

To: Staff

Date: May 15, 1984

From: Dick Jirik

Subject: Gooseberry Silver-Gold Mine, Storey County, Nevada

Saturday morning I went on the AIME field trip out to Asamera Minerals' Gooseberry Mine which is located in Sec. 25, T.19N., R.22E., approximately 20 miles east of Reno in the Virginia Range and some 5 miles south of Clark Station. This property was put into production last year.

At present, approximately 10,000 tons of ore are mined per month from this underground operation. The mill treats about 350 tons of material per day. The millfeed averages between 7 and 8 ounces silver and 0.18 to 0.20 ounces gold per ton. Cutoff grades are about 5 ounces silver and 0.15 ounce gold per ton. The mill circuit is described on the attached handout.

The Gooseberry deposit is a good example of volcanic-hosted epithermal precious metals vein occurrence, similar in many respects to the Bonanza-type metallization mined in the nearby Comstock district. The mineralized vein structure is hosted within a porphyritic andesite (?) unit of the ~~Mio~~-Pliocene Kate Peak Formation. The main vein strikes roughly east and generally dips south about 80 degrees, although dip reversals to 45 degrees north occur locally. The vein varies in width from less than one foot up to over 15 feet. It is accompanied by innumerable subsidiary veins and veinlets of quartz-calcite and late stage barren calcite, most of which occur on the hanging wall side of the main mineralized structure. Zones of veining, including the main ore-bearing vein, may attain widths up to 30 feet.

The veins are composed primarily of quartz and calcite, typically as a fine to medium-grained crystalline-appearing aggregate that may actually be a recemented microbreccia in places. The chief silver mineral is argentite, which occurs as disseminated grains and thin subparallel bands generally near vein margins. Trace to minor amounts of one or more silver-antimony sulfosalts often accompany the argentite. Gold occurs native associated with pyrite and as electrum, but it is too fine-grained to be visible to the unaided eye. The vein paragenesis has not been refined, but at least three stages of Ag-Au mineralization have been tentatively identified. All are associated with calcite. Evidently calcite becomes the dominant gangue mineral through time. Copper is about the only base metal

to occur; at the deeper levels it is present as chalcopyrite but rarely does the copper content exceed 0.1 percent. There is little or no evidence for supergene enrichment below the 500 foot level.

Controls for the mineralization are poorly understood. The ore zones or chutes appear to plunge steeply to the west. The mineralization may be localized along flexures or zones of dip reversal, or possibly the intersection of the main vein with pre-mineral high angle cross faults or shear zones. The vein has been segmented and offset by numerous post-mineral cross faults having displacements ranging from less than a foot up to about 20 feet.

The wall rocks, at least on the 1000 ft level, appear pervasively propylitized. The gray-green porphyritic andesite (?) is probably composed mainly of clay and chlorite, with minor quartz, secondary albite and calcite. Up to several percent disseminated pyrite also occurs within the wall rock. Little or no precious metal values are associated with this generation of pyrite. Hypogene propylitization is probably the dominant alteration type at the Gooseberry mine. Other types of epithermal alteration commonly associated with volcanic-hosted precious metal veins, such as silicification, argillization, etc. have not been recognized.

Perhaps the most striking feature of the deposit is the very subtle to nonexistent expression of the vein at the surface. Because the vein is relatively soft it does not form resistant outcrops. Thus, vein exposures are quite discontinuous and sporadic to rare. Also, vein widths at the surface are generally quite narrow relative to depth. The discovery outcrop, situated at the site of the main shaft, may have been the only mineralized exposure of the vein at the surface. The farthest point west to which the structure has been traced with any confidence is marked by a diffuse zone of bleached and propylitically (?) altered porphyritic andesite (?) ^{cut} by some gypsum veins and veinlets of probable supergene origin. The country rock contains a few percent disseminated limonite, probably after pyrite ~~sulfide~~. In summary, the surface features are hardly indicative of a major precious metals bearing epithermal vein at depth, and if it weren't for the very minor exposure(s) of silver mineralization at the surface it is likely that the Goosberry Mine wouldn't even exist.

