, for we find the Gila conglomerate deposited on an uneven, and in places, deeply dissected surface, As far as known, the Gila conglomerate has not been warped or dislocated by faulting in this area, though studies extended over a wider field may very possibly modify this conclusion."

TERRACE GRAVELS.

Between Bonita and Spring Creeks (see photo and Map No.1) on the northwest side of the Gila River from 50 to 200 feet above the stream in its lower course, we find a large acreage of auriferous gravel deposited in four distinct terraces. The deposition of the gravel in terraces would indicate a temporary check in the erosive power of the stream, much later than the Gila Conglomerate.

CHARACTER AND SOURCE OF TERRACE GRAVELS.

The terrace gravels are of auriferous origin, deposited by erosive agents, and, being a much later flow than the Gila conglomerate the Gila donglomerate forms the bed-rock of stratas of gold concentration. These gravels no doubt are part of a remnant of an old ancient river channel. The channel may be traced by its exposed edges and rims in several places. All the boulders and stratas of gravel have a slight dip of 10 degress to the northwest, whereas the Gila conglomerate dips 20 degrees southwest. These gravels indicate a temporary check in their erosive power, due no doubt, to the erosion gradually declining in intensity, thus forming the many terraces. The gold being of ancient origin, being derived from disintegration of the immeasurable gold bearing quartz veins in the igneous rocks of post-paleozoic age.

The gravel consists of average size boulders, from the size of a bucket to that occasionally of a large barrel, and sand of a very loose nature, all washed smooth and well rounded. No pipe clay or cemented gravel is to be found of any consequence except, occasionally now and then I observed a thin layer of about two feet in thickness of gravel cemented by some carbonate of lime with oxide of iron which, when coming in contact with water, disintegrates instantly.

The gravels, as shown deposited by an old ancient river channel in the form of terraces, never eroded into the bed of the Gila River. The old river channel makes a swing northwest along the north bank of Spring Creek, thence disappearing underneath a heavy wash, The gravels in the Gila River bed are largely composed of detritus material and of rocks found in the Gila congomerate. The writer drilled three test holes in the bed of the Gila River to determine this factor. The depth to bed-rock in each hole was twenty feet where the drill entered the Gila Conglomerate, and at a depth of thirty-two feet encountered hot water. A few colors of free gold were found in each hole throughout the twenty feet of gravel, this no doubt having come out of the Gila conglomerate, and the Gila conglomerate contains a little free gold throughout, but not in commercial quantity.

It is not materially significant where the gold comes from found so abundantly in the gravel, or how it was deposited- but it is important and very essential to fix the value of the gravel, the positive and probably yardage of the deposit, the best working methods water handling debris and other data pertaining to economic and successful operation.

Therefore, in order to arrive at my conclusion, I will study separately each item, group them, and deduct my conclusion accordingly.

GRAVEL OF POSITIVE YARDAGE.

The first terrace 50 feet above water level of the Gila River, covers an acreage of approximately 640 acres of mining ground out of the 2160 acres of land lowned by that company. This acreage having been determind by measurements, open cuts, and pits, to contain approximately the following yardage of POSITIVE gravel:

Approximate	length	between	extreme	points	----------	11,200 ft.
"	width	"	"	"	----------	1,820 ft.
"	depth	"	"	"	----------	30 ft.

According to these figures, the importance of the deposit approximates a POSITIVE average of gold bearing, auriferous gravel, allowing 25% for boulders and shrinkage, a total of 17,017,000 cubic yards.

GRAVEL OF PARTIALLY ASSURED YARDAGE.

The second terrace 90 feet above water level of the Gila River covers an acreage of approximately 480 acres of mining ground out of the 2160 acres of land owned by that company.

This acreage has not been fully determined by the writer as POSITIVE GRAVEL, however PARTIALLY assured. While many tests were made and the values appear to be the same as on the lower terraces, several shafts seventy feet in depth must still be sunk to fully determine if the gravel extends to bed-rock, the Gila conglomerate before pronouncing it definitely POSITIVE gravel. Nevertheless I am fully convinced in my own mind that the entire acreage to bedrock is pay gravel of the same character and value as the first terrace of 640 acres below, as along Bonita Creek and Spring Creek beginning of terrace the bed rock Gila conglomerate is clearly visible. This acreage contains the following estimated yardage.

Approximate length between extreme points----------11,220 ft.
" width " " " ---------- 2,700 ft.
" depth " " " ---------- 70 ft.

According to these figures the approximate yardage, allowing 25 per cent for boulders and shrinkage, would be a total of 58,905,000 cubic yards.

GRAVEL OF DOUBTFUL YARDAGE.

The balance of 960 acres are thus far doubtful as no work i. e. sinking of shafts or open cut work, has been done. In order to determine fully the extent of the gravel deposited upon this acreage several shafts should be sunk to bed-rock, to a depth of one hundred and twenty feet (120). The entire acreage is covered with gravel of the same character as that of the other two terraces below and along Bonita and Spring Creeks the conglomerate bed-rock is visible indicating that the whole acreage may contain pay gravel throughout. I made man y tests by pannings, which all showed gold of the same value as the other ground, nevertheless, I will have to include this acreage as DOUBTFUL. In the event that we find this ground to contain pay gravel in its entirety, it will add an additional yardage of approximately 45,760,000 to what we already have. The measurements of the acreage are as follows:-

Approximate length between extreme points----------5,280 ft.
" width " " " ----------2,600ft.
" depth " " " ---------- 120 ft.

TESTING OF GRAVEL AND SAMPLING.

Having ascertained the approximate yardage, and the character of the gravel, the next important phase is the velues in free gold per cubic yard. The only method of testing and sampling a gravel property is by rocker, the pan, or sluice. I employed all three methods in my sampling. The best location for my sampling was to start on the different pits, shafts, old and new, open cuts, group them and find the average.

ON PLATE NO. I will be found the plan of shafts, pits and cuts showing the ensemble of sampling of First terrace. The gravel was taken at different heights, all along the top of the First terrace in open pits and shafts from 6 to 30 feet in depth, and all along the face of the bank in cuts from 6 feet in width to 30 feet in height, were cut vertically in the different strata.

From 3 to 12 pans were taken in each pit and shaft; and from one half cubic yard to as many as two cubic yards of gravel were taken from pits, shafts and cuts, and washed by rocker or sluiced, exclusive of the bed rock. All samples were taken in a box measuring one cubic yard, or 3' x 9' x 1'. This box was filled with gravel and boulders, allowance being made for the volume of the boulders; then washed either by rocker or through the sluice box containing riffles. The free gold was then separated by amalgamation from the "black sands", weighed on special gold scales, and values calculated using for unit value per milligram the fineness of the gold as per mint receipts. The results thus obtained being 60¢ per cubic yard for the entire six hundred forty acres. This acreage has been determined by measurements, spaced by myself, the average of which has been found as follows:

Approximate	length	11,220 feet
"	width	1,820 "
"	depth	30 feet

According to these figures the importance of the deposit approximates 17,017,000 cubic yards of POSITIVE gold bearing auriferous gravel, or, in round figures at 60¢ per cubic yard a POSITIVE value of $10,210,200.00 in dollars and cents.

The method employed to determine the average value per yardage is what we call the method of compensation, which means that the surplus average taken of cut, shaft, or pit, is applied to the deficiency of the other, and by proceeding in the same manner from topto bottom the general average can be determined with some accuracy (provided enough prospects are taken to cover the whole of the area)

ON PLATE NO. 2 will be found the ensemble of sampling of Second terrace. The same method of sampling being employed as in the first terrace. The results being the same 60¢ per cubic yard. None of the shafts located on the Second terrace are down to bed rock; more work should be done. The value of the gravel appears to average the same as on first terrace, and the character of the gravel is the same, and I am confident this acreage contains pay gravel throughout, of the same value as first terrace; however, I will call it PARTIALLY assured gravel. The acreage determined by measurements has been found to be as follows:

Approximate	length	11,220 ft.
"	width	2,700 ft.
"	depth	40 ft.

According to these figures we find the deposit on the second terrace contains approximately 58,905,000 cubic yards of gold bearing gravel, having a PARTIALLY assured gross value of $33,343,000.00 in dollars and cents.

ON PLATE NO. 3, third terrace, not enough work has been done to determine any POSITIVE OR PROBABLE value of the ground. The same method should be adopted in prospecting by shafts, pits, and cuts; my time being limited, it could not be done. I nevertheless "panned" and "Rocked" the many places, as shown marked "PP" on the Plate. The results obtained were the same, as on first and second terraces, and in several places I obtained as many as 43 colors to the pan, and from the size of the

tests amounts to 200 pounds to a cubic yard, having an assay value from $12.00 up to as much as $48.00 per ton in gold.

Accepting therefore, the lowest assay value per ton, or $12.00 it would add an additional value of $1.20 per cubic yard. The total yardage available in the two terraces being 75,922,000 cubic yards. This would amount to $91,106,440. These figures appear staggering, nevertheless, they are to a certain extent true. The gold bearing "black sand" in this locality is extremely rare of its kind. I shall not include them as POSITIVE value until further tests on a larger scale have been concluded. I merely mention them as they are of great commercial importance.

The losses in precious metals in the metallurgican end of placer mining are unknown. In many cases, the gold is so excessively fine that much of it is lost, even under the most favorable conditions possible, under the old-gold-saving devices.

In the State of California the gold dredges are now recovering 92% of all platinum found in the state, and California produces 82.5% of all the platinum mined in the United States, Heretofore, the platinum was washed away with the black sand in the tailings.

METHOD OF OPERATION.

