

# TAILINGS TEST

CONVERSATION WITH ANDY ROBERTSON  
RE: TEST PITS AND INTERMEDIATE DAM  
10 AUG 88

007530

What is needed for the non test pit part of the project is to define the scope of the remaining characterization program - not detailed in 60602.

- Previous RM and AR have decided locations of sample sites and tests to be done on samples as well as methods to be used for:
  - preservation of samples
  - extraction of pore water
- There is a potential here for getting data that we can't use for the purposes it was collected as with Klonn-Leonoff data that existed before the Test Pit Program.

*10 days from now*

- Drilling: - holes to go through tailings all way to bedrock

Typical rig would be a SME-55 - hydraulic feed  
- can take shelby samples and do SPT's  
*CMA = 750  
Sonic - Midnight Sun*

Area under X Valley and Down Valley is already done but need pore waters which we can get from pizsometers.

## SURFACE WATER PROGRAM

Entirely by Robert over phone - need to ensure sampling and flow measurements are accurate and sufficient - need good background data - all previous sites are near mine and data are erratic.

Need seasonal variation in upstream surface water quality and quantity - need amount and alkalinity to assess neutralization capacity - monthly data needed - maybe a 4 week period of weekly measurements during runoff.

## GROUNDWATER

- Will it be done correctly? - what is planned?
- Can we provide someone to sit with rig - 2 days - 3 days per hole, 3 holes on down stream side =  $\frac{9}{2}$ , 10-11 hr days?

Typical person would be \$40-45/hr; \$450 per day depending on experience; 2-3 year practiced eng. would be okay.

Need to get:

Physical composition, grain size, etc  
Clean comp pore water  
Check comp soils

Check comp soils

Need good logging and good sample preparation. Seal in saran wrap with air excluded. Can't leave in Shebys, must be extracted soon after taking to avoid rust. (This is Roberts 1st geotech assignment - he has not done all of this before.)

BEST PROGRAM:

Simple mechanical testing

- Sieving
- Permeability tests

Chemical analysis on water to define current contaminant migration level and to allow us to define the parameters for mixing with AMD water to define constraints for equations for chemical change.

Attenuation tests for soils - ie. column tests on soils.

After sampling: organize testing. Want to see what detailed testing will be done, methods, procedures and parameters to be tested for.

Prepare a little report on the results of the program.

(Adrian Brown could review (from Denver) the project.)

FOUNDATION CHARACTERIZATION PROGRAM

Samples from above program - need tests laid out.

TAILINGS CHARACTERIZATION PROGRAM

This year be sure we get right samples and analyses.

Mainly in 1989 review placement, methods and sequence - "literature" review and records review - where are coarse tails versus the slimes.

3 holes in above program are through tailings

EPS has done 6 or 7 holes and carried out characterization.

Need to draw up models of tailings type distribution. Need location of coarse zones, soft zones, included ice zones for long term settling is affected by this - testing for settlement characteristics. Reason: Shallow paddy type water cover - large settlements in slimes area will require rebuilding of paddies, need to know amount required.

80% of physical stuff will get this year, may need to do another 20% next year.

## MODELLING PROGRAM

All other programs aim to provide data for modelling and eventually design.

Physically (quantity) and kinematically how does water move through tailings impoundment and down into aquifer below.

Need to know how physically and chemically how the water moves through different zones - sand composition different and rates of movements higher than slimes, more oxygenated, higher reaction rates.

Pictorial model starting with elements at YTWB hearing - then breaks them down and adds modifier routine to look at chemical change. Leading to a linear model of water movement through the various elements.

For 1988:

Pictorial model - must get all the elements together and their inter relationships, basic structure of each of elements, inflows and outflows - but also need to look at what happens in each elements and at what rate.

Don't need any computer work this year only to get the framework sorted out.

Objective here is to have a tool that allows us to modify certain elements and evaluate effectiveness of each mitigative measures

Brenda mines models is similar, Lotus model on spreadsheet is done, SRK will show it to us.

## TEST PLOT PROGRAM

- Lack of progress getting instruments working.
- 3-4 week exercise to recover instrumentation in drums - now we still don't know if the instruments are working.  
For example do the thermistors work? Throw a voltmeter on to check.
- Cover placement progress is good but may be wasted if instrumentation doesn't work.
- Sample tubes are so bent and bowed that may not work.  
Robert has modified certain tubes and these modifications may effect performance when bent - need to know this.
- We should now have a summers worth of results - should be getting data now.