The main structure has been explored over a distance of more than 3000 feet along strike on the 1000 foot level. In a vertical dimension the vein has been explored to a depth of 1350 feet. Most all production to date has been derived from the 800 and 1000 ~~foot~~ levels. These two levels have the largest amount of workings. Exploration is being conducted on the 1150 and 1350 ft levels. Although the original owner did some drifting on levels above 500 ft, these workings are now largely caved. Consequently, the vein above this level is still largely unexplored. Thus, in summary, the vein is still open in four

directions and the potential for significantly increasing the ore reserves appears very good to excellent.

Assuming, among other things, that the abundance and grade of mineralization remains relatively consistent with depth, and that the water table lies substantially below the deepest workings (presently the 1350 ft. level), the property should be producing for a number of years to come.

ASAMERA MINERALS (US) INC.
(GOOSEBERRY CONCENTRATOR)

INTRODUCTION

THE GOOSEBERRY CONCENTRATOR HAS BEEN DESIGNED TO TREAT 350 TONS PER DAY OF SULFIDE GOLD AND SILVER ORE. THE SILVER OCCURS MAINLY AS ARGENTITE (Ag_2S) AND THE GOLD OCCURS AS BLEBS OR WIRES IN PYRITE, AND AS ELECTRUM (GOLD-SILVER ALLOY). CALCITE (CaCO_3) AND QUARTZ (SiO_2) ARE THE MAIN GANGUE MINERAL.

SCHEDULED THROUGHPUT FOR 1983 IS 300 TONS PER DAY. A CONCENTRATE GRADE OF 240 OUNCES PER TON SILVER AND 5.4 OUNCES PER TON GOLD HAS BEEN ACHIEVED. THE RECOVERY HAS AVERAGED 85% SILVER AND 84.3% GOLD.

CRUSHING

ORE IS CRUSHED WITH A KUE-KEN 12"X36", 40HP, JAW CRUSHER AS THE PRIMARY CRUSHER. ORE IS FED TO THE JAW CRUSHER BY A SIMPLICITY VIBRATING FEEDER WITH A VIBRATING GRIZZLEY AHEAD OF THE JAW CRUSHER. THE JAW CRUSHER DISCHARGE IS CONVEYED TO A SPOKANE MODEL 72-EV IMPACT CRUSHER AS THE SECONDARY STAGE OF CRUSHING. THE SECONDARY CRUSHER DISCHARGE IS FED TO A VIBRATING SCREEN WITH 3/4" X 5" SLOTTED CLOTH. THE OVERSIZE IS RETURNED TO THE SPOKANE CRUSHER AND THE UNDERSIZE IS CONVEYED TO THE FINE ORE STORAGE BINS (500 TON CAPACITY) OR TO AN OUTSIDE ORE STORAGE PAD.

A 50HP, 10,000 CUBIC FEET PER MINUTE DUST COLLECTOR REMOVES PARTICULATES AND TRANSFERS THEM TO A BAGHOUSE FOR FILTERING.

GRINDING

THREE ORE FEEDERS DELIVER ORE TO THE TWO STAGE GRINDING CIRCUIT. AN AUTOWEIGH MODEL MARK IV E-400 BELT SCALE DELIVERS A TONNAGE READOUT. A DENVER 5' X 12' ROD MILL WITH A 150HP MOTOR GRINDS ORE AS THE PRIMARY GRINDING STAGE USING 3" RODS. A SALA 3" PUMP DELIVERS THE ROD MILL PRODUCT TO THE BALL MILL DISCHARGE SUMP WHERE A DENVER 5 X 4 SRL PUMP FEEDS A BANK OF FOUR KREBS D6B CYCLONES FOR CLASSIFICATION. THE CYCLONE UNDERFLOW IS RETURNED TO THE HARDINGE 8' X 9' BALL MILL WITH A 350HP MOTOR AS THE SECONDARY GRINDING STAGE. THE CYCLONE OVERFLOW IS SENT TO THE FLOTATION CIRCUIT AND THE SIZE OF THE CYCLONE OVERFLOW IS 90% MINUS 200 MESH (75 MICRONS). THE FLOTATION FEED IS SAMPLED WITH A DENVER AUTOMATIC SAMPLE CUTTER AND THIS SAMPLE IS USED FOR THE FLOTATION FEED GRADE.