HYDRAULIC MINING: The term "hydraulicking" is applied to excavation of gravel banks by streams of water thrown under pressure from nozzles. (Economic Paper 3, Department of Commerce, U. S. , page 6, 1929) "Hydraulic mining was started in 1852 in Nevada City, California. By 1865 this method of placer mining was well established and the years 1866 to 1876 were notable for their gold yield from hydraulic mines." "The size of the gravel is not so important in hydraulic mining, large boulders can be handled, providing there is room for their disposal. Gravels of 600 feet or even greater depth have been worked--other things being equal the smaller and looser the gravel the higher will be the duty of the water." (Bulletin 92, C. S. MB,1923)

Next to the question of gold contents, the determining factors in the employment of this type of mining are the presence of an abundance of water that can be brought to the mine under pressure, and the existence of sufficient grade for the disposal of the tailings. Few hydraulic mines are so situated that a full head of water is obtainable throughout the year.

The "Neel-Gila River" auriferous gravel deposits may be economically and profitably worked by hydraulic method.The climatic conditions are such as to permit continuous work throughout the year. An abundant water supply is available under high pressure the year round. The "terrace" gravels are unusually well situated as regards dumps room for stackings or tailings to carry on extensive hydraulic operations at very low cost.

The duty of water, in cubic yards per miner's inch varies from one to ten, and depends upon the character of gravel, the facility for disposal of tailings, the amount and head of water available.

After the equipment and installation of a hydraulic property

of the colors the value of 60¢ is conservative for this acreage, although I cannot include it as pay gravel, therefore will place it in the DOUBTFUL column until such time when it has been fully prospected. In the event it should be found that the 960 acres contains pay gravel throughout it adds an additional 45,760,000 cubic yards. I have every reason to believe it will.

AMOUNT OF GOLD: I am confident from all the prospects taken that my figure os 60¢ per cubic yard is very close to the reality, and that I have not overestimated the value in free gold of the deposit, and therefore will adopt it in my calculations. Having the yardage and the value, the amount of free gold in the two terraces is:

First terrace------	$10,210,200.00
Second terrace-----	35,343,000.00
	$45,553,200.00

BLACK SANDS:

In addition to free gold, many of the ancient river beds carry "black sands" and concentrates containing considerable quantities of Platinum, Iridium, Osmium, Zircon, Monasite, and other metals or metallic oxides. In former years of hydraulic placer mining and dredge mining, these were thrown away with the tailings; whereas, the "black sand" and sand products would in many cases be of much value.

In order to thoroughly sample a large body of gravel to ascertain the exact amount of "black sand" concentrates to a cubic yard of gravel is a very difficult problem, due to the great variation of the deposit. Near the surface the metal content usually is exceedingly low, and becomes richer as we near the bed-rock; therefore, the metal content has to be gauged by a mechanical separation of a large sample. It must be remembered that, roughly speaking, a drill sample will only represent something like on e part in 200,000 to one part in 1,000,000 of the body of the material to be worked. (Dredging for Gold in California by D'Arcy Weatherbe.)

The sampling of the tailings is even more difficult. The difference of opinion on the subject is an added proof of the well known difficulties of correct sampling and of the great variation of the personal equation in this work.

I do not consider that sufficient or detailed tests have been made to form a definite conclusion as to the gold value per ton of "black sand" concentrates available per cubic yard of gravel, until a more complete working test on a larger scale has been made. The purpose of my examination is merely to obtain data as to the advisability of saving the "black sand" concentrates; and judging from tests made and from past experience on similar gravel deposits, the "black sands" concentrates found in this property represent a by-product of considerable value.

The results of the tests are most surprising. The total weight of black sand concentrates recovered by sluicing and rocker

the question of labor is not a serious one, as but few skilled people are required. 3 pipers, 6 sluice men, a good blacksmith and perhaps a winchman, are all that are required on a mine of moderate size, handling from 2000 to 5000 cubic yards of gravel a day; 24 hours.

The chief advantages that hydraulic mining has over any other form of mining is as follows:

FIRST: It is not so greatly affected by the cost of railroad transportation of supplies and materials.

SECOND: Small turnover of labor.

THIRD: Excessive low cost of operation for the amount of material (yardage or tonnage) handled.

FOURTH: Practically absolute elimination of speculation of ore bodies. Surface gravel deposits are unlike to underground ore bodies being lost, due to faulting or vein distortion, or losing their values with depth.

FIFTH: Auriferous surface gravels, in their extent, depth, breadth, and length, may be accurately had and determined by correct measurements, without guessing.

SIXTH: The gold content in auriferous gravel deposits are usually evenly distributed;; ø very seldomdoccur in spots or bunches. In the "Neel-Gila River" deposit the gold content is evenly distributed from the very surface to bed rock.

SEVENTH: Placer mining offers but very little risk to capital invested. Success is dependable entirely upon its management.

EIGHTH; In placer mining for gold, we are dealing with a commodity unlike any other commodity produced in the world. There are no fluctuating prices in the sale of gold--the price is always the same, whether you have one ounce or one hundred thousand ounces.

STATISTICS OF COSTS OF WORKING HYDRAULIC GRAVELS.

(Hydraulick Mining In California ,pp 277, 1885, by Aug. J. Bowie, Jr.) "The resume of work done by the "La Grange" Company, Stanislaus County, California, June 1st, 1875, to September 30th, 1876, gives the following results:

Average yield of Gravel per cubic yard.	.10.19¢
Cost per cubic yard.	.06.00¢
PROFIT PER CUBIC YARD.	.04.19¢

The "NORTH BLOOMFIELD" Company, Nevada County, California (Table XLVIII by Aug. J. Bowie, pp 278, 1885) over a period of three years, on 4% grades, high banks, and with great hydrostatic pressure, was much less than the LA GRANGE, as follows:

Average yield of Gravel cubic yard, 1875-1875	.03.99¢
Cost per cubic yard.	.02.86
PROFIT PER CUBIC YARD	.01.13

Average yield of Gravel cubic yard, 1875-1876	.06.60¢
Cost per cubic yard.	.03.25
PROFIT PER CUBIC YARD.	.01.13¢

Average yield of Gravel cubic yard, 1876,1877	.12.68¢
Costs per cubic yard.	.06.19
PROFIT PER CUBIC YARD	.06.49¢

The "FRENCH HILL" hydraulic mine, in Stanislaus County, California, over a period of three years, 1875-1876 (Table LI, bu Aug. J. Bowie, Jr. pp 285, 1885,) shows a tabular statement of costs as follows:

Average yield of Gravel per cubic yard.	.13.00¢
Cost per cubic yard.	.06.03
PROFIT PER CUBIC YARD.	.06.97¢

The statistics quoted from Aug. J. Bowie, Jr., Tables and disbursements, are absolutely accurate, I quote them for the sole purpose of arriving as nearly as possible to the actual costs of operating a hydraulic mine.

The "LA GRANGE", "NORTH BLOOMFIELD," AND "FRENCH HILL" hydraulic mines were among the largest of this type ever operated in the State of California, and their average yield in gold value per cubic the very lowest. All three of these mines paid millions of dollars in dividends to their owners--prior to legislative restrictions on disposal of tailings. Hydraulic mining is regulated and controlled inthe State of California by the California Debris Commission under federal Statute, Mine after mine was closed by injunction based upon this decision and the Federal legislation passed in 1893(The California Debris Act) Hydraulic mining in California is illegal if carried on in such a manner that it injures the navigable channels of the SACRAMENTO OR SAN JOAQUIN River systems. In order to carry on hydraulic mining in California, a permit, subject to the approval of the DEBRIS COMMISSION is necessary before mining may be started. The STate of Arizona has no such law, as the State of Arizona contains no navigable. streams.

COST DATA WORKING NEEL-GILA RIVER GRAVELS.

The cost per cubic yard of gravel varies as to locality. In California, the cost varies from .02.08¢ to as much as 6.19¢ per cubic yard, and in Alaska to 25¢ or more. Where gravels are cemented and the duty of the miner's inch is low, the costs necessarily increase. The duty of a miner's inch in hydraulicking is the cubic yard of gravel which can be broken down and sent through sluices by one miner's inch of water in 24 hours. It varies with height of bank, character of gravel and bed rock, grade of bed-rock, amount and pressure of water, and with all the factors influencing sluice capacity.

The "Neel-Gila River" gravels will not cost over .03.00¢ per cubic yard to work. The gravel contains no pipe clay or cemented material. Low banks from 30 to 40 feet, the duties of the miner's being high, under a head of 300 feet, the duty per miner's inch therefore should be approximately 3 cubic yards per miner's inch of water

LABOR ESTIMATE OF THREE SHIFTS:
HYDRAULIC OPERATIONS:

Men:	1 Manager	$500.00monthly
	1 Superintendent	300.00
	9 Giant Pipers @ $6.00 per shit	1,458.00
	6 Giant Sluice Tenders @ $5 per 8 hr. shift	900.00
	2 Ditch tenders @ $4 per shift	240.00
	1 Blacksmith	250.00
	1 Blacksmith's helper	150.00
	L Electrician	300.00
	2 Carpenters	600.00
	1 Cook	150.00
	1 Cook's helper.	100.00
	26	
		$ 4,948.00 monthly

ECONOMIC CONSIDERATIONS

In reviewing the conditions at a placer property of this nature, it is essential that we obtain a balanced perspective with regard to the following points:

(L) Total extent, possibilities, and the gross and net value of the property.

(2) The economic limit of operations, viz; Either minimum or maximum monthly output to obtain the best returns in proportion to a given capital outlay; so as to obtain practical working results.

(3) The net values of the gravels per cubic yards after deducting costs aso as to visualize the dividends earnings and capital refunding point of view.

(4) The type of equipment that will give practical working results and insure saving the "values" and yet will not cost more for capital outlay than an amount within the capital expenditure admissible for this type and xize of deposit.

For the present purpose of this economic estimate, we may consider that we have upwards of17,017,000 cubic yards of POSITIVE gravel and 58,905,000 cubic yards of PARTIALLY assured gravel available.

The working season is all the year ariund, with three daily 8 hour shifts each. Average actual mining time about 20 hours out of the 24 hours per day. Normal capacity of plant from 15,000 to 20,000 cubic yards per day.

Normal output 360,000 cubic yards.

Normal annual output 4,320,000 cubic yards.

