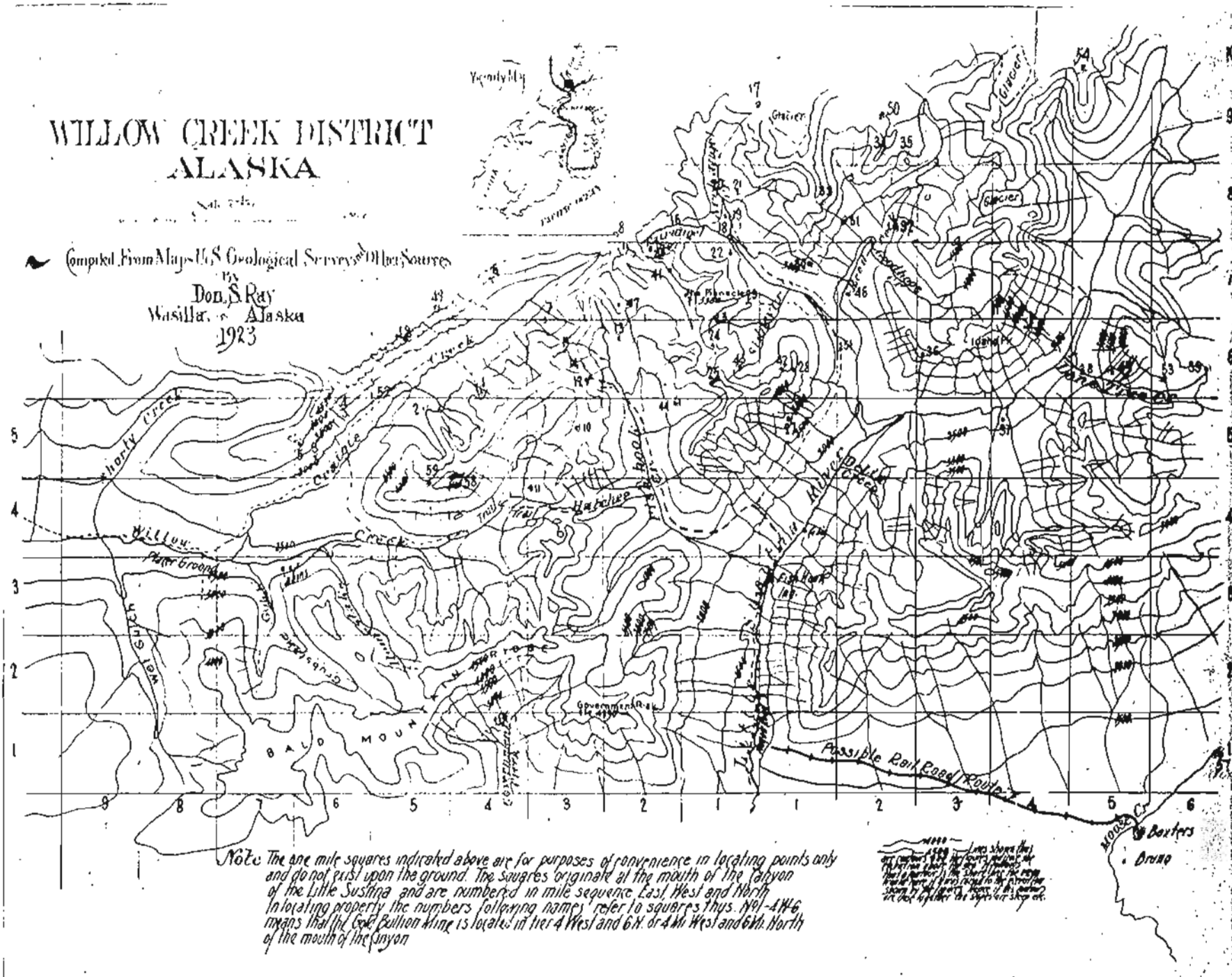


# WILLOW CREEK DISTRICT ALASKA

Computed from Maps U.S. Geological Survey & Other Sources

by  
**Don S. Ray**  
Wasilla, Alaska  
1923



Note: The one mile squares indicated above are for purposes of convenience in locating points only and do not exist upon the ground. The squares originate at the mouth of the canyon of the Little Susitna and are numbered in mile sequence East, West and North. In locating property the numbers following names refer to squares thus: 1W1-4N6 means that the Gold Bullion Mine is located in tier 4 West and 6N or 4 Mi West and 6Mi North of the mouth of the canyon.

1000 - Lines show the 1000 foot contour lines. 1900 - Points show the 1900 foot elevation points. The 1900 foot points are shown by the letters 'A' through 'Z' and are numbered in the order in which they were discovered.

- |   |                                     |                                  |                                  |                          |                       |
|---|-------------------------------------|----------------------------------|----------------------------------|--------------------------|-----------------------|
| 1 Gold Bullion Mine 4W6                     | 11 Mammoth Prospect 3W4             | 21 Little Gem Gold Mining Co 1W8 | 31 Idamar 2E8                    | 40 Webfoot Extension 2W7 | 49 Long Holland 5W7   |
| 2 Golden Light Prospect 5W5                 | 12 Alaska Free Gold Mine 3W6        | 22 Webfoot Prospect 1W7          | 32 Mary Ann prospect 2E8         | 41 Virginia Group 2W7    | 50 Neptune 2E9        |
| 3 War Baby Mine 6W5                         | 13 Gold Cord Mine 2W6               | 23 Mohawk prospect 1W6           | 33 Snow King prospect 1E8        | 42 Rac Group 1E6         | 51 Mary Ann 2E6       |
| 4 Pan handle Prospect 6W5                   | 14 Independence Gold Mines 3W6      | 24 Keystone prospect 1W6         | 34 Willow Creek Development 2E9  | 43 Colorado Group 1W6    | 52 Rainbow 5W6        |
| 5 Lucky Shot Prospect 6W5                   | 15 Kelly Willow Creek Mining Co 3W6 | 25 Smith-Sargent prospect 1W6    | 35                               | 44 Rae Wallace 2W5       | 53 Murray 6E6         |
| 6 Gold King Prospect 4W7                    | 16 Talkeetna Mine 1W8               | 26 Snough prospect 1E5           | 36 La Roi Mines Co 3E6           | 45 Gold Mint 5E6         | 54 Jessie Garbor 5E10 |
| 7 Newman & Miller Prospect 3W7              | 17 Anchorage Gold Mines Co 1W9      | 27 Mabel-nine 1E6                | 37 Gold Mint prospect 4E5        | 46 Garstead 2E7          | 55 Bruno Coal Mine    |
| 8 Dixie Prospect 2W8                        | 18 Rutland prospect 1W8             | 28 Arch prospect 1W7             | 38 Maverick prospect 5E6         | 47 Blue Bird 2W7         | 56 Baxter Coal Mine   |
| 9 Little Willow Prospect 2W7                | 19 Fern and Goodell prospect 1W8    | 29 Opal prospect 1E7             | 39 Moose Creek Copper Claims 6E6 | 48 Joe Brazil 5W6        | 57 Lilwall-Rawson     |
| 10 Brooklyn Willow Creek Gold Mining Co 3W5 | 20 Giant Gold Mining Co 3W8         |                                  |                                  |                          | 58 Durrn 4W4          |
|   |                                     |                                  |                                  |                          | 59 Swanson 5W5        |

PRELIMINARY REPORT OF OPERATING MINES AND PROSPECTS,  
WILLOW CREEK DISTRICT, ALASKA  
September 15 to 19, 1937.

Introduction:

The Willow Creek district is rated as the second district in value of lode-gold production in Alaska by the Alaskan Branch of the U. S. Geological Survey for the year of 1937. The largest producer of the last few years has been the Willow Creek Mines. This year the production from this mine has fallen to nearly the half million mark. However, the total production of the district as a whole has held up due to the increased production of the Independence and Fern mines. Milling began at the Independence on June 6 of this year and from this date until September 8 a total of \$158,000 has been recovered. The total production for the year, with the new mill put into operation in October, was reported to have been nearly half a million dollars.

The construction of two new mills, and new milling machinery installed at the Fern, is the most promising feature for future development of the district. More staking and four newly organized companies show this district to be progressing very rapidly.

Another factor that has helped the development of this district has been the new road construction which now links up all the producing mines with the main road system from Wasilla to Palmer and Anchorage. This has lowered freight costs and has been an important factor along with the rise in gold price that has warranted the present developments. Another factor, which will greatly aid this district, is the possibility of electrical power being transmitted by the Anchorage Light and Power Company. This should lower costs and greatly aid the district. The following is a summary report of general mining activities for the past season, made by the writer during a hurried trip through this district. Weather conditions did not permit the examination of prospects on which most work had ceased for the season. A general preliminary trip was made through the workings of the operating mines for safety inspection and noting new development work. Considerable has been written regarding these mines and prospects, and a summary list of U. S. G. S. publications on the district is contained in this report.

Independence Mine:

85-1 1/2

The Independence and Martin mines are held under option by the newly organized Alaska Pacific Minas, Inc. The total holdings consist of 39 claims, of which 28 claims are patented. These properties are located on Fishhook Creek in the Willow Creek district, 19 miles via road from Palmer, Alaska. The two properties adjoin and apparently have the same vein system. The Alaska Pacific Mines, Inc. apparently holds the properties and the Wasilla Mining Company is the operating company. The relation of these two companies is not known; however, C. L. Harrison is President and W. W. Stoll is general manager of both companies.

Operations were started by this company in August, 1936, which consisted of opening up the mines, general repair work, and some building construction. During the following winter of 1936-1937 four men were engaged in tunnel work in the Independence, and a total of 460 feet of underground work was accomplished. Two hundred tons of ore was milled from the Martin property in 1936.

Since May 1 of this year a total of 700 feet of underground development work has been done in the Independence, and on the date of visit a total of 63 men were employed. However, a number of these were engaged in construction of buildings and the new mill on the Independence. The old Lane mill on the Martin property was in operation at a capacity of 15 tons a day. Four Denver cells were used below this old mill. These cells are to be transferred to the new mill. No development was in progress on the Martin property, and it was not visited. Development was to start this coming winter.

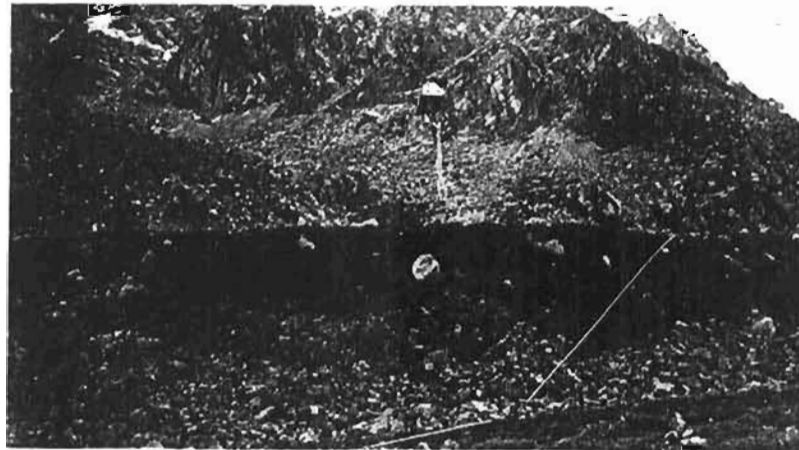
In the Independence mine, as the result of the tunnel work, a continuation of the lower tunnel, started by J. M. McDonald, manager for the Alaska Free Gold Mining Company, the former operating company, a new high grade ore shoot was discovered. This shoot has a proven length of over 100 feet and varies from 1 to 6 feet and possibly 8 feet at its greatest width, as the wall rock carried values. This shoot is on the downward extension of the Independence vein. On the above levels considerable stoping has been done on this vein. However, a considerable amount of ore still remains which can be milled at a profit with the new mill. This vein has a strike of N. 10° W. and dips 20 to 25° W. It is faulted in the northern section with a zone 15 feet wide that strikes N. 50° W. and dips 40° E. This faulting has been post vein formation, and its displacement is not known.

