

GROUP 24 (Tonopah-Belmont Tailings)
General

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MINING PAPERS
GROUP 24, TONOPAH, BELMONT TAILINGS

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BELMONT TAILINGS

Summa Corporation
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SUMMARY

The Land Exploration and Mining Division has discovered a potentially viable operation with relatively low risk and high return on investment. The operation would be on Group 24, otherwise known as Belmont Tailings. Prior mining and treating of silver ore from the Tonopah Mines is the source of the tailings. By using modern day technology and the present high price of silver, it appears that the tailings material may again be treated and a profit realized from the sale of the metal.

This report gives an order of magnitude of expected expenses and revenues. Our own metallurgy group, as well as outside consultants, have provided some basic data which indicate the Belmont Tailings are susceptible to an agitated leach carbon-in-pulp process. This process will, at a minimum, recover 57% of the contained silver in the tailings. Using the base price of silver at \$4.25 an ounce and gold at \$100 an ounce, it appears we could have a gross revenue of \$2,324,000. The annual cost would amount to \$1,630,000 including amortization of the initial investment of \$362,000. This operation would realize a total net pre-tax income of \$694,000 annually. The plant life is estimated at about 2 years and pay-back for the initial investment would be six months.

It is recommended that we spend the remaining 4 months of 1976 to study this operation thoroughly. This work would include detailed engineering drawings of the plant, outside metallurgical tests of the process itself, and a thorough financial investigation of the project. The financial investigation should include firm bids based on the detailed engineering drawings, sensitivity analysis of the metal markets, and any other variables that could influence the profitability of this venture.

It is recommended that 10% of the desired capital for this project be expended in 1976 to protect the \$362,000 investment that would have to be made in 1977. The Belmont Tailings Project appears to be a potentially good operational project for the Land Exploration & Mining Division. The money spent to get firm details does not represent a high risk because of the encouraging results we have experienced to date.

PROPERTY

The Belmont Tailings is the general name of Group No. 24 acquired in 1969. This group consists of 19 patented claims and is located on the outskirts of the Town of Tonopah, Nevada. It is in Nye County and described as being in Section 31, T3N, R43E and Section 36, T3N, R42E (see attached land plat map 24-L-2).

There are minor ownership problems within the group (Hall, 1976) but nothing to conflict with processing the tailings (see ownership map 24-L-2.1). The area involved is roughly 90 acres in size and is bounded on all sides by Summa property which provides ample space for a plant site and easy access.

Prior mining and treating of silver ore from the Tonopah mines is the source of the tailings. Milling began in 1912 and ended in 1923 (Nevada Bureau of Mines and Geology, 1976). Records indicate about 1,600,000 tons of ore was treated and 94.8% recovery attained on the 25 ounce silver ore. These figures verify our geological investigation data.

GEOLOGY

The Tonopah area consists of a series of thick flat-lying volcanic flows generally of rhyolitic to andisitic composition. At depth an intrusion has released mineralizing fluids which have selectively replaced certain of the volcanic flows as a result of either a favorable, physical or chemical environment (Tonopah files).

The prime target mineral was silver with minor amounts of gold present. The treatment of the high grade silver ore included milling and thus created a large amount of tailings as an end product. These tailings were too low grade at the early day price of silver to justify further treatment.

In June, 1976, forty-three drill holes were completed on a 300 foot grid. The tailings were sampled every three feet for the entire depth of each hole. After drilling and assaying were completed, the results were plotted on plan-view maps and an accurate estimate of tonnage and grade was calculated. The results indicate there is 1,292,534 tons at 1.29 ounces per ton silver for a total of 1,668,227 ounces of silver contained in the tailings (Saunders, 1976).

METALLURGY

Agitation leach tests on samples of the Belmont Tailings have been run and some preliminary results are available.

SAMPLES:

The samples for the test work were obtained during the recent auger drilling sampling program. An updated reserve and grade figure was obtained in this work. A report by Fred Saunders gives the Belmont Tailings a reserve of 1.3 million tons with an average grade of 1.29 ounces of silver and 0.005 ounces of gold per ton. The auger samples were composited to give a representative sample of the entire tailing reserve.