FLOTATION

THE FIRST STAGE OF FLOTATION IS THE ROUGHERS WHERE A BULK CONCENTRATE IS FLOATED. THE FIRST AND SECOND SCAVENGERS FLOAT THE REMAINDER OF THE FLOATABLE GOLD AND SILVER. THERE ARE FOUR DENVER MODEL 21 MACHINES FOR THE ROUGHERS AND TWELVE MODEL 18 MACHINES EACH FOR THE FIRST AND SECOND SCAVENGERS. A SPENCER BLOWER DELIVERS 1200 CUBIC FEET PER MINUTE OF AIR TO THE FLOTATION MACHINES.

FLOTATION (CONT'D)

THE FLOTATION CONCENTRATE IS SAMPLED BY A DENVER AUTOMATIC SAMPLER PRIOR TO BEING PUMPED TO THE DENVER 20' DIAMETER THICKENER.

LEACHING

THE THICKENER UNDERFLOW IS PUMPED BY A DORR-OLIVER ODS PUMP TO ONE OF THREE 16' X 16' LEACH TANKS. A 30% SOLIDS IS MAINTAINED WHILE LEACHING THE GOLD AND SILVER CONCENTRATE FOR 36 HOURS AT A CYANIDE DOSAGE OF 30 LBS OF CYANIDE PER TON OF SOLUTION. AIR IS INJECTED INTO THE LEACH TANKS TO PROVIDE THE NECESSARY OXYGEN TO KEEP THE REACTION GOING.

PRECIPITATION

AFTER THE 36 HOUR LEACH, THE PREGNANT SOLUTION IS FED TO TWO 8' X 6' PRECIPITATION TANKS. ZINC DUST IS ADDED TO THE SOLUTION CONTAINING, ON THE AVERAGE, 50 OUNCES OF SILVER PER TON OF SOLUTION AND 1 OUNCE GOLD PER TON OF SOLUTION.

THE BARREN SOLUTION, WHICH HAS BEEN REMOVED OF THE GOLD AND SILVER VALUES, IS DECANTED AND USED IN THE LEACH CIRCUIT FOR THE MAKE UP WATER. THE PRECIPITATE IS PUMPED TO A SHIVER 36" FILTER PRESS FOR DEWATERING OF THE PRECIPITATE. THE PRECIPITATE IS THEN REMOVED FROM THE SHIVER PRESS AND PLACED INTO THE DRYING OVEN. THE PRECIPITATE CONTAINS 87% SILVER AND 2.0% GOLD. THE IMPURITIES ARE IRON, ZINC, ALUMINA, AND SILICA.

