

EXPERIMENTS IN TAILINGS RECLAMATION AT
GRANISLE COPPER

Paper prepared jointly
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Zapata Granby

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INTRODUCTION

Zapata Granby Corporation's Granisle Copper Division is located in North Central British Columbia. The property itself is located on McDonald Island in Babine Lake, which is the largest natural lake in the province. All traffic to and from the island is by means of a 1 1/3 mile barge crossing.

The mine began production in 1966. At present we are mining at a budgeted tonnage of 50,000 tons per day, processing 14,000 tons of ore per day. The porphyry ore deposit is low grade with the present cut-off grade at 0.20% Cu. The tailings disposal system is rather unique in that the tailings are dumped into a portion of the lake that has been totally enclosed by dams constructed of pit waste rock and cycloned sands.

The tailings sands on the dormant No. 1 pond range from medium to very fine in soil texture with an average pH of 8.1, potassium 179 pounds per acre, phosphorus 4.3 pounds per acre, and nitrogen 1.4 pounds per acre.

RECLAMATION PROGRAMS

Our tailings reclamation objectives to date have been mainly of an experimental nature with the transplanting of native species common to the area.

In 1977, an eleven acre area was transplanted with Common Horsetail on a staggered 50 foot x 50 foot pattern. The clumps of Horsetail used for the program were obtained from a nearby area of natural growth in soil similar in composition to the tailings pond. In October of 1977, three areas of natural invasion of Horsetail on the southern end of the tailings pond were

staked out to monitor their growth rate. In the late spring of 1978, it was found that the circular patches of Horsetail had spread about two feet. This increase in the diameter represents an increase of approximately 21%. This along with the 95% success we realized from the 1977 transplanting led to the transplanting of the balance of the pond as part of the 1978 program.

Also as part of the 1978 program, we established seven test plots where various native species were transplanted. The species tested were:

Fireweed (Epilobium angusrifolium)
Thimbleberry (Rubus parviflorus)
Common Wild Roses (Rosa spp)
Red Raspberry (Rubus idaeus)
Solomons Seal (Similacina amplexicaulis)
Flat Top Spirea (Spiraea lucida)
Purple and White Pea (Lathyrus nevadensis)
Lodgepole Pine (Pinus contorta latifolia)
Black Spruce (Picea mariana)
Northern Black Cottonwood (Populus trichocarpa)

Each test plot was halved with one half being lightly fertilized with 34-0-0 chemical fertilizer. The monitoring of these test plots and success ratios will be an integral part of the 1979 Reclamation Program.

At the suggestion of the Reclamation Branch of the B.C. Ministry of Energy, Mines and Petroleum Resources, three test plots were established on the south side of the No. 1 pond. The plots were treated with 34-0-0 fertilizer at various rates of concentration.

The Reclamation Branch felt that the fertilization alone would enhance the natural invasion of indigenous species. The plots were therefore located in the vicinity of the previously reclaimed No. 1 dam face.

The major thrust of the tailing portion of the 1978 program was the seeding of the No. 1 pond.

This aspect of our program, although experimental in nature, could provide Granisle with a successful basic formula for future work on the No. 2 and No. 3 tailings impoundments.

Prior to the actual seeding of the pond, an attempt was made to scarify the surface. A John Deere 410 backhoe was used to drag a custom made scarifier over the sands. The attempt was considered unsuccessful due to the fact that the machine was too heavy to negotiate the extremely fine textured, dry tailings. Consequently, the majority of the 28 acres was hand-raked before seeding.

Richardsons' "R.S. Tailings Pond Mix" was chosen for the pond seed mixture. The mixture breakdown was as follows:

Creeping Red Fescue 20%	Sweet Clover 10%
Alfalfa Blend 10%	Birdsfoot Trefoil 5%
Crested Wheatgrass 10%	Canada Bluegrass 5%
Orchardgrass 10%	Redtop 5%
Slender Wheatgrass 10%	Tall Wheatgrass 5%
Smooth Bromegrass 10%	

In early October, four wedges were cut from a fallen Cottonwood. These wedges had sprouts growing from them ranging from 18 to 30 inches in length. The wedges were soaked in water for two days and planted approximately 8 to 10 inches deep and about 15 feet apart in the No. 1 pond.

The rapid decaying of the water-soaked wedges should hopefully provide the sprouts with sufficient nutrients to sustain initial growth.

As a result of the unusually hot, dry summer experienced throughout most of the province, an attempt was made to irrigate the No. 1 pond. A 2 1/2 inch

plastic line was tapped into our mill reclaim water supply and run to the edge of the pond (approximately 100 yards). At this point the line was reduced to a 1 inch diameter perforated plastic line that ran approximately 375 yards out onto the pond. Due to low head and friction losses, the system was ineffective after the first 200-300 feet.

FUTURE RECLAMATION PLANS

Our 1979 reclamation program for the No. 1 tailings pond hinges a great deal on the success of last years' transplanting. Hopefully some of the native species will indicate a reasonable survival rate warranting further transplanting, as was the case for the Horsetail transplanting. Also for the upcoming season, plans have been made for more test plots on the No. 1 pond. These plots will be seeded with a variety of legumes and fertilized at various concentrations.

The area on the west side of the pond that was seeded and fertilized in 1972 will be harrowed, re-seeded and fertilized. It is felt that turning under the existing sod would hasten the natural decaying process and provide a more desirable base for a new crop of legumes.

CONCLUDING STATEMENT

At the time when the public is taking a more serious interest in the environment, we as industry are being put in the spotlight more and more. I would like to think that through Symposiums such as this one and through concentrated efforts in the field, that mining will set the standards for industry in surface reclamation.

DISCUSSION RELATED TO BARRY TRIP AND J.R. CHALMERS' PAPER

Ben van Drimmelen, Ministry of the Environment. I was wondering about the use of these native transplants. Are you looking for a species that will grow on a tailings pond.

ANS. Yes, during the last year's program the idea was to encourage the native species for the tailings area.

Dave Polster, Techman Ltd. Have you any ideas of what the cost effectiveness is of transplanting onto the tailings on that sort of scale.

ANS. No. Not really. I'm sorry I haven't got any figures on that.