VARIABILITY:

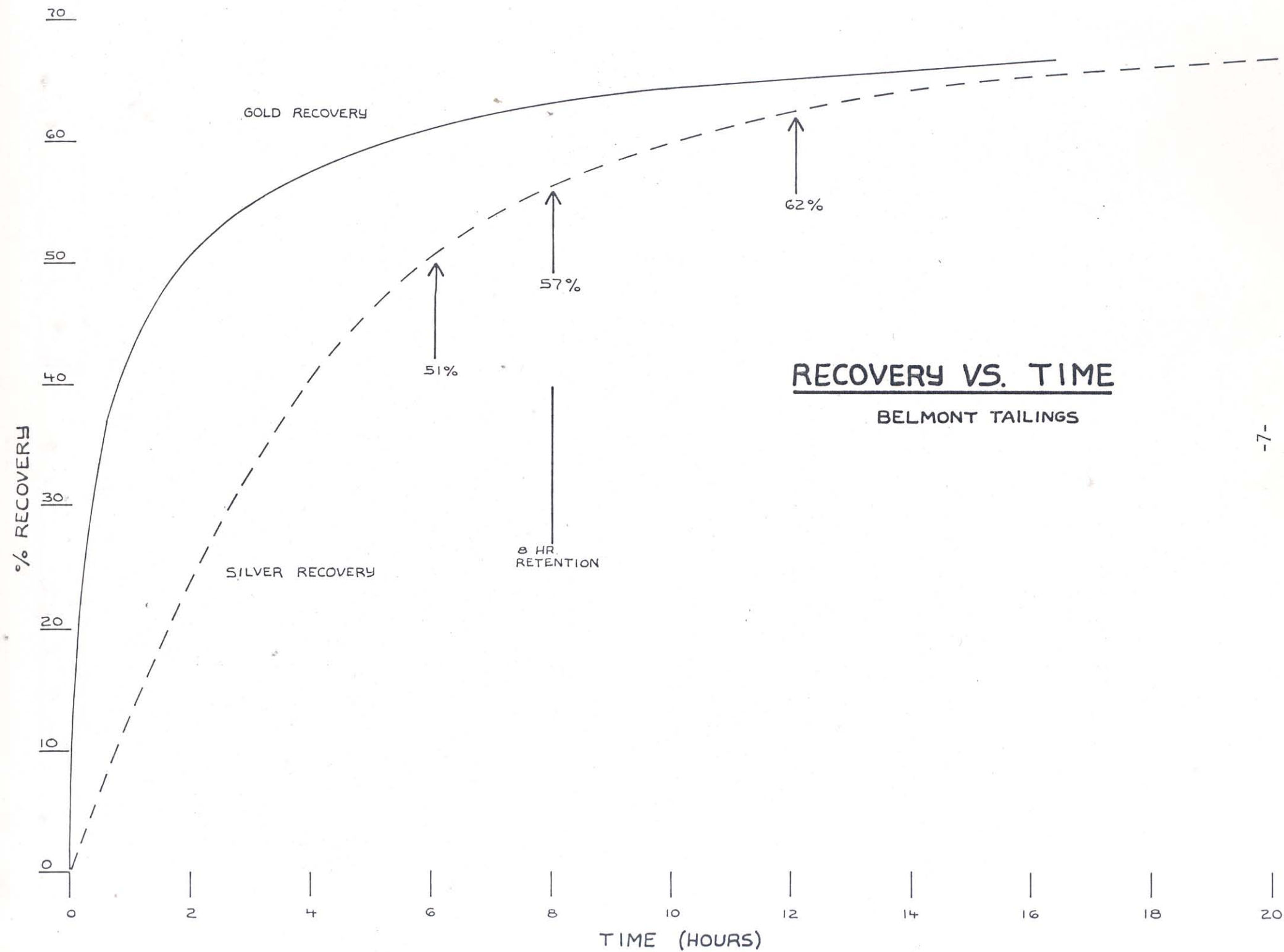
The first tests run were made to determine if the tailings show consistent metallurgy at randomly selected location and depths. Roll bottle tests with a 6-hour reaction time were made on 8 holes. A small variance was noted, but the considering recovery and reagent consumption, the entire reserve shows consistent metallurgy and may be represented by a single composite sample.

