COAL MINING DAMAGE IN ALBERTA

A Brief submitted to the

Government of Alberta by the

Alberta Land Preservation Society

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A B S T R A C T

Coal mining in Alberta has had severe detrimental effects because of negligence during mining and lack of reclamation afterwards. An upsurge in mining is imminent at many places along the Foothills Belt. If practices of the past continue to prevail then great harm will unquestionably result.

The damage done by coal mining in Alberta has been most severe in the Mountains. It includes devastation of scenery, pollution and silting of streams by mine wastes, extreme soil loss by increased erosion, and loss of wildlife habitat. These have immediate and permanent adverse effects on the renewable resources and recreational value of the mountain region. They also may seriously endanger the water supply of the Prairies.

A single statute should be created to cover protection of the environment from mining, and apply to the entire Province of Alberta. It must be clear and specific. It is of greatest importance that the enforcement of regulations be under the Government Department that is responsible for the renewable resources that are endangered. Control of reclamation must no longer be left to the Department of Mines and Minerals.

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INTRODUCTION

The Land Preservation Society of Alberta is concerned that mining of coal is a threat to the beauty of our Province and the quality of our environment. The Society has commissioned the undersigned group to prepare this report on coal mining damage in the Province of Alberta. We submit this report with all sincerity and respect, and request that it be given your serious consideration and action.

Many local mining operations in Alberta are negligent in prevention of environmental damage. There is a conflict between mining and other land uses, especially recreation and tourism. The intention of this report is to point out the problems and suggest constructive corrective measures.

OCCURRENCE OF COAL IN ALBERTA

Coal in Alberta occurs in the Plains and in the Foothills (Figure 1). The two kinds of occurrence are very different, and each has used a distinctive method of mining.

In the Plains, the coal lies at shallow depths in gently rolling to relatively flat terrain, and the seams are nearly horizontal. In 1968, 75% of the coal produced in Alberta, or about 3 million tons, was from the Plains, and most of it was by strip mining. Area mining is the method practiced in this region. A box cut is made through the overburden to expose the coal seam which is then removed. This cut extends to the limit of the property or the deposit. As each succeeding parallel cut is made, the spoil (overburden) is deposited in the cut just previously excavated. The final cut may be a mile or more from the starting point of the operation and may be several miles in length.

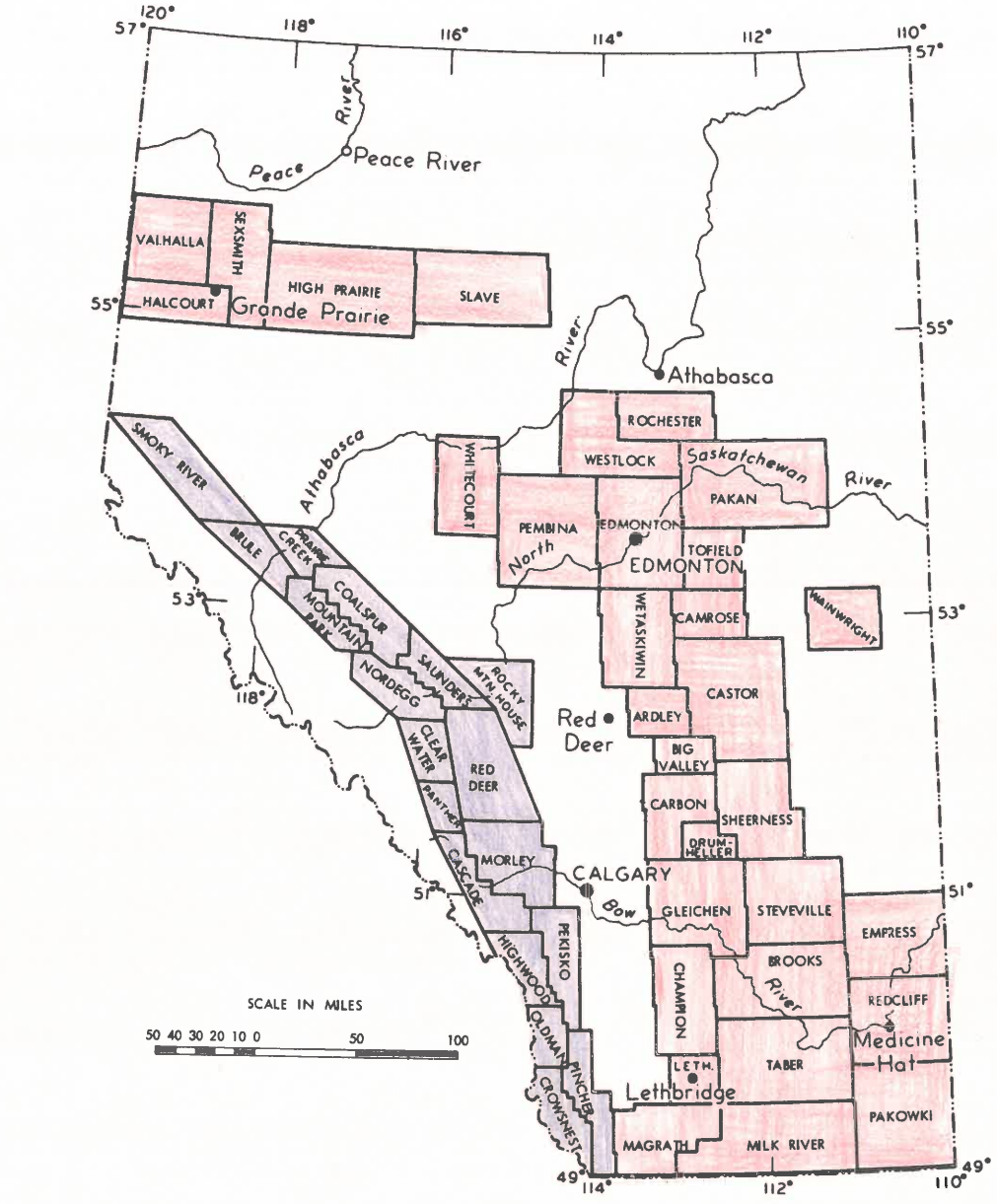

Figure 1. Coal Areas of Alberta

Viewed from the air, area stripping resembles a plowed field or the ridges of a gigantic washboard. A coal mine in the Plains is usually quite a compact feature.

In the Foothills, coal occurs in several discontinuous narrow belts and the seams usually are steeply inclined. The coal-bearing belt extends from south of the Crowsnest Pass to the Smoky River area North of Jasper National Park (Figure 1). This is a distance of 400 miles, nearly the full length of that part of the Rocky Mountains which lies in Alberta. It is possible and economically feasible to mine coal by underground methods at many places in this belt. In a number of localities along the mountain belt, where thick coal seams are near the surface, it is feasible to remove the coal by strip mining. In 1968, about 25% of the coal produced in Alberta, or 1 million tons, came from the Foothills. About 14% of this was by strip mining making up 3.5% of the total tonnage produced in the Province.

Various methods of strip mining have been employed in the mountains, including contour stripping. Because the rocks of the mountains are folded, the seam of coal usually is tipped on its side; it trends along the mountain face and slopes into the mountain. Coal is near enough to the surface to strip mine only in long narrow strips that trend along the mountain range. The overburden is first removed from the seam and pushed down the mountain, and then the coal is removed. The mining starts at one end of the seam and proceeds to the other. This method produces deep gouges in the mountain (Plate I). They are bordered on each side by unstable precipitous slopes. On the uphill side is the highwall, steepened by excavation; on the downhill side is the pile of spoil material.