Normal annual output 4,320,000 cubic yards. It would therefore take approxim ately 20 years to work out the deposits of first and second terraces.

Records of costs usually include only operating expenses, omitting capital charges, as the latter may be very high.

AVAILABLE WATER AND WATER RIGHTS.

Few hydraulic mines are so situated that a full head of water is obtainable throughout the year.

THE NEEL PLACER COMPANY, INC. own two valuable water rights, as follows:

Application for 200 second feet of water in Section 31, Township 6 South, Range 28 East, G & S R. B & M., County of Greenlee, State of Arizona, on the Gila River, has been filed with the Division of Water Resources of the State of Arizona. Permit having been granted. The Gila River is the largest and longest River in the State, and during the lowest season of the year flows as much again the amount of water than the application calls for at the point of diversion.

To carry on hydraulic operations throughout the year, it will be necessary to construct a pipeline approximately 6 miles in length to carry the source of water amounting to 10,000 miner's inches to the point of use. The topography of the ground is of easy grade, and in the distance of 6 miles we develop a head of 300 feet, vertically. The 10,000 inches of water, under an effective head of 300 feet, will operate 3 number 9inch Hendy Hydraulic Giants having acapacity of not less than 3320 cubic yards each, every 24 hours.

Another pplication for 50 second feet of water in Section 26 Township 6, South, Range 28 East G&SRB&M, County of Graham, State of Arizona, on Bonita Creek, has been filed by the Neel Placer Company Inc. with the Division of Water Resources of the State of Arizona. Permit having been granted. This source of waters supply is for the purpose of generating hydro-electric power and for general cullinary camp and residential use

WOOD

There is sufficient timber in the immediate vicinity upon the property, along the Gila River and Bonita Creek, for fuel purposes, The timber consists of black walnut, box elder, sycamore, cottonwood, mesquite, black willow, and pine oak of fairly good size trees.

Lumber for sluice boxes and for building purposes, i. e. Oregon Pine, White Pine, Spruce, etc. may be had from the lumber dealers at Safford or Solomonville, 12 to 17 miles distant.

LABOR.

Plenty of labor is available at any time of the year. The mining towns of Clifton, Morenci, are only 16 miles distant, and the copper mining camps of Miami and Globe are 89 miles away on the line of the Southern Pacific Railroad and National U. S. Automobile Highway Nos. 80 and 180.

CONCLUSION:

In conclusion, I consider the POSITIVE and PARTIALLY assured gravel (situated within the boundaries of the property under consideration, estimated at 75,922,000 cubic yards as unquestionable, and the gross average value of 60¢ a cubic yard conservatively given.

If we placed the average gross free gold yield at 50¢ instead of 60¢ a cubic yard, and allow liberal amounts for operating expenses, overhead, reserves, amortization, etc. of say 10¢ per cubic yar , it leaves a capital value of the property at over $30,368.800

The writer will say that an immense yardage of gold bearing gravel exists in this property, which is extremely rare of its kind, and contains all natural advantages for economical operation, and easy of access, that will pay good dividends under competent management over a long period of years.

I fully consider the venture worthy of capital investment.

Respectifully submitted.

F. H. Vahrenkamp,

Consulting Enginner

San Francisco, California
January 6, 1930

(C O P Y)

J Ø H N S L A K

Consulting Mining Engineer.
General Manager, St. John Copper Organization.

CORDES, ARIZONA

R E P O R T

on the

NEEL PLACER COMPANY'S

DEPOSIT

LOne Star Mining District, Graham County,

Arizona.

Neel Placer Company
Phoenix, Arizona

Gentlemen:

As a result of my examination of the above named Gold Placer Deposit, I am enabled to make the following report, which I believe to be correct in every substantial particular. I agree, at any convenient time, for a consideration, to assist any interested party or parties in making a joint examination of this property, and if all the statements cannot be reasonably corroborated, in said joint examination, I agree to make no charges for my services, while thus engaged.

SUMMARY:

I find the Neel gold placer deposit to be one of extreme ancient origin, probably first formed thirty to forty millions of years ago, and it is compbsed of many and various beds or flows of gravel on top of one another, plainly indicating or showing that each one of these beds or flows was deposited by subsequent flows at various times during later ages. The property itself consists of two thousand one hundred and sixty (2,160) acres covered by most splendid and uniform gravel deposits, (no objectionable clay present) the pay dirt begins at surface -- richer as one digs downward; it pans 20¢ to $5.00 per cubic yard; conservatively, it would net at least 50¢ per cubic year through the entire deposit; the average thickness of gravel will be at least 18 feet; total gravel at least 215,000,000 cubic yards. Thus, the total profit when the property is worked out should be $108,000,000.00. The deposit forms a sort of peninsula, in other words, the large Gila River surrounds it on three sides; it is a most splendidly situated property for mining economically, being only about 6 miles from a highway and railroad, and connected by a fair country road. I truly consider this as the finest, largest and richest gold placer deposit on this continent today. It is a "foolproof" proposition. From any investment point of view and working it upon any

appreciable scale, say from four hundred to five hundred cubic yards, and eventually 25,000 cubic yards per day - on greater scale the better - the investment should prove to be as safe as the safest of good bonds, and much more profitable. Observing and noting all the excellent points about this excellent deposit, it gives me much pleasure to most highly recommend it -- and do so without "ifs" or reservations, (except one thing): that the man in charge of operations should be a man who thoroughly understands those things.

THE PROPERTY:

This property, as previously stated, consists of 108 mining claims, of 20 acres, or a total area of 2,160 acres, more or less, all joining one another in a solid block of ground. These claims are held by location under the United States and State of Arizona Mineral Laws, and the required annual assessment work having been properly performed every year since location, and thus, the titles are clear and perfect in every essential respect.

GEOGRAPHY:

This property is situated in the great Gila River Valley, Lone Star Mining District, about 10 miles in a northeasterly direction from Solomonville, on the U. S. Highway 180, and S. P. Railway, Graham County, Arizona, and a fair 6 miles long country road connects with said highway immediately east of Solomonville, which leads to the property in a northerly direction. A small expediture on this 6 miles of road would make the transportation to and from the mine very easy and inexpensive. (A rough sketch on the last page of this report shows approximate location and lay of the property, river, creek, roads, etc., and it is other wise more or less self-explanatory.)

TOPOGRAPHICALLY:

The property lies, I might say, in a basin -- within a valley in shape and form of a peninsula (see sketch) practically surrounded on three sides by the Gila River, from which the property which also forms a sort of terraced plateau, gradually rises higher bit by bit toward the north, northeast, and northwest. While a few miles further on in said directions high hills and high mountains are in evidence, which, with its countless gold-bearing veins having been subjected to erosions, and its disintegrations washed by floods, rivers and creeks downward into the great basin through countless ages of the remote past. And hence, this great auriferous or placer gold deposit.

CHARACTER OF DEPOSIT:

The gravel-banks rise abruptly and immediately at the river 5 feet to 30 feet above it and keep on slowly and gradually rising toward the north. While the bed-rock is in evidence only at one point, on the westerly side of the property at and in the curve of the river, which appears in the form of a huge dyke of basalt, through the thickness of gravel rises at once above it up to 10 feet and over. Countless holes have been sunk throughout the property, but none to the bed-rock, and the deepest of them is about 20 feet down. In these holes one can observe various gravel beds, or various thicknesses, which were formed by various flows at various times, among these appear also several flows of lava, from a few inches to one foot or so in thickness, (not hard pen or cement) but very friable and carries same in gold values as the other river gravel. There are no objectionable clays present, nor have I noticed any very large boulders, those which I have observed over the property are of the size of large melons. In other words, this gravel deposit appears to be extremely clean, very easily worked with any kind of equipment one may desire to use, and its gold values easily recovered to the smallest fraction. The deposit as a whole appears to be very porous and it thus shows that every additional layer of gravel that flowed

and was deposited over the previous layers - most of the heavy gold, naturally - percolated downward toward the bed-rock; and there, when the operation is once under way - great bonanzas may be looked for with confidence. Even now, at near the surface, it is true, one occasionally gets as low a sample as 30¢ or even 20¢ per cubic yard, but this kind is very few, and most of the present holes show from 40¢ to $1.50 per cubic yard, and many samples go much higher than that, and even as high as $5.00 per cubic yard. Furthermore, the two men now working on the southerly side of the property near the river, neither of whom are experienced placer miners, and working with the crudest possible tools and equipment, and in the crudest possible manner - both are making a good living wage. Thus, it can readily be understood what can be accomplished by an experienced placer mining man, with real equipment, speed and economy, and by mining this deposit to the bed-rock. All of it is rather beyond present calculation or estimation.

VERY CONSERVATIVELY:

Let me say that this deposit will average 18 feet in thickness throughout the property, (though it will prove to be of much greater thickness) yet at that it means 100,000 cubic yards of gravel to every acre, or on the whole property, of 2,160 acres means 216,000,000 cubic yards of gravel; at 50¢ per cubic yard net,(which will be actually greater) it means at least $108,000,000 as net profit from the whole property.

WATER AND TIMBER:

Water is absolutely plentiful for all purposes the year around. There is no timber on the property, except some brush wood fit for fuel, such as mesquite, cottonwood, etc.

ELEVATION:

About 3,000 feet above sea level, an ideal climatic condition, permitting continuous operations throughout the year.

