RECLAMATION PLANNING FOR THE LINE CREEK PROJECT

Paper Presented
by:

R.H. Crouse
Vice President-Mining
Crows Nest Industries Ltd.
Fernie, B.C.
RECLAMATION PLANNING FOR THE LINE CREEK PROJECT

The proposed Thomas F. Gleed Mine, part of the Line Creek Coal Project, will be located on Line Creek Ridge in the Crowsnest Pass area of southeastern B.C. It is approximately 12 miles northeast of Sparwood and 9 miles southeast of Elkford, and lies at an elevation, at its highest point, of 6800 feet. The planned wash plant will be adjacent to the C.P. Rail Fording Spur in Elk Valley at an elevation of 4200 feet, near the confluence of Fording and Elk Rivers, 5 miles downstream from the mine site.

Crows Nest Industries, a recently acquired wholly-owned subsidiary of Shell Canada Resources, holds fee lands and coal licences in this area. A total of 18,650 acres of coal licences are dedicated to the Line Creek Coal Project, of which approximately 350 acres will actually be mined.

In 1976 C.N.I, signed an Option Agreement with Mitsui Trading Company of Tokyo, Japan to jointly undertake a feasibility study of the proposed plan. This study was completed in October 1977, and Mitsui has recently exercised their option to acquire up to 49 percent equity interest in the Line Creek Project.

Considerable effort and expense has gone into exploration and evaluation of the Line Creek Project over several years, and it now stands at a point where it has received government approval of the Stage II Environmental Study which was completed by B.C. Research. Stage III of the Coal Development Assessment Procedure is now being prepared. A comment will be made on the Coal Guidelines procedure later in this presentation.

Reclamation planning has been a major part of the total develop-
ment effort for this project. Mine design has included regularly scheduled reclamation activities to keep temporary negative environmental changes to a minimum. In other words, reclamation was included from the original concept rather than it being an afterthought.

The mining method will be a conventional shovel-truck operation for removing waste materials. Coal will be recovered with hydraulic excavators and truck hauled to an in-pit breaker station that will discharge onto a belt conveying system for transporting coal from Line Ridge to a series of bins located in the upper valley of Line Creek. Product will be reclaimed from these bins with a 17-yard front-end loader into 70-ton bottom dump trailers hooked two in tandem per truck, and hauled over a 40-foot wide, paved road, a distance of 5.5 miles to the wash plant. Approximately 40 million raw metric tons of coal will be mined over the 20-year life of the project.

Mine design calls for removing 240 million bank yards of waste from mine pits into an area we have labelled West Line Creek Canyon, on the west side of Line Ridge. The existing small stream in the dump canyon will be diverted into a stage-constructed 1 1/2 mile channel to keep the stream and runoff water from eroding dumps. Final discharge of this diversion channel will be designed after experience has been gained from previous stages.

In order to minimize solids input, a series of settling ponds will intercept drainages from the west side of Line Creek in the area of mining activity. These ponds will be constructed first in the development. Water draining from the dump and pit areas will pass through a system of settling ponds prior to entering Line Creek. Alum will be added when necessary at the inflow to appropriate ponds to accelerate settling of suspended material.
A major effort has gone into designing waste dumps to obtain stability, minimize erosion potential, and establish early restoration of wildlife habitat. Initial waste disposal will be directly off the ridge to the west of the mine, but as working room is developed, the dump will be worked northward to the head end of West Line Creek. When the northernmost extent of the dump is reached, its face will be turned to the south, which direction it will follow for the remaining life of the project. This design makes the dump somewhat unique in that three sides will be contained by existing undisturbed terrain with only the south advancing face left unsupported. Movement monitors will be installed along the active south face to predict potential areas of weakness. Dump sites may be closed temporarily to allow for improved stability. A porous toe dam will be constructed in the mouth of West Line Creek to contain any slides that may occur in the dump face and yet allow for flow of water into the last setting pond. The pervious section will be constructed from selected sandstone excavated during prestripping.

