

METAL MINES GUIDELINES REVIEW PROCESS

VALLEY COPPER PROJECT

STAGE II SUBMISSION

PROVINCIAL REVIEW COMMENTS

BIOPHYSICAL ASPECTSI. MINISTRY OF ENVIRONMENTA. Assessment Branch
(Regan to Richardson, 80-12-04)1. Follow-up Discussions

With respect to the various Ministry of Environment review comments which are listed below, the company should contact Dr. Lance Regan (387-3044) to arrange follow-up meetings, where needed. He will personally arrange Victoria meetings, and will contact regional personnel to ask them to arrange meetings in the region, if needed.

B. Waste Management Branch
(Weldon to Richardson, 80-11-27; Hicke to Weldon, 80-10-09).1. Spectrographic Analysis

In Volume I, the spectrographic analysis of the Valley Copper ore does not indicate either units or the method of analysis used, hence it is rather difficult to assess the value of Appendix A of this part of the report. It is possible that this was an oversight, but it is important information that should be included. Another difficulty with the spectrographic analysis is that the elements molybdenum, gold and silver are listed as being either "trace" or "ND" although, on page 17 of Volume I, it is indicated that they will be recovered as concentrate. This raises the question - How does the proponent know that these elements will be recovered in specified quantities when the analysis indicates either "trace" or "ND"? It is evident that some other, more precise, method of analysis must have been used to show that molybdenum, gold and silver would be present in the concentrate. This analysis would be more useful in determining the relative presence of other elements in the list. A more precise spectrographic analysis should be provided which would indicate the units of measurement and the detection limits of the method used. Such an analysis should also include mercury and radium.

2. Acid Generation Potential

Further to Volume 2, it would be appreciated if an acid generation report, or at least the data generated on the acid generation tests for ore and waste rock, could be provided. The text of Appendix 2 seems to indicate that there is a possibility that the ore or waste could produce acid, but only one "anomalous" sample is discussed in detail. A review of the acid generation potential by this Branch is difficult without this information.

3. Contaminated Water Treatment

In the addendum to Volume 3, Crippen (page A-27) indicate that contaminated surface runoff from the waste dumps will mostly flow to the tailings pond, but a small quantity may be directed to the Witches Brook system. It would be useful to know the quantity involved, at what time of year flows would enter Little Divide Lake, the number, location and design of the settling ponds, and the point at which these diversions would enter the lake.

4. Other Concerns

It should be noted that this Branch has concerns respecting contingency plans for environmental emergencies, the handling of hazardous wastes, air discharges, construction camp discharges, and other miscellaneous details; however, it is expected that these will be addressed directly through the normal regulatory process.

C. Water Management Branch

(Fellman to Regan, 80-09-03; Fellman to Carter, 80-11-24).

1. Hydrogeology Report - Initial Review, August/September 1980

- (i) The project is of a substantial size. The joint area of the mine and mill is approximately six square miles, the distance across the pit will be 1.5 miles, and the pit will be 1,200 feet deep. The main impact on the water management of the area will be related to the dewatering of the pit. The various aquifers which the pit will intersect could be connected by "windows", although the consultants assume that a till completely seals each layer. The water from pit dewatering will be used for mine operations, where much of it will accompany the tailings to the Pukaist Creek tailings pond. Tailings will be in the order of 37,200 U.S.g.p.m., a third of which could occur as moisture which will remain permanently as a gel. Under natural conditions, Witches Brook and Guichon Creek have run dry. Guichon Creek near Lower Nicola has run dry in 1922, 1925, 1926, 1927, 1928 and 1973.
- (ii) It was pointed out that minimum daily flows in Witches Brook during August and September have declined significantly since the Bethlehem and Lornex operations began pumping water, and that the company's initial hypothetical calculations have not allayed fears that flows in both Witches Brook and Guichon Creek may be affected by the Valley Copper project.
- (iii) In view of the potential for problems to be experienced by water licencees along Witches Brook and along Guichon Creek, and by licencees using local wells, it was recommended that the company should apply for a water licence under "Land Improvement Purposes", to include the dewatering of the pit and minesite drainage. This would be in addition to the water licences for "Diversion Purposes" and for water supply for "Domestic and Industrial Purposes". It was also recommended that:
 - (a) the quantity of water which is dewatered from the pit be continually monitored;

- (b) Witches Brook be continually monitored for discharge;
- (c) the company be responsible for supplying domestic water to licencees on Witches Brook and on wells near the mine during drought conditions, if pit dewatering can be demonstrated to have contributed significantly to dry-up....OR...that it maintain acceptable flows in Witches Brook and downstream on Guichon Creek.

