Proceedings of the 5th Annual British Columbia Mine Reclamation Symposium in Cranbrook, BC, 1981.
The Technical and Research Committee on Reclamation

NORTHEASTERN BRITISH COLUMBIA – PREPLANNING AND RECLAMATION OF EXPLORATION ACTIVITIES

by

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ABSTRACT

The prime areas for coal exploration are usually alpine or subalpine environments, although some potential mine areas and access are in boreal, coniferous forests. To minimize environmental damage, preplanning of access and exploration investigations is a requirement.

Road locations are initially located using air photographs, topographic maps and geologic maps. Potential problem areas are delineated and sources for road fill determined. In the field the planned road location is traversed and on site changes made. During road construction a concurrent reclamation program is maintained.

Once a preferred adit location is determined, access and exact seam location must be defined. Rotary drilling and geologic mapping along access trails aid in the seam definition. Use of existing access minimizes new environmental damage. Using a small backhoe can aid in seam exposure while lessening surface disturbance.

Following completion of the exploration program, all disturbed areas are reclaimed and access closed.

BACKGROUND AUTHORS

Dave Johnson, B.Sc., Mount Allison, has been involved in northeast coal exploration for the past three years and is presently the Project Geologist for Quintette.

Roger Shields, C.E.T., is a graduate of BCIT and has been involved in northeast coal exploration since 1970. He is presently the Field Manager for the Quintette project.

INTRODUCTION

The alpine, subalpine and boreal, coniferous forests that cover the coal measures of northeast British Columbia are undeniably one of the most scenic areas of this province. The alpine is reasonably accessible, the rivers have an abundance of fish and wildlife abounds. This may seem a

bit flowery but the point is made. We appreciate this countryside. It is also our livelihood. We are concerned for both.

When planning an exploration program the objective is to produce the most amount of information for the least amount of dollars. This, however, must be balanced against environmental damage. By careful pre-planning and closely supervising its implementation, both of these objectives can be achieved.

LOCATION

The areas to be discussed in this paper are the inner foothills of northeast British Columbia.

Specifically, the discussion covers Quintette, Belcourt and Saxon projects. These properties range from the Alberta border to within 60 km of Chetwynd, B.C. The license area is in excess of 80,000 ha covering estimated coal reserves of over 4 billion tonnes.

ENVIRONMENT

The dominant surficial materials in high elevation areas are weathered and colluviated bedrock, and highly weathered tills deposited prior to the last glaciation. At lower elevations, the slopes of major valleys in western regions of the inner foothills region are covered by recent deposits of ground moraine which often extend to the valley floor. In the eastern portions of valleys, outwash deposits commonly replace or overlie the till. Other surficial materials present include small pockets of lacustrine materials overlying outwash, alluvial deposits in major valleys, and small organic deposits, mainly bogs.

The most common vegetation types are boreal and subalpine coniferous forests with alpine vegetation types at high elevations.

PLANNING

Pre-planning of roads, adits or even cat trails that may cause significant environmental damage is essential.

Initially topographic and geologic maps are examined. The geology and topography tells the planner the most likely location for a possible

adit. This gives *us an* end point for our road location. Similarly, these maps will also help locate recessive and resistant formations. The recessive units tend to be wet and require excessive fill which in turn can result in slumping. The resistant units may require drilling and blasting or excessive fill to get around them. Knowing where the various problem lithologies are allows pre-planning around them while maintaining optimum grade.

The geologic knowledge of the area is also useful when searching for suitable road building material. For example, we knew that the Hulcross Formation, a marine siltstone/very fine sandstone, made a very good road bed for the relatively light equipment that would be travelling on it. Therefore, when planning we could pre-determine where possible borrow pits could be excavated without excessive surface disturbance. The road was planned to intersect this formation at several locations.

After examining the geologic/topographic maps, a more detailed examination is conducted with air photographs. This enabled us to locate prominent ridges, excessively wet areas, and slides. It is on the air photos that the preliminary road route and adit locations are indicated.

One of the most obvious reasons for planning is to use existing access. It makes sense both economically and environmentally. We have been fortunate in some of our exploration to have large, cleared seismic lines accessing some areas. Obviously, the seismic lines will not follow the best ground, but 90% of the time they are usable. Using tracked vehicles and wide pad caterpillar tractors, use of most of the trail is possible. And where it isn't, the seismic crews have usually constructed a bypass! However, it was necessary to corduroy in particularly wet areas.

In addition to seismic lines, we have used fire lines which have created access to recent burn areas. Keeping in mind the possible erosion problems, road locations in burn areas are preferable to those located in mature growth.

Finally, after determining as many routing options as possible, and comprising our drill and adit locations to expedite the program and minimizing environmental damage, we go to the field.

