RECLAMATION AND INDUSTRY IN ALBERTA - TODAY AND TOMORROW (1960s)

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ABSTRACT

This paper provides the author's perspective on a series of questions posed by the symposium's Organizing Committee. The paper does not represent an endorsed industry wide collective response. Questions posed by the Organizing Committee and addressed by the author include: (1) How does industry work within current reclamation legislation, (2) what changes are needed to address future problems (e.g., industrial sites), (3) what should be the role of industry in developing reclamation regulations, (4) who should decide end land use (government, industry or public), (5) what is the role of the public in reclamation and what should it be, and (6) what are the costs and benefits of reclamation to industry? Comments also are presented on the topic of whether dams, highways, agricultural practices, etc. should fall under reclamation legislation.

INTRODUCTION

This paper presents the author's perspective on a series of questions posed by the symposium's Organizing Committee. The paper should not be construed to represent an endorsed industry wide collective response to the questions posed. There are many industries, among them are oil, gas, coal, oil sands and utility companies to name some. I can no more represent all of them than, for example, someone in one government department can speak for all other government departments.

Having stated the above, I will now present my perspective on the questions posed. This perspective has been obtained over the years by teaching forest soils and forest ecology, by working in reclamation in the oil sands north of Fort McMurray (for both government and industry), by working with wellsite and access line construction and reclamation, by working in the pipeline industry and dealing with its environmental impacts and also by working with coal mining and reclamation associated with it.

Hopefully, the following discussion provides some new thoughts or at least a new perspective for each reader, even though the presentation is somewhat general.

DEFINITION OF INDUSTRY

In discussing "industry" it is important to clarify what industry includes as there is a wide variety of industries in Alberta which are subject to reclamation legislation to one degree or another. Included are coal mining, oil and gas, oil sands mining, electricity generation and borrow pit material companies.

With regard to land disturbances, coal mines may have exploration roads, exploratory pits, campsites, drill holes, borrow pits, waste disposal, overburden dump areas and minesite areas to be reclaimed. Mines may be in forested mountainous areas such as Smokey River Coal at Grande Cache or they may be in agricultural areas such as near Forestburg.

Oil sands are either open pit surface mines, Syncrude Canada Ltd. and Suncor Inc. north of Fort McMurray, or they can be in situ such as those also near Fort McMurray, Cold Lake or Shell's operation near Peace River, Alberta. Many of the open pit types of disturbances are similar to coal mining except generally they are on much larger scale. In addition, they generally have a greater density of drillsites and drill holes and also a tailings pond and tailings sand. Both the sand and the pond have been the subject of much discussion and research over time in terms of their reclamation. With in situ exploitation of the oil sands, there is considerably less surface disturbance as the "oil" is extracted underground without a large surface pit.

With respect to the oil and gas industry, there are some significant differences from the open pit mining used for coal and oil sands extraction. There are many seismic lines cut through forested areas which, if the seismic results are promising, lead to drillsites. The drillsites (wellsites) require access roads and handling of drilling wastes and, for wells brought into production, a gathering system of pipelines and a pipeline to transport the oil/gas to the consumer. The pipeline being a linear development, creates a narrow strip of disturbance which may go for a short or long distance. There are also associated valve sites and possibly upgraders or refineries. These industrial sites can bring a myriad of difficult reclamation problems with them as they are retired. This has just recently been emphasized in an accident in soutneast Calgary.

Electricity generating stations and transmission lines have other disturbances attendant with them. This is particularly true with the transmission lines where there is a need to keep brush, especially trees, out from under the lines. Sometimes the companies involved are connected with coal mines as coal is used to provide the power to generate electricity.

The sand and gravel business is another which is governed by reclamation legislation. With this industry, a hole (depression) remains to be reclaimed after extraction of the resource.

HOW DOES INDUSTRY WORK WITHIN CURRENT RECLAMATION LEGISLATION?

Industry has responded to current reclamation legislation in a variety of ways depending upon the particular legislation, the company, the economic climate and the political climate.

More specificaly, in some cases industry has taken the approach of not contesting the legislation and what is required to be done, but has just gone ahead and done it. There have been a few bumps along the way in terms of agreeing about how to do it, but not about whether it needed to be done.