2. Hydrogeology - Review of Official Stage II Submission

It is noted that, in Volume 2, section 4.4.1, page 16, there is further reference to the possibility of "...local erosion 'windows' in the confining beds which allow a more significant vertical movement of groundwater." This Branch remains concerned with the unknown factor of how much the dewatering of the pits will deplete the inflow to the Witches Brook Watershed. Table 6-1 (page 34) seems to be the best available indication of projected inflow to Little Divide Lake at present and during the mining phase. One source of water loss to Witches Brook is the diversion of Unnamed Creek (A) to the tailings pond.

3. Action on Earlier Recommendations

With respect to the initial Branch requests (see point #1 (iii) for points), it is noted that (b) is now addressed and that (c) is under study (vis. the submission considers as one solution the possibility of a storage dam on Little Divide Lake). Recommendation (a) - the monitoring of pit dewatering - is not satisfactorily addressed in the Stage II submission.

4. Waste Management Design Considerations

The ditches are to be designed for the once-in-200-years flood event - the normal Branch requirement. The drainage plans presented in Volume 2 (Figures 6-2, 6-3 and 6-4) do not yet include drainage data for the tailings pond. The plan of the plant site drainage (Figure 6-4) has been reduced to such a small scale that it is difficult to read. A large-scale plan should be submitted with the water licence application.

D. Fish and Wildlife Branch

(Ringstad to Regan, 80-12-04; Holman to S. MacDonald, 80-11-17).

1. Compensation Program

The program of compensation and mitigation to redress fish and wildlife habitat losses, although being administered separately from the Stage II submission, is considered to be part of the Stage II requirements. Government and company acceptance of this proposal will satisfy the majority of this Branch's needs for environmental impact management.

2. Regional Staff Concerns

The regional staff have noted the following concerns with respect to Volume 2:

(i) Little Divide Lake

Flows in the lake will be reduced approximately 30 percent (page 35). Can makeup water be provided? It is noted (page 43) that groundwater pumping is not expected to affect surface water levels in the lake. However, what contingency plans are proposed in the event that levels are reduced?

(ii) Metal Concentrations

Molybdenum concentrations in forage which is grown on tailings may pose problems (page 54). What are the consequences for wildlife, and what remedial action is appropriate? A similar question is raised by the potential increase in copper levels in fish (Appendix I). It is expected that concerns for the fisheries impacts of water level changes in Witches Brook will be addressed by the compensation program. Other aspects of water level changes (the concerns of ranchers and Natives) should be handled by the Water Management Branch. Finally, the questions concerning the potential for accumulating metal concentrations in vegetation on reclaimed areas (molybdenum) and in fish (copper) should be part of the general Stage II assessment. These questions will undoubtedly require research and monitoring during mine operation, but do not necessarily lend themselves to treatment within the compensation program which is presently proposed.

E. Air Studies Branch

(Mann to Regan, 80-12-01; Leung to Wilson, 80-11-27; Davis (unaddressed), 80-12-02).

1. General

The Branch does not foresee major air-related problems with the project since the company plans to take adequate control measures. Moreover, there is no particularly sensitive receptor of air emissions in the area. There is a potential problem of dustfall and suspended particulates due to trucking. Permits may need to stipulate appropriate dust control measures and dust monitoring near the haul road.

2. Sources of Air Emissions and Air Quality Impacts

Air emissions (total suspended particulates, fugitive dust and small amounts of trace metals) will mainly be due to drilling, blasting, crushing, drying of concentrate, truck haulage and loading. Recognized methods of control, such as water injection will be applied to reduce fugitive dust to acceptable levels within the mining areas. Outside the minesite, the air quality is not expected to be adversely affected except possibly along the haul road (see point #1, above).

3. Air Quality Recommendations

No air quality data have been collected in the proposed mining areas. In view of the types of mining operations which are proposed, air monitoring is not deemed necessary before or during the operation of the mine. However, Valley Copper Mines Ltd. should be advised that the onus is on the company to ensure that dustfall and suspended metals due to trucking should be monitored and controlled if problems arise.

4. Climate - Precipitation Data

There is considerable discrepancy in the annual precipitation values for the Lornex climate station. In Table 4-1 (Volume 2), annual precipitation for this station is listed as 307.3 mm (based on 1970-76 data); in Table 4-3, it is listed as 339.9 mm (based on 1969-79 data); and in Table 4-6, it is listed as 537.2 mm (based only on 1967-69 data). Air Studies Branch data indicate that mean annual precipitation is 375 mm in that region. On page 46 (section 7.1.1), annual precipitation is listed as 380 mm. Moreover, on page 46 (section 7.1.1), May to September precipitation is listed as 60 mm; however Air Studies Branch data indicate a May to September precipitation of 150 mm for that area.