Twelve different veins were reported on the two properties which dip into the mountain and have variable distances between. However, they are more or less parallel in strike. It is the belief that this veining is the result of movement on joint planes. All the veins are contained in the quartz diorite formation. This origin bears out rather logically when the character of the veins are noted. They are distinctly banded, have free walls and the alteration of the wall rocks is very evident, and movement along the walls is very distinct. The bands vary in thickness from thin bluish black streaks to bunches, and they are lenticular in form. The ore is bunched and variable in values. The quartz has a gray to bluish color and contains a highly scattered mineralization with specks of gold.

A thin section of the quartz taken from the center of the new orebody shows large anhedral quartz masses fractured, and the fractures filled with a fresh younger generation of quartz. Associated in seams and masses considerable talc, kaolin and ankerite was noted.

Sulphides were distributed throughout, but the talc and kaolin contained the greatest amounts, which were of a very fine nature. Associated with the younger quartz and in the fractures and occasionally in the older quartz was a larger type of mineralization. The talc-kaolin, ankerite and rutile are no doubt the alteration products of the original feldspars, and ferromagnesium minerals. Gold occurs free and is associated in and with the younger generations of quartz. Galena, sphalerite and chalcopyrite are the main sulphides.

Another thin section taken from a hard quartz band near the center of the vein of the new orebody shows mainly a ground mass of second generation quartz with some anhedral pieces of the older quartz. The mineralization occurs very fine, and talc, kaolin and ankerite are in much less amounts than the above section. A thin section of the altered wall rock, originally the quartz diorite formation, shows a highly altered matrix of plagioclase feldspar (possible andesine) fractured and broken augite, quartz, and muscovite. The muscovite shows pressure lines which appear to be from two directions. Contained in the altered and partly replaced pieces of muscovite are most of the sulphides. Also in the altered portions of the plagioclase feldspar, sulphides occur. Small amounts of chlorite were noted. This wall rock alteration has been one of the major factors in the genesis of the ore. A detailed study of the ores of this district has been made and is contained in bulletin 849-C\*.



Upper bunk house and workings  
of Independence Mine.

\*See appended bibliography.



New camp and site of Independence Mine.

Mining and Milling Machinery, Independence Mine:

This season almost entirely new mining and milling machinery has been installed and this is expected to be in operation in October of this year. The camp and combined mill and power house are located on a new site approximately 1,000 feet nearer the head of the valley than the old camp and mill site. New camp buildings consist of four modern apartments combined in one building, a combined cook house, dining room, wash room and bunk house, office and combined bunk house, and a new mill and combined power house. Note photo below.



New mill and power house, Independence Mine  
(Note road to mill)

A combined blacksmith shop, mess house, ore bins and tram station are under construction at the portal of the main tunnel. Note first photo.

The installed machinery in the new mill building consists of a Gardner-Denver 2-stage compressor, 550 cu. ft. per minute capacity, run by a 125 H. P. Caterpillar diesel. A boiler is installed for winter heat. A new aerial gravity tram is to be constructed from the mill, elevation 3600 feet, to the Independence main tunnel, elevation 4058 feet, a distance of 1800 feet. A power tram is to be constructed to the Martin property a distance of 3200 feet. A 4-inch air line has already been completed to the Independence, a distance of 1800 feet. A phone system between mill and mine is to be maintained. At the present time two Sullivan portable compressors are in operation at the main tunnel of the Independence.

The complete milling equipment is not installed, but will consist of a 75-ton crude ore bin, 8x12 inch Marcy Blake-type crusher, 35-ton crushed ore bin, belt feed conveyor to 42x60 inch Marcy ball mill run by a 60 H. P. Fairbanks Morse diesel, 30-ton capacity, a Gibson impact and Clark-Todd amalgamators, Dorr classifier and four Denver flotation cells. The mill building is of sufficient size for 100-ton capacity, and is to contain a cyanide plant which is to be installed later. At the present time the old Lane mill was in operation on the old mill site. Storage tanks, as shown in mill photo, have a total capacity of 24,000 gallons of diesel oil.

Safety conditions have been taken into consideration in both the planning of the construction of buildings and in future mine development. The new camp site is supposedly in a location not subject to snow slides. The upper blacksmith shop, lunch room, and ore bins are 300 feet away from the portal of the main tunnel, against a rock bluff, which deflects snow slides in two directions. The haulage way between upper bins and main tunnel portal is entrenched into the side of the mountain and covered with a roof over which snow slides will pass. In the mine the firm quartz diorite and low dipping vein make for safe conditions unless too great an area is stoped without roof support. Further the management is considered good, and working conditions as noted were fair.

High Grade Mine: <sup>95-61</sup> K\*

The High Grade Mine, located 1 mile north of the Independence Mine and near the head of the Fishhook Creek valley, is now owned by H. Snider and R. G. Dodson. A group of eight claims are held. Two men have been engaged in drifting in the tunnel. Last season a total of 100 feet of underground work was completed in the tunnel. Considerable

trenching was done on the flat below the tunnel in an effort to pick up the high grade vein. This was unsuccessful. No ore has been found in the last two seasons. Two small parallel stringers, on which some high grade ore has been found comprise the showings. The tunnel has been driven on the largest vein. This vein varies from a few inches to one foot, strikes N. 10 to 20° W., and dips 25° W. A slight movement shows along the walls and the structures appear to be jointing. The mineralization and wall rock alteration appear to be very similar to the Independence.



Mill and tunnel dump, High Grade Mine.

Contained in the above mill building is a Gardner-Denver 7x6 inch single compressor, Joshua-Hendy crusher, 6x8 inch, Straub circular 10-stamp mill, capacity 6 tons per 24 hours. These are run by a 15-H. P. semi-diesel.

The total production from this mine has been \$5,000 during the last five years. This production was made from high grade pockets found along the small veins.

#### Gold Cord Mine:

The Gold Cord Mine is located one-half mile above the Independence Mine, and it is being operated by the Gold Cord Development Corp. Milling and mining development have been continuous throughout the year. The mine was not visited, but development work was reported as sinking on a continuous orebody below the old workings on the south side of the large fault. Several small faults were cut by the shaft and considerable water has to be pumped as a result. A total of 2000 feet of development work has been done since 1931. Considerable of the ore milled

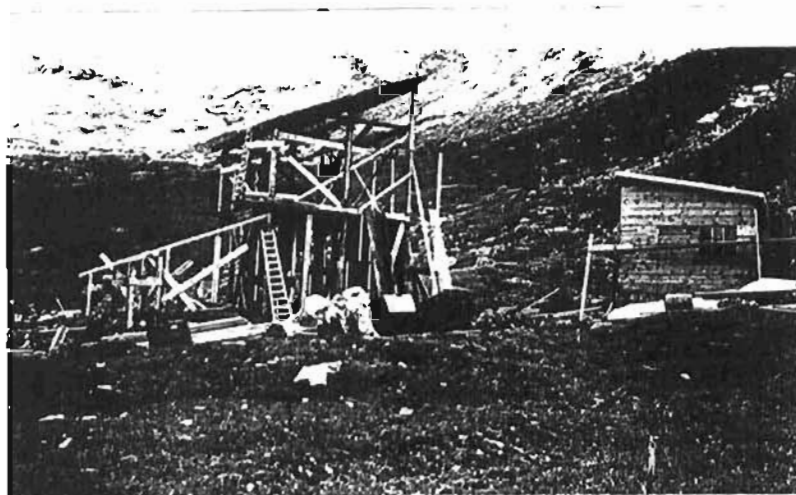
has been taken from the old stopes. The old mill is in operation one shift a day and a total of three tons per day is milled. A total of 7 men have been employed for the year.

Mr. Horning reports that next season a flotation plant is to be installed and the ponded tailings, approximately 7,000 tons, are to be retreated. These tailings were reported as averaging \$10 per ton in gold.

Geology was reported to be similar in formation and type to the Independence Mine. A detailed report of the mine is given in Bull. 849-C\*, p. 217.

#### Kelly Property:

The Kelly property adjoins the Independence and Martin properties on the west, and is located over the mountain ridge near the head of Willow Creek. This property consists of 11 claims owned by Mr. & Mrs. Milo Kelly. Last year the Kelly Gold Mines Corp. was organized and operations since have been under this name and under the management of Milo Kelly. In August of last year construction of a 15-ton mill was begun. This mill was expected to start on September 20 of this year.



New 15-ton Eldorado ball mill under construction,  
Kelly Gold Mines Corp.

A new road was completed this season to the camp by the Alaska Road Commission, a total length of one and one-fourth miles.

\*Op. cit., p. 3.



On the date of visit, development in the mine had ceased and the workings were not visited. Mr. Kelly reported five known veins on the property, three of which have been partly developed. Small lenses were encountered on the veins that varied from 30 inches to 3 feet in greatest thickness. A proposed crosscut tunnel is to be driven from the mill level to intersect the veins, and from which level they are to be stoped. The geology was reported as similar to the Independence and the veins were reported dipping to the west which with the slope of the mountain should make for a short crosscut tunnel. Twenty-five tons of ore is broken at the workings ready to be trammed to the mill, and several tons of float ore is to be gathered and milled. This ore was reported as averaging \$50 per ton in gold. A total of \$20,000 was reported spent within the last year in development work.

A 1500-foot gravity tram has been constructed from the workings to the mill. Here the ore is dumped onto the floor and crushed by feeding a roll crusher, from which it drops into the 15-ton Eldorado ball mill. The pulp is run over two sets of plates into an Allam amalgam trap. Next season a flotation cell is to be added. The mill is operated by water power fed from springs above. Next season a 1,000-foot pipe line is to be constructed to the falls of a small creek, and a 427-foot head will be developed. The milling season is expected to average 125 days per year. A reconditioned Dodge motor with special head is to be used as a compressor, delivering 154 cubic feet of air per minute. This is run by a gasoline Dodge motor. A blacksmith shop, mill building, cook house and tent bunk houses represent the buildings on the property. Six to eight men are employed.

Lucky Shot Mines: K x 85-23

The lower workings of the Lucky Shot Mine, which is located on the right limit of Craigie Creek one and a half miles above its junction with Willow Creek, were investigated. Development and milling has been continuous throughout the year. Production for the year dropped to nearly the half million dollar mark from both the War Baby and Lucky Shot. The cause for this decrease has been due to two factors. Very little ore was found in the lower workings in both mines, and ore pillars and lower tenor of ore from various parts of the mines has been milled to keep up the capacity. It is the general impression that the Lucky Shot has been mostly worked out. Only small short lenses of ore were found between the 650 and 500 foot levels. Below the 650-foot level nothing has as yet been found. On the 410-foot level of the War Baby a drift has been extended under the Lucky Shot on the vein at a depth approximately 800 feet on the dip of the vein below the 650 level. No ore was found on this level under the Lucky Shot.

Mining and development were in progress on the following levels in the Lucky Shot. Two small lenses were being stoped between the 650 and 500 levels. On the 500-foot level two shifts were engaged in drifting through the Lucky Shot fault to the west. This is being done with the hope of picking up the extension of the Lucky Shot vein past the fault. This vein has not been located in the west block on the surface, and there has no doubt been considerable displacement. The chances of picking up this extension are good, and if such is done, it will no doubt extend the life of the mine. The War Baby has been definitely proven to be the eastern extension of the Lucky Shot vein past the Capps fault in the east block. Stoping of pillars is in progress above the 400 level. Filling of the stopes is necessary before pillars can be taken. A raise was under way to the hanging wall vein and from this vein some ore is expected. This raise starts on the 400-foot level. Timber in the drift of the 300-foot level and in the open stopes shows considerable evidence of pressure of the hanging wall. Above the 300-foot level all the ore including the pillars was reported mined. This section was not visited, but was reported inaccessible in some places. No work is being done above the stopes between the 300 and 400 levels.

The total amount of underground work done in the Lucky Shot from January 1 to September 1 of this year consisted of 214 feet of raise and winzes, and 174 feet of drifting and crosscuts.



Lower workings of Lucky Shot Mine.

War Baby Mine:



War Baby Mine showing new building  
constructed after fire two years ago.