On the other end of the spectrum, there have been situations where a company has initially outright refused to do a particular activity. Generally, our system in Alberta is flexible enough to accommodate differences of opinion, provided there is a sound case and strong supporting evidence. At least there is room for discussion in the Alberta system, contrary to the situation in many of the U.S. states. In the U.S., the federal government became directly involved in reclamation with the passage, by the U.S. Congress, of the Surface Mining Control and Reclamation Act of 1977 (SMCRA) (Public Law 95-87 30 USC 1201 August 3, 1977) and the subsequent formation of the Office of Surface Mining (OSM). The states appear to have little to say about reclamation within their boundaries. Even though reclamation documents are sent to the state offices, most of the states are simply clearing houses for OSM and the real clout is with OSM.

The implementation of SMCRA has led to some interesting and difficult problems because it is a national legislation, and there is a wide geographic variation from east to west and north to south. It actually costs more to reclaim land for forestry in some of the eastern states than it does to reclaim it for agriculture even though it was initially forested hills. This is because the reclamation standards are set for agriculture and once it is reclaimed to those standards people farm it rather than put it to forest. The point is that even though the areas were initially steep and rocky with good tree growth the standards don't permit putting soil material back that is rocky and on a steep slope. Hopefully, we can avoid this problem in Alberta where forestry is often a desired end land use.

Alberta industry also works within current legislation by hiring personnel with the required expertise, either as consultants or as permanent employees. Many of these people have experience working within government and understand how the system works and how to work with the system to expedite their company's development applications as well as knowing what is required to be in those applications.

The companies also frequently make their personnel available to participate in joint government/industry committees which may be working on revamping various reclamation guidelines or developing and conducting joint research projects. In other cases, industry has committees which its

environmental employees participate in and fund projects in common industry interest areas. In still other cases companies fund their own, usually site specific research.

CHANGES NEEDED TO CURRENT LEGISLATION

Generally, there are few changes which I would suggest to existing reclamation legislation. Often the problem is not with the legislation, but with the interpretation by different individuals, government departments and/or industry personnel. As pointed out by Dr. Doug Mead of Shell Canada Ltd. at a meeting in April 1987 concerning regulations and guidelines for disposal of drilling wastes (Mead 1987), a major problem in this area has developed because of inconsistencies in approaches to what was or was not permitted in terms of disposal methods. These inconsistencies existed within and between government agencies. In an effort to resolve these and other problems, a joint government/industry committee is to be struck to attempt to resolve these difficulties.

Another problem in the past has been changing personnel in both industry and government with constant "re-training" required. With economic times as they currently are they may be a change in personnel due to job termination, but there is no "re-training" required as the positions are not being refilled. Also, I believe there is more awareness of what is needed to reclaim areas today than existed a few years ago so this makes for a more consistent approach as well.

A key point for minimizing the amount of change required is the retention of flexibility within the regulations. They need to be kept specific enough so they cover the needs of the system, but general enough so they cover the maximum number of situations to promote consistency.

There are a couple of areas, however, where I would suggest some changes be made for the 1990s. The first of these concerns regulated and unregulated pipelines. I submit that the regulations should be changed so all pipelines become regulated and the artificial boundary of having to be 150 mm in diameter (or greater) and 16 km in length (or longer) before it is regulated be eliminated. It seems to me that pipeline disturbance is pipeline disturbance, what length or diameter have to do with it is minimal. Certainly in the case of NOVA, we do essentially the same things whether it is a regulated or unregulated line except we don't submit a D&R Application. NOVA's goal is to minimize reclamation problems with the pipeline so generally the same things are done.

Another area where I would recommend change is the area of topsoil salvage. I believe this regulation should be changed to introduce more useful flexibility and practicality into the system. In a native rangeland situation on Solonetzic soil, there may only be a half inch of topsoil which is impractical to salvage, let alone be able to replace it. As an example, do we really want to salvage the Ae horizon of a Luvisol? I don't see the point as

by definition it is an eluviated or leached horizon and yet there certainly are government instructions at times to salvage it. Perhaps a change to state something to the effect that topsoil be salvaged where practical, necessary, and other suitable materials are not proven to be available. The wording surely could be developed to give the flexibility required. Clearly in the Green Area especially it is not always necessary to salvage topsoil. For those questionable areas, the expertise in Alberta Agriculture, the Alberta Research Council or Agriculture Canada could provide valuable input in resolving salvage requirements of guidelines.

