

## **RP-4 OPERATING INFORMATION**

All shaker tables must be firmly secured to a dense solid mounting base. Wooden stands will set up harmonics and vibrations. Dense concrete or solid bed rock is preferred or a heavy braced steel table sitting on concrete. Mount shaker table to solid bedrock when operating in the field. Vibrations or harmonics will have a negative effect on the concentrating action of the gold and a negative scattering effect. Global Mining shaker tables do not vibrate, they oscillate in a perfect smooth motion. If you want to save micron sized gold, remove all harmonics from the oscillating shaker table.

### **LEVELING**

(Important) Do not level across or on top of the deck riffles. Place a level on top of the lower steel bar that extends between the two bolts that hold down the mounting feet. Use flat washers installed under either end of the mounting feet for precise level adjustment in the long axis. Horizontal slope of table will change by adjusting the T handle slope tilting screw. Adjust deck up or down for precise control of concentrate line.

### **SETTLING OR CLARIFYING PONDS**

At no time should sand or slime be re-circulated back with mill water. Large, calm, surface areas are required to settle slimes. **Buckets, barrels or any deep containers** with turbulent water will not allow slimes to settle. Tailings should discharge into a tails pond or into a primary holding vessel before entering slime settling ponds. Surface area is more important than depth. A small 10 X 20 ft settling pond can be installed in about 30 minutes. Shovel a 6" high retainer wall of earth and remove all gravel and fill with soft sand. Roll out plastic liner and fill with water. Desert areas require a plastic cover to retard evaporation. Use 2 X 4 wood across pond and lay plastic.

### **COMPACT TAILINGS THICKENERS**

A small compact tailings thickener introduces tailings feed at a controlled velocity in a horizontal feed design that eliminates the conventional fee-settling zone. The feed particles quickly contact previously formed agglomerates. This action promotes further agglomeration and compacting of the solids. Slowly rotating rakes aid in compacting the solids and moving them along to the discharge. Under flow from the thickener (60-65% solids) is processed through a vacuum filter and a 90-95% solids are sent to the tailings area. Tailings thickeners are compact and will replace ponds. A 23-ft-diameter will process flow rates at 800 gpm or 50 tph.

## **DEFLOCCULANTS AND WETTING AGENTS**

Use 65% soda ash, 25% sodium silicate and 10% sodium hexametaphosphate as a "DEFLOCCULANT". Omit the phosphate if you are concerned with EPA. Union Carbide Tergitol surfactant should be used as a wetting agent. Check ph with litmus paper for ph 10 or more. Sometimes lime may be substituted for the deflocculant. Dissolve in a vessel for about an hour and then allow to settle into a clear solution. Add the clear lime solution as needed to recirculating water for maintaining a ph of 10. Lime will clear the water more effectively than soda but will not dissolve the clays as well. Liquid Dawn and Jet Dry work well also.

## **GOLD LOSSES**

Pine oils and vegetation oils regularly coat the surface of placer gold. Sometimes up to fifty percent of the smaller gold will float to the surface and into the tails. The pine oil flotation method for floating gold is still in use today. A good wetting agent will aid in the settling and recovery of oil coated gold.

## **OPERATION OF THE RP-4 SHAKER TABLE**

Separation of concentrate from tails

Minerals or substances that differ in specific gravity of 2.5 or to an appreciable extent, can be separated on shaker tables with substantially complete recovery. A difference in the shape of particles will aid concentration in some instances and losses in others. Generally speaking, flat particles rise to the surface of the feed material while in the presence of rounded particles of the same specific gravity. Particles of the same specific gravity, but varying in particle size, can be separated to a certain extent, removing the larger from the smaller, such as washing slime from granular products. Mill practice has found it advantageous in having the concentrate particles smaller than the tailing product. Small heavy magnetite particles will crowd out larger particles of flat gold making a good concentrate almost impossible with standard gravity concentrating devices. The RP table, using magnetics, overcame this problem and sends the magnetite into the tails, leaving the non magnetics to concentrate normally.