5. Potential Evapotranspiration and Soil Moisture Deficit

Calculations of potential evapotranspiration and soil moisture deficit by the Air Studies Branch differ from those listed on page 46 (section 7.1.1) of Volume 2. For example:

	<u>Volume 2</u>	<u>Air Studies Branch</u>
Potential Evapotranspiration	250 mm	558 mm
Soil moisture deficit	110 to 340 mm	83 mm

F. Terrestrial Studies Branch

(Van Barneveld, undated; Blower to Regan, 80-12-23).

1. General

The attempt to relate certain aspects of vegetation to applied questions was useful, although the vegetation type descriptions were rather generalized. Individual species should ideally have been addressed with respect to their relationship to the existing environment and their adaptability to the post-mining environment.

2. Recommendations

- (i) It is recommended that revegetation studies be initiated by the company in 1981, that these studies continue until the start of mining operations, and that they then proceed according to Section 7.0 of the Reclamation Plan (Volume 2).
- (ii) These vegetation studies should be aimed at selecting the best plant species for revegetation purposes, with specific emphasis on determining those plant species which have the least tendency to accumulate minewaste metals.
- (iii) In order to simulate, as closely as possible, the post-mining waste rock and tailings dump sites prior to the actual start of mining operations, it is suggested that a portion of the study sites be located on adjacent existing mine company lands with similar types of ore (such as the Bethlehem Copper Mine area).

(iv) Because of the likely value of this revegetation research for other future mining developments, both within and outside the valley, it would be desirable for Reclamation personnel from the B.C. Ministry of Energy, Mines and Petroleum Resources to provide an appropriate input into these vegetation studies.

G. Aquatic Studies Branch
(Pommen to Regan, 80-10-01 and 80-10-27).

1. Water Management Plan

In Volume 2, the water management plan (Figures 6-2 and 6-3) for the minesite is incomplete. Before the Stage II review process is completed, Valley Copper Mines Ltd. should submit more information on the following aspects of the water management plan:

(i) The contaminated water treatment system for the waste dumps in the Witches Brook drainage:

- plans showing locations of all collection ditches and settling ponds;
- design criteria, rationale and flows for all collection ditches and settling ponds.

(ii) The plant site drainage system:

- plans showing locations of all collection ditches;
- design criteria, rationale and flows for all collection ditches.

(iii) A diversion ditch is shown along the northeast side of the mine at year 5, but not at year 20 (Figures 6-2 and 6-3). The rationale for discontinuing the diversion of surface water away from the waste dumps between years 5 and 20 should be explained. How will drainage on the east side of the mine be handled in year 20?

2. Post-Mining Drainage Pattern

In Volume 2, as in the Crippen appendix in Volume 3, there is little indication of the post-mining drainage pattern proposed for the minesite. The formation of a lake in the open pit is a possibility, but Valley Copper proposes to assess the feasibility of lake development during mine operation. It is recommended that, before the Stage II review process is completed, the company submit more information about the post-mining drainage pattern, including:

- drainage system layouts, design criteria and rationale;
- stability of the open pit walls after the dewatering wells are shut down (page 26 of Volume 2 states that "...Overburden dewatering is essential to achieve safe, stable open pit walls".);

- preliminary assessment of the feasibility of developing a lake in the open pit:
 - stability of pit walls with rising lake levels;
 - sources of water and length of time to form the lake;
 - water quality and productivity of the lake.

3. Contaminated Water Treatment System

In the Crippen appendix to Volume 3, the contaminated water treatment system (i.e. settling ponds, collection ditches) has not yet been finalized, and thus no details of the system have been provided. Before the Stage II review process is completed, Valley Copper Mines Ltd. should submit more information on the contaminated water treatment systems for the waste dumps and the plant site area, including:

- plans showing locations of all collection ditches and settling ponds;
- design criteria, rationale and flows for all of the collection ditches and settling ponds.

4. Diversion Ditch System

In the Crippen report, a diversion ditch is shown along the northeast side of the mine at year 5, but not at year 20 (Figures 2 and 3). The rationale for discontinuing the diversion of surface water away from the waste dumps between years 5 and 20 should be explained.

5. Hydrogeology

The revised Volume 3 answers questions raised by the Branch in August, 1980. The elevated nitrate/nitrite concentration (4.53 mgN/L) noted in the addendum for the sample from the Lornex pit on September 3, 1980, may be due to contamination from residual ammonium nitrate explosives in the pit rather than being a natural occurrence.

H. Inventory and Engineering Division

(LeBreton to Foweraker, 80-09-09, 80-10-07; Reksten to Coulson, 80-09-04, 80-10-07, 80-12-02, 81-01-02).