FUTURE OPERATIONS:

As equipment for the initial attack of operations, I would recommend either a power shovel or a drag-line system, (this according to which kind the operating engineer might choose, although both would be equally efficient) with such other equipment as goes with it, and all of it, as a unit, to cost approximately $20,000 to $25,000, and of sufficient capacity to work and treat not less than 400 to 500 cubic yards per day. The work should be started at some point along the westerly or southwesterly side of the property by the river and the best point undoubtedly would be toward the westerly side where bed-rock crops out. Until sufficient room is established behind the diggins for washed gravel and silt - the same can be shot over across the river, where there is plenty of room, by various inexpensive means. But when plenty of room is once established and the diggins well advanced away from the river toward the north - then of course, I would recommend the Old Reliable, "Hydraulic pressure - Hydraulic Diggins", as the water reservoirs for the desired pressures can be easily established on the property. And then a couple of men could thus wash down thousands of cubic yards of gravel daily - at a cost of 2¢ to 5¢ per cubic yard. Such methods were much used throughout the western states in their early, large placer mining operations. In fact, with Hydraulic Diggins placer deposits that contained no more than 10¢ per cubic yard have been worked at a profit, and thus there is no reason on earth why this most splendid deposit could not be worked at a most handsome and satisfactory profit. And that it will be, I have no doubt, or at least, it should be.

IN CONCLUSION:

I wish to say that this is one of the finest, largest and richest placer gold deposits I have ever seen, either on this or any other continent. Nature has done her perfect work. For as this deposit has all the essential points and earmarks considered by placer mining experts as of much importance, such as peninsula or deposit (within horse-shoe) or short curve or turn of the river; being an ancient deposit and subsequently enriched by additional flows and depositions of various gravel layers from time to time; plenty of water (a feature which is nearly as important toward success as the gold itself) no clays or other objectionable materials; excellent climate; and an easy and inexpensive transportation; in short, this is a sort of a "Bank in the Rough", which is bound to make good in the line of most satisfactory returns. And, thus, I truly and sincerely recommend it to anyone who has the means and the ambition to make more.

Respectfully submitted,

(Signed) John Slak

Consulting Mining Engineer

Phoenix, Arizona,
June 23, 1931.

REPORT ON NEEL PLACER PROPERTY

Dear Mr. Neel:

I am sending you herewith some information taken from the report you refer to, but as the owner of this report has recently died and his affairs have not been adjusted, I am not at liberty to send you a full copy of the report.

The head Assayer and Tester found the average free gold to be $1.00 per yard. The Engineer cut that in two in making his report. The Black Sand showed $1.20 to $4.80 per ton; he used $1.20 in making his figures. If he had used an average of $2.40 it would make a difference of $144,000,000.00.

According to the attached assay map the values put into round numbers would be as follows:

640 Acres at $1.80 for 31,360,000 Cu. Yds. equals $56,648,000.00
This was fully drilled and tested to bed rock.

---

480 Acres, entire surface tested and some deep holes show it to turn about the same as the 640 acres, or $1.80 per cubic yard.
480 Acres, or 37,632,000 Cu. Yds. @ $1.80 equals $67,737,600.00

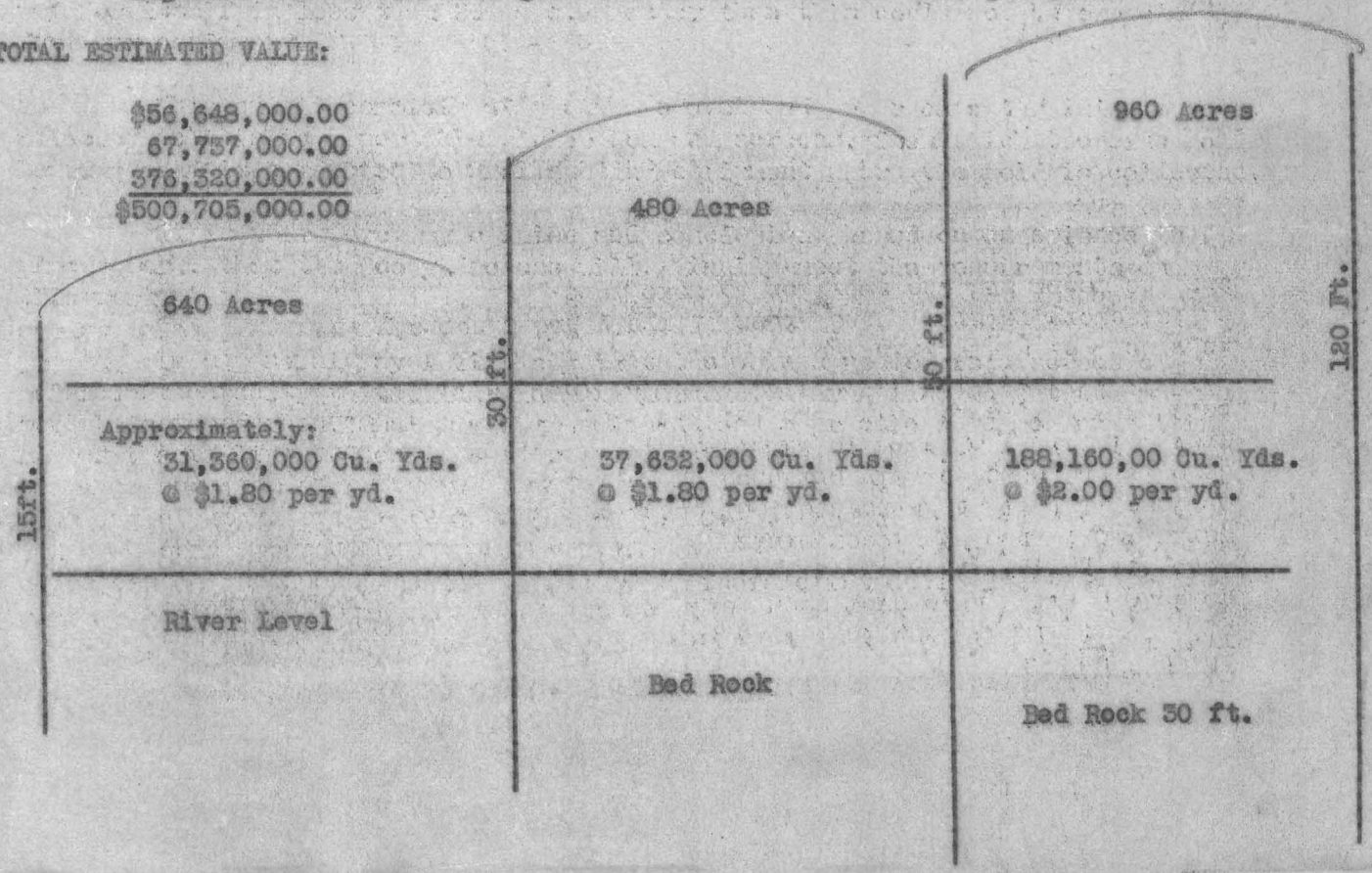
---

960 Acres partially tested indicates that it will run at least $2.00 per yard. 960 Acres, or 188,160,000 Cu. Yds. @ $2.00 per yd. equals $376,320,000.00

Engineer claims all free gold can be recovered at .03¢ per yard.

TOTAL ESTIMATED VALUE:

$56,648,000.00
67,737,000.00
376,320,000.00
$500,705,000.00



REFERENCE TO BIG PLACER

ENGINEERING DATA

I am very familiar with the Gold Placer property located about twelve miles northeast of Solomonville north of the Gila River at the Junction of Bonita Creek, and having has a wide experience in Placer work and examined many Placer properties in the United States and in Mexico, can say that natural conditions are all highly favorable for getting out gold here at a very low operating cost, and with comparatively small outlay for equipment. And can further state that the 2,100 acres embraced in this property carries an immense yardage of gold bearing material that runs uniformly high in values from top to bottom, which in places, is fifty to sixty feet deep, and taking into consideration the favorable conditions for taking out gold -- uniform high values and enormous yardage, it is the best property that I have ever seen.

I have given the matter of equipment for this work a lot of study, keeping in mind the idea of making as high percentage of recovery as possible at as low operating and installation cost as possible, and from the best information at hand I recommend the "goody Process" made in Denver, Colorado, which the owners agree to set up and put in operation under a guarantee to do satisfactory work or no sale. The price of the outfit is $15,000, with a capacity of 2,400 yards per day, working three shifts, this capacity and price operating in ground that runs $1.20 per cubic yard, would pay for itself in less than 20 days. Better than this could not be expected from any equipment.

This outfit consists of a steam shovel and power on caterpillar tracts, attached to this is a portable sluice box and screens, from which the fine gold bearing sand is conducted to amalgamating equipment where the gold is collected.

It is therefore, my opinion and conclusion, based on experience in placer work, that the Goody Process will, finally meet the requirements on this work.

In a general way I will say that the things needed is a screen of sufficient capacity to take care of big yardage, a drag line to get the material to the screen, amalgamating equipment and a practical method of getting rid of the tailings. Conditions are very favorable on this.

(Signed) C. E. Morgan

Mineralogist Geologist

Carnets

NOTES RE: NEEL GILA PLACER

Supplementing my letter of June 17th, 1935, to W. J. Zimmers in reference to the Neel Gila Placer I wish to submit the following data.

Apparently this property has been thoroughly investigated only by Mr. Vahrenkamp who was employed by Judge Ainsworth in 1929 and 1930. Mr. Vahrenkamp, with the assistance of some ten or twelve men, spent three to four months on the property and the cost of his work is said to have been approximately $7,500.00 excluding any engineers fee, as Mr. Vahrenkamp was to receive his compensation in stock or interest in the property, a procedure which naturally throws suspicion upon the results of his work and recommendations in his report.

GENERAL

The elevation of the Placer is 3400 feet above sea level and the elevation of Safford is 3100 feet. The road distance from Safford to the Neel claims is twenty-two miles, of which fifteen miles is over the paved highway leading from Safford to Clifton.

WATER SUPPLY

According to information received from the local Water Commissioner, who has taken measurements during a number of years, the normal flow in the Gila River is about 75 second feet and the minimum flow is 25 second feet. The normal flow at Bonita Creek is 4 second feet and the minimum flow 2 second feet, but these figures do not include the underflow which may be considerable. The City of Safford has recently appropriated 2 second feet from Bonita Creek for domestic water supply and the United States Government has

filed on all the unappropriated water from the Gila River and its tributaries for use in irrigation of the Indian lands below the Coolidge Dam. One of the alphabetical departments of the United States Government now plans to erect three more dams on the Gila River, one of which will be located about six miles above the Neel Placer and will have a height of 225 feet.

