

Visit to B. C. Moly by Kerr AddisonGroup - March 17 to 19, 1971General

- Daily air service available - 10 passengers - when weather permits from Prince Rupert.
- Mine site in area of heavy snowfall and high rainfall, approximately 370 inches of snowfall per year. Temperatures are not extreme and moderated by coastal influence, -10 to -15° below zero is extreme but for very short duration.
- 275 Employees are on payroll; approx. 250 are active employees.
- 86 married employees - 26 in trailers, 56 in prefab 3 bedroom units.  
 Company leases the trailer for \$80/month from the employee who in turn pays the Company \$30.  
 3 bedroom units are rented for \$32, \$34, \$36 per month.  
 Company provides all services - sewage and water. Heating paid by employees.
- Recreation centre cost \$435,000.00.
- Single quarters available for approx. 200 individuals.  
 Company charges \$2.00 per day per single employee.
- TV. is available from Terrace - CBC direct plus other recordings.
- Area, due to isolation, is a high general subsidy requirement by the Company.
- No churches.
- Lower school is provided - to Grade 7?
- Depressing climatic environment.
- Small 2 bedroom hospital available - a resident doctor is scheduled to arrive soon.
- Moly sales in 1970, \$1.66 U.S. per lb. of Moly containing to .10% to 0.24% Pb.; \$1.71 per lb. containing - .10% Pb.
- High turn-over is experienced in personnel. Average length of stay for a single employee is 45 days. Thus, greater stability entails the provision of more family dwellings.
- In addition to an outlay of \$3,000,000.00 for the construction of a power line from Terrace - 90 miles-, the Company is paying to B. C. Hydro \$300,000.00 annually for power. Plant heating is by electricity; it is currently provided free by B. C. Hydro.
- Average daily power consumption on a monthly basis is 5,000 KW; ?  
 peak daily consumption on a monthly basis is 6,500 KW. ?
- An agency in Vancouver is retained for the loading and unloading of the barge in Vancouver and for the necessary handling there and storage of mine supplies and shipments.
- Barge makes two trips a month to site. A trip one way requires 4 to 7 days.
- All townsite services - water, sewage disposal, roads and all maintenance - are provided at Company's expense.
- The local store is subsidized by the Company by approx. \$1,000/month. Plus the Company provides the building.
- Entry to site for personnel is currently by air.

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- Sales of their product is currently a problem - approx. 1,500,000 lbs. of moly stored in Vancouver, awaiting sales.
- Current economics show a pit design encompassing the mining of 29,000,000 tons of ore grading 0.216% MoS<sub>2</sub> with a 0.16% MoS<sub>2</sub> grade as cutoff, waste ore ratio of 1.18 to 1.0, as being the most economical. This pit design bottoms at the 1570' elevation on the west and at the 1710' on the east. Within this same design 37,000,000 tons of material can be provided grading 0.201% MoS<sub>2</sub>, with a mining cutoff at 0.12% MoS<sub>2</sub> and a waste-to-ore ratio of 0.84 to 1.0.
- The Parent Company does not appear to be taking a genuine interest in optimizing the development, and consequently improvements are hampered by this disinterest.
- The 3 bedroom family units cost the Company approx. \$35,000 each when set-up on site.
- Telephone communications is on the microwave system with Terrace. - 2 lines for phone communication.
- Road construction from townsite to plant - a distance of 7 miles, cost \$750,000.
- A new 2-year Union contract was signed in March '71. Increase in wages, including fringe benefits, will amount to 19.2% over 2 years - 12%, the first year; 7.2%, the second year. Rock and Tunnel, and Operating Engineers are the joint bargaining agents.
- Inability, up to this time, to attract skilled tradesmen due to wages existing below prevailing need of the area. This last Union contract incorporates improvements in this area.
- Mill building and service building, including warehouse, are all under one roof. Service Bldg. has only 2 bays. This is very incommensurate with needs. At least 6 bays are required. An outlay of \$350,000 for expansion should be considered here to meet with requirements.
- Administration, Engineering, and Accounting building is very adequate.  
(where's the pit change-room?)
- Pit Mining grade in 1970 was 10% lower than forecast. (Is this due to dilution primarily on other factors as well?).
- Pit Mining costs in 1970 were approx. 30% higher than forecast; mill costs were slightly lower than forecast; General and plant costs were slightly higher than forecast.
- Original estimate of total outlay for the project was \$17,000,000. Total costs incurred amounted to \$33,000,000.

#### Orebody

- B. C. Moly ore reserves are given as 62,800,000 tons, grading 0.212% MoS<sub>2</sub>, with a cutoff grade of 0.16% MoS<sub>2</sub>.
- Bill Sirola's review disclosed a (to the 1,500' elev.) tonnage of 62,500,000 with a grade of better than 0.20% MoS<sub>2</sub>, with cutoff at 0.16% MoS<sub>2</sub>. (This is the minimum compatible cutoff grade with operating costs).

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Note: With this type of ore occurrence, we must allow for dilution - 5 to 10%? Also there should be an allowance near surface for oxides - 4%?

- After Mining the 29,000,000 tons, grading 0.216% MoS<sub>2</sub>, stated in the "General" above, the waste-to-ore ratio starts to increase quite rapidly according to pit engineers at site.
- Orebody is sort of doughnut-shape in plan.
- East pit is porphyry with hornfels, grading 0.25% MoS<sub>2</sub>, and with ore widths as narrow as 200'.  
West pit is approx. 800' at its widest, grading 0.21 MoS<sub>2</sub>, composition mainly diorite and porphyry. Material from the west pit is easier grinding and better mill recovery is experienced. Due to its greater width than the East pit, stripping ratio is less. It is currently planned to concentrate an ore removal mainly from the west area during the next three years.