1. Previous Groundwater Concerns

When the June, 1980 version of Volume 3 was initially reviewed, the two main groundwater concerns were:

- the need for a test drilling and pumping test program to be conducted in the area where open pit mining was to take place;
- the effects of pit dewatering on hydrologic regimes.

Concerns had focused on the presence of a sand and gravel aquifer which is 200 feet thick, on the high well yields in surficial deposits, and on the absence of precise hydrogeological information in the mining area. Following discussions, it was agreed that a test drilling program need not accompany filing of the Stage II report. However, it was agreed that the required flow rates to accomplish dewatering must be known during mine operation if dewatering was to be effectively accomplished. The Division felt that groundwater and streamflow monitoring would be necessary during the licencing phase in view of possible discharge reductions in Witches Brook and Guichon Creek due to pit dewatering. It was noted that wells should be completed in both the water table aquifer and deeper aquifers to explore the magnitude of the effects of groundwater withdrawal in the central Highland Valley, and to determine whether groundwater depletion is the definite cause of streamflow reduction, rather than climatic factors. Details of a monitoring program were proposed to the company's consultants.

2. Groundwater - Stage II Review (Volume 3)

The intent of the September, 1980 addendum to Volume 3 was to complete groundwater documentation, to respond to known agency concerns, and to indicate proposed drilling and piezometer monitoring. In general, the Division feels that these intents have been satisfied. The following points are noted:

- (i) It is uncertain whether or not the placing of a water level gauge on Quiltanton Lake to establish that surface waters are "perched" and separate from deep aquifers (page A-3) will resolve that matter. Pumping at a rate of 600 USgpm for 100 hours would lower the lake level only about 1 inch if the effect were entirely on the lake. This does not, however, take into account hydraulic continuity between the lake and the water table aquifer, and the latter must first be affected by vertical leakage created by pumping from deep aquifers. It may not be possible to detect possible influences on the lake during such a short time interval.
- (ii) Distances for piezometers have not been quoted in the addendum. Moreover, no consideration has been given to installing some large-diameter (6-to-8-inch) wells in the first deep or deeper aquifers, as suggested in Mr. Le Breton's 1980-09-09 memo.
- (iii) The opening statement on page A-6 is misleading, although it is understood in the context of the Highland valley. Groundwater studies of the type proposed are now a normal provincial expectation for large mining projects.

3. Previous Surface Water Concerns

The Stage I review revealed errors and omissions in data presentation, and some questionable data interpretations. Concerns did not appear to have been relayed to Brown, Erdman and Associates, the authors of the hydrogeological report which, in revised form, now forms Volume 3 of the Stage II submission. In August and September, 1980, the following main concerns were indicated to the consultants:

- (i) The results of the water balance analysis could not be conclusive because of anomalies in the data. For example, the Pukaist Creek streamflow data are affected by the Lornex tailings pond. The analysis did seem to provide support for interpretations of surface water/groundwater interactions based on hydrogeological evaluations.
- (ii) It could not be stated that "...from the streamflow records of Witches Brook, the pumping of groundwater to date in the Highland Valley has not affected the streamflow characteristics of this drainage". There are no objective data to verify this statement. August-September flows on the average are much less in the 1967-76 period than in the 1957-63 period. Climate and streamflow data in the area are inadequate for comparing this measured difference to climatic data.
- (iii) It was recommended that a hydrometric station be established by the developer on Witches Brook near the outlet of Little Divide Lake.

The September, 1980 addendum was reviewed in October, 1980, and the following points were noted:

(i) Proposed Drilling and Testing Program

The proposed water level gauge on Quiltanton Lake will be unlikely to provide conclusive evidence on water level changes, due to the difficulty in detecting small changes and in accounting for the impacts on water levels of sources other than groundwater.

(ii) Grippen Report - Surface Water Hydrology and Drainage Control

The report does not provide adequate background data for a reliable assessment. A meeting with the consultant was suggested.

4. Surface Water - Volume 3 (Stage II Review)

The proposed drilling and testing program outlined in section I of the addendum has commenced. The Division supports the installation of a hydrometric station at the outlet of Little Divide Lake, possibly in conjunction with a control structure at the outlet to regulate flows to Witches Brook, given that the design and operation details receive Water Management Branch approval. The Division requires a meeting with the company and its consultants to discuss its outstanding concerns on the Grippen report prior to Stage II approval-in-principle. Other concerns are as follows:

- (i) The company should respond to the Division's Stage I review comments on surface water.
- (ii) Any analyses of available hydrometric data on Pukaist Creek, Bethsaida Creek, and Witches Brook have not adequately taken into account the effect of the Bethlehem and Lornex developments.
- (iii) The lack of suitable hydrometeorological data in the study area precludes statements that the runoff regime of Witches Brook has, or has not been, affected by groundwater interference in connection with past mining activities.