From all the above it is evident that the water question will be a serious one and will entirely eliminate the possibility of hydraulic mining and probably also of dredging. I believe that a sufficient supply of water to operate a washing plant of moderate size might be obtained from some of the ranches in the vicinity of the placer or preferably from wells sunk on the claims in the vicinity of the river. This assumes that the actual mining would be done by mechanical means, such as steam shovels.

QUANTITY AND QUALITY OF GRAVEL

Unquestionably there is some gold present in all of this gravel and also in the Gila Conglomerate, this having been derived from some small gold bearing quartz veins which have been noted in the Gila Mountains, but I do not consider the geological conditions favorable to the formation of any valuable placer since no large gold deposits are known to exist in the area drained by the Gila and its tributaries nor does this area contain any net work of small gold bearing veins such as exist in the Sierras Mountains of California and in parts of British Columbia and Alaska.

In the gravel there is a noticeable absence of quartz pebbles, nor could I find any fragments of sulphide minerals, but merely jasper and silicious hemitite which are not usually gold bearing. The black sand may very likely have been derived from the basic igneous

rocks, and although Neel gave us figures indicating that the value of the black sand was as much as $2.00, in addition to the value of the free gold, per yard of gravel I consider this statement entirely absurd and worthy of no attention.

On the present surface of the placer claims there is a small concentration of values due to wind action, as is usual in ndarly all similar deposits in a desert country, but below this it appears almost certain that values would be absent or negligible until the bed rock is approached and the gravel lying directly above the bed rock should normally contain the largest quantity of black sand and also of free gold. Therefore, it is really of the greatest importance to reach bed rock if possible and obtain some samples from the lowest stratum of the gravel.

Lacking any reliable data concerning the lay of the bed rock and also a topographical survey of the surface of the property it is impossible to estimate the quantity of gravel in this district. The area which may have been enriched through concentration by the lava flows is probably limited to 2,000,000 yards, but might amount to as much as 10,000,000 yards if the second terrace is found to be well mineralized. The quantity of gravel underlying the third terrace is enormous and will run into hundreds of millions of yards, but I could not find the slightest reason to believe that this had any more value than the many billions of yards which compose the alluvial plains formed by the Gila River and up to the present time neither the second nor upper terrace has been sampled in any satisfactory manner.

Should the present sampling yield unexpectedly high values and further investigation be in order this should include as well as a more systematic sampling (going down to bed rock,) a topographical survey of the entire mineralized area and a geophysical survey by electrical (resistivity) methods to determine the contour of the underlying bed rock. The total expense of a proper examination and sampling aimed to indicate the average values in some 20,000,000 yards of gravel would probably run to $20,000 and cover a period of probably six months.

The character of the gravel is such that it could practically all be mined by a large power shovel of 2½ or 3 cubic yards capacity after having been shaken up with explosives and some of the cemented gravel might require grinding in a ball mill, but I think that a large portion of the fine material representing less than 20% of the total yardage could be sent to a washing plant after having been run through a series of trommels which would eliminate all pebbles larger than a half an inch or possibly quarter of an inch in diameter.

It is obvious that the method of mining to which the local conditions seem to limit the operation of this oproperty is vastly more expensive than hydraulic work and the working costs of 3¢ per cubic yard mentioned by Vahrenkamp and Slak are entirely ridiculous.

Considering all the conditions effecting the water supply, mining and treating of the gravel, storage of debris, and royalty to the owners, it is my judgment that the total working costs would be in the order of 25¢ per cubic yard and I would not consider that the Neel Gila Placer had any commercial value unless one were able to estimate a yardage exceeding 10,000,000 of an average grade of 50¢ or better per cubic yard.

In my judgment there is only a very remote possibility that such a deposit exists on the Neel Claims, but I believe that this is worth checking up at an expense which should not exceed $1500.00.

The points at which I indicated that the samples should be taken are located in what appears to be the best portion of the claim, and after this work is completed it will be in order to draw some further and more definite conclusions.

Yours very truly,

G. H. Colvocoresses

GHC:DF

April 4th, 1941

Mr. C. A. Firth
P. O. Box 158
Safford, Arizona

Dear Mr. Firth:

Re: Neel Placer

I have your letter of the second instant and recall very pleasantly our meeting in Safford in 1935, at which time I was making an examination of the so-called Neel Placer below the mouth of Bonita Creek and along the banks of the Gila River.

There is no reason why I should not communicate to you the result of my investigation, which however was not favorable since the sampling which was carried on under my supervision did not give satisfactory results and we were unable to check the high opinion of the property which had been expressed in previous reports and which induced the A. O. Smith Corporation of Milwaukee, for whom I was then acting in a consulting capacity, to carry on the investigation mentioned.

I have in my file a fairly complete report on the property made previous to my examination by F. H. Vahrenkamp, consulting engineer of San Francisco, also copy of a report by John Slak, a local mining man, and notes in reference to statements made by Neel and others regarding the yardage and value of the gravel.

I shall be pleased to forward you copy of all the above for the sum of $100.00 but I am not at all sure that you will wish to secure this data since personally I could not confirm the estimates of Vahrenkamp and Slak and my own report would not be likely to assist you in interesting any capital for the further development of the property.

Of course our investigation was by no means complete but merely was of a preliminary nature and like everyone else we may have made mistakes. The reports at least contain a very considerable amount of information and Vahrenkamp gives quite elaborate results of his investigation, which I understand involved an expenditure of some $7500.00 and as a result of which he estimated the existence of a very large yardage of high grade gold-bearing gravel.

I shall be glad to hear from you further on this matter if you will be interested in my proposal.

Yours very truly,

GMC:at

C. A. FIRTH, COMMISSIONER

UNITED STATES OF AMERICA
VS.
GILA VALLEY IRRIGATION DISTRICT
ET AL. E-59 GLOBE

OFFICE OF THE

Gila Water Commissioner

P. O. BOX 158

Safford, Arizona

April 14, 1941

Mr. George M. Colvocoresses
Mining and Metallurgical Engineer
1102 Luhrs Tower
Phoenix, Arizona

- file -

Dear Mr. Colvocoresses: Re: NEEL PLACER.

This will acknowledge receipt of your letter of April 4 and I read with great interest what you knew of the property.

I am taking your proposal up with my parties and will write you further should they seem interested.

Thanking you for your courtesy, I am

Very truly yours,

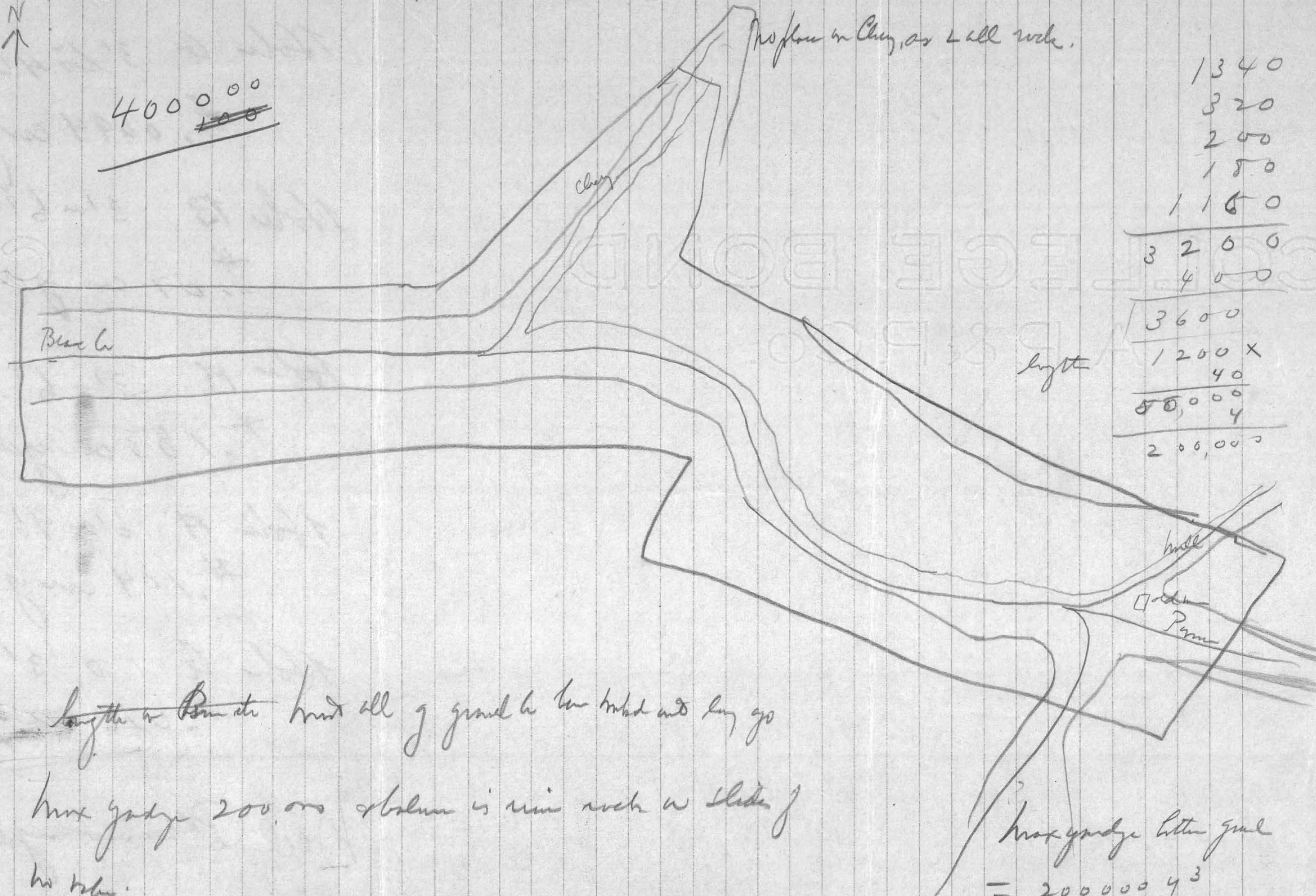
C. A. Firth.