The final change I propose is that disturbances such as dams, highways and agricultural activities begin to receive some of the same reclamation attention that the activities of industry do. There is little doubt that there are rules and there are rules. For example, in the construction of an irrigation ditch, is the topsoil kept separated from the spoil and/or placed back over the spoil of the ditch bank? No. Does a farmer installing tile drains with, for example, a Ditch Witch worry about separating the topsoil from subsoil and replacing in order? No, he just trenches through it and replaces the mixed material. How many times have you observed deep rutting in a farmer's field caused by the farmer? Has he been threatened to be shut down by Alberta Environment or Alberta Agriculture for causing mixing of the topsoil and subsoil? On the subject of weed transport, how many custom combining outfits are cleaned weed free before moving from farm to farm from Saskatchewan or the US? How many times have you driven by Alberta Transportation projects which are not reclaimed for several years? How many times have you observed soil erosion and movement downslope inevitably into watercourses. Some of these cases certainly end up causing siltation and sedimentation in the streams and perhaps reducing fish populations. I submit sediment is sediment to a fish whether it be caused by industry or government activity.

An excellent example of different rules could be observed last spring from my office windows. The city of Calgary was having the LRT bridge constructed across the Bow River over a period of weeks and the amount of disturbance in the river was clearly evident from the NOVA building by the brown cloud of sediment at the construction site and downstream from the site. This at the time when this section of the Bow River was closed to all fishing to facilitate rainbow trout spawning! I can guarantee industry would have been prohibited, with valid reasons, from doing any but emergency construction work on the Bow at this time. Does government created sediment in water cause less fish mortality than industry created sediment? I really don't think so!

The point is, it would be a whole lot easier for many of us industry environmental types to convince our bosses and their bosses of the need for conducting reclamation if they didn't have so many examples of non-industry situations where people are not making a similar reclamation effort to that expected of industry.

CHANGES NEEDED TO ADDRESS FUTURE PROBLEMS

This topic is very problematical, especially in a strongly resource extraction based economy such as in Alberta. If you detect some hesitancy to predict future problems you are correct and there is a reason for this hesitancy. When I started working for the Alberta Oil Sands Environmental Research Program (AOSERP) in 1976 there was a lot of enthusiasm and discussion about prospects for additional oil sands plants, a total of 10 plants by 1986 was projected to be a real possibility. The total in 1987 is two, Suncor Ltd. and Syncrude Canada Ltd., the same as in 1976. None are under development and Syncrude has been on-again off-again with their expansion program. I won't go into the number of major pipelines proposed to move oil or gas out of the Beaufort Sea down the McKenzie River Valley or elsewhere (and shelved).

With respect to reclamation, it is important to remember that it was less than 10 years ago, December 1977, that the Development and Reclamation Plan Guidelines for Surface Mining first came out. We have certainly had many discussions, some heated arguments, and reclamation has progressed considerably since then. Unfortunately, we still don't have long-term research or operational experience to provide answers to some reclamation problems. We don't know, from field experience, the long-term response of tree growth on mined soils, for example. I do believe, however, that the answers are out there to assist in making excellent predictions for current situations and time will be the test of those predictions. Generally, I am confident thae results will be satisfactory, however these are some of the challenges which face us in the 1990s.

The preceding comments illustrate the difficulty of anticipating the future. It was suggested that industrial sites was a good example of future problem. If it is, then the future is now. They are a current problem as the recent problems with soil contamination in southeastern Calgary have served to emphasize. There is little doubt that reclamation of industrial sites will become even more pressing in the future, this is especially true because these sites may have the potential to have a serious impact on humans.

I believe it is important to be alert for future potential problems and when something comes up, to assess the problem quickly and respond in an appropriate manner. Let's discuss residual herbicides (or soil sterilants as you may know them) for a moment. When these materials first became available, no one anticipated the problems attendant with use of them, especially the incorrect use of them. It appeared they were great, no more weeds for 3 to 5 years. There definitely is work going on today to determine how to reclaim those affected soils, with ongoing research in both industry and government as problems with these materials have surfaced.

Future, and current, questions exist about how to reclaim oil sands tailings ponds, industrial sites (with a wide variety of contaminants to deal with), drilling waste disposal, residual herbicides, and pipeline and minesite abandonment and reclamation.

I am confident that with the employment of the innovative, creative human mind and with current and future research efforts on the part of both government and industry that solutions will be found in the future as in the past. A very key link is continued communication and cooperation, with just enough regulation to ensure compliance, in order to maximize distribution of information and implementation of new techniques and minimize the number of problems.