5. Surface Water - The Reclamation Plan (Volume 2)

The following review comments are noted:

- (i) The description of Surface Hydrology under Section 4.0, Existing Environment, is taken from the Brown, Erdman report on hydrogeology. There are some errors in Tables 4-3 and 4-4.
- (ii) The section on Drainage Control under Section 6.0, Mine Site Water and Dust Management, is comprised mainly of the Crippen report from Volume 3, Surface and Groundwater Studies. The author of the Crippen report has arranged to receive detailed Division review comments (which are not reported here).
- (iii) The Reclamation Plan (Section 7.0) assesses climatic constraints, plant growth potential of mine and mill waste (based on 1975 U.B.C. study), and vegetation. One of the goals of the reclamation plan should be to ensure that the flow regime in Witches Brook is not detrimentally changed. Achieving this will depend on overcoming the constraints which are identified, and on carrying out a successful re-vegetation program with proper shaping of mine waste dumps.
- (iv) It is not planned to reconstruct the open pit area to pre-mining topography and land use, since this is not economically feasible. It is anticipated that water levels in the pit will return to the former levels of Quiltanton Lake. It is unknown how long it will take to reach this level. It is stated that "...throughout the period of mine operation, pertinent information on annual precipitation, surface runoff, groundwater seepage, potential evaporation and water quality will be assembled to assess the feasibility of developing a lake within the lower levels of the open pit", but no details of the monitoring program are given.
- (v) It seems likely that the Monitoring Programs (section 8.0), as outlined in the Brown, Erdman report, and the Study Proposals (section 9.0) will provide useful data for successful reclamation.

II. MINISTRY OF AGRICULTURE AND FOOD

A. Farmland Resources Branch
(Sasaki to Richardson, 1980-11-27)

1. Metals in Forage

In Volume 2, page 55, it is stated that "...A more detailed assessment of vegetation quality, specifically copper and molybdenum concentrations, is required before this forage can be evaluated". It is also stated that such investigations will be conducted. The following should be clarified:

- (i) Is the company firmly committing itself to investigate and assess the quality of forage to be grown on tailings and waste material?

- (ii) If so, who will conduct the research (inhouse staff? consultant?), and within what time period?

This Ministry wishes to be informed of, and consulted on, the planning and implementation of this research.

2. Grazing Use

In Volume 2, page 56, it is stated that "...Over the long term plant communities which provide forage for domestic livestock, food and shelter for wildlife and merchantable timber will be established". How many years are entailed "over the long term"? It is hoped that the results of the investigations discussed in point #1 above would be incorporated into the process of forage species selection. The company's reclamation staff should contact the Ministry for advice and recommendations on forage species mixes and fertilizers.

3. Tailings Pond

It is understood that the Bethlehem, Lornex and Valley Copper projects will all be utilizing the tailings pond. How are responsibilities for reclaiming the tailings pond to be allocated?

4. Weed Control

The company should commit itself to controlling designated weeds in the project area (and should refer to the Weed Control Act, administered by this Ministry).

5. Surface Water Drainage

The Ministry of Agriculture and Food requests that the company maintains existing flow levels in Witches Brook since it is a tributary of Guichon Creek, which provides an important source of irrigation water to ranchers in the Guichon Valley.

III. MINISTRY OF TRANSPORTATION AND HIGHWAYS

A. Design and Surveys Branch
(Kent to Richardson, 80-12-04).

1. General

The Ministry notes that satisfactory liaison has been established with the Regional Engineer and his staff regarding relocation of the Logan Lake Highway. There are no other comments.

SOGIO-ECONOMIC AND COMMUNITY ASPECTS

I. MINISTRY OF MUNICIPAL AFFAIRS

A. Planning Services
(Harkness to Richardson, 80-12-01)

1. General

From this Ministry's viewpoint, Volume 4 is an excellent review of possible socio-economic impacts due to the project. The technical information expected in a Stage II report has been provided. It is recommended that the report be accepted.

2. Settlement Choices

A major question with respect to this project concerns residential preferences or wishes. The submission argues that, even with the Base Case developments alone, the relative attractiveness of Logan Lake as a residential locale within the region will increase. This means that workers migrating to the region as a result of the Valley Copper project will be increasingly attracted to this community rather than to other communities in the region. Therefore, it is a fairly reasonable assumption that 75 percent of in-migrant workers will choose to live in Logan Lake. These expectations appear reasonable since they coincide with the Village's recent experience.