In the Rocky Mountains coal has been mined by underground methods since the 1880's, and in the last 20 years there has been considerable strip mining.

On the Alberta side of the Crowsnest Pass, many underground mines and six strip mines have operated within twelve miles of Highway No. 3, an Alternate Trans-Canada Highway (Figure 2). All have been abandoned except for one underground mine and two strip mines. Extensive abandoned strip mines are in the Luscar area and a smaller abandoned one is at Ribbon Creek in the Kananaskis area South of Canmore.

Recent developments indicate that further expansion of coal mining in the mountains of Alberta is imminent and that stripping will be involved. Strip mining will begin in the Canmore area near the entrance to Banff National Park.[1] The Cardinal River project is a large-scale strip mining operation which will begin soon near Luscar in the Mountain Park Coal Area (Figure 1). Large scale mining will commence soon in the Smoky River Coal Area within the confines of the Willmore Wilderness Area; a small amount of this will be by stripping. In addition to expansion by present operators, new companies are showing an interest in mining coal in the Foothills of Alberta. We conclude that coal mining activity will continue to increase in Alberta and ultimately may affect a much larger part of the Foothills Belt.

Coal mining in the Foothills of Alberta has been concentrated in mountain passes because of accessibility. Now, however, mines are opening up in more remote regions. It is certain that there are other deposits between the passes that can be mined economically. In time, permits will be sought to mine many of these if economic factors remain as they are or become more favourable.

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[1] TOUGH, G., (1968), Public Policy and Coal Mining, Cascade Coal Area, Alberta; M.Sc. Thesis, University of Calgary, Department of Geography.

DETRIMENTAL EFFECTS OF MINING IN ALBERTA

There are many cases in Alberta where coal mining has been a severe detriment to the environment. It has reduced the quality and quantity of our water supply, as well as disrupting its regular delivery. It has desecrated large areas and reduced their value as a recreational resource. If mining is controlled in the future as poorly as it has been in the past, then enormous damage will result.

The direct bad effects of underground mining have been the pollution of streams by mine wastes, increased erosion around the mine workings, scattering of coal dust from trucks and machinery, and extensive construction of poorly planned road networks. The direct results of strip mining are devastation of land and destruction of aesthetics; however, in this case, it is the secondary effects that are the most dangerous. In strip mining, protective cover of vegetation is removed, normal drainage is disrupted, topsoil is mixed with broken rock, and usually dumped on adjacent land. This results in landslides, abnormal soil erosion, silting of streams, wind blown coal dust, and loss of wildlife habitat.

Specific examples of bad practices can be drawn from several of the regions where mining has taken place. The most severe damage done by coal mining has been in the Crowsnest Pass area, both as far as abandoned areas and areas presently being worked, and the examples will be taken from that area. A case of an abandoned strip mine is Grassy Mountain, about 6 miles north of Blairmore and about 4 miles East of the Kananaskis Highway(Figure 2, Locality 1). Between 1947 and 1958, the West Canadian Collieries mined about 2,750,000 tons of coal there. A great network of roads and cuts were involved there.

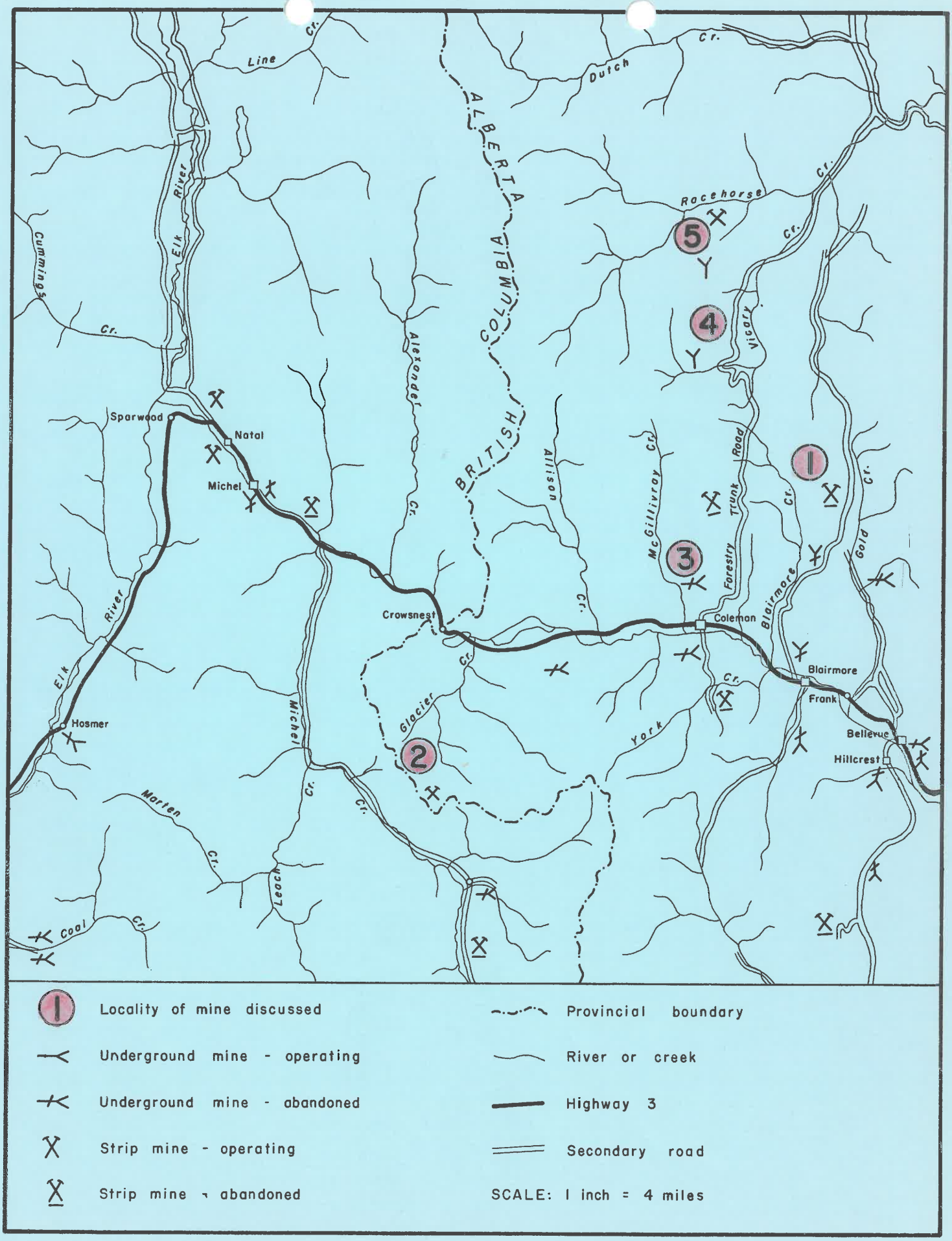

Figure 2. Coal Mines in the Crowsnest Pass Area of Alberta and British Columbia.

Nothing was done to restore the landscape and no seed was planted. This entire mountain, once beautiful, is now a moonscape of deep gouges and a network of roads. Two once fine trout streams drain this mountain, Blairmore Creek and Gold Creek. The detrimental effect on fish life in these streams has been enormous. In addition, Gold Creek serves as the water supply for the Village of Frank. Nothing of any consequence has been done to restore the land despite the fact that reclamation of this site would be a simple matter. West Canadian Collieries does not operate any longer and its coal properties were bought in June,1966 by Scurry-Rainbow Oil Ltd. That Company has been investigating the economic feasibility of re-opening mines in the area and shipping the coal to Japan.