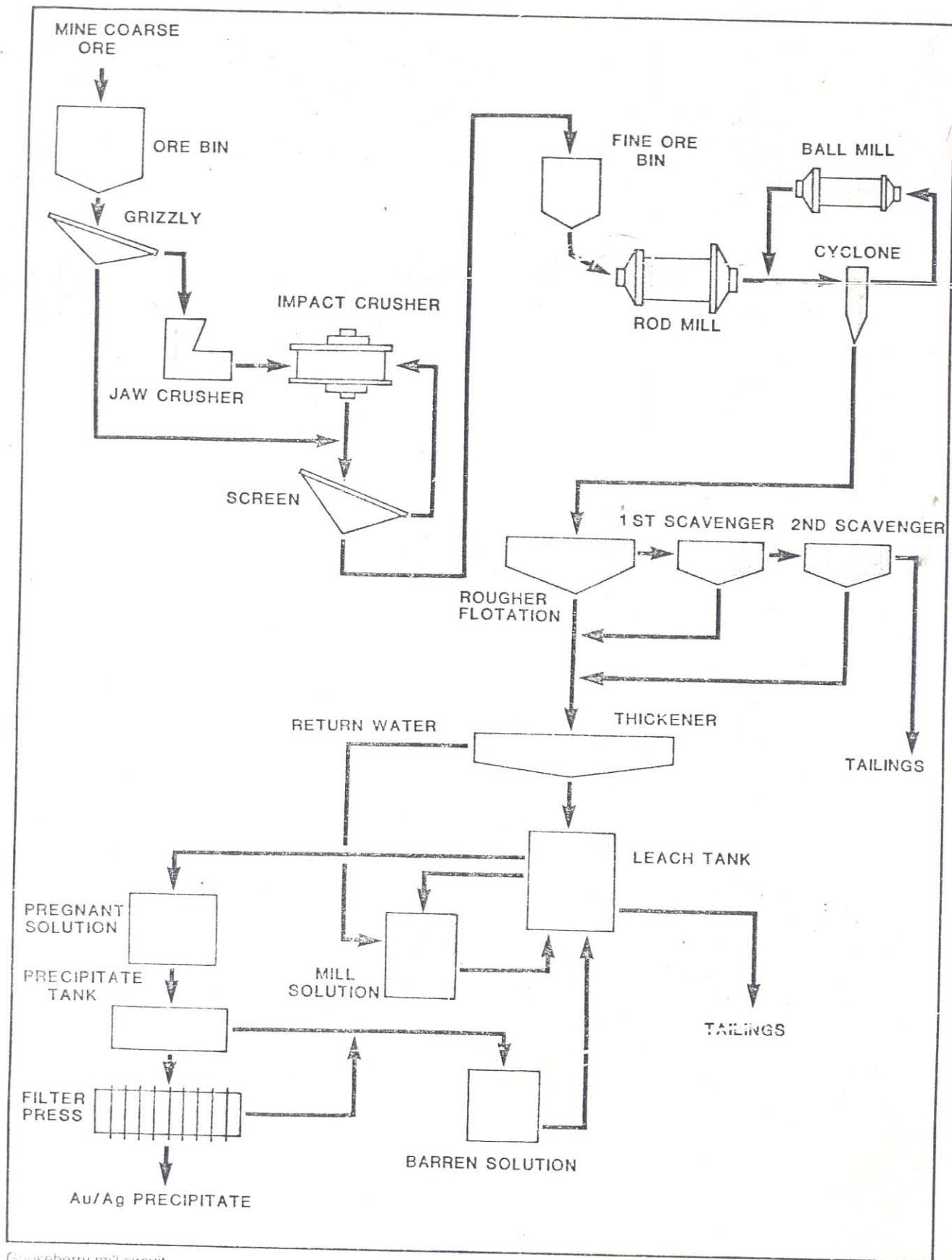
AFTER THE PRECIPITATE HAS BEEN DRYED, IT IS SAMPLED, PLACED INTO FIVE GALLON CANS AND SHIPPED TO THE ENGELHARD REFINERY IN ANAHEIM, CALIFORNIA.

BACKFILL

THE FLOTATION TAILINGS ARE AUTOMATICALLY SAMPLED AND PUMPED IN TWO STAGES WITH TWO DENVER 4 X 3 SRL PUMPS TO A KREBS MODEL TU-10 CYCLONE. THE COARSE FRACTION, 20% BY WEIGHT, (UNDERFLOW) IS SENT UNDERGROUND AS BACKFILL AND APPROXIMATELY 15% OF THE UNDERFLOW PASSES 400 MESH (38 MICRONS).

THE SLIME FRACTION (OVERFLOW) IS FED BACK TO THE MILL AND THEN PUMPED TO THE TAILINGS DAM.

RECYCLED WATER IS PUMPED BACK FROM THE POND FOR REUSE IN THE MILL CIRCUIT.



Gooseberry mill circuit.



ASAMERA MINERALS (U.S.) INC.