3. Population

The Ministry is currently reviewing the population implications of this project. The company has estimated that the impact of its project will bring the population of Logan Lake up to 4,500 persons. In doing so, it has made several critical assumptions, particularly in terms of distribution of employees between Logan Lake and other communities. Moreover, it assumes that workers who are out of work due to the closure of Craigmont Mines will choose to stay in Merritt and commute to work in the Highland Valley. It is important to review the population situation in the light of these assumptions, given that a population of 5,000 - only 500 persons above the company's estimate - would likely require the Village to assume police costs, and to expand central or off-site sewer and water systems. This in turn would have major implications for risk and financial viability, given that the Village is currently at its statutory limits for mill rates and debt levels.

4. Housing

The provision of adequate housing for "indirect" or service sector employees needs more attention. The report seems to advocate the leaving of the service sector responsibility for housing solely to private developers, who would respond to market conditions. This approach has proved in the past to be unsatisfactory. In the initial stages of growth, private developers are normally reluctant to invest, due to the high risk involved. In these situations, the supply of housing lags behind the demand. In the interests of sustaining normal, balanced and healthy growth of the community, the supply of housing should precede, or at least keep pace with, the demand. "Indirect" employee housing should be approached in the same manner as "direct" employee housing. Developers may require some form of financial guarantee against risk.

5. CMHC Mortgage Guarantees

The Stage II submission identifies a problem with the CMHC requirement that resource companies guarantee to assume CMHC mortgages held by their employees, should the latter default. Companies have agreed to this in the past; however, because the companies will not guarantee service sector employee mortgages, an inequity results. The Ministry is discussing this matter with the CMHC.

6. Housing Subsidies

(i) Company Proposal

The company proposes to provide housing subsidies only to employees who reside in Logan Lake because:

- it wishes to attract workers to Logan Lake;
- Logan Lake offers the positive benefit of being close to the minesite;
- other companies located in the community - Lornex and Highmont - do not offer the subsidy outside Logan Lake.

(ii) Open Subsidy Option

Other communities in the region, in particular Ashcroft, Merritt and Kamloops, want the company to offer housing subsidies to workers wherever they choose to reside. The reasons for this proposal are that:

- the communities perceive that they will be able to attract a portion of the newcomers;
- the capital investment for new services in Logan Lake will be reduced by utilizing services which are presently available but underutilized in existing communities.

7. Population Distribution Implications of Housing Subsidy Policies

(i) Existing Residents vs. In-Migrants

A housing subsidy which was provided to all new employees, irrespective of whether they come from within or outside the region, would be considered inequitable because those who are currently residing within the region are presumably already in housing. Therefore, it is assumed that the subsidy is available only to those who are newcomers to the region.

(ii) Logan Lake vs. Other Communities

Although a uniform subsidy to all newcomers would give workers the choice of residing in any community they wish, it is doubtful whether this would have a significant influence on the relatively considerable attractiveness of Logan Lake because of the substantial cost of

commuting from other communities within the region. The relative attractiveness of these communities would likely only increase if the extra cost of commuting was compensated by the company. This would be an unreasonable expectation.

(iii) Provision of Services in Logan Lake

The Ministry's experience with other similar communities indicates that, as a town approaches a population of 5,000, a significant threshold for providing a range of new services is reached. If the population is less than 5,000, the per capita capital cost of providing these services is often too high. Therefore, for the benefit of Logan Lake, it is important that it achieve this threshold level as quickly as possible.

(iv) Recommendations on Housing Subsidies

The Ministry recommends as follows:

- new employees drawn from within the region should not receive the housing subsidy;
- newcomers attracted to the region from outside should be eligible for a subsidy, regardless of where they live.

In making these recommendations, it is recognized that the relative attractiveness of other communities vis-a-vis Logan Lake will not likely increase substantially.

8. Provincial Risk Exposure and Risk Protection

With respect to risks associated with the development of resource-based communities, this Ministry attempts to minimize provincial risk exposure. The Ministry's approach to risk protection is based on the following principles:

- risk protection is a concern where resource development leads to radical changes in the community;
- risks should be shared in proportion to the expected benefits; the resource company, as the primary agent of change, should bear an appropriate share of risk in resource communities;
- risk protection should be required equally from all companies in proportion to the change which they cause in a community.

While the Ministry is concerned with possible risks in Logan Lake, it does recognize the difficulties in securing risk in communities where more than one company is involved. However, given the extent of growth resulting from the Valley Copper development, and the consequent extent of capital expenditures, the Ministry may seek appropriate risk protection for the Province and local governments.

9. Municipal Financial Implications

(i) Ministry Review of Analysis

At this point, there is no reason to doubt the validity of the company's analysis of the financial impacts. However, without a full financial analysis by this Ministry, it cannot accept the financial responsibilities of various parties as suggest in the report. It is currently working with the Village to ensure that the physical planning, including the engineering analysis and costing, is in order. Once this work is complete, a full financial analysis of expansion can be undertaken by the Ministry.