Coleman Collieries operates a strip mine on the top of Tent Mountain on the Alberta-British Columbia border, 7 miles South of Sentinel, Alberta. (Figure 2, Locality 2). Over a period of 10 years or more, $2\frac{1}{2}$ million tons of coal have been mined from an area of 300 acres. For some time, overburden and other wastes were simply bulldozed down the mountainside with no apparent control. It was often mixed with snow. In the spring runoff, much of this material was carried into Glacier Creek with obvious bad effects. Fortunately, this Creek is swift and clears itself well; however, the wastes are transported downstream and end up in Crowsnest Lake. The Lake remains muddy most of the summer, and is in fact the settling basin for the Tent Mountain strip mine. Recently, efforts have been made to alleviate the situation by curtailing dumping over the mountainside, by construction of trenches, and by construction of three settling ponds on Glacier Creek. None of these have been too successful. If the project had been undertaken with proper reclamation in mind in the begin-

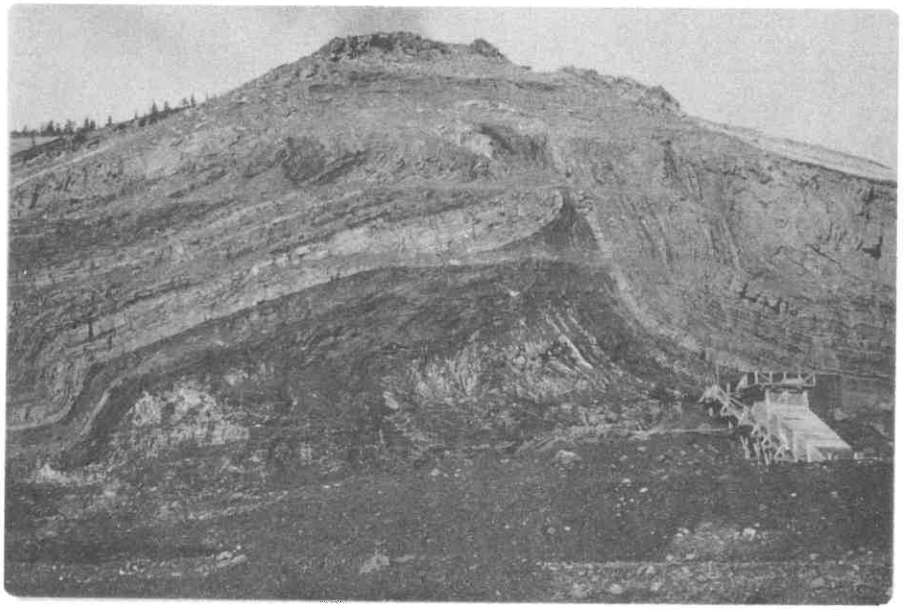

PLATE I - Grassy Mountain strip mine, 6 miles North of Blairmore, Alberta. This pit has been abandoned for years and no reclamation was done.

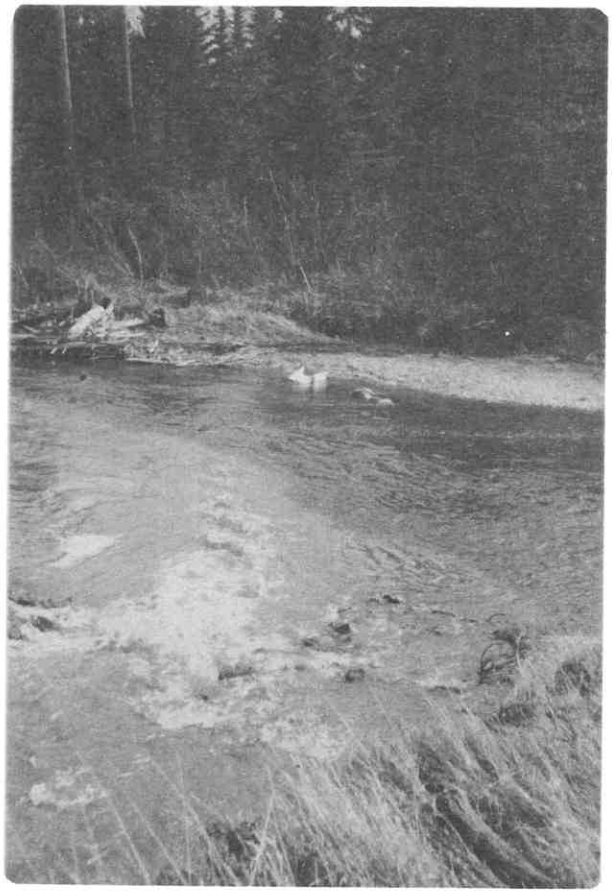

PLATE II - Junction of McGillivray Creek and the Crowsnest River in the Town of Coleman, Alberta. The Creek is polluted by water from a mine abandoned nearly 20 years ago.

ning, damage could have been prevented simply and at minimum cost. Under present circumstances, prevention of future damage and proper reclamation would be costly.

Coleman Collieries also owns the abandoned McGillivray Creek underground mine at Coleman (Figure 2, Locality 3). A mine portal here that is visible from the main highway has been releasing bright yellow mine water into McGillivray Creek for at least 20 years. The water, which is dilute sulphuric acid and is high in iron, is shown in a photograph (Plate II). McGillivray Creek, downstream from the mine, has extensive iron deposits (yellow boy) on its bed and supports virtually no aquatic life. Pressure has been exerted on the Company recently to correct this situation, but at this time, no results are visible.

At Vicary Creek, 11 miles North of Coleman, an underground mine operated by Coleman Collieries has caused extreme damage to Vicary Creek (Figure 2, Locality 4). Waste water from the mine runs through two ineffective settling ponds and then directly into Vicary Creek in considerable quantity. Coal dust and silt from the working areas is blown into the stream, and together with the mine water, has polluted it for miles. Fish habitat and food supply have been destroyed by the silt and chemicals, and precipitation of iron compounds is starting. What was once a wonderful trout stream, is nearly destroyed. The valley of Vicary Creek above the Forestry trunk road has virtually been ruined for recreational purposes. One of the most serious problems in the Vicary area is the spillage of coal from overloaded trucks which systematically ignore loading regulations. In addition, the coal trucks are over-using the Forestry trunk road to the detriment of the roads and the tourist traffice.

In 1968, the working areas were seeded in a project shared by the Forest Service and the Company. The effectiveness of this can not yet be fully evaluated, but it is years too late, and at the very best, a token effort.

It appears that Racehorse Creek, 5 miles to the North, will be destroyed as badly as Vicary, by projects that the same Company has begun and by new projects that they propose. Racehorse Creek is a well-known trout stream and lies in a valley of tremendous recreational potential. A well used Forest Service Recreational Area had been established about 5 miles downstream from the mine site years before mining here was proposed. Already, a strip mine has been opened (Figure 2, Locality 5). An unusually unsightly and over-developed road system was constructed for that mine, and winds back and forth over the mountains. Now, an extensive underground mine is proposed in the valley of Racehorse Creek by the same Company. The same factors that exist in the Vicary Creek workings apply here, and the same degree of destruction may be expected.