- Robert does not appear to be planning ahead on how the program should proceed.
- AR concerned we will get into a situation where deficiencies are revealed too late to remedy by this winter when its too late to do anything about them.
- AR has gone over testing quantities and procedures for the tailings that went into the pits in the 6 weeks RM was at SRK - RM says its done but hasn't provided any results of physical and chemical analyses..

Equity has done some of this type of work. Sweedes have done hundreds (Boliden). Waterloo has done a lot - Dr. Bloes (?).

Jim Sharp can do this and we could employ him directly - ideal person is Robert - best assistant is someone with a strong instrumentation background like Jim Sharp.

- Jim Sharp would be \$35.00/hr
- Ordinary tech might be \$22-25

AR thinks the 4 year program will be judged to be too short to show that dry covers will work. (Show down 1/2 m per year acid front movement (neutralization front where water goes back to original tailing pH)). EPS will not really be able to say no it won't but they will want more testing if we insist the dry cover is working and the data are not convincing.

#### TAILINGS POND

1. Concern over the quantity of tailings that has gone in and the capacity of the impoundment.

What is the source of the design?

- Klon Lenoff?
- Golder?

What is the height volume relationship?

Why do the estimates seem so flawed?

- Is the bulk density wrong

Was volume calculated on the basis of a level fill to top of impoundment or a sloping surface from a beach at the upstream side?

- 1a. What was the original down valley concept?

- Centerline raising
- downstream raising
- Is CL raising feasible based on tailings nature, flow gradient from mill and timing wrt winter formation of ice lenses
- possible full size test embankment an Curragh beach area then get photographic evidence it

works.

2. Following the current plan will trigger a probable \$ZOM expenditure starting in 1992 related to abandon of down valley impoundment in addition to old CAMC tailings (the abandon of CAMC will probably triggered anyway)

- Further it may invalidate possible abandonments because of restrictions to the ultimate height of intermediate dam wrt slope on tailings behind the ID.
- May not be able to use what we regard as the full capacity of DV scheme if we want a wet abandonment.
- To use this full capacity and to have a wet abandon (if tailings test pits show dry won't work and forced to go wet) then may be forced to raise XV dam (or build new one) per KL (at \$10 M+) and dredge old tailings into Faro Pit or behind this huge dam.
- Sloping beaches and small dyke in current DV may be causing problems of elevation wrt to dam height and again limiting abandon options
- We need a good topo map of this area so can evaluate just what has been done here wrt abandon.

EPS is well aware that the contaminant front is moving down at 0.5 m per year in the old tailings and will be exerting great pressure to cap those tailings soon especially if the test pits don't show the dry covers working clearly enough.

- Possible alternative (assuming now committed to DS scheme) is to go CL on next raise if at all possible - to do this we need to spigget tails off the upstream side of the ID in the coming summer season (to limit ice lenses) in order to build stability.

#### CONCLUSION:

We have to get together: Jim Moore, Golders Gilchrist, Robertson Me (and Forgaard?) to look at the implications of different happenings in the tailings pond area with respect to the financial commitments that they may trigger and overall operational cost savings being achieved by comparison.

Some options are:

- 1) Continue as is
- 2) Go CL now
- 3) DS now then CL
- 4) go to pit ASAP
- 5) use XV impd. and - pump water to pit for treat or
  - treat plant for pit water
  - recycle

followed by:

1. wet aband, or
2. dry aband - layered: slimes, till, riprap  
- simple till

Consider:

- 1) Structure design wrt certain height limitations in light of wet/dry choice.
- 2) when going to pit is possible
- 3) what costs of going to pit are
- 4) what costs triggered are by each choice

Need a meeting possibly in September to deal with these questions - most likely mtg and memo to KAF.

September - November at latest should have this mtg.

Must look at future options not past things that have been cut off.

tops on search area will be done.

Send Teresha an update of memos or Reports needed.

once <sup>or 6w</sup> ~~2m~~ or so take a week  
- need support on technical side specialists  
- do research & write.