COMPOSITE SAMPLE:

A composite sample of about 400 pounds was prepared. The cuttings from 9 of the auger holes were mixed and used for leaching tests. Consistent grade and reagent consumption was seen in this sample, which is representative of the tailings reserve. The composite grade was 1.3 ounces of silver per ton and .006 ounces of gold per ton. Composite samples were leached in a cyanide-caustic solution for time periods from 2-to-12 hours.

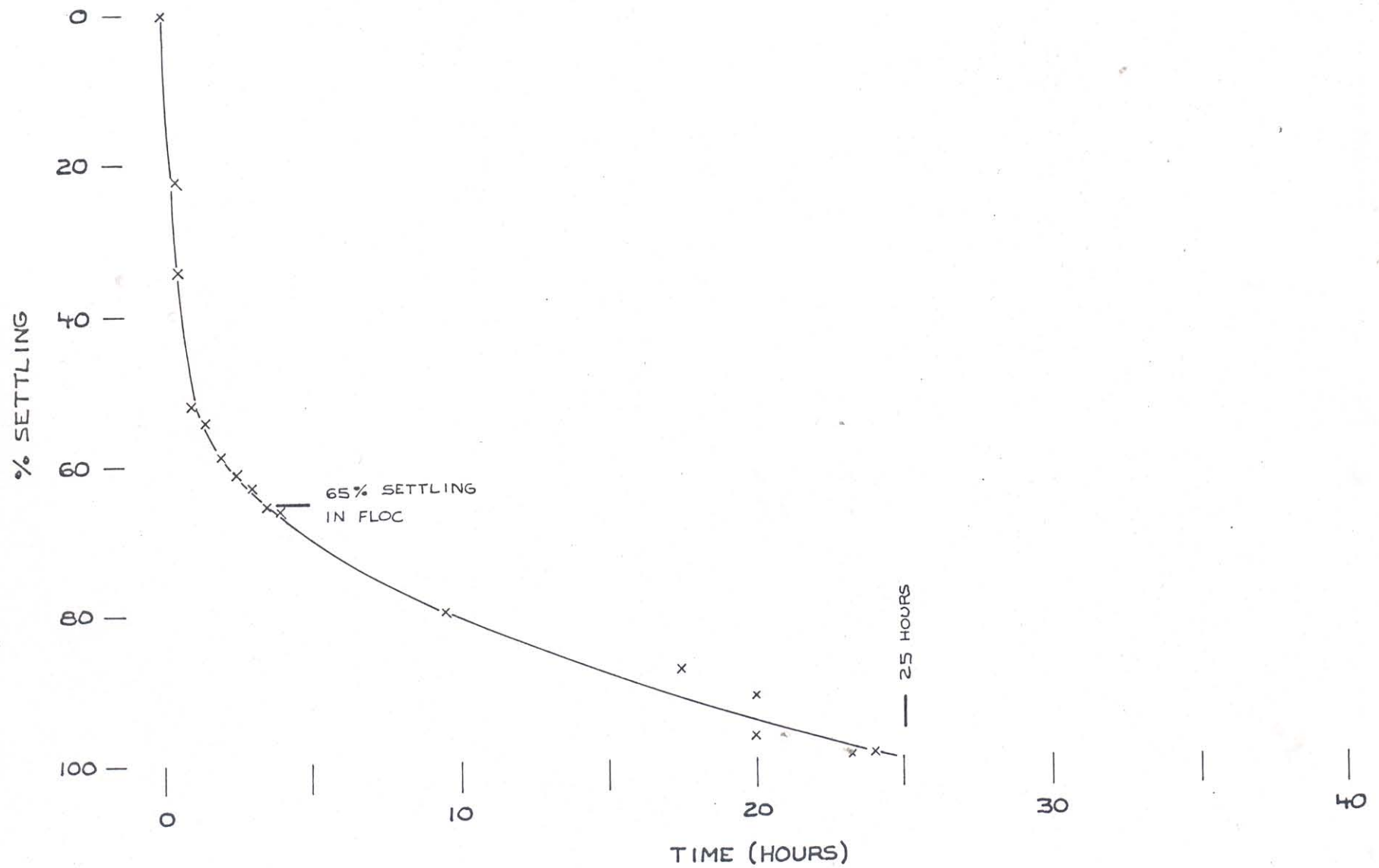
The heads, tails, and solutions were assayed for gold and silver and recoveries and reagent consumption were calculated for each sample. The samples reacted in a predictable manner and results were graphically plotted to determine the shape of the recovery vs. time curve.