The War Baby Mine, located 1200 feet east of the Lucky Shot and representing the continuation of the same vein past the Capps fault, is furnishing the greater amount of the present ore milled. Here again on the lower level (410') only a small amount of ore was found. The levels of this mine are reached by means of a well constructed 7x10 foot (33°) incline shaft. The vein is bounded on the west by the Capps fault and on the east by the East fault. The 3800-foot drift west from the 410 level picked up the Lucky Shot vein past the Capps fault after a displacement of 400 feet of the hanging wall to the south. This fault strikes nearly north and south and dips 40° east. Drifting was in progress in this long drift. A long raise of over 800 feet is proposed from the 410 level to the 650 level of the Lucky Shot. This is mainly for the purpose of prospecting this area. The vein in this drift is very small, and in only one spot was any values found. A small amount of quartz is found only in short lenses along the vein. To the east of the incline shaft on the 410 level a drift was extended on the vein and into the East fault. Bad ground was encountered in the fault and the drift was terminated. This fault was reported to have a displacement of 1500 feet of the hanging wall to the south. This would throw the extension of the vein near the center of the Craigie Creek valley where the vein would be covered with glacial moraine. Two stopes were being mined above the 410 level. The quartz showed a width of 5 feet, of which only a portion was taken for ore. Also horses of waste occur in the ore. Occasionally the ore is sorted in the stopes, and the stopes are filled with waste. A good block of ore remains between the 260' and 130' levels. This block of ore will no doubt keep the mill going for the remainder of the year. Between the 130-foot and adit levels, nearly all the ore has been stoped.

A new 30-H. P. Caterpillar diesel has been added to a new Paddock hoist, direct connected, for use in the shaft.

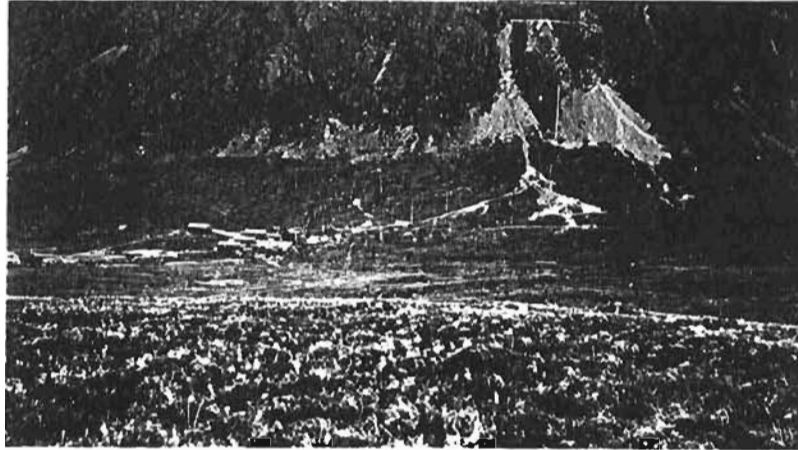
The total development in the War Baby from January 1 to September 1 of this year has consisted of 125 feet of raising and 1,000 feet of drifting and crosscutting on the 410 level. Some diamond drilling was done by Lynch Bros. on the 410-foot level last year into the foot and hanging walls. The results were reported nil. Several drill holes were put down in the valley east of the War Baby in an effort to pick up the continuation of the vein. These were reported unsuccessful. The cost of drilling was \$2.45 per foot.

A total of 90 men were employed, of which 65 were employed in the two mines.

In the mill the Gibson concentrating table was cut out of the circuit below the Marcy mill and a Pan American jig was added. This made a better recovery of concentrates and free gold.

#### Safety Conditions:

Safety conditions throughout both mines are generally considered fairly good. Air circulation is good in the War Baby as it circulates down the shaft and up through the stopes to the surface adit level. Two air fans with 8-inch pipe are used in the long drift under the Lucky Shot. Circulation of air in the Lucky Shot seemed fairly good. The stopes are kept filled to within a few feet of the backs, however, bad slabs exist on the hanging wall, which are in places near talc seams. These have to be picked down or would otherwise be dangerous. In some stopes stulls have to be added where the stope is not filled. Other conditions that may lead to accidents are the steps of the inclines up to the mines, and the steps down the incline shaft of the War Baby. In places the steps are wet, and a small amount of water flows over the top steps of the shaft. These no doubt freeze in winter and make an icy condition. Another condition is the closeness of the skip to the chute lips in the incline shaft. Men traveling on the skip, which itself together with hoisting equipment is safe, have to lay down in the low angle of dip of the shaft, and the chute lips are nearly flush with the top of the skip. Thus if any one raised his head during the raising or lowering of the skip past these chute lips, he would contact the lip itself. The management, however, is good and the principal of mining is well understood and enacted.



Camp of Willow Creek Mines and Lucky Shot Mine.

Rapp & Till have nine men employed in their cyanide plant located below the Lucky Shot mill. Nearly all of the tailings have been treated, and at the present time they are engaged in moving part of this plant to the site of the Ready Bullion Mine. By next season they expect to have the plant ready to treat 25 tons per day. A total of 75,000 tons of tailings were reported available. A small plant is to remain at the Lucky Shot to treat the daily mill run tailings.

Jap Property: K 2 85-95

Morris Anderson is mining and milling 200 to 300 pounds of high grade ore per day on the Jap property, located at the head of Willow Creek. He has a lease from the owner, Mr. Swetmann of Seward.

The ore is mined from a small 10-inch quartz vein. The richest ore is reported on the vein in small shoots near fault intersections.

Sydney Black is developing a small property with two men employed on Craigie Creek, near the head.

Ed Hill and Ward Schrafe are prospecting in a tunnel located on the divide between Craigie and Purchase creeks.

Jack Jefferson and Pyle did assessment work only this year on the Marion Twin and Mint properties.

The Fern Mine: 85-26

The Fern Mine is located between Archangel and Fairangel creeks, 24 miles distant via road from Wasilla. It has been operating continuously for the last two years. For this year an average of 400 tons a month has been milled. In the mine there is sufficient ore in sight and partly blocked out for two years at the present rate of milling. The holdings have increased from 17 claims to 42 claims. These are under lease to T. S. McDougal, the present operator. The bunk house has a new addition and a combined cold storage plant. The cook house has been rebuilt and furnished. A large new addition has been built on the mill, which includes a new assay office and power house. The present Denver quartz mill is to be replaced by a 25-ton Straub ball mill this fall. A new 145 H. P. Caterpillar diesel has been installed to operate the mill during the winter season. This also is connected up with an exhaust heater to heat the building for winter operations. A new 15-kilowatt generator has been added for lights. Water power will be used during the summer season. The old machinery contained in the mill consists of 80 H. P. Fairbanks Morse diesel, a Sullivan 10x12" single stage compressor, a Universal crusher, 8x12" jaws, four unit flotation cells, two Denver and two Kraut, and a 10-ton regrind mill. Amalgam plates are used below the ball mill. The mill is operated three 8-hour shifts by four men. A new 40 H. P. Tractrotac is used for heavy hauling and trucks for light road trucking.

The working portions of the mine were visited. Stopping was in progress in two stopes above the No. 1 level. Here the ore has a width of 27 feet consisting of banded quartz lenses and highly altered wall rocks. This ore was reported as averaging \$24 a ton in gold. The top of the stope is within 40 feet of the surface and a raise is started to the surface. This raise will give ventilation to the entire mine. The ore is lowered through chutes to the 2 level or main level and thence lowered by gravity tram to the mill. A new tunnel level known as No. 3 level was started this year. This level is vertically 225 feet below the main level. This tunnel is in a distance of 300 feet, and it is to be driven 700 feet at which point a raise will connect up with the winze on No. 3 vein on No. 2 level. The development of the orebody from the present stopes to the lower levels shows a decided rake of the ore toward the northeast along the strike of the vein. This vein system is referred to as a stringer lode type in Bull. 849-C.\* This vein system is inclosed in quartz diorite and geological conditions are very similar to the other mines of the district.

A total of 28 men are employed.

\*Op. cit., Bull. 847, last page.

Conditions in this mine in regard to safety are generally considered not good. First the entrance tunnel portal is enclosed with a wooden approach structure, which in case of fire would endanger the lives of the men working in the mine. Fire doors are lacking and with the proposed raise to the surface above No. 1 level, all the fumes would pass into the mine. Also the entrance is started under a rock slide and the timber supporting are badly in need of repair. This condition is general throughout the mine. In the stopes the ore and walls contain many talc seams which endanger the men working under the roofs. Near the surface there is danger of stopes caving unless filling is carried close behind the face. The walls are faulted, and the faults are cut by severe jointing, which makes for individual blocks which slough. These conditions were pointed out to the management. Safety training would be advisable at this mine.



Fern camp and mill.

Assessment work was done by the owners on the Thorpe property, located on Grubstake Creek, three miles south of the Lucky Shot Mine. This property was not visited and work had terminated for the season. Seventy-five feet of tunnel work was reported done and the high grade vein was intersected at the face. The total underground development consists of two tunnels vertically 20 feet between and which together total 800 feet of underground work. Last year a snowslide demolished the buildings and the small Straub mill. A small water power development is located on the property. This is composed of a 3500-foot ditch and a short 9 inch to 6 inch pipe line, and is rated at 50 H. P. The owners, Mr. and Mrs. Thorpe of Wasilla, have this property up for sale at a price of \$50,000 on option. There are, however, some legal difficulties as to ownership, according to reports.

For detailed descriptions of these properties and the entire district as to geology, history, etc. the writer refers you to the following publications by the Geological Survey on the Willow Creek district:

List of Geological Survey Reports on the Willow Creek District

"A Reconnaissance of the Willow Creek Gold Region," by F. J. Katz, Bull. 480, "Mineral Resources of Alaska, 1910," p. 139.

"Gold Lodes and Placers of the Willow Creek District," by S. R. Capps, Bull. 592, "Mineral Resources of Alaska, 1913," p. 245.

"The Willow Creek District, Alaska," by S. R. Capps, Bull. 607.

"Gold Mining in the Willow Creek District," by S. R. Capps, Bull. 642, "Mineral Resources of Alaska, 1915," p. 195.

"Gold Lode Mining in the Willow Creek District," by S. R. Capps, Bull. 692, "Mineral Resources of Alaska, 1917," p. 177.

"Lode Developments in the Willow Creek District," by Theodore Chapin, Bull. 712, "Mineral Resources of Alaska, 1918," p. 169.

"Lode Developments in the Willow Creek District," by Theo. Chapin, Bull. 714, "Mineral Resources of Alaska, 1919," p. 201.

"The Willow Creek Gold Lode District, Alaska," by James C. Ray, Bull. 849-C.

"The Willow Creek-Kashwitna District, Alaska," by S. R. Capps and Ralph Tuck, Bull. 864-B.



# MINING WORLD

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## The Cover Picture

Despite its Antarctic aspect, the illustration on the cover is not a picture of Little America. It is a view down Fishhook Creek in Alaska, with the camp and mill of the Alaska-Pacific Consolidated Mining Company dominating the foreground. In the sky are clouds, not northern lights, and in the left distance is the Matanuska Valley.

## TAKE the Best of It

SOME people say of the SEC: 'It's here. We can do nothing about it. We may as well make the best of it.

"I can't agree with the 'make the best of it' point of view. I say, rather, TAKE the best of it; discard the worst of it; and try to improve the middlings to the point where they will be worth something."

C. O. Dunlop, president of the Silver Dollar Mining Co. and of the Northwest Mining Association, is speaking as he sits in the office of Mining World.

"The idea of the SEC is right in general; but the values in the SEC are mixed up with unhappy administrative theories and practices which PREVENT rather than PROTECT investment. Thus the investor is being injured and the small man needing capital — the prospector and small mine owner — is being destroyed.

"As I see it, the present SEC set-up is like a complex ore. It has some values, but they are locked up with worthless gangue. We can get them out if we try. We can recover the free gold—the best of it—by amalgamation. The worst of it—the tailings—we throw away. The middlings—the sulphides—we can treat, beneficiate, and finally reduce to values.

"So with the SEC program. Let's take the best of it, discard the worst features, and reduce to their real values those fractions which show some promise.

"Why should we say: 'It's here. We may as well make the best of it'? That's surrender.