CAF:C

770

940
170
770

Cross Plan



No place in Clay, or all rock.

1340
320
200
180
1160
3200
400
3600

length 1200 ×
40
~~50,000~~ 48,000
4
200,000

~~4000~~ 400000^{00}

~~Length ... [illegible]~~ Must all of ground be [illegible] and [illegible] go

Max yardage 200,000 & balance is [illegible] rock in slides of [illegible]

[illegible]

Max yardage [illegible] ground

= 200000 y^3

Bed [illegible] = 50000 y.

[illegible] 120000 y - [illegible]

Hole G 3'-0"-4'-6"
#.0094 cu yd

Hole B 3'-6'
#.07 cu yd

Hole A 3'-6'
#.183 cu yd.

Hole F 6'-9'
#.104 cu yd.

Hole G 0-3'
#.076 cu yd.

Neil Pleus Samples

REPORT ON THE NEEL-GILA RIVER PLACER PROPERTY,

PLACER DEPOSITS. OWNED BY NEEL PLACER CO., INC., PHOENIX, ARIZONA

LOCATION OF PROPERTIES

The Neel-Gila River Placer Deposits are located in Township 6, South, Range 28 East, of the Gila and Salt River Base and Meridian in the County of Graham, State of Arizona. The Gila River flows through the eastern and southern boundary of the property; Bonita Creek, a tributary to the Gila River, flows through the north-east corner of the property; Spring Creek forms the western boundary of the property. (See Map No. 1)

The property is located at an elevation of 3332 feet above sea level. Following are listed the various mining claims, areas, and status of title.

CLAIM NAME	AREA	UN-PATENTED. STATUS
Gold Spot No. 1	160 acres	160 acres
Gold Spot No. 2	160 "	160 "
Gold Spot No. 3	160 "	160 "
Gold Spot No. 4	160 "	160 "
Gold Spot No. 5	160 "	160 "
Gold Spot No. 6	160 "	160 "
Gold Spot No. 7	160 "	160 "
Gold Spot No. 8	160 "	160 "
Gold Spot No. 9	160 "	160 "
Gold Spot No. 10	160 "	160 "
Gold Spot No. 11	160 "	160 "
Gold Spot No. 12	160 "	160 "
Gold Spot No. 13	160 "	160 "
Banner	20 "	20 "
Bonny	20 "	20 "
Redd Bird	20 "	20 "
Gold Nugget	20 "	20 "

STATUS OF TITLE:

The mining claims are held under U. S. Government possessory title, located on unsurveyed U. S. Government lands, to legal subdivision. The annual assessment work required under the U. S. Mining Laws, in order to hold title has been duly performed by the owners every year since the date of location, and notice of performance of such yearly work by the owners having been duly filed for record, as required by law, in the County Record's office at Safford, the county seat of Graham County, Arizona.

ACCESSIBILITY:

The property is accessible by automobile over a good graveled road following up the Gila River Valley, distance twelve (12) miles from the town of Solomonville, Arizona--a railroad station on the Southern Pacific Railroad.

The distance by automobile from Phoenix to Solomonville, over U. S. National Highways Nos. 80 and 180 is 189 miles. The Southern Pacific Railroad makes connection at Bowie, Arizona, with main line trains for Phoenix, Los Angeles, San Francisco and all points west and El Paso, New Orleans and all points east.

CLIMATE:

Climatic conditions are favorable for hydraulic operations throughout the entire year, being moderate and agreeable, except in the months of June, July and August, when the sun becomes very warm during the day, although not oppressive, with pleasant, cool evenings. Much more endurable than the heat of eastern cities.

GEOLOGY:

The geology of the region is fully described in Professional Paper No. 43, "Morenci and Clifton Quadrangle" by Waldemar Lindgren. It being so thorough and painstaking that it seems of little use to revamp any of its contents. I therefore, shall quote excerpts from his report.

"GENERAL CHARACTER AND DISTRIBUTION: The bounders of the conglomerate are of local origin, and their derivation from particular mountain flanks is often indicated by the slopes of the beds. Its cement is calcareous. Interbedded with it are layers of lightly coherent sand and of trass and sheets of basalt; the latter, in some cliffs, predominating over the conglomerate. -- Beginning at the mouth of Bonita Creek below which point their distinctive characters are lost, they follow the Gila River for more than one hundred miles toward its source. Below Bonito Creek it merges insensibly with the detritus of Pueblo Viejo Desert. It is, indeed, one of the "Quatenary gravels" of the desert interior, and it is distinguished from its family only by the fact that the water-

course which crosses it are sinking themselves into it and destroying it instead of adding to its depth--- The material of the Gila River formation consists almost exclusively of coarse subangular gravels, appearing more or less distinctly stratified, by non-persisting streaks of lenses of sand, and containing fragments of all of the older rocks of the mountains. In most places basalt and rhyolites predominate, as is natural when we consider that at the time when these deposits were being accumulated a much larger part of the quadrangle was covered by volcanic flows than at present. Other rocks may, however, locally preponderate, thus, for instance, below the area of porphyry a few miles southwest of Morenci, where the gravels consist almost exclusively of coarse-diorite-porphyry often indeed, difficult to distinguish from the deeply weathered outcrops of the same rock. Along the lower part of Eagle Creek volcanic rocks are extremely abundant in the Gila conglomerate, and the dividing line between this and the underlying basaltic and rhyolitic tuffa in places becomes indistinct.---Along the Gila River from the mouth of Bonita Creek to the mouth of Spring Creek the erosion has in many places produced steep or nearly perpendicular bluffs of Gila conglomerate usually pitted by reason of the gradual weathering out of the large pebbles. Where volcanic rocks predominate the conglomerate is often well cemented. The color of the Gila conglomerate is reddish to grayish white, especially in places where long-continued exposure has had opportunity to oxidize the iron.

"MODE OF DEPOSITION: The Gila conglomerate is unquestionably of fluviatile origin, and was deposited during an epoch in which the lower reaches of the rivers gradually lost their eroding and transporting powers, while disintegration progressed rapidly in the mountains. Especially was it active among the loose masses of lava, which then covered so much of the quadrangle, from which intermittently torrential streams brought down vast masses of the crumbling rocks. The climatic conditions were then probably very similar to what they are at present. The volcanic outbursts of the Tertiary took place under conditions of active erosion, the different

flows being often deeply dissected before the eruption of the next mass. This epoch of erosion doubtless continued for a short time after the close of the igneous activity, for we find the Gila conglomerate deposited on an uneven, and in places, deeply dissected surface. As far as known, the Gila conglomerate has not been warped or dislocated by faulting in this area, though studies extended over a wider field may very possibly modify this conclusion."

TERRACE GRAVELS:

Between Bonita and Spring Creeks (see photo and Map No. 1) on the northwest side of the Gila River from 50 to 200 feet above the stream in its lower course, we find a large acreage of auriferous gravel deposited in four distinct terraces. The deposition of the gravel in terraces would indicate a temporary check in the erosive power of the stream, much later than the Gila Conglomerate.

CHARACTER AND SOURCE OF TERRACE GRAVELS:

The terrace gravels are of auriferous origin, deposited by erosive agents, and, being a much later flow than the Gila conglomerate the Gila conglomerate forms the bed-rock or stratas of gold concentration. These gravels no doubt are part of a remnant of an old ancient river channel. The channel may be traced by its exposed edges and rims in several places. All the boulders and stratas of gravel have a slight dip of 10 degrees to the northwest, whereas the Gila conglomerate dips 20 degrees southwest. These gravels indicate a temporary check in their erosive power, due no doubt, to the erosion gradually declining in intensity, thus forming the many terraces. The gold being of ancient origin, being derived from disintegration of the immeasurable gold bearing quartz veins in the igneous rocks of post-paleozoic age.

The gravel consists of average size boulders, from the size of a bucket to that occasionally of a large barrel, and sand of a very loose nature, all washed smooth and well rounded. No pipe clay or cemented gravel is to be found of any consequence

except, occasionally now and then I observed a thin layer of about two feet in thickness of gravel cemented by some carbonate of lime with oxide of iron which, when coming in contact with water, disintegrates instantly.

The gravels, as shown deposited by an old ancient river channel in the form of terraces, never eroded into the bed of the Gila River. The old river channel makes a swing northwest along the north bank of Spring Creek, thence disappearing underneath a heavy wash. The gravels in the Gila River bed are largely composed of detritus material and of rocks found in the Gila conglomerate. The writer drilled three test holes in the bed of the Gila River to determine this factor. The depth to bed-rock in each was twenty feet where the drill entered the Gila Conglomerate, and at a depth of thirty-two feet encountered hot water. A few colors of free gold were found in each hole throughout the twenty feet of gravel, this no doubt having come out of the Gila conglomerate, and the Gila conglomerate contains a little free gold through out, but not in commercial quantity.

It is not materially significant where the gold comes from found so abundantly in the gravel, or how it was deposited, but it is important and very essential to fix the value of the gravel, the positive and probably yardage of the deposit, the best working methods water handling debris and other data pertaining to economic and successful operation.

Therefore, in order to arrive at my conclusion, I will study separately each item, group them, and deduct my conclusion accordingly.

GRAVEL OF POSITIVE YARDAGE:

The first terrace 50 feet above water level of the Gila River, covers an acreage of approximately 640 acres of mining ground out of the 2160 acres of land owned by that company. This acreage having been determined by measurements, open cuts, and pits, to contain approximately the following yardage of POSITIVE gravel:

Approximate	length	between	extreme	points.....	11,200 ft.
"	width	"	"	.....	1,820 ft.
"	depth	"	"	.....	30 ft.