Certain operating and abandoned underground mines are polluting streams of the Foothills Belt by the release of mine wastes. In the case of abandoned mines, steps should be taken to plug the portals. In the case of operating and proposed mines, steps should be taken to alleviate the situation by altering the methods of mining. There may be cases in which proper protective measures would be so costly as to prohibit certain underground mines.

Strip mining which has been done in the mountain regions of Alberta to date has without exception, been done unwisely with regard to its deleterious effects on renewable resources and on the environment. Underground mining has been little better. There are no instances of strip mining in the mountains

in which reasonable smoothing of the disrupted landscape has taken place by replacing the overburden, and no cases in which any but token seeding to grass has been done, to prevent erosion and pollution. In the case of most strip mines, strict controls will reduce damage to an acceptable level. Grassy Mountain and Tent Mountain are two cases in which proper methods would have reduced damage satisfactorily if applied early enough.

Costs of reclamation of strip mines in the entire U. S. A. in 1960 ranged from 4 cents to 10 cents per ton of coal mined. Costs in the Foothills Belt of Alberta would be in the lower part, or even below this range per ton of coal, because our stripped seams here are very thick. A qualified landscape architect has informed us that reclamation and hydroseeding of the Tent Mountain strip mine at Coleman could have been done for less than 2 cents per ton of coal mined.

Irreparable environmental damage has already taken place in the Crowsnest Pass and the Coal Branch. There is every reason to believe that these serious damages will be duplicated on a vastly greater scale at other places along the Foothills Belt unless new practices are adopted. A certain amount of environmental damage is inevitable in coal mining; however, the entire matter must be carefully analyzed to see whether the damage might be outweighing the economic benefits.

ATTITUDE OF ALBERTA COAL MINING BODIES

The general attitude of the companies that have mined the Foothills of Alberta and of the Department of Mines and Minerals, is that no mistake is being made in current mining practices. They have not disputed the fact that NO STRIP MINE IN THE FOOTHILLS OF ALBERTA HAS EVER BEEN RECLAIMED AND RESEEDED. They claim instead, that only a small amount of land is underlain by strippable coal and that this area is inconsequential. Indeed, it is true that the actual stripped area is small, and is usually measured in acres rather than in sections. However, the area figures generally given do not include the miles of road that are bulldozed out of the landscape, the area upon which the overburden is dumped, or the area upon which dust is blown or carried by water. The above reasoning is nearly as absurd as would be a suggestion that an oil well disturbs ONE square foot of land because this is the area of land that is cut by the drill. Arguments that cite the size of area mined to support the contention that reclamation in the Foothills is unnecessary must be regarded as worthless.

Experience in the U.S.A. has demonstrated clearly the tragic error in the present attitude in Alberta. Surface mining of coal has been done extensively in the Appalachian Mountains and little precaution or restoration took place. A recent extensive study prepared by the U.S. Department of the Interior [1] had the following to say about it.

> "The large tracts of unreclaimed land existing today have resulted essentially from past failure to recognize reclamation as a necessary part of the cost of mining and of the products resulting therefrom. Instead of requiring reclamation, society, through ignorance or apathy, accepted the alternatives - erosion, acid drainage, lowered water quality, and other detrimental aftereffects - as costs of 'progress.'

[1] UDALL S.L., (1966), Study of Strip and Surface Mining in Appalachia, An Interim Report to the Appalachian Regional Commission; Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402

> Current protests against despoilment of the land imply that now, however, the public is probably willing to pay for the reclamation of strip and surface mined lands. It is soberly realized that some of the past benefits of that 'progress' involved deferred costs for which payments have come due. In other words, benefits have already been realized; we are now confronted with deferred social costs from which there is no cheap and easy escape."

The study showed clearly that a mistake has been made and shows the concern that the U. S. Authorities have about it. It showed also that the remedy is costly, that it would have been much cheaper if done concurrently with mining. One result of this study was the drawing up of a recommended restoration program costing over one billion dollars. These funds will be expended over a 20-year period by Federal and State Governments, as well as private owners, with priority on prevention of future damage. The study also clearly revealed the need for controls to prevent future damage.

It has been claimed that the Rocky Mountains are an entirely different situation from the Appalachians and therefore the lack of reclamation poses no danger. This is absurd ! It is true that there are factors which make for less destruction in the Rockies. The areas to be stripped are smaller and less continuous; moreover, we will have a lesser problem with sulphuric acid wastes, because the coal in our area is low in sulphur. On the other hand, however, there are factors that make stripping here a greater potential danger. Stripping here is often much deeper and will reach to depths of 480 feet. In addition, the seams rarely follow contours and therefore greater erosion affects the stripped areas. Nevertheless, the situation existing in Alberta today and the potential problem tomorrow, is as serious as that which has occurred in the Appalachians.

Coal companies and government mining departments in the Appalachians stoutly maintained that strong legislation was unnecessary. They stated that operators would reclaim the land voluntarily and that environmental damage was inconsequential. Damage was, in fact, immense and could not be reduced until clear and strong legislation was passed.

An identical situation exists in Alberta. The future upsurge in mining here will be done by large companies who claim that they will adopt responsible conservation practices. We understand that in most cases of proposed strip mining these operators have budgeted for proper reclamation. They claim, and we hope, that they will carry this out. However, past experience demonstrates adequately that mining companies will not voluntarily take measures to prevent environmental damage if this costs them money. In the Foothills Belt of Alberta, the operators are not obliged by the Government to adopt good conservation practices and they can hardly be expected to do so voluntarily. Clear and binding legislation must be introduced.

PRESENT LEGISLATION IN ALBERTA

The following legislation and regulations apply, in one way or another, to regulation of coal mines in respect to watershed protection, pollution prevention and land restoration:

The Surface Reclamation Act
The Mineral Surface Lease Regulations
The Right of Entry Arbitration Act
The Coal Mines Regulation Act
The Forest Protection Regulations
The Public Health Act
The Fisheries Act (Federal)

Power for control of mine damage to the environment was legislated as follows. The Surface Reclamation Act applies to the reclamation of mines on surveyed lands in the Province of Alberta with the exception of those in the Forest Reserves. This Act is administered by the Department of Mines and Minerals. The same responsibility in other parts of Alberta comes under the Mineral Surface Lease Regulations, which is administered by the Department of Lands and Forests. The Right of Entry Arbitration Act can be appealed to by mine operators to allow them to operate mines in any part of the Province of Alberta, including those areas in the Forest Reserve. This Act apparently can overrule the Mineral Surface Lease Regulations. The Right of Entry Arbitration Act is administered by the Department of Mines and Minerals, and its three members are all from that Department. This means that the Department of Mines and Minerals, in fact, regulates the environmental damage done by mines in the entire Province of Alberta.

Surveyed Lands

Conservation and reclamation of surveyed lands is under the jurisdiction of the Surface Reclamation Council, which was established by the Surface Reclamation Act. Most surveyed land on which mining can take place is in the Plains, but there is some surveyed coal land in the mountains. Usually the surveyed land is owned outright by the operator, but in some cases, he makes agreement with the surface owner to remove the coal. A surface owner can appeal to the Surface Reclamation Council to have his land restored to better condition if he sees fit to do so. In the case where the operator is also the surface owner, there is little pressure to restore land and he can do more or less as he pleases with it. In the Plains, there is an incentive on the part of the operator to restore land because it may then be used for another purpose or sold. In most cases of surveyed lands in the Plains there has been reclamation, but in the mountains there has been none.