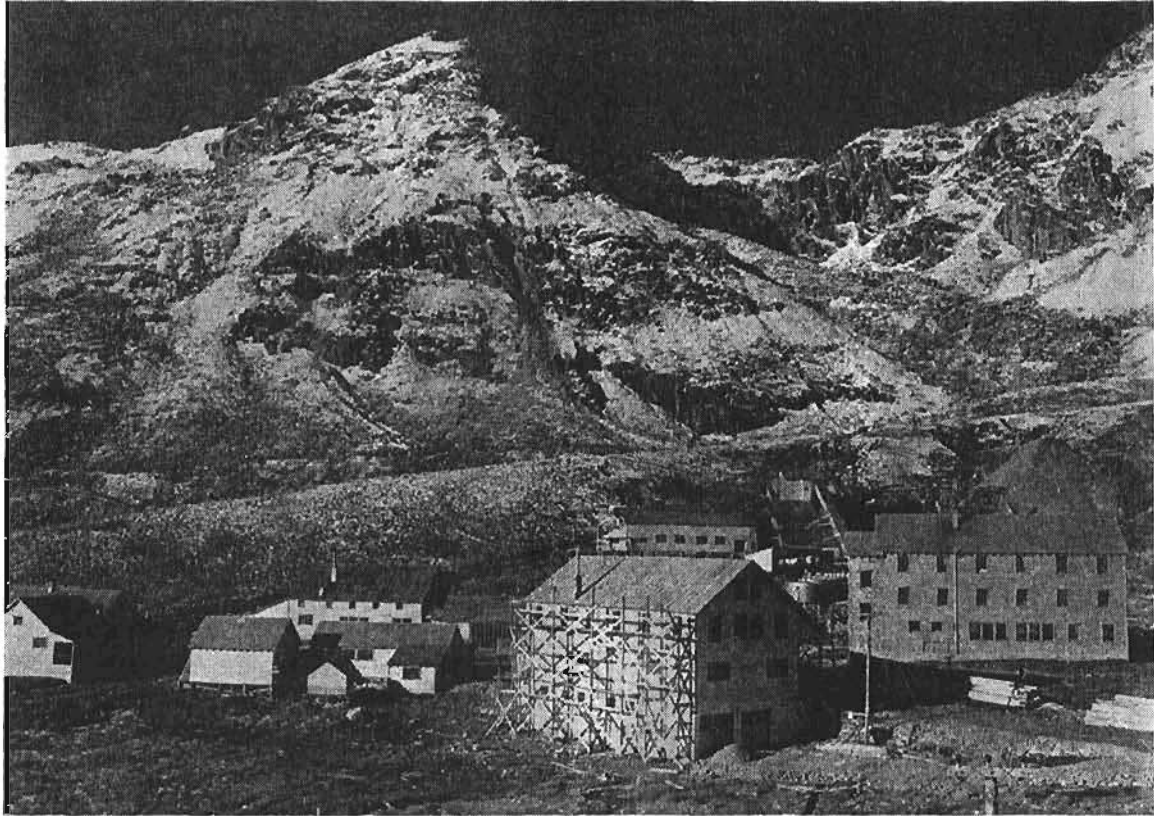
"The effect of SEC administrative and regulatory policies is plain to be seen in the Coeur d'Alenes, where small enterprise is paralyzed by utter inability to meet the capricious and impractical requirements.

"An example? SEC regulations say I must prepare in advance a program for expenditure of all the money to be raised through issue of securities—and I must so spend it all, regardless of what facts may be disclosed in the course of the work. If I strike an unexpected but promising vein, I may not use this money to mine it, to get out ore. I must go on cross-cutting in country rock according to the program.

"Is that sound mining? Is it sensible?"

"I'm asking because somebody has to speak out loud."

## Alaska Pacific Consolidated Mining Co.



# Second Alaska Lode Mine

**A**LASKA-Pacific Consolidated Mining Co. is the second lode gold producer in Alaska, following the Alaska Juneau Gold Mining Co.

Three years ago this company came into production.

Although it was on property now held by this company that lode gold was discovered in the Willow Creek District in 1908, the mining properties now owned by the Alaska-Pacific Consolidated Mining Co. had been idle for 22 years before it began operations.

The company's rise constitutes one of the most dramatic stories in the long drama of Alaska mining. Its achievements have not been solely of spectacular character, for they have been reflected in a studious program of development aimed at long-time operation. They have resulted in a re-awakening of the entire district and in the rejuvenation of other mines in the Willow Creek camp.

The Alaska-Pacific Consolidated Mining Co. is headed by C. L. Harrison as president, with H. E. Turner as vice president, Walter W. Stoll as secretary-treasurer and mine manager, Clay C. Harrison as assis-

Alaska-Pacific Consolidated Mining Co. camp buildings with Skyscraper Mt. and part of Independence Mt. in the background. Independence mine dump appears on upper right margin. New Water Tunnel dump just above right hand building. Dump from South-Southeast portal may be seen above left corner of building with scaffolding. Free Gold camp buildings near skyline on left margin. Free Gold tram terminal and bunkers on skyline in saddle to left of Skyscraper Mt.

tant secretary and Victor Montgomery as counsel. These men, with August Buschmann and Henry Waechter, constitute the board of directors.

The company was promoted without payment of any cash commissions and most of the financing was by subscriptions made against production notes, with stock offered merely

All photographs accompanying this article were taken by Russ Dow of Palmer and Hewitt's of Anchorage.

as a bonus. The company started operations June 1, 1937, and in one year from that date had retired all its production notes, the subscribers receiving their stock without cost. Dividends have been paid semi-annually since operations were begun.

### Geology, Geography, Topography, Weather

Mineralization of the Alaska-Pacific Consolidated Mining Co. properties—and of the Willow Creek district generally—is characterized by the frequent occurrence of very high grade ore shoots, by pinching and swelling of veins and pitching and flattening of the dip.

The following geological abstract is condensed from the report of James C. Ray, U. S. G. S. Bulletin 849-C, based on investigations made in 1931:

"Gold quartz veins of the Willow Creek district belong to the type of ore deposits that may be expected to continue downward for several thousand feet below the present surface. The veins occur in an essentially homogenous quartz diorite intrusive mass, batholithic in form; therefore, the composition of the wall

rock plays practically no significant part in the distribution of the gold within the veins. The veins were formed partly as fissure fillings and partly by replacement of the wall rock along fractures and of fragments of the wall rock caught between fracture walls.

"There has been an apparent tendency for the ore shoots to form at and near the branching of major fractures within the mineralized zone, which has been proved to be at least 8 miles long. . . . Numerous faults cut the veins into segments that are as much as 1,200 ft. long. . . .

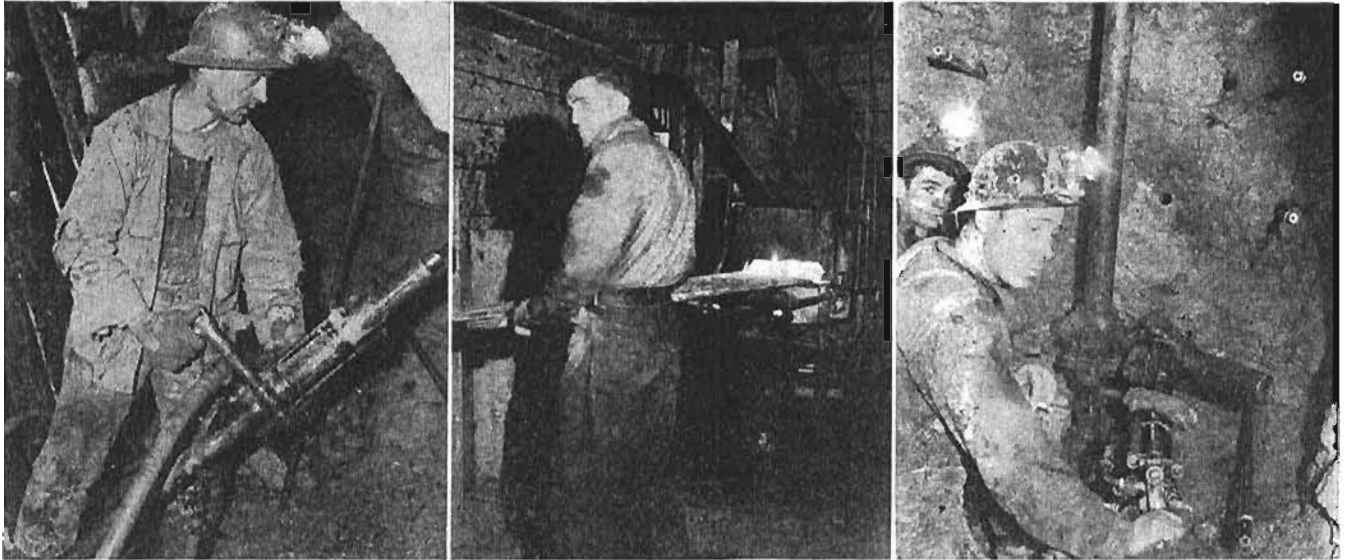
"The gold was the last metallic mineral to be deposited. It occurs as isolated grains in the quartz and is associated with tetrahedrite and galena. The tetrahedrite, galena and gold replace earlier sulphides such as pyrite, sphalerite and chalcopyrite, and are associated with a late microcrystalline quartz, which cements the earlier massive quartz and at many places forms the well-known ribbon structure. . . . The minerals accompanying the altered wall rock and those in the ore are remarkably similar to those of the famous Mother Lode and Grass Valley districts in California. A further similarity to the Grass Valley veins is the irregular pinching and swelling of the lode and the irregular distribution of ore shoots. In Grass Valley . . . exploration has resulted in profitable mining down to 7,000 ft. on the dip.

Looking across Fishhook Creek valley to the Alaska-Pacific Consolidated Mining Co. property, in the upper view one sees Independence Village in the middle distance, with the company buildings and mill behind. The dump on the mountainside at the right is from the Independence portal and that near the center of the picture from the South-Southeast portal. The Old Mill is seen to the left of the main buildings.

The middle view looks past the Independence mill to Independence Mountain, with the Independence tram terminal on the margin at the upper right, with the dump just to the left of it. Note tram tower on rise just above the oil tanks.

From the South-Southeast tunnel, the lower picture looks down to the mill and camp, with Independence Village beyond. Note Water tunnel dump to the left of the mill. Road continues to the left to the Gold Cord Mine.





Within this great distance there is no apparent change in the type of minerals that were deposited from the heated solutions, and similar conditions are expected to prevail also in the Willow Creek district."

The vagaries of the veins and values have naturally imposed mining problems in the district, and these in the past have often been met by the expedient of hunting for high-grade without respect to the rational development of the mines with respect to long life, economic production and thorough mining.

With respect to the mining policy of the Alaska-Pacific company, Walter W. Stoll, manager, says:

"The veins of the district, while persistent in strike, and presumably in depth also, are very irregular. They pinch and swell and are distorted and cut by innumerable small faults and a few of major character. In our operations we have finally adopted the practice of removing the entire mineralized portion of the veins, almost without regard for the values demonstrated by assay of the face samples. Exceptional values have been demonstrated time and again in the ore broken immediately adjacent to an area which has assayed rather meagerly, and a vein one foot or less in width carrying no quartz, in one round has widened to six feet or more of solid quartz. We have found the inconsistencies can be almost reduced to a pattern. For

Stoping, steel sharpening and drifting in the Alaska-Pacific Independence Mine. All equipment appearing in the pictures is of Gardner-Denver manufacture.

every pinch we know there will be a swell and for every steep pitch a concomitant flattening. Likewise, lean spots may lie immediately adjacent to rich lenses.

"These general characteristics, now fairly demonstrated by nearly three years of mining, have produced a system of mining new in our district."

The Willow Creek mining district lies in the southwestern part of the Talkeetna Mountains in south central Alaska, immediately north of Cook Inlet. It is reached by road from the Alaska Railway through the Matanuska Valley. Independence mill and village of the Alaska-Pacific Consolidated Mining Co. is about 21 miles by road from rail at Wasilla.

Supplies arrive by steamer from Seattle to Seward, thence by rail to Wasilla, and by road to the property. All operations are conducted above timberline, which is at approximately 1,800 ft. Spruce is available in abundance for mine timbers about 15 miles from the property. Average annual temperature range is from 70 degrees to minus 10, with average precipitation around 20 inches, and aggregate snowfall of about 50 inches. The higher portions of the district

are free from snow from about mid-June to the end of September.