According to these figures, the importance of the deposit approximates a POSITIVE average of gold bearing, auriferous gravel, allowing 25% for boulders and shrinkage, a total of 17,017,000 cubic yards.

GRAVEL OF PARTIALLY ASSURED YARDAGE:

The second terrace 90 feet above water level of the Gila River covers an acreage of approximately 480 acres of mining ground out of the 2160 acres of land owned by that company.

This acreage has not been fully determined by the writer as POSITIVE GRAVEL, however PARTIALLY assured. While many tests were made and the values appear to be the same as on the lower terraces, several shafts seventy feet in depth must still be sunk to fully determine if the gravel extends to bed-rock, the Gila conglomerate before pronouncing it definitely POSITIVE gravel. Nevertheless I am fully convinced in my own mind that the entire acreage to bedrock is pay gravel of the same character and value as the first terrace of 640 acres below, as along Bonita Creek and Spring Creek beginning of terrace the bed rock Gila conglomerate is clearly visible. This acreage contains the following estimated yardage.

Approximate	length	between	extreme	points.....	11,220 ft.
"	width	"	"	.....	2,700 ft.
"	depth	"	"	.....	70 ft.

According to these figures the approximate yardage, allowing 25 percent for boulders and shrinkage, would be a total of 58,905,000 cubic yards.

GRAVEL OF DOUBTFUL YARDAGE:

The balance of 960 acres are thus far doubtful as no work i.e. sinking of shafts or open cut work, has been done. In order to determine fully the extent of the gravel deposited upon this acreage several shafts should be sunk to bed-rock, to a depth of one hundred and twenty feet (120). The entire acreage is

covered with gravel of the same character as that of the other two terraces below and along Bonita and Spring Creeks the conglomerate bed-rock is visible indicating that the whole acreage may contain pay gravel throughout. I made many tests by panningsy which all showed gold of the same value as the other ground, neverthless, I will have to include this acreage as DOUBTFUL. In the event that we find this ground to contain pay gravel in its entirety, it will add an additional yardage of approximately 45,760,000 to what we already have. The measurements of the acreage are as follows:

Approximate	length	between	extreme	points.....	5,280 ft.
"	width	"	"	"	2,600 ft.
"	depth	"	"	"	120 ft.

TESTING OF GRAVEL AND SAMPLING:

Having ascertained the approximate yardage, and the character of the gravel, the next important phase is the values in free gold per cubic yard. The only method of testing and sampling a gravel property is by rocker, the pan, or sluice. I employed all three methods in my sampling. The best location for my sampling was to start on the different pits, shafts, old and new, open cuts, group them and find the average.

ON PLATE NO. 1 will be found the plan of shafts, pits and cuts showing the ensemble of sampling of first terrace. The gravel was taken at different heights, all along the top of the First terrace in open pits and shafts from 6 to 30 feet in depth, and all along the face of the bank in cuts from 6 feet in width to 30 feet in height, were cut vertically in the different strata.

From 3 to 12 pans were taken in each pit and shaft; and from one half cubic yard to as many as two cubic yards of gravel were taken from pits, shafts and cuts, and washed by rocker or sluiced, exclusive of the bed rock. All samples were taken in a box measuring one cubic yard, or 3' x 9' x 1'. This box was filled with gravel and boulders, allowance being made for the volume of the boulders; then washed either by rocker or through the sluice box containing riffles. The free gold was then separated by amalgamation from the "black sands", weighed on special gold scales, and

values calculated using for unit value per miligram the fineness of the gold as per mint receipts. The results thus obtained being 60¢ per cubic yard for the entire six hundred forty acres. This acreage has been determined by measurements, spaced by myself, the average of which has been found as follows:

Approximate length..... 11,220 ft.
" Width..... 1,820 ft.
" depth..... 30 ft.

According to these figures the importance of the deposit approximates 17,017,000 cubic yards of POSITIVE gold bearing auriferous gravel, or, in round figures at 60¢ per cubic yard a POSITIVE value of $10,210,200.00 in dollars and cents.

The method employed to determine the average value per yardage is what we call the method of compensation, which means that the surplus average taken of cut, shaft, or pit, is applied to the deficiency of the other, and by proceeding in the same manner from top to bottom the general average can be determined with some accuracy (provided enough prospects are taken to cover the whole of the area).

ON PLATE NO. 2 will be found the ensemble of sampling of Second terrace. The same method of sampling being employed as in the first terrace. The results being the same 60¢ per cubic yard. None of the shafts located on the Second terrace are down to bed-rock; more work should be done. The value of the gravel appears to average the same as on first terrace, and the character of the gravel is the same, and I am confident this acreage contains pay gravel throughout, of the same value as first terrace; however, I will call it PARTIALLY assured gravel. The acreage determined by measurements has been found to be as follows:

Approximate length..... 11,220 ft.
" width..... 2,700 ft.
" depth..... 40 ft.

According to these figures we find the deposit on the second terrace contains approximately 58,905,000 cubic yards of gold bearing gravel, having a PARTIALLY assured gross value of $33,343,000.00 in dollars and cents.

ON PLATE NO. 3, third terrace, not enough work has been done to determine any POSITIVE or PROBABLE value of the ground. The same method should be adopted in prospecting by shafts, pits, and cuts; my time being limited, it could not be done. I nevertheless "panned" and Rocked" the many places, as shown marked "PP" on the Plate. The results obtained were the same, as on first and second terraces, and in several places I obtained as many as 43 colors to the pan, and from the size of the colors the value of 60¢ is conservative for this acreage, although I cannot include it as pay gravel, therefore will place it in the DOUBTFUL column until such time when it has been fully prospected. In the event it should be found that the 960 acres contain pay gravel throughout it adds an additional 45,760,000 cubic yards. I have every reason to believe it will.

AMOUNT OF GOLD:

I am confident from all the prospects taken that my figure of 60¢ per cubic yard is very close to the reality, and that I have not overestimated the value in free gold of the deposit, and therefore will adopt it in my calculations. Having the yardage and the value, the amount of free gold in the two terraces is:

First terrace.....	$10,210,200.00
Second terrace.....	35,343,000.00
	$45,553,200.00

BLACK SANDS:

In addition to free gold, many of the ancient river beds carry "black sands" and concentrates containing considerable quantities of Platinum, Iridium, Osmium, Zircon, Monasite, and other metals or metallic oxides. In former years of hydraulic placer mining and dredge mining, these were thrown away with the tailings; whereas, the "black sand" and sand products would in many cases be of much value.

In order to thoroughly sample a large body of gravel to ascertain the exact amount of "black sand" concentrates to a cubic yard of gravel is a very difficult problem, due to the great

variation of the deposit. Near the surface the metal content usually is exceedingly low, and becomes richer as we near the bed-rock; therefore the metal content has to be gauged by a mechanical separation of a large sample. It must be remembered that, roughly speaking, a drill sample will only represent something like one part in 200,000 to one part in 1,000,000 of the body of the material to be worked.

(Dredging for Gold in California by D'Arcy Weatherbe.)

The sampling of the tailings is even more difficult. The difference of opinion on the subject is an added proof of the well known difficulties of correct sampling and of the great variation of the personal equation in this work.

I do not consider that sufficient or detailed tests have been made to form a definite conclusion as to the gold value per ton of "black sand" concentrates available per cubic yard of gravel, until a more complete working test on a larger scale has been made. The purpose of my examination is merely to obtain data as to the advisability of saving the "black sand" concentrates; and judging from tests made and from past experience on similar gravel deposits, the "black sands" concentrates found in this property represent a by-product of considerable value.

The results of the tests are most surprising. The total weight of black sand concentrates recovered by sluicing and rocker tests amounts to 200 pounds to a cubic yard, having an assay value from $12.00 up to as much as $48.00 per ton in gold.

Accepting therefore, the lowest assay value per ton, or $12.00 it would add an additional value of $1.20 per cubic yard. The totalyardage available in the two terraces being 75,922,000 cubic yards. This would amount to $91,106,440. These figures appear staggering, nevertheless, they are to a certain extent true. The gold bearing "black sand" in this locality is extremely rare of its kind. I shall not include them as POSITIVE value until further tests on a larger scale have been concluded. I merely mention them as they are of great commercial importance.

The losses in precious metals in the metullurgican

end of placer mining are unknown. In many cases, the gold is so excessively fine that much of it is lost, even under the most favorable conditions possible, under the old-gold-saving devices.

In the State of California the gold dredges are now recovering 92% of all platinum found in the state, and California produces 82.5% of all the platinum mined in the United States. Heretofore, the platinum was washed away with the black sand in the tailings.

METHOD OF OPERATION:

HYDRAULIC MINING: The term"Hydraulicking" is applied to excavation of gravel banks by streams of water thrown under pressure from nozzles. (Economic Paper 3, Department of Commerce, U. S., page 6, 1929). "Hydraulic mining was started in 1852 in Nevada City, California. By 1865 this method of placer mining was well established and the years 1866 to 1876 were notable for their gold yield from hydraulic mines." "The size of the gravel is not so important in hydraulic mining, large boulders can be handled, providing there is room for their disposal. Gravels of 600 feet or even greater depth have been worked--other things being equal the smaller and looser the gravel the higher will be the duty of the water." (Bulletin 92, C. S. MB, 1923)

Next to the question of gold contents, the determining factors in the employment of this type of mining are the presence of an abundance of water that can be brought to the mine under pressure, and the existance of sufficient grade for the disposal of the tailings. Few hydraulic mines are so situated that a full head of water is obtainable throughout the year.

The "Neel-Gila River" auriferous gravel deposits may be economically and profitably worked by hydraulic method. The climatic conditions are such as to permit continuous work throughout the year. An abundant water supply is available under high pressure the year round. The "terrace" gravels are unusually well situated as regards dump room for stackings or tailings to carry on extensive hydraulic operations at very low cost.

The duty of water, in cubic yards per miner's inch varies from one to ten, and depends upon the character of gravel, the facility for disposal of tailings, the amount and head of water available.