The Surface Reclamation Council comes under the Department of Mines and Minerals and the Deputy Minister of Mines and Minerals is automatically Chairman. Some members of the committee are appointed by the municipalities, and others by the Department. The members appointed by the municipalities are not required to have any particular professional qualifications and they have been described to us by the Chairman as "practical experienced men." It is also not certain that their decisions are made without external pressure. We are not certain of the qualifications of the members appointed by the Department, but it appears that they, too, need no special professional qualifications.

In the appraisal of reclamation of a mine, one member from the Department and one from the municipality involved judges whether the landscape has or has not been left in a suitable condition. Criteria to be applied are not set out clearly in the Surface Reclamation Act, and much is left to discretion. Being made by non-professional men, the inspections of sites prior to and after surface mining would appear to be no more than descriptions of the original topography and ground cover; they do not appear to provide the basis for a complete prior plan of reclamation. It is a responsibility of the Department of Mines and Minerals to aid and promote increased mining activity. It is the responsibility of the Surface Reclamation Council to prevent or control damage that these mines might create. These two responsibilities clearly are incompatible and should fall under different departments. At the very least, the responsibilities of Deputy Minister of Mines and Minerals and Chairman of the Surface Reclamation Council, cannot reasonably be executed by one and the same man as they now are.

It follows that the Surface Reclamation Council of Alberta is not able to provide a professional and unbiased level of inspection or planning. Because of the mode of inspection, there is no uniformity in the administration of surface mining regulations. Because it is controlled by the Department of Mines and Minerals, with the Deputy Minister as Chairman, there is clearly a conflict of interest in land uses. The aim of the Council is to protect the renewable resources of the Province, yet the governmental agencies concerned with these resources do not control that Council.

Reclamation of surveyed lands has been good in many cases, a notable example being that following the surface mining at Taber. In other cases, damage has been serious, a notable example being Grassy Mountain.

Forest Reserves

In the case of mining in the Forest Reserves, it is clear that there is in fact no provincial legislation that can satisfactorily control the proper development and proper reclamation of surface mines, notwithstanding what has been repeatedly implied by spokesmen for both the Government and the industry. There are certain vague regulations, but even they are unenforced. Moreover, there is a conflict among departments. In this case, an even more blatantly incompatible conflict of responsibility exists. The Department of Lands and Forests has responsibility for proper conduct, but the Department of Mines and Minerals has the authority. Here again, the Department of Mines and Minerals has as one of its aims to increase mining activity. The responsibility of ensuring that surface mining does not damage the environment or the renewable resources falls upon the Department of Lands and Forests. In fact, however, this latter Department has no real authority. A mine operator can by-pass the Department of Lands and Forests by appealing to the Department of Mines and Minerals through the Right of Entry Arbitration Board.

Such an instance happened recently in the case of the proposed Racehorse Creek mine. The Company felt that it was unable to open the mine if it were to comply with the conservation practices demanded by the Department of Lands and Forests. It appealed to the Right of Entry Arbitration Board, which overruled the surface resource managers and will allow the Company to proceed. The arbitration procedure, as presently set up, does not serve the purpose of providing any operating restrictions or protection for other resources.

A similar instance of conflict has occurred in the case of the Willmore Wilderness Provincial Park. This area was set aside in 1959 by the Department of Lands and Forests to be an unexploited area for the benefit of future generations. Within a few years of its establishment, seven townships were removed from the Park and will be used for coal mining. The justification for this at the time was that coal reservations had been held in that area prior to establishment of the Park. More recently, however, new concessions have been granted within the Park. A 21-year quarrying lease was granted on December 13, 1968, and coal reservations were granted to four companies on February 10, 1969.

In summary, the legislation designed to prevent and reduce environmental damage resulting from coal mines, is grossly inadequate. Moreover, because the real control is virtually all vested in the Department of Mines and Minerals, mining activities have always been given precedence over all other uses of the land. As a result, the renewable surface resources and the quality of the environment have not been protected.

OBJECTIVES FOR CONTROL OF MINING IN ALBERTA

The basic objective of conservation and reclamation measures applied to mining coal in Alberta should be to ensure that mining fits harmoniously into a complete developmental scheme that is best for the people of the Province. To state objectives, we might paraphrase the Udall report which states as its goals (Udall, 1966, p 4) "to prevent future devastation of the environment while fostering economic growth of the mineral industries, and to alleviate damage caused by past strip and surface mining." It must be recognized that proper mineral development must be compatible with other uses of the land. This is particularly so in the mountains, where genuine and honest cost benefit analyses must be made by governmental agencies before any more projects begin. None have been made in the mountains so far in connection with mining. The total value of all resources of all kinds must be considered.

We feel that the immense potential of renewable resources available in public lands in the mountains has not been evaluated properly in the past, and their continued existence is threatened by mining. This includes the tangible resources such as water that can be used there or farther downstream, as well as the intangible resources such as recreation. Since nearly all existing and projected mining in the Foothills Belt of Alberta will take place in the Rocky Mountain Forest Reserve and the Willmore Wilderness Park, we offer the following material to support the great value we place upon the renewable resources in these areas. The two resources that are most seriously endangered by mining are the recreational potential, and water supply, and these will be discussed below.

Recreational Potential of Foothills

A conservative estimate is that the population of Alberta will increase from 1,463,000 in 1966 to 2,200,000 in 1981, or by about 50%. Even greater growth rates are given for the cities, which are expected to double in that 15-year period. In 20 years, Alberta will be more than 80% urbanized and this pattern is already developing, with the population becoming concentrated in the urban centres along the highway connecting Lethbridge, Calgary, Red Deer and Edmonton. It is a recognized fact that a large and rapidly increasing part of our urban population regard the mountains as their recreational playground.

Most of this large urban population of Alberta will be located within easy driving distance of the Foothills, and will have abundant leisure time to spend there. No less important is the recreational desire of the rural population who are equally rapidly regarding the Foothills as a place of recreation. The consequence of this is that there will be a tremendous dollar value placed on the recreational potential of the Mountains and Foothills. One of the most attractive features of this Province, and an aspect that has encouraged many people to move here, is the fact that we have the Mountains and Foothills. It is most important that we keep them in an unspoiled condition.

The Rocky Mountain Forest Reserve has been managed and continues to be managed under objectives that stress physical production, with oil, coal, water, wood and forest being favoured. Recreation has been tolerated, but not encouraged. The following statement by the Eastern Rockies Forest Conservation Board (ERFCB) states the policy, "It will not be the policy of the Board to encourage or promote recreational use of the area and indeed such use will be restricted in large sections of the Reserve." [1]

[1] General Policy Statement of the Eastern Rockies Forest Conservation Board, Amended 1964.

With such a policy orientation, it is very easy to understand the very low level of recreational development in the Foothills and Mountains of the Rocky Mountain Forest Reserve.

It is impossible to show a high enough dollar value for recreational land now because people are accustomed to free recreation, but it is certain that the values will increase in the future and that values put on it now are incorrect on the low side. A real value can be placed on the right to fish, hunt, camp, or picnic, by using the sometimes high fees that people are willing to pay for these things in other places. It is difficult, however, to evaluate the enjoyment of solitude, wild animals or beautiful scenery. Private recreational land in the Foothills is skyrocketing in value. Large parcels at Bragg Creek in the Foothills West of Calgary sold for $150 per acre in 1963, and now sell for at least $500 per acre. River lots in Canmore have been known to go from $3,500 to $6,000 in value in the last year. Many investment advisers agree that the value of recreational land in the Foothills Belt will continue to climb. This is an indication of what recreation on public lands there will be worth to the Province in the future.