The reclamation plan includes progressively replanting each section of the dump during spring and summer as the dump becomes dormant. Although true topsoil is scarce in the area, those surface soils which are now supporting vegetation will be spread over the finished waste dump to encourage regrowth. This material will be stockpiled as it is encountered during the normal sequence of mining.

To provide a root zone with decomposable material, for future soil development, a two-foot blanket of Kootenay shale and decomposed common overburden material will be spread over the finished disposal site prior to spreading topsoil. These materials have been
extensively tested in B.C. Research's lab and supported good growth characteristics of plant species assessed. There are about 39,000,000 bank yards of this waste available from total overburden yardage. Approximately 400 acres of dump surface and slopes will be replanted during the life of the project. A detailed schedule has been prepared which shows where decomposable material will originate each year, showing distance to be hauled and amount of material to be used. A portion of the dump surfaces will be replanted each year, the location and area of which is detailed in the reclamation schedule.

All finished slope sections will be dressed to an angle of 26 degrees. All top surface dump areas will be sloped at a percent downgrade to the west where a collection ditch is located. These ditches will place runoff water from the dump surfaces into the diverted West Line Creek diversion canal at appropriate intervals.

A monitoring program will be maintained to assure that revegetation will promote wildlife habitat as soon as possible after the dump areas become dormant. This program will also take into consideration changes that may have to be made in the original plan.

Since 1973, C.N.I. has been actively engaged in conducting reclamation trials. Initial programs included reclamation of two teat pits and some exploration roads. Further studies have included a detailed assessment of soils, potential waste materials, natural revegetation, candidate reclamation native species survey, native seed collection and testing. Extensive native and agronomic species test plots have been established in the subalpine zone. This will be augmented with further native species tests which will also include shrubs. Continuous long-term site specific studies have been formulated to develop reclamation techniques to provide a self sustaining cover for the proposed mining area.
The overall reclamation plan deals also with the following concerns:

Open pit highwalls - The north highwall which lies roughly at right angles to the strike will be benched. The west side foot-wall will also form the finished slope and will utilize rock fences on slopes down to 26 degrees.

Main haul roads, shop and parking areas - These areas will require little reclamation except that steps are to be taken to ensure no adverse effects arise from runoff water during and following road construction.

Plant site facilities - Immediate cosmetic reclamation will take place following construction to reduce the possibility of dust and erosion.

The reclamation plan will receive top priority and commitment by project management. Direction of the plan will come from an environmental superintendent with responsibility and authority to carry it out. This individual will be an environmental biologist with adequate staff and will report directly to the project general manager. By reporting to the head man, he will have more independence and latitude to make the reclamation plan accomplish proposed objectives.

When I was asked by Dr. Errington to make this presentation, he thought it would be germane to comment on our experience with the guidelines for development of coal; I, therefore, would like to make some comments relative to this experience.

Line Creek Stage II Environmental Study was the first to receive approval from the Goal Guidelines Steering Committee. My overall opinion is that the procedure is fundamentally sound and designed to minimize negative environmental, social and economic impacts. Our observations indicate at least two major difficulties, keeping in mind that the procedure itself is, and must be both analytical
and critical, designed to take issue with a development plan and point out inadequacies. However, problems I allude to are: First, there appear to be no priorities set by government which would rationalize the differences between agencies, such as, Economics and Mining on the one hand and Environmental and Fish & Wildlife on the other. For instance, what are the overall benefits accruing from coal development as opposed to the alienation of winter range and some displacement of wildlife. This controversy is still under discussion.

Second, and this is a generalization, there is a lack of liaison or differences of opinion between and within governmental agencies which tends to preclude resolution of problem areas.

After submission of Stage I, several questions and comments pertinent to Stage II were brought to our attention which were responded to both verbally and in writing or were covered in Stage II volumes. Yet many of the same points surfaced again following assurance that they had been satisfactorily answered. We must assume from this, there had been lack of consensus among involved governmental branches.

Sometimes I get the feeling that you can't get there from here because industry is always wearing the black hat and the environmentalist is always wearing the white hat. Problems as mentioned lead to costly delays and, in this competitive market, could actually result in a loss to foreign competition.