Although above timberline, the elevation of the Willow Creek district actually is not great. The Independence mill of the Alaska-Pacific company is at approximately 3,500 ft., the highest point on the property being at 5,100 ft. The Martin mill, which the company call the Old Mill is at about 3,300 ft. elevation.

The property of the Alaska-Pacific Consolidated Mining Co. consists of 47 claims, shaped roughly like a capital A, with the point of the letter slightly east of north. The east side of the east leg is drained by Fishhook Creek, on which the company's two mills are located. The west side of the west leg is drained by Craigie Creek, while Willow Creek itself finds its source in the basin between the two legs of the property.

Mining to date has been confined largely to the east leg of the property. The operations of the Alaska-Pacific Consolidated Mining Co. have been predicated primarily on the tunnel and subsidiary workings at the 900 level, portal elevation 4,058 ft., with a shaft to the 1300 level, and drifts north and south on the 1,100 level, from which much of the recent mill feed has been drawn.

The adit enters the ridge of Independence and Skyscraper Mountains, forming the east leg, and runs in a west northwesterly direction to the main Independence vein, along which drifts run north and south on the 900 level. The northerly extension reaches to within about 1,500 ft. of the limit of the property in that direction.

The south tunnel runs from the junction with the main adit about 2000 ft. south southwest to the Free

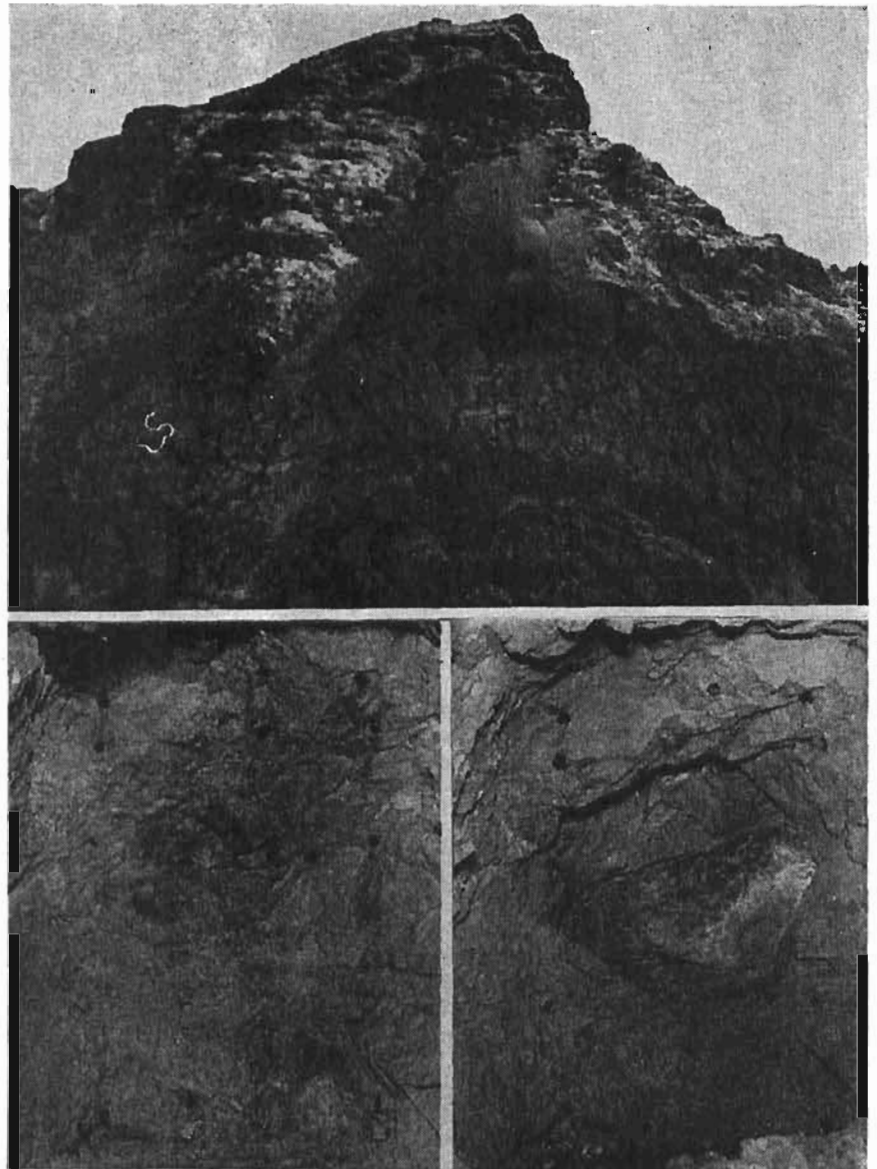
#### ALASKA-PACIFIC CONSOLIDATED MINING CO. OPERATIONS

Year	Tons of Ore Milled	Estimate Ore Reserves, Tons	Fine Ounces of Gold Recovered	Development Footage	Average Number Employees
1936, 2 mo.	800	10,400	641	1,885	24
1937, 7 mo.	4,160	22,300	11,261	2,650	55
1938, 12 mo.	13,684	60,000	18,450	7,424	83
1939, 12 mo.	23,808	118,000	24,262	10,175	128

Powder work on the Alaska-Pacific property.

The upper view shows a big shot of DuPont powder cutting a bench for the bunkers and tram terminal at the South-Southeast portal on Skyscraper Mountain. Refer to illustration on Page 2 for location of the portal.

Lower pictures show how Alaska-Pacific works its burn cut to mine ore encountered in a drift. On the left, a typical round of holes with the lower one closed with wooden plugs. A band of high-grade crosses the face at this point. All holes for the round are drilled, but only those in the ore are loaded. On the right, the same heading after the shot, showing how the central holes have drawn the ore, which is mucked up without dilution or necessity of sorting, leaving the waste to be drawn by firing the remaining holes.



Gold property. Here it forks into the east and west crosscuts. The east crosscut breaks out above the Fishhook Creek valley with a portal tributary to the Old Mill, the smaller of the company's two plants.

The west crosscut has been carried through Independence - Skyscraper ridge a distance of 1,010 ft., breaking out on the opposite side above the Willow Creek basin. As the properties on the west leg are developed, this tunnel will be connected with them by tram around the basin, affording a haulageway to the mills in the Fishhook Basin and obviating the necessity of mill construction and operation in the Willow Creek Basin.

### Mining Methods

The mining problem of the Alaska-Pacific Consolidated Mining Co. is complicated not only by the vagaries of the vein width but also by some faulting and the flat dip, averaging 22 degrees to the west—that is, into the mountain.

Practice generally is to drift directly on the vein. Drifts are 5 by 7 inside timbering, which is rarely necessary except where a vein forms a substantial portion of the drift back and in faulted areas.

In drifting, 16 to 20 holes are used per round, with a pyramid cut employed primarily. Powder is 40 per cent gelatine dynamite, fired with electric delay caps. From 4.5 to 6 ft. are pulled per round. In drifting on a substantial vein of good ore, all

holes may be drilled but those in ore blasted first.

Ore produced in drifting is sorted and milled, waste being used to fill earlier stopes. When a substantial body of ore is blocked out by such drifting, mining is carried upward in flat stopes.

The stopes are carried up direct from the vein without preliminary raising. After some progress has been made, stulls are set and lagged, gobs being built up with waste. Ore chutes are maintained between gobbed areas.

Cut-and-fill stoping is used throughout. While the country rock is sound and stands fairly well, practice is to fill as rapidly as possible and to follow the stope face closely, particularly where the stope width is considerable.

Ore naturally will not draw and it is customarily mucked down the chutes. Recent practice has involved the use of two Gardner-Denver

double-drum air scraper hoists and slushing scrapers. In this method, several—usually three—stope raises are driven radially from the station on the drift, where the hoist is mounted on a turntable. Ore is mucked by hand from the stopes to the scraper raises, which are carried up a few rounds ahead of the stope face.

Drill holes in stoping average 5 ft. in depth, a round consisting of as many as the miner can drill and load in a shift. Where the vein is narrow, holes are sometimes staggered, alternately on the foot and hanging walls. Two sticks of 30 or 40 gelatin is the normal charge, although it may be as little as a half-stick.

Drills are largely of Gardner-Denver manufacture, including eight 3-in. drifters and an equal number of 2½ in. drifters, with six R91 stopers and two R111S stopers. Conventional steel is used, it being Bethlehem 1-in. hexagonal on drifters and ¾-in. hex



on stopers, where the starting gauge is  $1\frac{1}{8}$ -in., with  $\frac{1}{8}$ -in. changes.

Drill sharpening shops are maintained at the Independence portal tram terminal, where there is a Gardner-Denver DS8 sharpener, and at the Martin portal, where the sharpener is a Gardner-Denver DS2.

A Chicago-Pneumatic diamond drill is used for exploration.

As the veins run narrow, considerable waste is produced. Values often occur in stringers roughly paralleling, and sometimes completely isolated from, the primary vein walls. This necessitates not a little sorting underground.

DuPont and Columbia explosives are used throughout the operation.

Ore cars are hand-trammed to the aerial tram terminals, there being 30 mine cars of the end-dump type in two sizes, 16 and 20 cu. ft.

### Recent Development

The Alaska-Pacific Consolidated Mining Co. has approximately 20,000 ft. of development, tunnels, drifts, crosscuts, shafts and winzes, about 8,000 ft. being added in 1938 and 10,000 ft. in 1939.

As has been mentioned before, the 900 level is the principal haulageway, although not a little ore is drawn from the higher levels through por-

tals. The 900 has been carried well north and south, although very little mining has been done above it except on the Independence ground. Although technically a drift on the vein, the 900 level north and south serves also as an adit, tapping shoots at a number of points, and actually on several veins. This type of longitudinal development is dictated by the extremely precipitous mountainside facing the Fishhook Basin, the necessity of protecting open haulage from snowslides, and of delivering ore to the mills by aerial tram.

The most notable recent development work of the Alaska-Pacific Consolidated Mining Co. involved sinking of an interior incline shaft from the 900 level to the 1100 and on to the 1300. Drifting has been confined largely to the 1100 level, and it has produced a very large part of the ore supply for the Independence mill, while the work done on the 1300

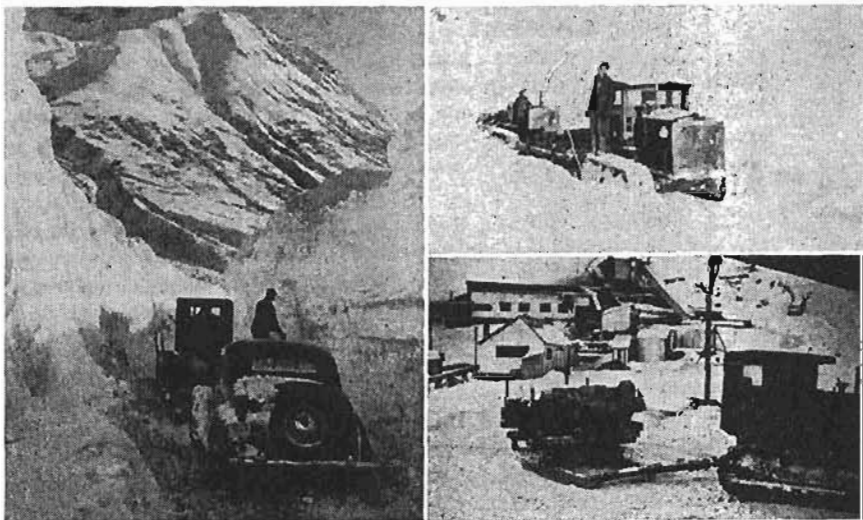
gives full indication of continuation of the higher ore shoots to that level. The incline shaft was driven in the footwall at 28 degrees, the vein dipping at an average of about 24 degrees. The shaft is 4 ft. 8 in. high and 6 ft. 8 in. wide inside timbering. Considerable water is made at the lower levels and this is handled to the 900 drainage ditch by two No. 5 Cameron air-driven pumps. During the low water period in early spring, mine water is collected at the 900 portal and piped to the mill, with two small oil-burning boilers installed in the line to guard against freezing.