Canmore Mines plans to strip mine coal from property they own outright at Canmore. The management is fully aware that this is valuable real estate for recreational purposes and they will reclaim it voluntarily for possible sale. (W. Riva, personal communication). The adjacent Rocky Mountain Forest Reserve is no less valuable and should be adequately protected for its public recreational potential.

We believe that the de-emphasis of recreational value of the Rocky Mountain Forest Reserve is a basic mistake of philosophy. We believe that the recreational value of the Rocky Mountains of Alberta outweighs any other single economic possibility which it has, except possibly mineral development. It is a recreational playground, not only for the people of Alberta, but for the people of the whole Great Plains to the East. Its potential as an earner of tourist dollars is also enormous, as tourism is presently the third largest industry in Alberta. Moreover, there simply must be a certain amount of recreational opportunity for the people, regardless of whether it returns a measurable profit today or not.

Water Supply

All major rivers of Alberta have tributaries that flow across coal-bearing formations of the Foothills Belt. These tributaries provide the regular supply of clean water upon which the industry of Alberta thrives. Coal mining in the Foothills Belt has the potential of affecting the quality, quantity and time of delivery of water to virtually the entire populated part of Alberta.

In a local area such as the Crowsnest Pass, unwise management has impaired the Crowsnest River before it reaches the Plains. The damage is permanent, and may be increasing in severity, despite the fact that all but one mine on the watershed of the river has long been abandoned. The single contributor of greatest damage to quality is probably the McGillivray Creek underground mine. Plate II shows clearly the waste material that pours into the Crowsnest River at Coleman. If an industry requiring clean water were to contemplate Coleman as a site, would the added cost of cleaning the water before use be enough to prevent the industry from being established ?

Quantity of water and its regular delivery are of even greater importance to industry and agriculture than quality. It is important that a steady supply be available and a most critical factor is the amount delivered at the time of low water. At these times, industries and irrigation projects of the Plains are highly dependent upon the stored groundwater that is released from the Foothills and Mountains in the form of springs and seepages.

Soil has the ability to store water and release it slowly over the dry season. In addition, it supports vegetation which creates shade and slows evaporation. Strip mines and mountain roads reduce water storage capacity. If these strip mines are not reclaimed and their network of roadways are not reseeded, great quantities of soil are eroded from those and adjacent areas causing water storage capacity to be reduced and flood level to be increased.

By how much have mining operations in the Crowsnest Pass reduced the water available at Lethbridge for industry and argiculture ? No studies have been made which can give a precise answer to this question. Nevertheless, there is no doubt that the supply at low water would be reduced.

The coal-bearing formations extend the full length of the Foothills Belt of Alberta. It is just a matter of time until operating and abandoned mines will be distributed sporadically along its full length, and this is demonstrated as follows.

A glance at Figure 2 shows that many mines exist in the Crowsnest Pass within a few miles of the railway. In the last few years, with the advent of large trucks, new mines have been opened farther North, and the coal is hauled to the railway. The same circumstances apply in the case of the two other main passes through the Mountains (Figure 1). In the Kicking Horse

Pass coal mining was once restricted to the vicinity of Canmore, but soon may be carried out as far away as Panther River. In the Yellowhead Pass, mining had for years been restricted to the nearby Luscar area. Soon it will commence on a very large scale far North of the Pass in the Smoky River Area.

If economic conditions for the coal industry remain the same or improve, we can expect virtually every prairie river to ultimately have coal mines on some of its tributaries.

CONSERVATION RELATED TO STRIP MINING

In North America, a vast amount of experience about strip mining of coal has been gained in both the technical and administrative fields. We in Alberta are fortunate to have this experience to call upon when we are at this rather early stage in the development of our coal mines.

TECHNICAL - Land disrupted by surface mining may be reclaimed in one of two ways; for "basic reclamation" or for "special land use."

Basic Reclamation consists of simply restoring the land to some basic order by smoothing and reseeding. It is done primarily to prevent the harm done by erosion and pollution, and to protect against watershed reduction and spoilage of scenery.

Special Land Use reclamation includes the development of sites or mined areas that might contribute to the economic growth of the region. These would be recreational areas, picnic grounds, access roads, hiking trails, dam sites, fish ponds, lakes, and industrial and commercial sites.

Of greatest importance in Alberta is basic reclamation to prevent further damage to the environment. Because of the distribution of coal in the mountains, the potential damage there by strip mining and its side effects is great.

A great deal of technical experience about conservation and reclamation methods has been gained in the Appalachian Mountain region of the U.S.A., where adequate techniques of environmental protection and reclamation of strip mines have been developed. Conditions in Alberta are somewhat different, but that experience can be called upon, modified, and applied here.

It is generally acknowledged that the Strip Mining Statute [1] passed by Kentucky in 1966 is the best and most successful strip mining law in the U. S. A. The Kentucky legislation specifies exactly what must be done, giving such things as slope angles, dimensions of cuts, nature of silt basins, amounts of fill required, type of grass or trees to be planted, and the types of fertilizer to be used. Enforcement of this legislation was stringent and operators were fined heavily if they failed to comply with it.

The regulating bodies in Kentucky are proud of what their legislation has achieved, and they are anxious to advise others of their knowledge and experience. Appendix I at the back shows the methods of reclaimation applied. Tremendous benefit has accrued to that State from the uses to which the reclaimed land was put.

ADMINISTRATIVE

It is possible to categorize three systems of enforcement of conservation practices that have been associated with coal mining. These may be called (1) voluntary; (2) mines department administered, and (3) administered by surface resource agencies.

(1) In the early days of mining here and elsewhere, there was virtually no legislation that applied to the conservation practices of coal mines. Restoration was unheard of and conservation was ignored. It was demonstrated adequately in this period that coal mining companies in their quest for efficiency, did not or could not voluntarily undertake measures to prevent environmental damage if those measures cost them money. Voluntary expenditure of money on such projects by

[1] 1966, Chapter 350; Kentucky Revised Statutes Relating to Strip Mining and Reclamation; Division of Reclamation, Department of Natural Resources, Frankfort, Kentucky 40601.

companies is comparable to a donation to a charity or community project. It would be kind of them to do it, but it can hardly be expected of them. Clearly, it is the responsibility of government to ensure that good conservation is practiced during mining, and that reclamation is done later.

(2) In some States of the U.S.A. (for example, Maryland), legislation exists to control the practices of mining companies, but it is administered by the mining department of the government. Although the damage has been considerably lessened, the mining departments have done a generally unsatisfactory job of policing conservation. This is probably because that role conflicts with the department's other role of aiding and encouraging mining activity.

The above situation is the same as that which exists in the Province of Alberta today. The Department of Mines and Minerals clearly has authority to control operations on surveyed lands through the Surface Reclamation Act. It also has effective control of operations on unsurveyed lands through the Right of Entry Arbitration Act, by means of which it can overrule the surface resource managers. The unfortunate results of this system in Alberta were described earlier.

(3) The best situation in North American so far as conservation practices by strip mine operators is that adopted by the State of Kentucky, which is administered by the surface resource agency. The most important features of their system and a comparision with that in Alberta is as follows :

(a) In Kentucky a single piece of legislation applies to the entire State. In Alberta the controls come under several pieces of legislation.