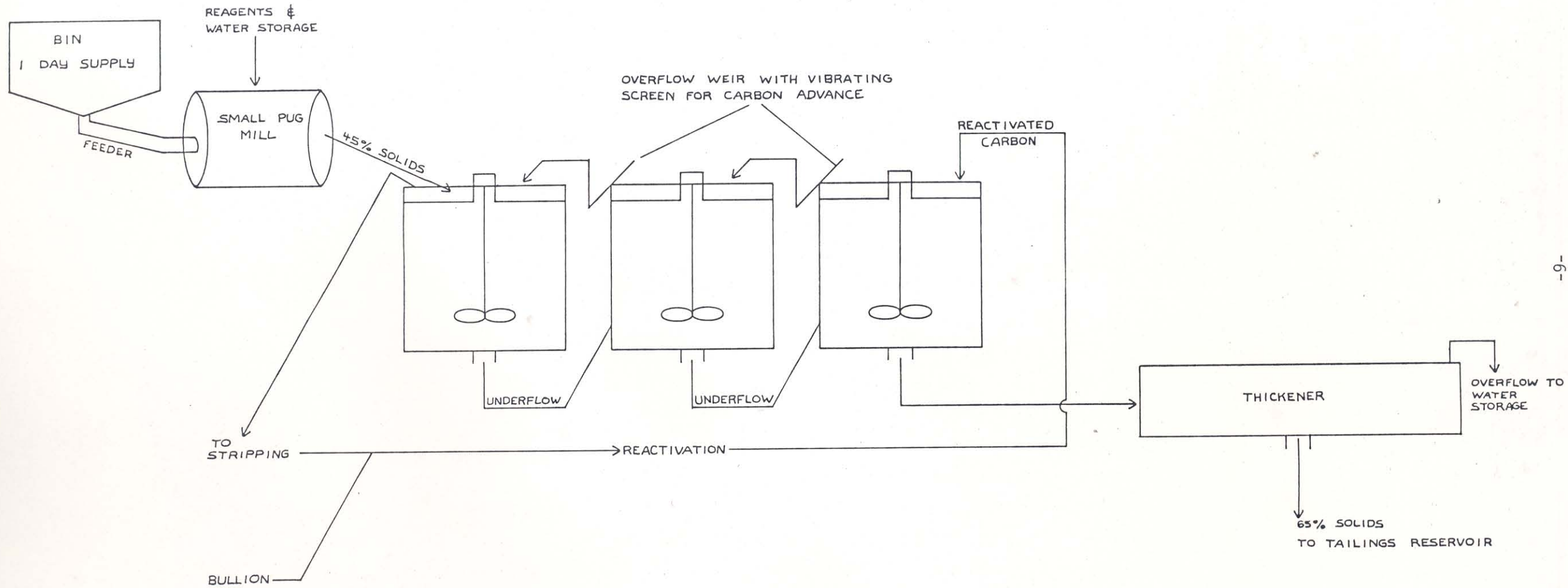
The following graph (see Figure 1) shows this plot and can be used to estimate the recovery attainable at any chosen reaction time. A further test on the composite, made after leaching, shows the expected settling rate for determining thicker size. (See Figure 2.) From the test work, the parameters for a basic flow sheet have been developed. (See Figure 3.)