Exploratory work is being carried on at a number of points in the vicinity of the Independence portal and also in the Eldorado workings at the extreme south end of the Free Gold property, as well as on the Jap and Brightness claims on the west leg, above the Willow Creek Basin. During the summer season, a camp is maintained on the top of Martin Hill, about 20 men developing high grade deposits at several points.

A so-called Water Tunnel has been driven into the mountain a short distance at a point about 50 ft. in elevation above the Independence mill. Eventually, this tunnel will be extended to the Independence vein system, which it should reach in about 2,900 ft., and at a point about 500 ft. in vertical distance below the present main haulage on the 900. In driving this tunnel it is expected that it will cut a number of veins thought to lie between the mill and the Independence vein. Outcrops of these veins are hidden by detritus. The tunnel should also furnish an adequate supply of water for milling, even though capacity may be increased.

In all cases ore is handled between portals and mills by aerial tramways.

Three pictures showing the tractors hauling concentrates by sled to the Matanuska Valley. On the left, an automobile follows the "Caterpillar" through a deep cut in the snow.



of which there are five in use on the consolidated property. The Independence Mine delivered ore for a time from the 750 portal, but now sends virtually the entire supply for the Independence Mill from the main portal at the 900 level. The upper terminal of this tram is located some distance north of the actual portal, the surface trackage being protected by heavy snowsheds.

The Old Mill draws its ore from the Skyscraper, South-southeast and Eldorado portals, the latter tram being 5,300 ft. in length, the longest on the property. During the winter, all ore for the Old Mill comes from the South-southeast portal.

Double track cables of the trams are  $\frac{3}{4}$  and  $\frac{7}{8}$ -in. wire, with endless  $\frac{1}{4}$ -in. traction wire. The main Independence tram has a vertical angle of 17 degrees. It is operated from the upper terminal, where the traction line sheaves are equipped with brakes.

Each of the two buckets, made by the Young Iron Works, Seattle, has capacity for 750 lbs. The tram will move 300 tons from the portal bunkers to the mill in 24 hours.

### Independence Mill

Ore reaches the Independence Mill by tramway 1,800 ft. in length. The tram is actuated entirely by gravity, the up-bound buckets carrying mine supplies, timber, etc. The buckets dump into a 70-ton coarse ore bin at the mill, the bin holding approximately one day's run.

Coarse ore is drawn as required onto a tapered roll grizzly with  $\frac{3}{4}$ -in. openings. Screen analysis of ore at the grizzly gives: on 6 in., 24.0 per cent; on 4 in., 8.3 per cent; on 2 in., 12.3 per cent; on 1.5 in., 7.6 per cent; on 0.5 in., 8.8 per cent; through 0.5 in., 31.8 per cent.

Grizzly oversize goes to Kue-Ken "30" crusher, 9 by 16 in. in jaw size and set to crush  $\frac{1}{4}$  in. Made by the Straub Manufacturing Co. of Oakland, the crusher is powered with a 25-hp. motor.

Crusher product joins grizzly undersize in the fine ore bin, from which it is drawn by a pair of Mine and Smelter belt feeders to the two ball mills. These are 42 by 60 in. Marcys, manufactured by the Mine & Smelter Supply Co. Each mill is charged with 6,500 lbs. of forged steel balls, make-up balls being 4 in. size. Ball consumption averages 2.4 lbs. per ton of ore. Quicksilver is added at the head of each ball mill every 15 minutes at the rate indicated by the condition of the amalgamation plates.

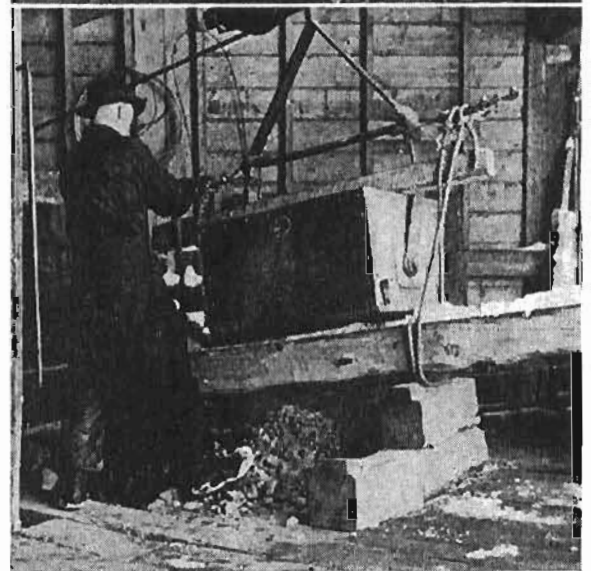
Tram tower with the carrier bound uphill. Note the pack box, complete with shoulder straps for carrying, hooked on ahead of the ore carrier. It contains lunches packed in tin cans and saves the men a long pack up the hill.



Upper terminal of the Independence tram. Chute from ore bin at the left. Ore carrier made by Young Iron Works, Seattle. Note mine timbers in the background. The tram terminal is located some little distance from the portal of the tunnel and is connected with it by heavy snowshed.



In the tram terminal at the Independence Mill, securing a large timber to the ore carrier for the return trip uphill to the Independence portal. All mill feed for the Independence Mill is received over this 1800-ft. tramway. It is actuated entirely by gravity.



The ball mill circuits are entirely independent, although virtually identical. Overflow from each ball mill passes through a trommel screen for the removal of definitely coarse material, screen undersize passes over step-plate amalgamators built by the company. Each of these consists of

several amalgamation plates. The plates are 4 ft. wide and 12 in. long in the direction of the flow. They slope 2 in. to the foot, with 1 in. drop between plates.

Overflow from the amalgamators passes to the classifiers. That in No. 1 circuit is a Dorr simplex, 15 by 1.5

ft., sloping 3-in. to the foot, with rake speed of 25 per minute.

The No. 2 circuit has a Dorr duplex classifier 20 by 4.5 ft., with one rake disconnected.

The circuits carry a 200 per cent circulating load. Classifiers are set to overflow 85-mesh. Rake product is returned to the ball mills and the overflow from each circuit to Denver

Equipment Co. conditioners. The No. 1 circuit has a 6-cell No. 12 Denver Equipment Co. Fahrenwald Sub-A flotation machine, while that on No. 2 circuit consists of four No. 18 special cells of the same type and make.

Flotation reagents are products of the American Cyanamid Co. Aerofloat No. 25 is used as frother with butyl xanthate in 4.3 per cent solu-

tion as collector, with a very little pine oil added at the third cell as a frother booster. Aerofloat consumption averages 0.17 lbs. and xanthate consumption 0.04 lbs. per ton of dry ore.

Flotation concentrates are run to two dewatering vats for each circuit, the drained concentrate being sacked for shipment by truck to the railroad at Wasilla station. In the winter they are loaded on a sled drawn by a tractor. The company operates two "Caterpillars." Freight and supplies for the mines are returned by the same conveyances.

Amalgam is retorted at the mill and the sponge shipped to the Seattle assay office.

Approximately 85 per cent of the values are recovered by amalgamation, with the balance in smelter returns from the flotation concentrates. Mill heads in 1939 averaged about \$38.50 per ton on assay and recovery is approximately 97 per cent. Approximately 90 tons of ore are now being milled per day. The total amount milled in 1939 was 23,808 tons, and it is anticipated 30,000 tons will be handled this year.

### Old Mill

The Old Mill is situated in the valley about  $\frac{3}{4}$  mile from the Independence Mill. Its principal ore supply is from the Free Gold property, and it is served by tramway from the Skyscraper, South-southeast and Eldorado portals.

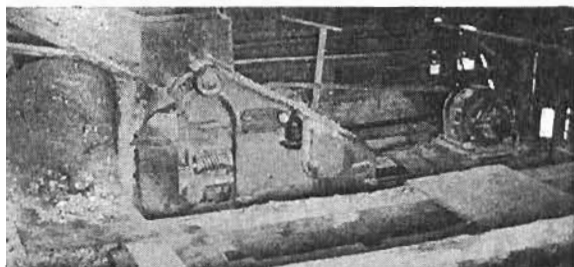
It is equipped with a Denver Equipment Co. jaw crusher, set to  $\frac{3}{4}$ -in. with an old Lane Chilean mill carrying six mullers for grinding. A Joshua Handy Iron Works belt feeder delivers the ore.

This is the mill which ground in the original operations of the company, producing much of the gold with which the modern plant was built. It still operates well, but its capacity is small, about 21 tons per day, and it will probably soon be replaced.

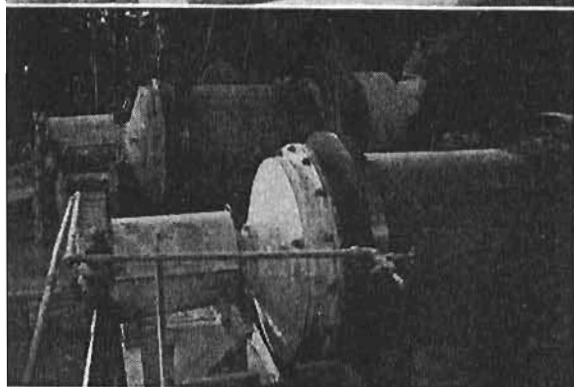
Product of the Lane mill passes over step amalgamation plates and thence to a Denver high weir classifier. Oversize from the classifier is re-ground in a  $7\frac{1}{2}$ -ton Denver ball mill. Classifier overflow goes to a Denver Equipment Co. 4 by 4 ft. conditioner and then to a 2-cell No. 18 special Fahrenwald Sub-A flotation machine. Re-ground material from the Denver ball mill passes through a Titan amalgamator made by the Mill & Mine Supply Co., Seattle, before being floated.

### Power Plant

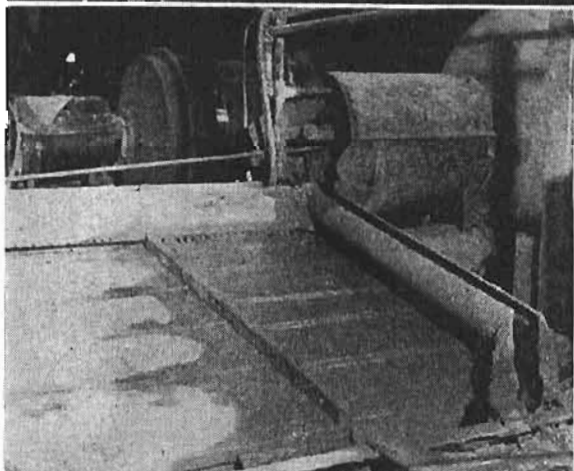
The main power plant for both the mill and mine operations is located



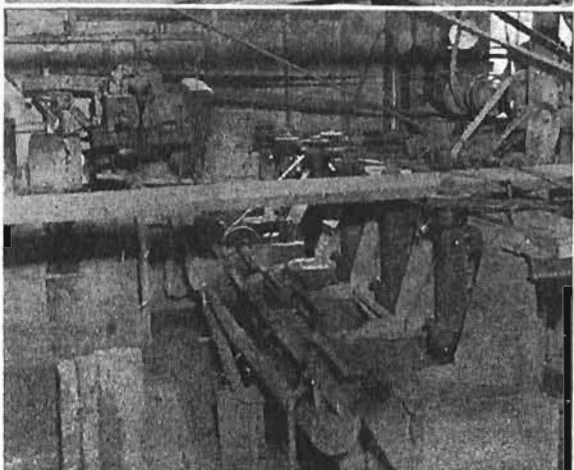
Kue-Ken 30 crusher made by Straub Manufacturing Co. in the Independence Mill.



Twin Marcy 42 by 60-in. ball mills in the Independence mill. Note the enclosed trommel screens through which they discharge. Screens remove coarse material to prevent abrasion of amalgamation plates.



Ball mill discharges through a revolving screen and step amalgamation plates. Coarse material from ball mill is run by the screen into trough at right, which discharges it over a separate amalgamation plate to classifier. Screen undersize flows through header over step amalgamation plates.



No. 1 flotation section in the Independence mill. Denver conditioner on the left, with Denver reagent feeder and 6-cell Denver Equipment Co. Fahrenwald Sub-A flotation machine on the right.



at the Independence mill. The largest engine is a 6-cylinder, 200-hp. Atlas diesel, which drives Gardner-Deuver 19 and 11 by 12 compressor, delivering 1,085 cu. ft. of air per minute.