ROLE OF INDUSTRY IN DEVELOPING RECLAMATION REGULATIONS

The participation of industry is vital to the acceptance and implementation of reclamation regulations. It assists in getting them adopted more rapidly because it helps ensure that some of the practical considerations have been taken into account. Otherwise, there is the danger of a proliferation of requirements which are impossible to fulfill. For an example, let's go back to forested northern Alberta where we may, in some cases, have only one-half inch of topsoil over an Ae or eluviated horizon. There is no practical way for a dozer operator to skim off that layer of material with all the tree and shrub roots in it so why even propose doing it? Industry has also had a role in that it can do its own research to confirm or refute regulations. Many things in the biological field are not black and white and reclamation requirements don't always make sense either as some of industry's research has shown.

Also, there is a real danger that if industry is not included that it will refuse to abide by the regulation. This means the regulatory agency will need to enforce the regulation which implies first that higher levels of decision makers will become involved from both government and industry and finally the potential for lengthy court battles exist. I don't think either party is especially enamored about going to court, although I suppose there is already a quasi-judicial system in place with the establishment of the Surface Rights Boards. Some examples of industry being included by government are the Reclamation Success Criteria Committee and several of the RRTAC research programs.

In concluding the discussion on this topic, there are several important benefits to industry being involved in developing reclamation requirements. They include:

1. industry has well qualified employees in various fields whose expertise and knowledge is useful;

2. industry personnel have a good appreciation for the operation of their company and the capabilities of equipment utilized by their company; and

3. if they participate in the development aspects there is more of a stake in trying to make sure "their" company implements the regulations they helped to develop.

WHO SHOULD DECIDE END LAND USE, GOVERNMENT, INDUSTRY OR THE PUBLIC?

I believe that all of the above parties should have a voice in determining what the end land use will be for areas disturbed or formed by a surface mine on crown land. I don't have a lot of change to suggest to the present system.

I would suggest that government has the responsibility to have land use plans available on a regional basis. The location of the deposits of natural resources are generally known for the province and plans can be made concerning potential developments. The potential end land uses are generally the obvious uses existing in an area plus perhaps one or two uses which the province might want to develop. As an example, the obvious end land uses in the oil sands north of Fort McMurray are forestry, wildlife and simply erosion control. Others which might be considered could perhaps be a recreational area for part of the area or perhaps agriculture in terms of range for buffalo. These end uses would be made known to industry and the public with the reclamtion standards by which each use would be judged to have been met or not met.

In the early planning stages, industry should examine the possible end land uses, determine if there are others they feel capable of achieving, and develop scenarios for the preferred end land uses and the other potential uses as well, keeping in mind the reclamation standards for each use.

At this point, the public should have input regarding what they would like to see as the end land use. They would have access to the regional information as well as the company's cost/benefit projections of various end land uses. This could perhaps be done at a public meeting or meetings. The opportunity would be available for comments and perhaps in an area such as Fort McMurray where accessible lakes are not overly abundant, the local public might prefer development of a usable lake or other recreational complex rather than having the area put back into growing more trees.

After this the company would need to resolve how it was going to respond to the outcome of the meeting and it would proceed with putting its plan together and submitting it to the government for formal approval.

ROLE OF THE PUBLIC IN RECLAMATION

I feel the public must be involved in reclamation or at least be given the opportunity to participate. The methodology to obtain their input has to vary according to the industry and at best it can be difficult. It is difficult to provide the information at a level most can understand and not feel intimidated nor feel their input doesn't matter. When there are local organizations there have been cases of effective participation by public groups. The situation of TransAlta Utilities and the Stony Plain Fish and Game Club is certainly one example of successful input into the reclamation planning process by the public. I expect there may be more forthcoming when more surface mine applications are submitted. Also, the public has a role as

government and industry watchdogs and if they see things they don't think are right, they can certainly make noise. Hopefully, they go first to the company or government department to give them a chance to rectify the situation or provide explanations.

ROLE OF GOVERNMENT IN RECLAMATION

Government has several roles in reclamation. There is the role of regulator or protector of the people's interest in their environment and their health. Government also has a role to play in reclamation research.

In the role of regulator, government is responsible for ensuring that industry does reclamation planning and plans ahead for the reclamation of disturbances associated with development. All too often, in the past, reclamation wasn't thought about until after the fact. This approach has changed considerably over the past 10 years. With advance planning appropriate quantities of the appropriate materials can be set aside for later use, etc. The bottom line is that with appropriate up-front planning, the cost of reclaiming disturbed areas can be minimized as well as built into the system. Also, industry should then be aware of where tne goalposts are and the rules of the game.