(b) In Kentucky a single body, the Strip Mining and Reclamation Commission, makes policy and administers strip mine reclamation laws for the entire State. In Alberta surveyed and unsurveyed lands fall under different agencies, and for the latter it is not separate.

(c) In Kentucky the agencies concerned with the renewable resources that are endangered predominate on the Strip Mining and Reclamation Commission, and the Department of Mines and Minerals is secondary. In Alberta the bodies concerned with renewable resources are virtually powerless and the fate of these renewable resources is in the hands of the Department of Mines and Minerals.

(d) In the Kentucky legislation the requirements are specific and the penalties for failure to comply are known. In Alberta the requirements are general and vague. Moreover the policing is mild and perfunctory.

Opponents of the Kentucky legislation attempted to stop it, using the argument that it would kill the industry and thereby adversely affect the prosperity of the State. Results have shown that coal production in Kentucky was not adversely affected and the mines continued to grow and prosper. Costs of reclamation were considerably less than had been expected. In many ways the companies found it easier to operate, because the regulations were clear and inviolable; this enabled them to know precisely the conditions under which they were to operate.

POLICY RECOMMENDATIONS

It is evident from the present situation surrounding coal mining in Alberta that some very important changes of policy will be required to achieve a realistic and balanced use of resources, particularly in the Mountain region. The importance of the following policy recommendations definitely is great enough to warrant scrutiny and decision of Cabinet level.

1. Genuine and honest cost benefit analyses must be made before any mining projects begin in the Rocky Mountains. The total value of all resources of all kinds must be considered, and due care must be taken that the course of development followed is that which is of greatest value to the people of the Province. Mineral development should not automatically take precedence over other resource possibilities. Instead there must be a proper balance in which it is recognized that mineral development is compatible with other uses of the land.

2. A standardized technique of cost benefit analysis should be developed, and the use of it should be mandatory in setting priorities of land management. A Board of Review should be established with competent professionals in each field, and it should meet at regular intervals to ensure that the analyses are being conducted properly. Dishonest use of the analysis must be guarded against by the development of procedures that ensure accountability, including legislative review and public hearings.

3. In these analyses each resource involved should be evaluated by the agency concerned with that resource. For example, fishing would be appraised by government fisheries biologists. Renewable resources

such as soil, timber, wildlife, fish and water should be given a realistic value that incorporates their potential value to future generations.

4. It should be accepted that there are certain areas which companies regard as feasible to mine, but that must be withheld from mining because the loss of other resources is too great and reclamation too expensive. In this connection, it is important to note that the Deputy Minister of Mines is not aware of any mining permits that have ever been refused in the Foothills Belt (H. H. Somerville, personal communication).

5. It must be recognized that recreation is a valuable asset of the Foothills Belt and the furtherance of such recreation must become accepted as a legitimate aim of public policy.

6. It must be recognized that the recreational worth of the Rocky Mountains to the people of Alberta is a crop that can be harvested year after year. Moreover, the value placed on recreational land in the Foothills Belt should reflect the much higher values that will apply when the population of Alberta is more urbanized, more affluent, and has more leisure time. Mineral wealth may be great, but it can be harvested only once. If done unwisely, it can destroy the recreational possibilities for generations.

7. It should be recognized that the Rocky Mountains of Alberta are a critical part of the recreational hinterland, not only of the people of Alberta, but of a large number of people of the entire Great Plains. As such, they are an important earner of tourist dollars. In fact, the dollar value of the Foothills Belt for recreation alone could in the long run far exceed its dollar value for any other purpose.

8. It must be recognized that aesthetics are important and must be preserved. Our environment must not be allowed to deteriorate, no matter how small the area involved. A small piece of land made unsightly and scarred devalues all areas from which it can be viewed, and all streams to which its waters drain.

9. Existing procedures seem to operate with the misconception that renewable resources, particularly soil and vegetation, begin to regenerate as soon as the coal mining is completed. This is wrong ! Soil seems to be regarded as a renewable resource because it can be regenerated. However, it takes approximately 1,000 years to generate one inch of soil in the Foothills, so that for all practical purposes, it should be treated as a stock resource. Once the soil is gone from a strip mined mountain, it is essentially gone "forever.".

Similarly waste waters that issue from abandoned mine portals will continue to pollute our streams for many generations. So far as the lifespan of man is concerned, they must be considered as permanent blights on the environment unless corrective steps are taken. An immensely long time is also required for a stream to rid itself of silt and re-establish itself after its equilibrium has been upset.

10. It must be recognized that much of the water required by industry and agriculture on the Plains is stored in soil of the Foothills Belt and slowly released into streams. This water is a resource of great value to the Province, and its quality, quantity, and time of delivery are all affected adversely by mining.

11. The costs of good conservation practices during mining operations and reclamation afterwards must be accepted as a fair and legitimate cost of a mining operation.

12. It must be accepted that the appraisal of land to be mined as well as the judgment of its acceptability after reclamation must be done by competent professionals.

13. It must be accepted as the responsibility of government to ensure proper practice by setting specific and clear conservation and reclamation legislation that is consistently and uniformly enforced. The operators can not be expected to employ any conservation practices voluntarily. In fact, it is quite reasonable that the industry would actively discourage introduction of conservation regulations that might reduce the efficiency of its operations.

14. It should be recognized that much of the coal mining done so far in Alberta has done more damage than necessary, and that there is need of improvement. This is notwithstanding the fact that legislation and enforcement here are purported to be very good.

15. Lastly, and perhaps most important is the matter of jurisdiction of government agencies. Conservation practices can be effective only if they are established and enforced by the managers responsible for the renewable resources endangered. It is noteworthy that certain U.S. state legislatures have done precisely this, with beneficial results. The State of Kentucky found that conservation and reclamation were ineffective when in the hands of the Department of Mines. Governor Edward T. Breathitt was quoted as saying that "Putting the Department of Mines in charge of conservation and reclamation is like putting a fox in charge of the henhouse."

We do not feel that it is impossible for a government department to administer fairly two activities that rival each other, as mineral production and surface resource utilization do. In this case however, it IS impossible because the Department of Mines and Minerals has authority to affect the welfare of both activities, but it has the responsibility for protecting only one of them. That Department has allowed mineral production to seriously harm renewable resources for which it is never held responsible.

It is not surprising that this damage has occurred. The Department of Mines and Minerals does not employ fisheries and wildlife biologists, groundwater hydrologists, foresters, or geographers specializing in land utilization. It therefore does not have the technical capacity to understand the damage that it allows to be done. Moreover, the public does not expect that Department to provide good hunting and fishing, attractive campsites, or good hiking trails with attractive scenery. Neither is it expected to provide the regular flow of clean water needed by agriculture and industry on the Prairie. These are responsibilities of other departments, notably the Department of Lands and Forests, and the Department of Agriculture.

It must be recognized that the departments responsible for renewable resources must have authority for the establishment and enforcement of conservation regulations pertaining to the mines in Alberta.

SPECIFIC RECOMMENDATIONS

In addition to the above general policy suggestions, we make the following specific recommendations.

1. The first thing that is needed in Alberta is that the Govnment commission a thorough technical study by capable and experienced consultants, to determine exactly what kinds of conservation and reclamation practices should be employed under local conditions. It is clear that we are now operating here in an area of ignorance as far as good conservation and reclamation practices are concerned. This study probably should be done in collaboration with the B. C. Government, investigating the Foothills and the Rocky Mountains of both Provinces together because the problems are similar.