(ii) School District Boundary Changes

To change the boundary between two school districts for taxation purposes is an important consideration. This Ministry will bring the matter to the attention of the Ministry of Education.

(iii) Revenue Sharing Among Municipalities

The question of revenue sharing among municipalities in the region is not addressed in Volume 4. A large proportion of mine workers in the Highland Valley, perhaps 60 to 70 percent, reside in communities other than Logan Lake. The question is raised whether these communities - Ashcroft and Merritt - should share in the increased tax base, both now and in the future. The Ministry's Research Branch is studying the issue.

II. MINISTRY OF LABOUR

A. Research and Planning Branch
(Schuyff to Richardson, 80-12-04).

1. General

The Stage II report follows fairly closely the terms of reference which were arranged between Mr. Paget and Mr. Kupferman in July, 1980. The overall quality and organization of the impact assessment is adequate for Stage II approval-in-principle. This Ministry has supplementary questions which pertain to the strengthening of the manpower planning aspects of the project.

2. Specific Manpower Concerns

To complete Stage II data requirements, the following information is required in Volume 4:

- a more detailed breakdown of the manpower information on pages 25-26, particularly in the categories of tradespeople, technicians, supervisory and professional.
- an indication of the expected source of those manpower requirements which are expected to be filled from outside the region (Appendix III-8).

- the principles and broad outline of the specific recruiting and training plans for positions in the aforementioned categories (in addition to the policy statement in Appendix III-9).

The above concerns result largely from an anticipated Province-wide shortage of highly skilled tradesmen and selected technicians and professionals. Concern is accentuated by the fact that, in addition to the operational demand from mining companies for skilled tradesmen, the construction of the various projects will impose additional pressures on the regional and provincial labour market.

3. Impact Analysis

The impact analysis would have been clearer if the present situation in the area had been chosen as the base case, with case A representing development without the Valley Copper Project, and case B representing development with the project. Including Afton in this scheme would lead to direct mining employment of 1,560, 2,075 and 2,925, respectively. Impact assessment and mitigation would be more readily determined in that case.

4. Special Employment Groups

It would be desirable to focus some effort on the possibilities of recruiting and training local women and young unskilled people in the apprenticeship program. In addition, the possibility of promoting carry-over of skilled construction tradesmen into operational maintenance deserves some attention. The regional concept has not been consistently used and occasionally causes some confusion.

5. Future Discussions

This Ministry is ready and anxious to cooperate with the company to work out in detail a mutually satisfactory recruiting training and development scheme.

ADDENDUM

FEDERAL REVIEW COMMENTS

I. ENVIRONMENT CANADA

A. Environmental Protection Service
(Ito to Richardson, 80-11-28, 80-12-23).

1. Review of Stage II Submission

During review of the Stage II submission, the E.P.S. identified certain areas of outstanding concern based on its Stage I review. It noted that, while the potential impacts on the Witches Brook watershed were assessed in detail, the impacts of expansion of the Lornex tailings pond on the Pukaist Creek system were not addressed sufficiently. Specific points were as follows:

- (i) What is the potential for the loss of tailings liquid to groundwater, leachate movement, and impact on Pukaist Creek water quality?
- (ii) The above information is required to assess where piezometers should be installed, and to what depth, to monitor potential leachates. Are the existing piezometers adequate?
- (iii) Is there a water balance available for the Lornex, Bethlehem and Valley Copper tailings pond?

2. Special Company Submission to E.P.S.

A special company submission (with material from Klohn Leonoff, B.C. Research and Beak) specifically addresses the E.P.S.'s Stage I review comments and has now been reviewed. All of the outstanding federal concerns with respect to water quality and quantity, including those in the Pukaist watershed, have now been thoroughly explored.

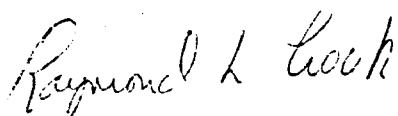
3. Klohn Leonoff Submission

The major concern that considerable amounts of contaminated tailings supernatant are already lost to groundwater has been largely dispelled, although the Klohn Leonoff discussion on water balance notes (page 2) that the assumed zero non-recoverable seepage (drawings D-2710-3, D-2710-4) are only best estimates. In this regard, the E.P.S. is uncertain regarding the suitability of the existing L-L Dam piezometers (now used to monitor hydrostatic pressures) to serve as monitoring points for non-recoverable seepage. If they are unsuitable, are any additional groundwater monitoring piezometers proposed?