CONSTRUCTION AND CONCURRENT RECLAMATION

The first work to be performed is to cruise the proposed route. And to check the adit locations to ensure there really is coal there!

Cruising of seismic lines and existing trails is relatively easy. The problem areas are again noted on the air photos and we determine whether the route can be used, corduroying is necessary, or a bypass must be constructed.

Cruising virgin forest and undisturbed alpine areas is necessary to confirm the route chosen in the office. When checking the proposed route in the field, the target area, whether it be an adit location or drill hole site, is located first. This gives the individual locating the road a cursory examination of the potential road location. Then, working back from the objective along the available access, the road location is flagged.

Following this methodology, the road is located with an excellent knowledge of the terrain, resulting in the best possible routing.

Areas that are low lying, or crossing possible slide areas, are noted so that slashers and tractor operators can be advised. These people are shown the route and pre-slashing begins.

Pre-slashing of roadways through undisturbed mature forest minimizes hanging trees and allows them to be immediately brought to -ground level. In this way, a minimum amount of damage is done to trees on either side of the roadway.

To reduce fire hazard and improve the aesthetic quality of the work, fallen trees are bucked into short lengths as well as buried once the tractor begins actual road making. Excessive slash along major roadways is piled and burned.

In areas of excessive cover, whether it be foliage or overburden, exact adit locations are difficult to find. For this reason, rotary drilling aids in drill hole location. Using the drill hole information to interpret the geology, and by careful examination of the topography, the suspected location of coal outcrop can be determined. The actual excavation of the coal seam is enhanced by the use of a small backhoe.

By cleaning the face of an adit in low relief areas with the backhoe, only a small area is required to clean the seam outcrop face. This definitely reduces the area damaged compared with that caused by a D-6 caterpillar.

In this way, the "search and destroy" method of seam outcrop is eliminated and environmental damage minimized.

Adit sites are located with drainage in mind, including proximity to major watercourses. Every attempt is made to ensure that water from the adit is restricted in its flow toward the drainage. This is often simplified by the distance. However, berms or ditches at a level below the portal are often used.

During construction the topsoil is set aside and a berm is placed around the adit platform to prevent coal spillage during the mining phase. The waste dump is located on *a* dry platform with berms and water diversion channels. Often, the adit platform is suitable for stockpiling the waste coal.

During all phases of construction close supervision is necessary to achieve the objectives of the pre-planning. This, of course, also applies to the reclamation.

RECLAMATION

Once adit construction is complete and the coal sample is taken, reclamation can begin.

The adit platform and drainage ditch are contoured to prevent erosion. The platform is used to pile waste coal and the coal is contoured against the highwall. The area is then covered by the soil set aside during construction. The area is seeded and fertilized with the appropriate mixtures as set down in the reclamation guidelines. The waste dump is treated in the same manner, ensuring water diversion channels are maintained to prevent erosion.

Since roads are often used from year to year in an exploration program, often only the ditches and embankments are seeded. Water barriers are used extensively to hinder erosion. Upon completion of a program, all roads are completely reclaimed by barriers, contouring where necessary,

fertilizing, and seeding. Alpine areas in our Saxon property have had excellent success in road and drill site reclamation after several seasons of monitoring.

Drill sites along roads are recontoured and seeded. Generally little damage is done by the actual drilling process although the drill return is directed away from major watercourses and artesian holes are sealed by cementing. Since most diamond drill sites are helicopter supported, little environmental damage results. The areas cleared for these drill sites are slashed and bucked in a similar fashion to road construction. Reseeding is not usually required.

Trenches that have been dug on the property range from natural river cuts to hand trenches, to road cuts to deep backhoe trenches. Trenches that are dug are filled in and the larger backhoe trenches seeded. The amount of environmental damage by trenching is minimal, amounting to a total of 0.6 ha on Belcourt property over the past four years.

All work areas, whether trenches, drill sites or adit sites, are cleared of refuse during construction. This ongoing process, where a helicopter brings supplies and then removes the waste on the return trip maintains clean work areas. When necessary, we get the accountant out from behind his desk for garbage detail when large items such as empty fuel drums accumulate in the field.

The final reclamation is the refuse dump area, which is recontoured and seeded like any other excavation and, on program completion, the camp-site is similarly treated.

FOLLOW-UP

In the initial years following reclamation, the site is revisited to monitor the progress of the reclamation. Reseeding may be called for. For example, Belcourt property which underwent its final year of exploration in 1980, will require seeding of the road crowns and reseeding of the areas that did not take because of an unusually dry spring and summer.

CONCLUSION

We consider that our methods of pre-planning, construction and reclamation have been successful in causing minimal disturbance, as well as speeding up the natural reclamation process.