

## Report on Staging compiled by Earle Jan 1 1990

Transportation of SNO equipment underground was discussed with Inco at a meeting held on Aug 25, 1989 and reported in minutes tabled by Hugh Evans in item 6 of those minutes.

- a) The SNO work force would usually go underground at 7:30, up at 3:30  
The second shift down at 3:40 and up at 11:40
- b) Material that fits into the cage can be moved underground on 24 hr notice. Material to be slung under the cage would require 1 weeks notice.
- c) At critical times up to five hoist trips a day could be scheduled with several weeks notice but a buffer store of components and materials should be established at the observatory.

In addition, I have been told that loaded rail cars would normally be moved underground during the grave yard shift and moved from the hoist station to the observatory during the day they arrive. Hugh Evans has told me that construction underground is not normally delayed because of problems getting materials underground.

I suggest, subject to being corrected, that we assume the following:

- a) We will be able to get up to 5 hoist trips per day with a maximum of 20 per week.
- b) That there should be one or more spur lines in possibly two side rooms, i.e. the auxiliary room and the ramp turn out, where at least five rail cars could be shunted aside.
- c) That there will be an air-winch enabling us to move cars around.
- d) That there will be a mono-rail enabling us to unload cars and store the material in side rooms and to move material to the cavity independent of the rail cars.
- e) We should be prepared to obtain unique cars for more than just the D20 transport.
- f) Note that the hoist has two cages and so can take two rail cars at a time.

### Hoist Requirements:

#### ACRYLIC

Assuming 200 panels with three in each cage or six per hoist then we have about 34 hoist trips in say 10 weeks from week 6-20 of installation.  
The scaffolding/preparation equipment might be 20 hoist trips spread

over 6 weeks before construction started. Some of the scaffolding could be rather long and have to be slung under the hoist. One hoist trip a day during a 20 week period should be sufficient.

### **PMT SUPPORT**

It was estimated by Lesko and Fulton when preparing their work package that it might take 20-75 hoist trips spread over the 100 working days or again about one hoist trip per day on the average.

### **PMTs and CONCENTRATORS**

These should go underground at a rate of about 100 per day or about one hoist trip per day.

Based on these considerations and allowing a factor of two for slippages, inappropriate packaging, miscellaneous material etc one should be able to manage with what Inco has offered us (i.e. up to five hoist trips per day during peak construction times). Unloading up to 10 rail cars in one day at the observatory and storing the material could be much more of a problem.

### **UNDERGROUND STORAGE?**

The useable volume of each cage is about 200 cu ft. One of our spare rooms is about 12000 cu ft or about 30 hoist trips if the room is packed to the ceiling. If one considers floor area, then the floor area of one spare room is 600 sq ft or the contents of about 6 hoist trips (cage area is about 50 sq ft). We see that a weeks worth of construction material will cover the floor area of one of the spare rooms and indicates that we will not be able to store more than a weeks worth of materials underground. We will have to be organize for smooth delivery from the surface.

### **FILLING WITH D2O?**

The schedule suggests that the D2O fill will take 100 days. To accomplish this there will be a period of several weeks during which 5 D2O transfer cars (or 3 hoist trips) will be going underground per day. The logistics of getting these 5 cars underground may be one thing. Getting them unloaded and back up for a refill so that the process can be repeated the next day will be a much bigger challenge. It would seem to me that a maximum of 2 hoist trips per day transferring 4 transfer cars would be more realistic. In addition, we should then have a total of 8 cars so that 4 are being filled while 4 are underground. Alternatively we should also consider the time cost (about 1.5 months) and financial saving if we had only 6 cars transferring 3 per day.