A "Caterpillar" D13,000 diesel engine drives the stand-by compressor, a Gardner-Deuver 9.75 and 6 by 7, 4-cylinder, vertical, delivering 550 cu. ft. of air.

A 4-cylinder, 135-hp. Atlas diesel drives the two Marcy ball mills and the flotation machines at the Independence Mill through line shafts and belt drive. It also powers a 30-kw. General Electric generator, functioning as a stand-by.

A "Caterpillar" D8,800 diesel turns a 62.5-kw. General Electric generator which furnishes electric power for lighting purposes, as well as for the crusher and flotation units at the Old Mill, and for electrification of the mine. The balance of the power required at the Old Mill is furnished by a 25-hp. Superior gas engine and a 15-hp. Fairbanks-Morse oil engine.

The property has diesel oil storage for 104,000 gals. In addition, there are two tanks of 11,000 gals. each for gasoline. All fuel is from Standard Oil Co. Lubricating oils are stored on racks and are largely furnished by the Shell Oil Co. and Valvoline Oil Co.

Water supply for the Independence Mill comes from a dam located above the mill on the west fork of Fishhook Creek, from mine water, and from a 6,000-gal. wood stave tank made by the Federal Pipe & Tank Co. All engine cooling water is pumped to this tank after use. The Old Mill water supply is provided by a dam on the east fork of Fishhook Creek and is brought to the mill through a 4-in. pipe 2,000 ft. in length. Independence Village is also supplied with water from the east fork.

### Employe Relationship

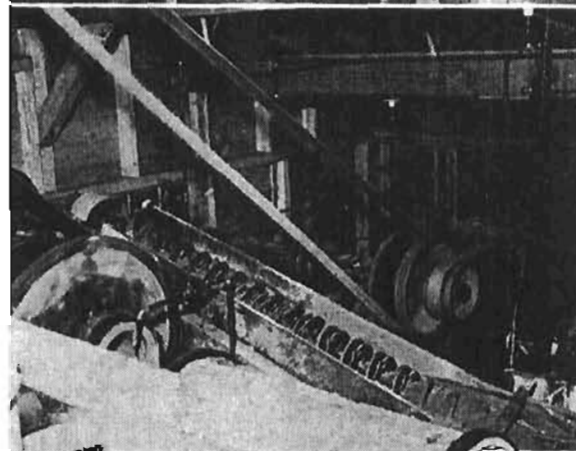
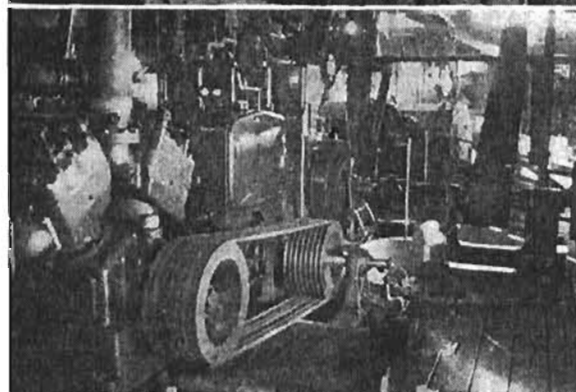
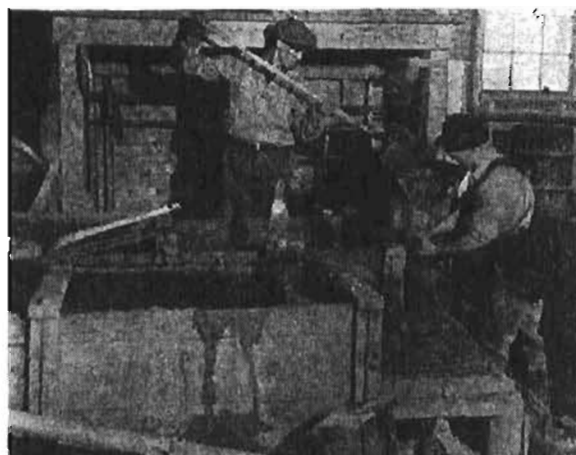
The Alaska-Pacific Consolidated Mining Co. maintains a modern camp and enjoys exceptionally harmonious relations with its employes. "Teamwork at the mine would be hard to improve upon," says C. L. Harrison, president of the company. "I am proud of our organization, proud of the mine, the men and its equipment.

"Our policy seeks development with an eye to the future. We have gradually expanded and improved our mills, but always out of earnings, after dividends. We have pushed development steadily, with the accent on blocking out ore, drawing much of our mill feed from development and

sacking concentrates from the dewatering vats for shipment to Tacoma Smelter. The concentrates are hauled by truck or tractor and sled to Wasilla, on the Alaska Railroad.

Gardner-Deuver 550-cu. ft. stand-by compressor, on the left, belt-driven by a "Caterpillar" D13,000 diesel. Atlas-Imperial 135-hp. diesel behind powers the ball mills and flotation units through belt and shaft drive.

In the Old Mill — On the left, 7½-ton Denver ball mill regrinding rake product from the Denver high weir classifier. Ball mill discharges into a Titan amalgamator, made by Mill & Mine Supply Co., seen in the foreground.



keeping intact numerous backs on ore shoots for drawing in the future."

The average annual payroll of the Alaska-Pacific Consolidated Mining Co. is now about \$250,000, of which 85 per cent goes to bona fide residents of Alaska. Next to the Alaska Railroad, the company has the largest year-round payroll in the south central portion of the territory.

There are 28 families living in the camp in quarters built and owned by them, but on company property. A territorial school is maintained in one of the company buildings. Beside workmen's compensation insurance to protect employes from loss of wages due to accidents, the company has arranged, and largely pays for, a group life insurance policy on all its permanent employes.

A policy of high wages, coupled

with modern living quarters, a well-equipped dry, bathing and recreational facilities, good and ample food, has produced a labor turnover of only about 3 per cent per month. Previously, a turnover of as high as 30 per cent per month has not been considered uncommon in Alaska.

The mine constitutes an election precinct and casts more than 150 votes in territorial elections. University of Alaska extension short courses in prospecting and mining are given each year, with 72 enrolled last fall for the six weeks course.

Total taxes paid by the Alaska-Pacific Consolidated Mining Co. in 1939, including the company's contributions for social security and territorial and federal unemployment insurance, approximated \$300 per day.

# Idaho Mines Seek Definition Of Injurious Dust Concentration

IDAHO suddenly became silicosis-conscious about 18 months ago when the state supreme court ruled silicosis was a compensable "accident"—that any victim of occupational disease was entitled to compensation unless the employer had used every reasonable precaution to prevent such disease.

That decision brought a sudden revolution in the handling of occupational diseases in the state, and gave grave concern to employers who had employes subject to such ills as silicosis, lead poisoning and carbon monoxide poisoning. Employers thought it well to set forth in full their responsibility under the new ruling by a legislative act which would define closely the extent of their liability.

The court decision was not exactly revolutionary. A few years ago the court ruled that a man, bitten by a wood tick and contracting Rocky Mountain spotted fever, was entitled to compensation while he was on the job. Not so long ago a logger fell out of his second-tier bunk in a company bunkhouse and collected compensation for a broken bone. The state compensation board has consistently taken a liberal view of the law, which the courts generally have sustained.

Disturbing to the mining industry was the fact that most of the large, established mines had taken steps to reduce dust by ventilation, sprays and by offering the men respirators, but a new man might have incipient silicosis contracted in another mine without such preventive measures. Regardless of this fact, the current employer would be liable.

A period of near panic ensued. Discharge of a number of employes suspected of suffering from silicosis created a "situation." Mines ordered stringent examination of new employes.

The 1939 legislature passed an act defining industrial disease, and creating a bureau of industrial hygiene, with Dr. A. F. Galloway in charge, and with Herbert Clare as field assistant. The bureau was to be absolutely non-political, appointments were to be on the merit system, and as far as possible it was removed from outside influence.

The law provided that the latest employer of a sufferer from occupa-

tional disease should be liable if the disease was detected more than six months after employment. In some respects this was not considered wholly satisfactory, but provision that the bureau should make a thorough test of mine workers now



J. W. GWINN

Secretary, Idaho Mining Association, an active factor in seeking to work out an equitable means of handling the silicosis problem.

employed in Idaho to determine whether or not they had silicosis met the objections. Each miner will have a card from the bureau showing whether or not he has the disease. The bureau has bought and equipped an X-ray trailer to make the necessary examinations to determine the lung condition of the prospective worker. This is designed to protect both the employer and the employe. Employers have the security of a state examination against unwittingly employing a man suffering from the disease.

It then became appreciated that mining wasn't the only cause of silicosis. Other forms of dust could cause it. So the bureau has established a dust-testing apparatus, with which Mr. Clare tours the countryside, testing various forms of dust for their silicosis possibilities. Flour mills, quarries, road work, come under his supervision.

With the X-ray trailer an effort is made to test as many miners as possible for traces of the disease.

As a result of discussions between the operators and the bureau, a committee was named with Howard McBride of the Bunker Hill & Sullivan Mining & Concentrating Company as spokesman. This committee at a recent meeting, with the urgent support of H. G. Washburn of the Federal Mining & Smelting Co., and other large operators, promulgated a code of practice to govern rock drilling.

This code was submitted to the state industrial accident board, and although it had the approval of the employers and hygienists present, and will be considered as a code of "fair practice," the board refused to recognize it officially. Members of the board held that where one concentration of dust might not be harmful to one individual, it might actively affect another.

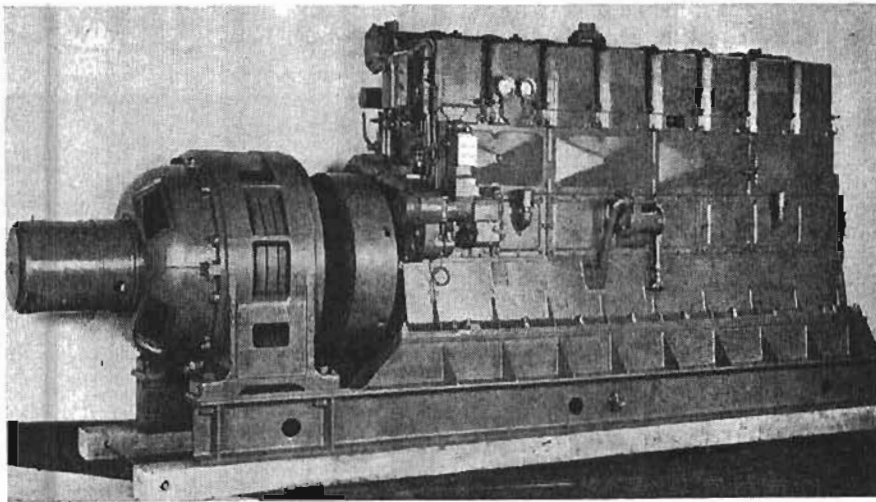
Both employers and labor representatives, however, feel that the new code gives protection to both sides and will help in clarifying the situation when silicosis cases come up for decision. Of course the industrial accident board has reserved the right to be sole judge of liability, but this code clarifies the situation.

The code as drawn specifies that it apply to all rock drilling operations in silica-bearing rock. Drilling is defined as drilling, cutting, chipping, channeling, broaching or crushing to excavate rock, whether done by machine or hand hammers.

Silica-bearing rock includes synthetic stony formations and is divided into two classes: one, containing less than 10 per cent free silicon dioxide; two, containing 10 per cent or more of free silicon dioxide, or having a variable unpredictable silicon dioxide content.

An "injurious silica dust concentration" for rock of Class 1 was fixed at 50,000,000 dust particles per cubic foot of air, as determined by an approved dust-count method. For Class 2 rock, the injurious concentration was fixed at 10,000,000 particles.

Provision was made that all rock drilling operations be so executed that there be no dissemination of injurious silica dust concentrations into the atmosphere, this control to be by suction and exhaust methods, wet method, or any other method approved by the board.



Mountain until it holed-through above the Willow Creek valley. This crosscut missed the extension of the Skyscraper vein, which evidently had been faulted into the valley. Diamond drilling on the north side of the fault located the vein and it is planned to raise 300' vertically to cut the vein, when a drift will be run on the vein to a point under the old Martin workings.