Experience of the U. S. A. could be used as a guide in the study, but the Appalachians are not the Rocky Mountains and a whole new set of specifications will probably have to be made. It is essential that this study be made soon because of the imminent increase in mining. It must then be made into law so that operators will know exactly what must be done and what reclamation will cost. The purpose of this study should be twofold. It will provide the operators with information on how conservation measures can be conducted. It will also provide the lawmakers with information as to what regulations are desirable and feasible.

It is imperative that this study be done as soon as possible. The group making the study should include the following specialists :

1. Geographer
2. Glacial Geomorphologist
3. Landscape Architect
4. Minerals Economist
5. Forester
6. Agricultural Scientist
7. Fisheries Biologist
8. Wildlife Biologist
9. Soils Engineer
10. Mining Engineer
11. Mining Geologist
12. Civil Engineer

2. There should be a single new statute controlling conservation and reclamation connected with all forms of mining, and it should apply to the entire Province of Alberta. Such a reduction in the number of Acts and Boards will make it considerably simpler for companies to deal with conservation problems.

3. The statute must outline specifically the precautionary and restorative measures to be taken during mining operations and the kind of restoration of lands that must be made after strip mining has been completed. The regulations must be specific so that a company can budget precisely for the reclamation which is required when it makes its initial study of the project proposed.

4. The Surface Reclamation Council should be abolished and a new Board should be created under the Department of Lands and Forests to establish and administer this statute. The Department of Mines and Minerals should have a minority representation on this Board.

5. A professional approach to strip mining should be taken when appointments are made to this Board. It should consist entirely of competent professionals employed by the Government. The Board should have in its employ men from all fields of reclamation, in order that they can provide expert advice to the companies. The number appointed to the Board should be small so that enforcement is consistent.

6. Mining operators should be required to post bonds in advance of mining that are sufficient to pay for conservation and reclamation requirements. These should be large enough that there is no doubt it will be to the advantage of the company to employ proper practices. If the company deems, it may forfeit the bond, which will be large enough to pay for the work to be done by a contractor.

7. Settling ponds must be established to ensure that undue silt and mine wastes do not enter streams from underground and surface operations. If the ponds first established are inadequate then more should be constructed until an acceptable degree of settling has been achieved.

8. Waste water from an underground mine must not be allowed to enter a natural stream unless first flowing far enough that it has reached an acceptable purity. To ensure this mine portals must be a sufficient distance from a stream, or else the waste water carried away a sufficient distance from the stream to be released.

9. There must be specifications of the kinds and numbers of roads that will be built into mining areas. It is imperative that roads built for mining projects on public lands follow a road system well designed to meet the needs of long-term management.

10. All areas of strip mining must be smoothed out and seeded and it must be ensured that the seed grows.

11. Certain requirements that are patterned directly after the Kentucky Legislation [1] are :

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[1] GRIM, E.C.; (1967) in Kentucky Engineer, Vol. XXX, No. 1, pp 10-47. Recommendations in Item 11 are after the Kentucky Statutes and are taken from this article.

(a) The size of cut and bench width must be limited, depending on the degree of slope of the mountain on which overburden will be placed. The calculations must be made scientifically, and the steeper the slope, the smaller amount of dirt that can be pushed down the hill. In Kentucky this bench width limitation reduced slightly the amount of coal recovered, but it also drastically reduced the number of landslides and proved dramatically to be a sound conservation measure.

(b) No fill bench may be created on slopes above the angle of repose (about 33 degrees). An operator desiring to operate on slopes above this steepness must haul the overburden removed to another area.

(c) The face of the coal must be covered by an appropriate thickness of clean dirt fill (in Kentucky it is 4 feet).

(d) The maximum slope of the highwall must be specified such that it will support vegetation (in Kentucky it is 45 degrees).

(e) No strip mining should be permitted close to a stream, road or public property (in Kentucky minimum distance is 100 feet).

(f) Grading must be done within a specified time interval after the coal is removed (in Kentucky it is 45 days).

(g) In area strip mining any land disturbed must be restored to its original contour, with all spoil ridges and highwalls eliminated, and no depressions left to accumulate water, unless a water impoundment is specifically approved by the regulating body.

(h) In area strip mining all acid materials must be buried under clean fill, drainage ditches constructed, and other erosion preventative measures taken as the situations warrant.

12. No additional permit should be granted to an operator who once fails to comply with the regulations to the extent of forfeiting his bond.

13. A citizens complaint provision should be inserted into the law to allow any citizen that has knowledge that the law is not being enforced to himself compel enforcement. In this connection, it should be recognized that a citizen as a part owner of public lands should report abuses of the Rocky Mountain Forest Reserve as he would abuses of his own property.

SUMMARY

The situation now facing Alberta is clear - great damage will result from coal mining unless new and improved legislation is drafted and effectively enforced. Amendments of present legislation are not enough; we need a fresh new approach.

It is time to decide in Alberta whether we will or will not learn from our own and others' mistakes. The coal operators will unquestionably be using all the know-how they can get from American surface mining operators for the extraction of coal. It is madness for us not to also import comparable technical and administrative know-how on control of the operations.

Let us be courageous in Alberta and enter into the new era of coal mining that other places have proven to be successful. This can be done only by passing a new and comprehensive act that is administered by the renewable resource managers. Let us not repeat the mistake made by the Province of British Columbia which has given final reading to new mining controls. The details of the legislation look good, but important basic weaknesses make it almost meaningless. Most notably :

(a) wide discretionary powers are given to the Minister of Mines, regardless of the party in office;

(b) there will be no specific division responsible for enforcing strip mining regulations, and these will be lumped with other responsibilities of mine inspectors;

(c) the question of what is satisfactory reclamation is too vague; and

(d) other resources that are affected by mining are not accommodated in the Act, and their representatives have no regulatory power. [1]

In short, the legislation accepted in British Columbia has learned nothing from the mistakes of others. This is despite the fact that many experienced people such as Elmore Grim, Director of Reclamation of the State of Kentucky, are anxious to provide advice.

It can happen in Alberta as it has elsewhere, and it can happen quickly. We quote the views of Harry Caudill, East Kentucky Lawyer and author of Night Comes to the Cumberland :

> "In return for the minerals that we have permitted to be taken out of this region we have a ruined land and a debased people. We have the problems and the American industrialists have the profits. I know that Canada will undergo precisely the same experience unless the Canadians profit, and profit quickly, from the experience of the people of Eastern Kentucky and West Virginia. The great American mining combines will strip off the land; over many thousands of acres they will mine quickly and with murderous efficiency, many millions of tons of coal which they will ship out at a profit. The Canadians will wind up with the holes in the ground and the problems. The Japanese consumers and the American miners will wind up with the profits. Precisely what has happened in East Kentucky."

Honourable Members, you have the opportunity and the power to guide a development that has consequences vital to this Province. Coal mining is very much on the increase and could cause tremendous damages.

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1 These four criticisms were made in an article by Howard Paish, entitled "Strip Mining - Need We Pay The Price of Experience," published in B.C. Outdoors, April, 1969.

The existing administrative set-up in Government clearly is unable to control it. A similar problem has been encountered elsewhere and has been successfully solved, most notably in Kentucky. It can be solved here as well, but it will require the willingness to learn from the mistakes of others, and the courage to implement legislation that may be unpopular in some quarters. We implore you to take a far sighted view of the problem and protect the resources that will be needed by future generations.

J. William Kerr

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