SETTLING RATE CURVE

BELMONT TAILINGS AFTER AGITATION





TAILING DENSITY	22 ft ³ /TN
PULP DENSITY	45% SOLIDS
RETENTION TIME	8 HOURS

MINING

The mining rate has been set for 3,000 TPD on a single shift basis, five days a week. Using a 6-hour work day, 500 TPD must be moved. Assuming a 0.5 minute loading cycle time; a loader with 4.5 yd.³ capacity would be needed. An estimated 4.5 minute cycle time for hauling indicates 13 trips per hour can be made and dictates the use of two 22 yd.³ trucks.

This equipment arrangement allows movement of material to a stock pile for the plant feed. Although the plant will operate continuously, mining can proceed on a five-day basis without extra shifts or overtime.

The plant will be fed from the stock pile every shift. A small 3 yd.³ loader will perform this operation. The stock pile loading concept will allow a steady, smooth flow of 2,000 TPD of material to be treated by the plant.

BELMONT TAILINGS TREATMENT PLANT

Given plant is a carbon-in-pulp agitation system with three agitators and a single thickener. The tailings pulp is added to the system at 45% solids and 6 x 12 mesh activated charcoal at 10-to-20 pounds/ton of slurry is contained in the system. Reagent concentration is set at 2 pounds/ton of sodium cyanide and 1 pound/ton of lime. Reagent consumption is estimated to be 1 pound/ton cyanide and 1/2 pound/ton for lime. After counter-current decantation agitation, the tailings are thickened to 65% solids before pumping to a reservoir for settling and water reclamation. Water losses are estimated at 20%.

The following shows some order-of-magnitude figures for the plant. Annual capacity is based on 330 operating days per year.

BELMONT PLANT:

Flow Rate (GPM)	636
Agitator Size (each)	30' x 30'
Agitator HP (total)	225
Thickener Size	70' x 13'
Thickener HP	<u>100</u>
Total Plant HP	450
Daily Reagent Consumption (w/loss)	
Cyanide	2,000 pounds
Lime	1,000 pounds
Plant Life	2 years

CAPITAL COSTS:

Site Preparation	\$ 5,000
Hopper and Feeder	6,000
Slurry Control	3,000
Power	20,000
Water	50,000
Repulper	16,000
Agitator and Tanks	70,000
Thickener	70,000
Pumps, etc.	47,000
Stripper	60,000
Tailings Dam	5,000
Water and Reagent System	<u>10,000</u>
TOTAL	\$362,000

OPERATING COSTS (Annual):

	<u>2,000 TPD</u>
Mining (Includes Lease)	\$ 330,000
Supplies	464,000
Utilities	65,000
Labor and Supervision	156,000
Stripping Plant	<u>350,000</u>
TOTAL DIRECT OPERATING COST	\$1,365,000

UNIT COST (per oz. Ag):

Amortization	\$ 0.38
Operating	2.80
Refining	0.10
Allocated Overhead	<u>0.06</u>
TOTAL COST/OZ.	\$ 3.34

OUNCES RECOVERED (ANNUAL):

Gold 2,500 oz. @ \$100/oz.

\$ 250,000 oz.

Silver 988,000 @ \$4.25/oz.

\$ 2,074,000 oz.

FINANCIAL OUTLOOK

Total Annual Revenue	\$ 2,324,000
Total Annual Cost	\$ 1,630,000
Total Net Income (Pre-tax)	\$ 694,000
Total Income for Plant Life (2 years)	\$ 1,388,000
Payback	6 months



summa

Internal Communication

Date: June 17, 1976
To: William J. Robinson
From: Fred Saunders *FS*
Subject: TONOPAH-BELMONT TAILINGS

Charlie Pierce Drilling of Lone Pine, California drilled 43 drill holes with his 3 inch vacuum drill rig. The holes were laid out on a 300 foot grid and samples were taken every three feet. All material taken from each hole was saved for metallurgical testing purposes except the material that was used in assaying. The assaying was done by Summa Corporation's own lab in Tonopah, Nevada under the direction of Bill Robertson.