It will then be possible to bring all ore from this portion of the mine out the main haulage tunnel, making it unnecessary longer to maintain the

remote Free Gold camp on the ridge of the mountain.

### New Oregon Geologist

Wessley Paulsen is the new junior geologist of the Portland office of the Oregon Department of Geology and Mineral Industries, succeeding Wayne Lowell, who is attending Chicago University for a higher degree.

Paulsen is a graduate of the University of Washington and has worked two years for Cornucopia Gold Mines.

The new 275-hp. Atlas diesel engine installed this winter in the powerhouse of the Alaska Pacific Consolidated Mining Co. at its Independence Mine in the Willow Creek District of Alaska. The engine is direct connected to a 200-kw. General Electric generator.

### Fern Gold Pays

Fern Gold Mining Co. in December paid its third dividend, disbursement being in the amount of 1c per share.

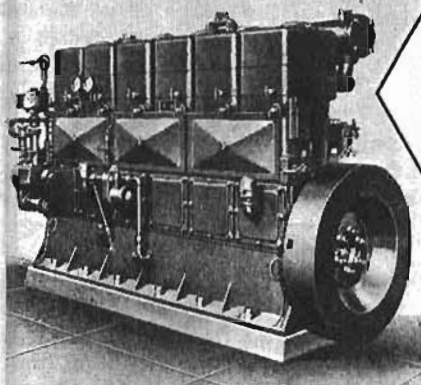
Jerome Drumheller of Spokane is president of the company, whose property is in the Willow Creek district of Alaska and is leased to T. S. McDougall, who in 1940 installed a new mill, increasing daily capacity to more than 60 tons.

### Tramway is Burned

Fire originating in an overheated compressor motor destroyed the upper terminal of the new aerial tram built by Leverett Davis on his Simmons property near Cornucopia, Ore., early this winter.

The mine had just gone into operation with the completion of the tramway, which had a span of about 3,000'. As result of the fire, operations were closed down for the winter.

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# Alaska Pacific Adds Power—

## Low Level Adit Driven

**T**WO new Atlas-Imperial diesel engines were added this winter by the Alaska Pacific Consolidated Mining Co. in the Willow Creek district of Alaska, thus increasing and modernizing the power plant of this second Alaska lode mine.

The larger of the two Atlases is a 275-hp., 8-cyl. 9x10½, 514 rpm. diesel, direct connected to a 200-kw. G. E. a. c. generator.

The other new Atlas is a 4-cyl., 80-hp. 7x8½ at 650 rpm. It drives a 62½-kw. a. c. generator and a 15-kw. d. c. generator through V-belts.

In addition, the power house previously had two Atlas diesels. One is 200-hp., 6-cyl., powering a 1,085 cu. ft. Gardner-Denver compressor, the principal source of compressed air.

The fourth Atlas is a 135-hp. machine, 4-cyl., driving the mill, and also a 37½-kw. a. c. generator.

A "Caterpillar" D13000 diesel serves as stand-by power for the mill, while a 75-hp. Cummins diesel drives a 360-cu. ft. Gardner-Denver compressor through V-belts.

A "Caterpillar" D8800 diesel, which was formerly in the Independence Mill, has been moved to the Old Mill as stand-by power, the Old Mill normally being operated electrically from the main power plant.

In addition to the main Gardner-Denver compressor and that driven by the Cummins diesel, there is a 550-cu. ft. Gardner-Denver compressor turned by a 100-hp. motor. The mine also is equipped with two portable compressors. These are normally hooked into the main air line for emergency use, but can be detached and taken to remote locations on the property for prospecting or development.

Walter W. Stoll, general manager, left the mine shortly before the holidays and spent some time at the company's headquarters in Seattle. Drilling of the new Low-Level Tunnel is being pressed actively this winter and he reported the heading was in 580' at the first of the year, leaving about 1,800' to go to the Independence vein.



Hauling the 80-hp. Atlas-Imperial diesel engine 26 miles from the Alaska Railway at Wasilla to the Independence Mine of the Alaska Pacific Consolidated Mining Co. The company's "Caterpillar" tractor did the job. It hauls concentrates down from the mine on a sled all through the winter.

When this is reached, Mr. Stoll plans to raise a 3-compartment 60° shaft to the 1,300 Station of the present winze below the 900 main haulage level. This station is 300' vertically above the projected sill of the Low-Level Tunnel at the Independence vein.

The tunnel is being driven with a 10x10' face, giving 8x8' inside timbers. It should be understood that timbering is not generally necessary in Independence ground, although the first 300' was heavy, and the timbering is being carried into the rock for some little distance on account of the stations and other facilities being cut. Five veins are known between the portal of the tunnel and its intersection with the Independence vein. As these are reached, stations for raises are being cut.

The advance averages 18' daily in three shifts. Four new Gardner-Denver D89 drifters are being used

in this work, two being mounted on a jumbo. They are using 1¼" round steel. To facilitate work on the tunnel, and in anticipation of the time when it will be the main haulage level of the mine, a steel shop has been built and equipped at the portal of the tunnel, which is only a short distance above the mill.

Holes are drilled 8' deep and are loaded with 80% Columbia gelatine powder. The rounds are mucked with an Elmco-Finlay No. 21 mucker, discharging into new 47-cu. ft. side-dump cars. The Alaska Pacific Company bought 20 of these cars this month from the C. S. Card Iron Works, Denver.

The tunnel is ventilated by a Coppus "Ventair" fan, delivering through a 16" duct. The track consists of 45-lb. steel laid on standard 7x8" hemlock railway ties. A portion of the tunnel will be double tracked.

Tunnel haulage is handled by a General Electric 4-ton locomotive equipped with 80-cell Edison alkaline storage batteries. Water made in the tunnel is of importance in the milling operation and is picked up in a flume 1' deep by 2' wide. Eventually, when this tunnel reaches the Independence vein, it should make considerable water which now has to be pumped from the lower levels of the mine.

The west cross-cut on the 900' level has been carried through Skyscraper

P.O. Box 941, S. Hill St, Wash. Dc 3rd 1955

85  
C. ...  
...

Mr. Philip R. Holdsworth,  
Commissioner of Mines,  
Juneau, Alaska

DEPARTMENT OF MINES  
RECEIVED  
DEC 12 1955

JUNEAU, ALASKA

Dear Mr. Holdsworth:

Many thanks for your letter and for  
the Bulletin received!

Don't know if Department  
of Mines is interested in buying pictures of  
Alaska mines but owning some of the old  
Gold Bulletin mine in the Willow Creek Dist.  
I am herewith enclosing one as gift to the  
Department.

Wishing you and Mrs. Holdsworth a Merry Christmas  
Yours sincerely,  
John T. ...

P.S. A genuine friend of Alaskan mining  
industry was lost when Harry Townsend passed  
away last Spring!  
J.B.

Gold Bullion Mine, Willow Creek Dist., 60 mi. North of Anderson, Pa.



Worked in this mine 1917-1919. Rich gold ore.

MR 85-4

Gold Bullion Mine, Willow Creek District, southcentral Alaska, circa 1917. This mine was staked by an undisclosed Japanese prospector around 1900 and thought to be the first discovery in the Hatcher Pass area.

It operated from 1910 to 1922. Photo gift of John Buford.  
~~by J. C. Reehm, (Taken from~~  
Miscellaneous Report [MR] 85-4.)

Change per  
Tom Bessent 5-26-92

# EIGHTY THOUSAND DIVIDEND TO BE PAID BY ALASKA PACIFIC

*A - 2 - Dec 31/37*  
Big Willow Creek Property, Formerly Operated by William Martin but Now Rehabilitated by C. L. Harrison Has Most Successful Year. New Equipment Installed

ANCHORAGE.—In addition to making a recovery in gold of around \$400,000 in the first six months of operation, C. L. Harrison, president of the Wasilla Mining Company, which has leased from the Alaska Pacific Mines the old Independence mine, announces the completion and successful 24-hour per day operation of the new mill constructed this summer and fall.

Most of the gold recovered during 1937 was made with the old Lane Chilean mill formerly used by Wm. Martin from 1913 to 1916. This old mill was not only something of an antique, but had been wrecked in a snowslide some years ago. It was next to a miracle that it could be made usable at all.

The new mill, a 50-ton Marcy ball type, will be operated thruout the year. For winter operation much special construction was required. The water supply line was not only insulated against frost by packing it in sawdust, but provision was made for warming it with the water from the two large diesels.

Mill supplies for eight months operation during the closed season are on the property. Duplicate parts for all essential equipment, an electric lighting plant, and all the necessary supplies for both mining and milling are ready at hand. Two carloads of dynamite were just one of the many items needed.

Special steel tanks hold around 30,000 gallons of diesel oil. Substantial bunkhouses with showers, recreation room and drying rooms make a very different winter camp from those of the early days.

Three trams are used carrying ore to the mills. The newest tram brings 800 pounds of ore down from the mountain in 55 seconds. It is a 1700-foot haul operated by gravity. The loaded bucket has sufficient weight to haul up all mine supplies as well as the empty bucket.

The officials of the Alaska Pacific Mines announce a dividend of \$80,000 will be paid on December 28. It is also announced that operation of the mine will continue all winter.



METAL MINING AND PROJECT REPORT

Mine Mac very

General Features

Aerial Tram - 1700' - 3/4" cable

1700' - 4" air line

3600' Power tram - 3/4" cable by 12 H.P. Gas Engine  
500 lb. bucket Drum Hoist

520 cu ft. Gardner Denver Compressor - run by  
125 H.P. Caterpillar

240 cu ft. Sullivan Portable Compressor  
Budda Engine Gas

New Mill - 35 Ton daily capacity

8x12" Crusher Denver

42x60" Marcy Ball Mill

Clark-Todd Amalgamator

9 lbs m

Step Amalgam Plate

6 Denver Sub A Cells

Makes 200-250 Concentrat.

Concentrat ratio 40 to 1

Run by 60 H.P. Caterpillar

Machin shop - Assay office

Ball-Bird Panner

Old Mill - 13 Ton daily

2 set mill

2 sets plates

Crusher

Run by 26 H.P. Super Gas Engine

Required tailing mill - 30 Ton daily

Screw Classifier

15 Ton Marcy Mill Ball

Four Denver Sub A Cells

Run by 20 H.P. Fairbanks Morse Diesel

References: 844-20

Average 85

# METAL MINING AND PROSPECT REPORT

## A. General Features

1. Mine Pacific Alaska Consolidated Mining Co Mining District Willow Creek
2. Investigator (Independence) Date Aug 6, 1938
3. Location Fishhook Creek - 16 miles via road from Palmer
4. Owners Co Address
5. Supt. or Manager W. W. Still
6. Chief Ores Mined Gold - silver
7. Associated Minerals pyrite, tetrahedrite, chalcopyrite, galena, sphalerite
8. Gangue Minerals qtz - two generations, talc, barite, anhydrite, chlorite
9. Rock Formations qtz - diorite
10. Nature of Deposit (Fissure vein, fissured zones, disseminated, etc.) Fissure - Movement on jointing
11. Thickness of vein or deposit 12 veins - 1' to 8'
12. Strike of vein or deposit Various strikes
13. Dip of vein or deposit Flat
14. Ore in (shoots, chimneys, etc.) Trenches + veins
15. Character and pitch of ore shoots North Flat pitch
16. Depth of barren zone \_\_\_\_\_ Depth of enrichment \_\_\_\_\_
17. Genesis of ore Intermediate - leoprotic type
18. Nature of associated dikes or veins None
19. Entrance to mine Tunnels El. 4058 - 4104
20. Amount of Drifts Several hundred Raizes Several X-cuts Several
21. Size of shafts 4 x 8' No. of Levels Three
22. Mine Machinery over
23. Mill Machinery over
24. Men employed 100 Dates of operation Co 1936 - present
25. Available timber and water power None
26. Transportation Road Trucks
27. Reported assays Various - 6 blocks avg. average \$300 gold content
28. Amount of ore milled or shipped 1937-1938 over \$1,000,000
29. Returns Production - Cash production - Reported

References: 849-C. etc.