## **SIZING OF HEAD FEED MATERIAL**

No established mathematical relationship exists for the determination of the smallest size of concentrate particle and the largest size of tailing particle that can be treated together. Other factors, such as character of feed material, shape of deck and volume of cross flow wash water will alter the final concentrate. Size of feed material will determine the table settings. Pulverized rod mill pulps for gravity recovery tables should not exceed 65-minus to 100-minus 95% except where specific gravity, size, and shape will allow good recovery. Recovery of precious metals can be made when processing slime size particles down to 500-minus, if the accompanying gangue is not so coarse as to require excessive

wash water or excessive grade to remove the gangue to the tails. Wetting agents must be used for settling small micron sized gold particles. Once settled, 400-minus to 500-minus gold particles are readily moved and saved by the RP shaker table head motion. Over sized feed material will require excess grade to remove the large sized gangue, thus forcing large pieces of gold further down slope and into the middling. Too much grade and the fine gold will lift off the deck and wash into the tailings. Close screening of the concentrate into several sizes requires less grade to remove the gangue and will produce a cleaner product. A more economical method is to screen the head ore to screen size, 16-minus or smaller and rerun the middling and cons to recover the larger gold. This concept can be used on the RP tables and will recover all the gold with no extra screens. A general rule for good recovery is less grade for the table deck and as much wash water as possible without scouring off the fine gold. Re-processing on two tables will yield a clean concentrate without excess screening. Oversized gold that will not pass through screen size mounted on RP tables, will be saved in the nugget trap. On the first run, at least one inch or more of the black concentrate line should be split out and saved into the #2 concentrate bin. This concentrate will be re-run and the clean gold saved into the #1 concentrate pocket. Argentite silver will be gray to dull black in color and many times this product would be lost in the middling if too close of a split is made.

### **SCREEN SIZING OR CLASSIFICATION**

Generally speaking, the riffled portion of a shaker table separates coarse non-sized feed material better than the un-riffled cleaning portion. Upon entering the non-riffled cleaning plane, small gangue material will crowd out and force the larger pieces of gold further down slope into the middling. Screen or to classify. The largest feed particles should not exceed 1/16 inch in size. It is recommended that a 16-minus or smaller screen be used before processing 3/4 inch or smaller feed material, is factory installed onto screening devices. Perfect screen sizing of feed material is uneconomical, almost impossible, and is not recommended below 65-minus.

### **PVC WATER DISTRIBUTOR RP-4**

The PVC distribution bar is pre-drilled with individual water volume outlets, supplying a precision water flow. Water volume adjustment can be accomplished by installing a 1" mechanical PVC ball valve for restricting the flow of water to the water distributing holes. The valve may be attached between the garden hose attachment and water distributing bar. More water at the head end and less water at the concentrate end is the general rule for precise water flow. More feed material will occupy the head end of the shaker table deck in deep troughs and less material will occupy the concentrate end on the cleaning plane. A normal water flow will completely cover the feed material over the entire table and flow with no water turbulence. A rubber wave cloth is installed to create a water interface and to smooth out all water turbulence. Bottom of water cloth must

smoothing out all the water turbulence. Bottom of water cloth must contact the deck. A shallow turbulent water flow without the wave cloth, no deflocculant or wetting agent and excess table grade will wash the gold further down slope and into the middling. For the operation of the table, twelve to fifteen gallons of water per minute is required.

### **HORIZONTAL TABLE SLOPE**

#### **AVOID EXCESSIVE SLOPE AND SHALLOW TURBULENT WATER**

For new installations, all horizontal grade/slope adjustments should be calculated measuring from the concentrate end of the steel frame to the mounting base. For fine gold, the deck should be adjusted almost flat. An example, fine feeds 200-minus or smaller will require 1/8 inch or less of slope for each foot of horizontal sloping table surface and coarse feeds will require up to horizontal sloping table surface and coarse feeds will require up to 1/4 inch per ft. of slope. Slope or grade must not be so excessive as to cause the concentrate to be scoured out and washed too far down slope. For the RP table, 1/4 inch down slope per running foot from level (measuring from the underside of the steel frame of the machine to the mounting base) will be a good starting point for most black sands operations. Maximum water with little grade should be used when processing very small gold particles. Excessive slope, shallow turbulent water and no wetting surfactant account for 99% of all gold losses when operating shaker tables.

