

Valle Mines Washer Design

The Valle Mining Co. of 11 South Meramec, St. Louis, MO 63105, has a large mining property at Valle Mines, Missouri, on which there are some old waste dumps estimated to total 75,000 tons. The company wishes to build a simple concentrator, such as a form of washer, to recover the major part of the economic minerals from the dumps. The dumps are small, individually, and vary quite a bit in content. An average grade estimate would be about as follows:

<u>Mineral</u>	<u>% Range</u>	<u>Sp. Gr.</u>	<u>Remarks</u>
Galena	1 - 2%	7.5	
Anglesite	Tr - 1/2%	6.3	
Cerussite	Tr - 1/2%	6.5	
Barite	10 - 15%	4.5	
Sphalerite	Tr - 1%	4.0	
Smithsonite	5 - 8	4.3	
Marcasite	Tr - 3	4.9	
Goethite	10 - 12	4.4	
Pyrite	? ?	5.0	
Dolomite	20 - 30	2.7	As rock.
Chert.	10 -	2.5	" "
Mud			Some Red - Some Gray.

Individual samples may be quite different from the above. The galena and the barite are crystalline but massive in texture. The smithsonite, marcasite, and goethite are often very honeycombed and porous, giving fictitious values for Sp. Gr. The galena is solid, and is highly resistant to corrosion. Of the two lead secondary minerals, anglesite and cerussite, the anglesite occurs as a coating on any galena nuggets in contact with moisture. Cerussite crystals can sometimes be seen. Both will be partially recovered with the galena in a washing operation.

Two washers have been operated on the property comparatively recently. One was worked from 1943 to 1947. It was set up to recover the galena, barite, and a salable product of smithsonite. This mill had no trouble with the galena and obtained a partial recovery of a fair grade of barite. Smithsonite work was another story. Not only could it not be recovered, but some of the barite was lost with it. The standard smithsonite concentrate grade calls for 40% or over of zinc. They could not get continuous results of over 25%. This washer worked largely on mine dumps as feed.

About two miles to the northwest is another washer site, and this one was based upon shallow overburden barite ore, more or less of the usual "tuff washer" feed, residual overburden. There was very little zinc mineral in this material and they were able to work on this basis. Incidentally, there are known to be more deposits of this character present on the property and such could be a bonus feed on any plant built to handle the 75,000 tons of waste dumps. The site of this washer is available, with a dumping ramp, concrete pier foundations, and a good sized water supply and settling pond. The location is more or less central on the property. Due to these plant parts already in place, it will be assumed that any new washing plant will be situated on this site. Another advantage of this location is that there is ample room at the top of the dumping ramp for the buildup of several stockpiles. To avoid sudden drastic changes in the feed to the washers, the ore from several dumps should be blended by mixing in stockpiles.

A new washer is envisioned more or less as basically modeled after the usual southeast Missouri tuff washer. There would be a dumping ramp above a grizzly, with the finer material of the feed being

washed thru with a hose. The grizzly oversize, possibly 8" plus, would mostly be dolomite waste. It would be rolled off to one side on to a pile for disposal. The few large boulders having ore could be sledged thru the grizzly. The undersize would go to a log washer. The overflow of the log here on most dump ore would be mud and would be pumped to the settling pond. With some feed to the washer there may be a fine sand product in the log overflow which would have to be caught and treated for mineral recovery.

The coarse underflow product of the log washer, now hopefully free of mud, becomes the feed for the crushing and screening section. It is common practice to run the log oversize on to a picking belt where galena nuggets, for instance, may be caught before going to the crusher. After the crushing and screening, the ore, now all thru some set size, say 5/8", is ready for the jigs. The former plants used regular 4 or 6 cell Harz jigs. Possibly with more modern type jigs or a combination of jigs, cyclones, spirals, or other equipment, a recovery of a good smithsonite concentrate can be made. The old plants took off the galena in the first cell and a high grade barite product from the second.

The following cells were middling products of barite, smithsonite, sphalerite, the iron oxides and some attached rock. It might be possible to sell this to somebody at a low price or to stockpile it. But the real economic worth of the project depends upon a solution to the separation of the smithsonite and the residual barite from this middling. The jig overflow is plain waste and goes to the settling pond.

As stated above, the available remaining dumps on the property have about 75,000 tons. There is reasonable assurance that this tonnage with the stated estimated grade can be obtained and delivered to the washer site. As mentioned before, there are some scattered "barite in clay overburden" deposits on the property. The tonnage of this is unknown but the plant could handle it and thus give an extension to the life. The old mines can easily be reentered, all being above water level. All the old shafts are completely caved but many of them are not full. With some work, they could be made usable for a temporary entry. With what can be seen, and can be gathered from Kidwell's report of an exploratory trip, at least part of the workings are open. For a better entryway, notice on Kidwell's surface map, the location of the shafts along

the "Big Lode." The northend of this is only 37' deep. A creek a few hundred feet to the north is just about at the mine level. An incline or ditch here of moderate size would give access for a small low bed truck to the long Big Lode drift. Any falls could be cleaned up and removed easily.

When the mine was being operated over 100 years ago, lead was practically the only mineral sought (before 1850). As little as possible of the so-called waste was hoisted. After passage room was provided, the rest was stowed underground. In addition to this, it is known that some levels were not mixed^m (see old Missouri Survey reports). These two classes of readily obtainable ore may very well be in much bigger amounts than the 75,000 tons. I think that before any actual mill washer size is decided, that these last two types of ore should be determined. It might be advisable to have a larger washer than the small 100 tons a day plant now being considered. Looking further ahead, it is hoped to develop a method for prospecting from the surface for "shallow mine" ore of this filled cavity type.

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