(backlog of Mtce. on shovels & trucks)

### Pit

- 2 1600 6-yd. bucket P&H. shovels are in use.
- 2 40R diesel-electric drills are in use, providing a 9" diameter hole.
- Shovel is capable of loading an average of approx. 5,500 tons per shift.
- The drillers provide an average of 280' per shift.
- Drill pattern is 18' x 18', with 6' sub grade.
- Initial floors were designed on 35' intervals, but this has now been changed to 40' on their lower floors.
- Explosive are delivered packaged by C-I-L from James Island - by barge. Powder slurry consumption varies with season but is approx. 50% AN/FO and 50% slurry. - 0.56 lbs. powder factor (approx.)
- Mining cost is approx. \$0.56/ton including an allowance of approx. \$0.06/ton of removal for equipment depreciation.
- 5400 feet is the average footage per hardest 9" button bit.
- Shovel teeth are changed approx. after 120,000 tons are loaded out.
- Final slope in the current design is 45°.
- 8 65-ton Haulpaks with a 700 H.P. engine and conventional drive are in use. 2 additional new trucks are arriving in April. Cost to site is approx. \$185,000 per unit.
- Blast hole cuttings are assayed. Drill cuttings assay about 4% higher than mill balance shows - due to oxides?
- Waste dump to the west swamp has room for disposal of 100,000,000 tons of waste according to Mr. Penny.
- To mine any distance south of Patsy Creek will involve an expensive diversion cost.
- 34 maintenance men in staff & hourly classifications are assigned directly to the pit.
- Many flash floods are experienced in the warmer months with Patsy Creek which passes by south of current pit operations.
- Major pit equipment - shovels and trucks - appear to have a large backlog of maintenance.

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- Sampling of drill cuttings is performed in a manner similar to that at Brenda and Endako Mines.

### Mill

- Tailings are discharged direct in to Patsy Creek and flow into Alice Arm Inlet. This practice may be enjoined at any time by the pollution control board.
- Primary crusher is a 42" gyratory, discharging at -5 1/2". There is no coarse ore stockpile.
- During the winter-months they encounter serious loss in time at the primary crusher due to hang-ups resulting from snow with finer ore material. Hydraulically operated hang-up coping equipment is recommended. Trouble period lasts approximately 3 months.
- Segregation in the mine-run mill feed stockpile during the winter months poses problems in processing through the primary.
- Brian O'Shawnessy feels that 9,500 tons a day could be planned with the present plant - on treatment of the west portion of the ore body.
- (Apparently snow from the pit is the main problem during the winter months.)
- 10,000 storage fine-ore bin has problems during the winter months at the feed points - 16 of them - due to snow with fires.
- Mill recovery - 90 to 91%. 1/3 of the moly concentrate is leached in an inexpensive crude leaching setup. Lime is used to neutralize the leaching solutions before discharging into the tailings disposal.
- Mill is currently treating about 8,500 tons per day.
- Pb depressant is used only in the cleaner circuit.
- Final grind is approx. 40% + 100 mesh.  
(% -200 mesh?).
- Total mill costs 1970 were \$0.94/ton. - (7,460 tons daily average).
- Mill water is obtained from a lake located above the pit area, about 2 miles from the plant.
- Grinding Index of East pit, is 16.1?; of west pit, approx. 13.5?.
- Allis Chalmers equipment is used for Secondary and tertiary crushing - one unit for each step. Tertiary discharge setting is at -1/2"; secondary, 3/4" to 7/8".
- Changing to slot type feeders under fine-ore bins - definite improvement.
- Brian O'Shawnessy claims he has good senior supervision in the mill.
- Diorite and porphyry is easier to grind plus better recovery of moly than hornfels and porphyry ores.
- Mine-run stockpile near primary crusher is 50,000 to 60,000 tons.
- 1 rod + 2 ball mill units operate in combination - all the same size.
- Holoflite dryer is in use.
- Leaf filters in use.
- Rougher circuit is followed by 3 regrinds and 4 cleaning stages. (Last 2 stages of cleaning are with one regrind.)
- 1/3 of the concentrate is batch leached for lowering of the lead content.  
Costs about \$.04/lb. of molybdenum for the leaching.

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- Concentrate is arranged, before loading onto barge, into 2 Pb grade lots - -.1%Pb and +.1% Pb to .249%Pb.

### Plant

There was no maintenance superintendent on site until 9 months ago. Penny now appears to have a very capable man in this section.

- Review what mill daily tonnage + recoveries can we expect from east pit - this is very important.
  - Review current impurities in mill product.
  - Review geologic reserves - plus attempt crude pit design.
  - Review mineable thus reserves.
  - Review cost.
  - Review power (B. C. Hydro) agreement and in case require to use more power.
  - Does Kennecott own B. C. Moly outright or what?
- Priority considerations and improvements are as follows:
- A. Get present plant (mill) to optimum maximum tonnage without any major outlays.
  - B. Provide research and hence outlay for leaching of all concentrate on site for provision of a premium product. \$750,000 estimated outlay.
  - C. Enlarge and improve maintenance facilities to commensurate with requirements - an estimated outlay of approx. \$350,000.
  - D. Provide 70 more family dwellings. This will put more life into the community as well as add a further stabilizing factor. - \$2,700,000 estimated.
  - E. Review tradesmen wages to attract better skills.
  - F. Gear pit to a 6 or 7-day per week operation (3 shift) compatible with optimum mill treatment.
  - G. Prevail upon government and others to connect road to Terrace - reduce isolation atmosphere.
  - H. Schooling provide to end of grade 8.

In short, re the above, no major outlays on expansion can be justified at this point. Optimize and refine the present plant with minimum outlay. Also, determine fully what can the mill do with east pit ores.