### **CONTROL OF CONCENTRATE LINE**

At some point on the concentrate end of the RP table, separation of middling and concentrate must occur. Small changes in the volume of feed material, wash water, deck slope and other factors will affect and change the concentrate line formed on the cleaning plane, thus requiring attention. A belt feeder for dry or commercial operations. Hand feeding is tedious and one can not feed at a continuous rate, which will cause the concentrate line to change continually. Deck horizontal slope/grade is used for the final control of the concentrate line and for accurate splitting of the concentrate. A slope T handle adjusting screw on the RP-4 and an automatic leveler on the RP-4 is located at the concentrate end of the table. The entire table assembly rotates, thus eliminating complicated splitting devices. Middling will always contain some values and should be re-run if operating at a high volume or the concentrate line was split too close. Save at least 1 inch of the top concentrate line into the #2 concentrate pocket on the first run.

### **RP-4 NUGGET TRAP**

A live bed nugget trap is molded into the tailings drain trough and will save all oversized gold that will not pass the submerged deck screen. The nugget trap should be cleaned periodically. When cleaning nugget trap, the wash water and table deck should continue to operate with the head feed material shut off. This will allow the nugget trap to clean itself of all tails gangue. After the remaining tails material has moved off and out of the nugget trap, stop the water and reciprocating action of the table. The remaining heavy material should be hand washed out of the nugget trap, into a gold pan or, etc., and

inspected for values. Excessive slope overloading of feed material or no wetting agent during operations, will result in fine gold trapped in the nugget trap. Continued operation of the table with water, during cleanup of nugget trap without a protective cover of sand in the nugget trap, will result in some fine gold being scoured out of the nugget trap. Large gold nuggets will withstand the normal flow of water in the drain trough and will not be scoured out of the nugget trap.

### **TABLE FLOTATION**

Flotation, using shaker tables, is almost a lost art. For most operations this method will never be practiced, but for a few this method could save the mill operator thousands of dollars. Froth flotation using air and flotation reagents have survived the test of time. Most minerals respond to humidification of particle surface by atoms, ions or compounds from aqueous phase, by aiding selective sorption of collector agents. Mineral can be made to float or sink. Air bubbles attach themselves to the oil coated mineral to floated and will form a froth at the surface. This froth can be dispersed into the tailings or with the use of pipes and air jets they can be discharged into the concentrate bins.

### **WOOD CRATE**

**Remove two shipping screws and washers from the front mounting feet of the Concentrating Table.**

### **CARDBOARD CRATE**

**Remove from the crate by pulling on the steel frame (NOT THE ABS TOP).**

**CAUTION: Do not allow ABS top to stand in direct sunlight without water. Always keep covered and out of sun when not in use as heat may cause the deck to warp.**

**CAUTION: Do not lift or pull on the ABS plastic top, always lift using the steel frame.**

**CAUTION: Do not attach anything to the ABS plastic top. Do not attach pvc pipe to concentrate discharge tubes. Constant vibration from the excess weight will cause stress failure of the plastic.**

**WARNING: Do not reach or place hands under the machine when in operation as serious injury may occur due to exposed moving parts (pulleys, belts, spinning blades) and/or electrical terminals may cause shock.**

**WARNING: Do not remove ground plug or use any electrical outlet that does not have a properly grounded outlet. Serious electrical shock may result if not properly grounded.**

## **MAINTENANCE**

1. All bearings are sealed and no grease maintenance is required.
2. ABS deck should be periodically cleaned with hydrochloric acid (swimming pool acid) (do not use paint thinners or ketones. (Grease, gold, and tables do not mix)
3. A small amount of grease should be applied to the adjustable T handle which is used for changing the slope of deck.

## **TO CHANGE BELTS**

### **(Do not disassemble machine)**

1. Two small rubber Eureka RD upright vacuum cleaner belts which drive the magnets should be changed between six months to one year.
2. To replace the larger round belt (buna o ring) which drives the upper magnets just roll the belt over the top of the magnets. **(It is that easy)**
3. Large V belt will last for ten or more years.