I would repeat that the Coal Guidelines procedure is sound, however, implementation has been cumbersome, slow and more expensive than necessary.
A first go-around is always a learning experience for both sides. Despite the fact that no two submissions can be identical, the Line Creek Project presentation will, in all probability, result in further applications being dealt with more expeditiously — at least we hope so.
DISCUSSION RELATED TO R.H. GROUSE'S PAPER

Dave Polster - Techman Ltd. What do you intend to do with the basal sandstone you strip?

ANS. It will be put primarily at the bottom and in the center of the dump. The sandstone represents about 25-30% of the total overburden.

Dave Polster - Techman Ltd. What about the final pit floor?

ANS. On the west side we are not going to use benches as they would become unstable, so we are using what we label rock fences. These consist of six-inch pipe, ten feet long, embedded six feet into the basal sandstone, with wire mesh and backed by two-inch cable set in forty-foot sections. These rock fences will be installed on all pit slopes greater than 26°. Below 26° there should be no problem.

Dave Polster - Techman Ltd. What about reclamation of that pit?

ANS. We have not been able to develop anything at this particular time. After we have exposed some of it, we hope to formulate some kind of reclamation plan. At least in our schedule at this particular point we have no way of replanting it. I am sure it wouldn't support growth by itself.

Hubert Maxwell - O.K. Syndicate. How does the average haulage distance for waste disposal in the manner you described, compare to previously accepted methods of just dumping it in the handiest spot?

ANS. I'm sure the amount of travel is increased. If we had just dumped it at edge the distance would have been considerably less. How much less we never investigated. I don't know if that answers your question. We are also considering the possibility of conveying the material out of the pit.

Hubert Maxwell - O.K. Syndicate. Do you have a dollar value percentage of cost covering all of the additional work and the length of time that has been involved up to the point of being able to make a production decision?

ANS. In our feasibility studies we only made a financial analysis of the plan that we had existing. We did not look into any alternate plans so we have no way of comparing. I'm sure it's more expensive but how much more I can't say. We know it has to be done this way and so we have not looked at alternates.
Hubert Maxwell - O.K. Syndicate. I believe you made the comment that, as you went along, you found that your mine plan resulted in considerably more expense than you had first visualized.

ANS. I don't think I made that comment. If I did, I made it erroneously. When I say it's more expensive, I know from my past experience that there are cheaper ways to mine that coal than we designed. But the plan we designed satisfies not only the economics but also the environmental problems. So we haven't looked back and said, "look what we could do at Line Creek if we didn't have to do this." So I didn't know the answer to the question. All I know is that from past experience, this is a more expensive way to do it.

Jon O'Riordon - Assistant Director Environment and Land Use Committee Secretariat (also Chairman of the Coal Guidelines Steering Committee). I'd like to say that we appreciate your comments or any other comments from any developers on the guidelines' program. We recognize that it is a learning process both for ourselves and the developers.

ANS. Concerning my comments about the procedure itself - we worked very hard at designing the words and that is why I read it word for word. We don't want to throw rocks at any individuals or any groups of individuals, but there are some problems and we know that the committee is aware of them.

Ken Crane - Luscar Stereo Ltd. Why will the coal hauling road be paved?

ANS. Mainly for economic reasons even though there is a considerably larger construction cost. We feel that the extra money put into paving the road will be much less than the maintenance cost of a gravel road over a 20-year period. The road is now designed to be 40-feet wide - we have received some criticism that the road might be too wide. My own experience with similar type hauls is that if you do have a road 40-feet wide, you get a little more speed out of the trucks and you have less chance of a collision. In the overall haulage system, we will save money with the paved road.

Ken Crane - Luscar Stereo Ltd. How long did it take you to get from the prospectus stage to your present stage?

ANS. I don't know the actual date of the original prospectus but it's close to two years ago. We handed in the Stage II in August of last year and we received approval in early December. We thought that the steering committee was very expeditious. An important deadline had to be met because we had to go to Tokyo with a technical presentation and they got the approval to us before we left.