After drilling and assaying was completed, the results were plotted on plan-view maps and an accurate estimate of tonnage and grade was calculated. The results of these calculations show there is 1,292,534 tons of 1.2911 ounces per ton silver grade for a total of 1,668,827 ounces of silver in the tailings.

A density test was ran by myself and one cubic foot of in-place material weighed 93 pounds for a 21.5 cubic foot per ton factor. As a conservative estimate 22 cubic feet was used in calculations.

FS:ps



summa

Internal Communication

Date: May 25, 1976
To: Mr. William J. Robinson
From: Mr. Fred Saunders, Staff Geologist *FS*
Subject: Tonopah - Belmont Tailings (Group 24)

As requested by you during our conversation of May 19, 1976, I went through all Tonopah office and lab files and pulled out all data pertaining to the Tonopah-Belmont tailings. The total data consisted of assays and drilling depths of 59 auger holes drilled in 1969 by Summa Corporation under the direction of A. J. Anderson. Unfortunately, there was no map or location for the holes. They were drilled on a grid and rough approximation of the pattern was deciphered. From this data it was estimated that the average assay of the pile would be approximately 1.48 oz./ton silver and .010 oz./ton gold, and they would have an average thickness of approximately 12.7 feet.

Due to the unreliable source and incomplete data, I would suggest that Summa Corporation re-evaluate the tailings themselves.

The following program for evaluation was laid out:

1. Construct an accurate base map of tailings.
2. Lay out a 300 foot grid and auger to bottom of tailings and assay the cuttings.
3. Evaluate this data for better tonnage and grade figures.

Step one has already been completed. Wally Boundy and myself resurveyed the pile and made a base map. From this base map it was determined that there is 3,630,800 square feet of surface on the tailing pile. If the pile averaged only eight feet thick and the tailings weigh ninety pounds per cubic foot, this would give you 1,320,291 tons of tailings.

Steps 2 and 3 should be completed to confirm this data.

DAVID L. PRUETT
MINING GEOLOGIST
GOLDFIELD, NV 89013

Apr 24
Gen
6000 0330 (4846)

May 25, 1976

Mr. William J. Robinson
Summa Mining Division
P. O. Box 1126
Tonopah, Nevada 89049

Dear Mr. Robinson:

Agitated cyanide leach tests on the Belmont tailings samples,
Group 24, were completed May 24th.

<u>Recoveries</u>	<u>Silver</u>	<u>Gold</u>
Carbon in pulp - 4 hours	66%	30%
Cyanide alone - 12 hours	73%	35%
Cyanide alone - 24 hours	67%	?

A series of carbon in pulp tests should be run with 6-10-12 hour
times.

The silver is precipitating from solution with excess time. Carbon
in pulp with correct time in agitation may run recoveries into the
80% range.

These tailings may be one of the best low capital intensive operations
in the Summa inventory.

Sincerely,


David L. Pruett

DLP:ps

METALLURGICAL TESTING DATA

Summa Corporation
Mining Division
Tonopah, Nevada 89049

Type Test: Agitated Cyanide #1 Belmont

Date: 22 May 75

6000 0330 (4840)

[illegible]

METALLURGICAL TESTING DATA

Summa Corporation
Mining Division
Tonopah, Nevada 89049

Type Test: Agitated Cyanide #2 Belmont

Date: 22 May 75

[illegible]

METALLURGICAL TESTING DATA

Summa Corporation
Mining Division
Tonopah, Nevada 89049

Type Test: Carbon in Pulp - Cyanide #3 Belmont

Date: May 24. 76

[illegible]

Sam'l Spruce