4. Beak Submission

The Beak discussion of Pukaist Creek water quality downstream of the L-L Dam was extremely helpful, and the additional monitoring and fish metal data are useful. It is unfortunate that these data were not included in the Stage I Report, since E.P.S. concerns were based on the partial data presented at that time. With regard to future monitoring of Pukaist Creek, it is understood that the responsibility for this matter and for tailings management is the subject of discussions between the three companies involved and the Inspection and Engineering Division. The E.P.S. wishes to be kept up to date on progress with these discussions since monitoring issues will be important during the licencing phase.

Compiled by:



Raymond L. Crook
Secretary
Metal Mines Steering Committee

1981-01-14

RLC:vv

ADDITIONAL REVIEW COMMENTS

(Attachment to Compendium of Provincial Review Comments for Valley Copper Project Stage II Report, 1981-01-14).

I. MINISTRY OF LANDS, PARKS AND HOUSING

A. Land Programs Branch

(Hubbard to Cockburn, 1980-11-28; Hubbard to Errington, 1980-12-02).

1. Mine Waste Disposal Area

It is noted that no indication is given regarding channelling of leachate from mine waste dumps and most especially low-grade ore dumps. (Volume 2, pages 7-8).

2. Milling

While it is desirable that the entire plant area will be drained to the tailings pond to contain accidental spills, major spills of oils and/or greases will presumably require additional treatment. (Volume 2, page 9).

3. Soils and Surficial Geology

While it is true that Brunisols based on glaciofluvial sands and gravels are not sympathetic media for vigorous plant growth, it does not seem justified to dismiss them entirely as reclamation media, especially bearing in mind the relative dearth of topsoil in this area and the almost total sterility of mine wastes. (Volume 2, page 13).

4. Benthic Invertebrates

A more detailed discussion including a discussion of species present, their habitat and their importance for fish resources, would have been useful, plus a listing of aquatic vegetation. (Volume 2, page 17).

5. Plant Succession on Sites of Severe Disturbance

An identification of the species colonizing severely disturbed sites should have been appended, since these species might prove useful in post-mining reclamation of the site. (Volume 2, page 24).

6. Surface Water Drainage

More information regarding the existing diversion of Bethsaida Creek, should have been included in either the Stage I or Stage II submission. Its existing diverted course is not shown, and hydrological data, such as discharge, velocity and suspended sediment are not presented. (Volume 2, page 27).

7. Contaminated Water Treatment

It is stated that a small amount of runoff from the waste dumps, which may contain silt and clay-size particles in suspension, may be directed to the Witches Brook system rather than to the tailings area, but no rationale is given. It is considered that settling ponds will be necessary. Ponds and layout of ditches should be finalized before acceptance of Stage II. (Volume 2, page 31).

8. Downstream Hydrological Regime

The study regarding mitigation of possible low flows in the Witches Brook system during the summer months should be carried out before mine development proceeds. (Volume 2, page 35).

9. Wastewater Treatment

More detail regarding treatment methods should be presented, and it is felt that the company should provide an accurate estimate of wastewater volumes. All three methods of treatment outlined here should be adopted, as well as schemes aimed at the cleaning up of oils and greases from the tailings pond, should spills of this nature take place. (Volume 2, page 36).

10. Hydrogeological Effects during Mining

Will Little Divide Lake prove adequate as a natural regulator of the flow in Witches Brook in the absence of Quiltanton Lake and Big Divide Lake? What are the implications if it is not? (Volume 2, page 43).

11. Dust Control

The material on dust control is imprecise, throwing doubt on the proposed control measures. (Volume 2, page 44).

12. Waste Rock

The production of a level, highly compacted surface on the waste rock dumps is not optimum for revegetation. A less compacted surface characterized by myriads of micro-hollows and ridges provides a more receptive seed bed. It is assumed that all waste rock areas will be top-dressed with reserved topsoil. (Volume 2, page 48).

13. Surface Soils

Evaluation of both surface soils and overburden as growth media should have been carried out before the Stage II report was submitted. It should be carried out prior to final approval of mining plans. (Volume 2, pages 51-52).

14. Vegetation Quality

Measurement of molybdenum levels in plants grown on waste rock should also be made, in addition to such measurements for plants grown on overburden. Further research will be needed in this field as the area is of substantial importance for range use. (Volume 2, page 54).

15. Revegetation Plan

It is assumed that substantially more detailed plans will be submitted before final mining approval. At present, proposals are rather preliminary. (Volume 2, page 57).

16. Open Pit

It would have been preferable for mapping of surface soils and overburden suitable for mantling waste dumps to have been included in the Stage II submission. (Volume 2, page 58).

17. Highway Relocation

Will the three-mile main highway relocation be on private or Crown land? Similarly for the Dekalb Road? Will the Crown or landowners (as appropriate) be compensated? (Volume I, pages 4 ff.)