After the equipment and installation of a hydraulic property the question of labor is not a serious one, as but few skilled people are required. 3 pipers, 6 sluice men, a good blacksmith and perhaps a winchman, are all that are required on a mine of moderate size, handling from 2000 to 5000 cubic yards of gravel a day; 24 hours.

The chief advantages that hydraulic mining has over any other form of mining is as follows:

FIRST: It is not so greatly affected by the cost of railroad transportation of supplies and materials.

SECOND: Small turnover of labor.

THIRD: Excessive low cost of operation for the amount of material (yardage or tonnage) handled.

FOURTH: Practically absolute elimination of speculation of ore bodies. Surface gravel deposits are unlike to underground ore bodies being lost, due to faulting or vein distortion, or losing their values with depth.

FIFTH: Auriferous surface gravels, in their extent, depth, breadth, and length, may be accurately had and determined by correct measurements, without guessing.

SIXTH: The gold content in auriferous gravel deposits are usually evenly distributed; very seldom occur in spots or bunches. In the "Neel-Gila River" deposit the gold content is evenly distributed from the very surface to bed rock.

SEVENTH: Placer mining offers but very little risk to capital invested. Success is dependable entirely upon its management.

EIGHTH: In placer mining for gold, we are dealing with a commodity unlike any other commodity produced in the world. There are no fluctuating prices in the sale of gold--the price is always the same, whether you have one ounce or one hundred thousand ounces.

STATISTICS OF COSTS OF WORKING HYDRAULIC GRAVELS:

(Hydraulic Mining in California, pp 277, 1885, by Aug. J. Bowie, Jr.) "The resume of work done by the "La Grange" Company, Stanislaus County, California, June 1st, 1875, to September 30th, 1876, gives the following results:

Average yield of Gravel per cubic yard.....	.10.19¢
Cost per cubic yard.....	.06.00¢
PROFIT PER CUBIC YARD.....	.04.19¢

The "NORTH BLOOMFIELD" Company, Nevada County, California (Table XLVIII by Aug. J. Bowie, pp 278, 1885) over a period of three years, on 4% grades, high banks, and with great hydrostatic pressure, was much less than the LA GRANGE, as follows:

Average yield of Gravel cubic yard,1875-1875.	.03.99¢
Cost per cubic yard.....	.02.86¢
PROFIT PER CUBIC YARD.....	.01.13¢
Average yield of Gravel cubic yard, 1875-1876	.06.60¢
Cost per cubic yard.....	.03.25¢
PROFIT PER CUBIC YARD.....	.01.13¢
Average yield of Gravel cubic yard, 1876-1877	.12.68¢
Cost per cubic yard.....	.06.19¢
PROFIT PER CUBIC YARD.....	.06.49¢

The "FRENCH HILL" hydraulic mine, in Stanislaus County, California, over a period of three years, 1875-1876 (Table LI, by Aug. J. Bowie, Jr., pp 285,1885) shows a tabular statement of costs as follows:

Average yield of Gravel per cubic yard.....	.13.00¢
Cost per cubic yard.....	.06.03¢
PROFIT PER CUBIC YARD.....	.06.97¢

The statistics quoted from Aug. J. Bowie, Jr., Tables and disbursements, are absolutely accurate, I quote them for the sole purpose of arriving as nearly as possible to the actual costs of operating a hydraulic mine.

The "LA GRANGE", "NORTH BLOOMFIELD", AND "FRENCH HILL" hydraulic mines were among the largest of this type ever operated in the State of California, and their average yield in gold value per cubic the very lowest. All three of these mines paid millions of dollars in dividends to their owners--prior to legislative restrictions on disposal of tailings. Hydraulic mining is regulated

and controlled in the State of California by the California Debris Commission under federal Statute, Mine after mine was closed by injunction based upon this decision and the federal legislation passed in 1893 (The California Debris Act). Hydraulic mining in California is illegal if carried on in such a manner that it injures the navigable channels of the SACRAMENTO OR SAN JOAQUIN River systems. In order to carry on hydraulic mining in California, a permit, subject to the approval of the DEBRIS COMMISSION is necessary before mining may be started. The State of Arizona has no such law, as the State of Arizona contains no navigable streams.

COST DATA WORKING NEEL-GILA RIVER GRAVELS:

The cost per cubic yard of gravel varies as to locality. In California, the cost varies from .02.08¢ to as much as 6.19¢ per cubic yard, and in Alaska to 25¢ or more. Where gravels are cemented and the dutyof the miner's inch is low, the costs necessarily increase. The duty of a miner's inch in hydraulicking is the cubic yard of gravel which can be broken down and sent through sluices by one miner's inch of water in 24 hours. It varies with height of bank, character of gravel and bed rock, grade of bed-rock, amount and pressure of water, and with all the factors influencing sluice capacity.

The"Neel-Gila River" gravels will not cost over .03.00¢ per cubic yard to work. The gravel contains no pipe clay or cemented material. Low banks from 30 to 40 feet, the duties of the miner's being high, under a head of 300 feet, the duty per miner's inch therefore should be approximately 3 cubic yards per miner's inch of water.

Records of costs usually include only operating expenses, omitting capital charges, as the latter may be very high.

AVAILABLE WATER AND WATER RIGHTS:

Few hydraulic mines are so situated that a full head of water is obtainable throughout the year.

THE NEEL PLACER COMPANY, INC. own two valuable water

rights, as follows:

Application for 200 second feet of water in Section 31, Township 6 South, Range 28 East, G & S R. B & M., County of Greenlee, State of Arizona, on the Gila River, has been filed with the Division of Water Resources of the State of Arizona. Permit having been granted. The Gila River is the largest and longest River in the State, and during the lowest season of the year flows as much again the amount of water than the application calls for at the point of diversion.

To carry on hydraulic operations throughout the year, it will be necessary to construct a pipeline approximately 6 miles in length to carry the source of water amounting to 10,000 miner's inches to the point of use. The topography of the ground is of easy grade, and in the distance of 6 miles we develop a head of 300 feet, vertically. The 10,000 inches of water, under an effective head of 300 feet, will operate 3 number 9 inch Hendy Hydraulic Giants having a capacity of not less than 3320 cubic yards each, every 24 hours.

Another application for 50 second feet of water in Section 26 Township 6, South, Range 28 East G&SRB&M, County of Graham, State of Arizona, on Bonita Creek, has been filed by the Neel Placer Company, Inc. with the Division of Water Resources of the State of Arizona. Permit having been granted. This source of water supply is for the purpose of generating hydro-electric power and for general cullinary camp and residential use.

<u>WOOD</u>:

There is sufficient timber in the immediate vicinity upon the property, along the Gila River and Bonita Creek, for fuel purposes,. The timber consists of black walnut, box elder, sycamore, cottonwood, mesquite, black willow, and pine oak of fairly good size trees.

Lumber for sluice boxes and for building purposes, i.e. Oregon Pine, White Pine, Spruce, etc. may be had from the lumber dealers at Safford or Solomonville, 12 to 17 miles distant.

LABOR:

Plenty of labor is available at any time of the year. The mining towns of Clifton, Morenci, are only 16 miles distant, and the copper mining camps of Miami and Globe are 89 miles away on the line of the Southern Pacific Railroad and National U. S. Automobile Highway Nos. 80 and 180.

LABOR ESTIMATE OF THREE SHIFTS:

HYDRAULIC OPERATIONS:

Men:	1 Manager	$ 500.00	monthly
	1 Superintendent	300.00	
	9 Giant Pipers @ $6.00 per shift	1,458.00	
	6 Giant Sluice Tenders @ $5 per 8 hr shift	900.00	
	2 Ditch tenders @ $4 per shift	240.00	
	1 Blacksmith	250.00	
	1 Blacksmith's helper	150.00	
	1 Electrician	300.00	
	2 Carpenters	600.00	
	1 Cook	150.00	
	1 Cook's helper	100.00	
	26	$4,948.00	monthly

ECONOMIC CONSIDERATIONS:

In reviewing the conditions at a placer property of this nature, it is essential that we obtain a balanced perspective with regard to the following points:

(1) Total extent, possibilities, and the gross and net value of the property.

(2) The economic limit of operations, viz; either minimum or maximum monthly output to obtain the best returns in proportion to a given capital outlay; so as to obtain practical working results.

(3) The net values of the gravels per cubic yards after deducting costs so as to visualize the dividends earnings and capital refunding point of view.

(4) The type of equipment that will give practical working results and insure saving the "values" and yet will not cost more for capital outlay than an amount within the capital expenditure admissible for this type and size of deposit.

For the present purpose of this economic estimate,

we may consider that we have upwards of 17,017,000 cubic yards of POSITIVE gravel and 58,905,000 cubic yards of PARTIALLY assured gravel available.

The working season is all the year around, with three daily 8 hour shifts each. Average actual mining time about 20 hours out of the 24 hours per day. Normal capacity of plant from 15,000 to 20,000 cubic yards per day.

Normal output 360,000 cubic yards.

Normal annual output 4,320,000 cubic yards.

Normal annual output 4,320,000 cubic yards. It would therefore take approximately 20 years to work out the deposits of first and second terraces.

CONCLUSION:

In conclusion, I consider the POSITIVE and PARTIALLY assured gravel situated within the boundaries of the property under consideration, estimated at 75,922,000 cubic yards as unquestionable, and the gross average value of 60¢ a cubic yard conservatively given.

If we placed the average gross free gold yield at 50¢ instead of 60¢ a cubic yard, and allow liberal amounts for operating expenses, overhead, reserves, amortization, etc. of say 10¢ per cubic yard, it leaves a capital value of the property at over $30,368,800.

The writer will say that an immense yardage of gold bearing gravel exists in this property, which is extremely rare of its kind, and contains all natural advantages for economical operation, and easy of access, that will pay good dividends under competent management over a long period of years.

I fully consider the venture worthy of capital investment.

Respectfully submitted,

F. H. Vahrenkamp,
Consulting Engineer.

San Francisco, California
January 6, 1930.