PLAINTIFF'S EXHIBIT

GP-719

"GOING GREAT GUNS" GETTING GYPSUM GO - GO - GO

BY: ROCKY R. BOLTER

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"GOING GREAT GUNS GETTING GYPSUM"

OR

THE MECHANIZATION OF THE BLUE RAPIDS MINE

It is always interesting to pause for a few moments in retrospect and see just how good one's predictions (guestimates to some) turn out. To some of us, this may seem like unnecessary deflation of our ego. Never the less, it is an educational process which all of us could indulge in with profit. Now! Let us go on with our story.

Blue Rapids has a mining seam some 8' thick, lying almost horizontal, and usually covered by 80' or more of well consolidated shales and limestones. Immediately above the gypsum is several feet of red and green shale which, on exposure to blasting strains, atmospheric humidity and temperature stress, spawls rather badly on occasion. Below the gypsum is a limestone strata with the contact consisting of a thin shale layer with some satin spar.

In the days of hand loading, the entire seam of gypsum was shot down. The individual loaders hand selected the rock to produce two grades. All of the bottom contact rock, top contact rock, "Bull Rock", and minus 3" went into #2 grade which was either disposed of to the portland cement industry or left within the mine. The #1 rock (what was left) was used in the manufacture of plaster items. To get an idea of the purity requirements, the rock used in plaster specialties ordinarily exceeds 99% purity with a very minimum of discoloring shale particles and no silica grains larger than 80 mesh. Actually, the #2 rock is considerably better than we have available at most of our other gypsum plants.

Almost invariably, when a mine is mechanized, quality suffers. It is, therefore, readily understandable that many viewed the mechanizing of the Blue Rapids Mine with grave doubts. Fortunately, we were permitted to rebuild the crushing plant just prior to mechanization and could incorporate certain features that would help us in other plans.

Our original plans called for under-cutting some 6" above the bottom contact in order to remove one contaminating seam. It was hoped that this would permit blasting with a mini-

mum of fines and that it would cause very little damage to the overlying shale. We expected to screen the minus 1 1/2" to #2 and hand pick the rest on a belt. A modern Joy Jumbo Drill and the usual Joy Shuttle Cars and Loaders were to be used. The mine was being set up entirely on Alternating Current with Portable Service and Ground Limit Controls.

After getting into operation with the picking process, we found that we were producing even higher quality products than had been possible with hand loading methods. There were some serious drawbacks in that the recovery to #1 never exceeded 50%. As a consequence, the pile of #2 rock grew larger and larger with the Industrial Sales unable to do anything about it. Also, we had not improved the shale spawling condition as originally hoped for and it was expensive to hand clean the spawled shale from the top of the shot down gypsum before it could be loaded. The #2 pile grew and when it reached 10,000 tons the Management put it squarely on the shoulders of Messrs. Brown and Puckett and said "Do something about it, or else". As you may guess, neither of us were looking for an "Or Else" so we decided that mining must be done in a manner that would leave a gypsum roof. After many trys, this was successfully accomplished. There was no roof parting but as the men gained in skill, they were able to control the gypsum that was left in the roof to a fair degree. Occasional unpredictable rolls in the overlying shale left improperly supported patches of gypsum roof and these areas were bolted to make them safe. This left us a mining face just under 6' in height.

With the new mining method, it has been possible to eliminate the necessity of picking belt, entirely. Occasional "bully rock" (containing shale veinlets) is encountered and these spots are loaded out as #2. Virtually all of the selection is made at the mine face. It is presently possible to produce an acceptable purity although our percent of mining seam recovery has dropped. In the event a Board Plant is ever established at Blue Rapids, we would

hope to recover the roof rock now left in place.

We will now review the material accomplishment of the Blue Rapids Mechanization. In the time of hand methods, a crew consisted of about 50 men, and Loaders were always scarce when they were needed most. The Mechanization was predicated on a 50% reduction in force and a saving of plus 50¢ per ton. In 1952-3, the Mining Cost, including Crushing, averaged about $1.85 per ton and this, of course, was by hand loading methods. In the last eight months of 1955 the comparable Mechanized Cost was $1.16 per ton. Hand loading used approximately .9 Man Hours per ton or produced about 9 tons per man shift. The mechanized operation uses approximately .3 Man Hours per ton or produces about 25 ton per man shift.

From the above, one can readily observe that the original objectives have been reached and exceeded. The crew has been reduced better than two thirds and there is better than 60¢ per ton saving in direct cost.

Under-cutting with short wall machines costs better than 20¢ per ton and it is one of the major items in the present cost structure. Very recently, super-powered pnuematic tired universal cutting machines have been built and it appears they might offer the possibility of further cost reduction. Also, Mill production facilities that would use the #2 grade and roof rock would help.

We would say that the Blue Rapids supervisory control within the mine has been quite effective in securing some of the above results. For a time, their maintenance was excessive but this situation seems to have improved.

We have tried to make our story short and simple but let us assure you there were many false starts, trials, and heart aches. Had it not been for the patience of Management, the excellent cooperation of Blue Rapids Personnel, and the helpful assistance of Acme Mine Foreman Wilkerson, the excellent results would not have been obtained.

As for the possibilities of improved Mining Costs in other plants, it appears that both Acme and Grand Rapids can gain through the use of modern Jumbo Drills. Akron, with a more complicated set-up, faces many problems not the least of which is supervision. Roof Bolting is rapidly becoming an established procedure there and we are hopeful that this will make possible the use of Jumbo Type Drills at that location. Studies are currently being made to improve both Stripping and Blasting at Fort Dodge.

Most of our Mining and Quarrying operations can still be considerably improved through better direct supervision. This, of course, brings in the problem of supervisory training. The best of machines perform poorly with indifferent operators and inadequate follow-up supervision. Thinking, understanding, planning and execution of plans still offer a most fertile field for cultivating further savings.

Respectfully submitted by,

H. C. Puckett