Government is responsible for checking periodically to ensure that reclamation is proceeding as planned and agreed upon. This should be done at least as various phases are completed, but during the phases also if at all possible. Phased bond release could be an integral part of this system as well. When a phase is completed, such as contouring and topsoil replacement, a percentage of the bond could be released to the company,

The government regulatory group is also responsible for establishing reclamation standards to be used to assess whether reclamation is successful or not. Some of this is underway and I think appropriately it also involves industry. Standards must, in the end, be attainable and realistic. These should also be able to be achieved in phases. Perhaps upon final contouring and topsoil replacement, soil chemical and physical characteristics could be used as the standards for determining partial bond release. If certain ranges are achieved part of the reclamation bond could be released.

The research role of the government contains two parts: (1) the funding of research; and (2) the conducting of research. Within Alberta, there has been both government funded only and joint government - industry funded research. This is something which I strongly support and a continued effort is necessary. If government sets the rules then government has the responsibility to research those regulatory initiatives that are questionable. Hopefully before implementation but surely soon after. Sometimes there is research of a general nature which government needs to do for its own information, while in other areas the results are generally useful to both industry and government and each gets the benefit of the others experience and point of view. Also, both parties then have an interest in using the result they paid for and it also maximizes the use of the research dollar.

Additionally, government has the responsibility to make use of its researchers and their results. This is in terms of conducting research, but also in developing standards, establishing regulations and resolving disputes. There is a group of experts in pertinent areas working in Alberta Agriculture, the universities, Alberta Research Council, Agriculture Canada, etc. It is important that this resource be utilized and boundaries between government departments be minimized. Alberta is not so large and heavily populated that there is an excess of expertise around and there is getting to be even less with job terminations in both government and industry. Therefore, we can't afford to be territorial or let personality conflicts stand in the way of getting the job done.

COSTS AND BENEFITS OF RECLAMATION TO INDUSTRY

The costs and benefits of reclamation to industry are difficult to put into terms of actual dollars or cents per ton of coal, per barrel of oil or cubic metre of gas. Costs are difficult to determine partially because companies like to keep costs confidential and out of the hands of their competitors. Companies also keep track of costs differently with some including everything from environmental staff costs to extra materials movement etc., while others only include costs for contouring, seeding, etc. I have not attempted to put dollar values together as a result.

In the final analysis, costs can be quite substantial in terms of dollars spent on reclamation operationally and on research. With respect to reclamation research, there is a wide range in the amount and time one company spends versus another company versus government spending. Companies spend money on projects which are solely for their purposes as well as money on joint projects with other companies and also with government. Perhaps Alberta Environment should establish an award for a "Reclamation Company of the Year"! This might stimulate competition between companies and encourage them to do good reclamation.

Some companies carry a large staff to do their operational reclamation and other environmental work, while others carry only one or two staff and do most of their work through consultants. In addition to these costs, there are the costs of conferences and other education to keep or bring staff up to speed in the reclamation area.

The benefits of reclamation are also difficult to assess except that without doing it the company wouldn't be operating. By doing a good job of reclamation, the company improves its chances of obtaining future timely approvals and builds credibility with the government regulatory personnel which is also important. Good reclamation is also good public relations. This extends to private land owners and company employees as well as the general public. Employees coming to work have a better sense of pride if they know their company is concerned about the environment. Unfortunately, for most of these benefits it is very difficult to put a dollar figure on them which can then be used in budget discussions with company management.

CONCLUDING REMARKS

In closing, I would suggest that we don't have the perfect system in Alberta for addressing the problems of reclamtion, but I am sure, based on past performance, that if we can continue the communication between industry and government, future reclamation problems will be solved. Our system is definitely the envy of a number of people involved in reclamation in the US where there is frequent involvement in litigation. Let's make a concerted effort to maintain the Alberta approach and work to improve it while remembering that the objective is to end up with acceptable reclamation.

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Mead, D.A. 1987. Alberta regulations and guidelines for the disposal of drilling wastes: An industry viewpoint. Second Annual Workshop, Pipeline and Wellsite Working Group, Soil Reclamation Subcommittee, Alberta Soils Advisory Committee; 1987 April 15. Edmonton, Alberta. 4 pp.

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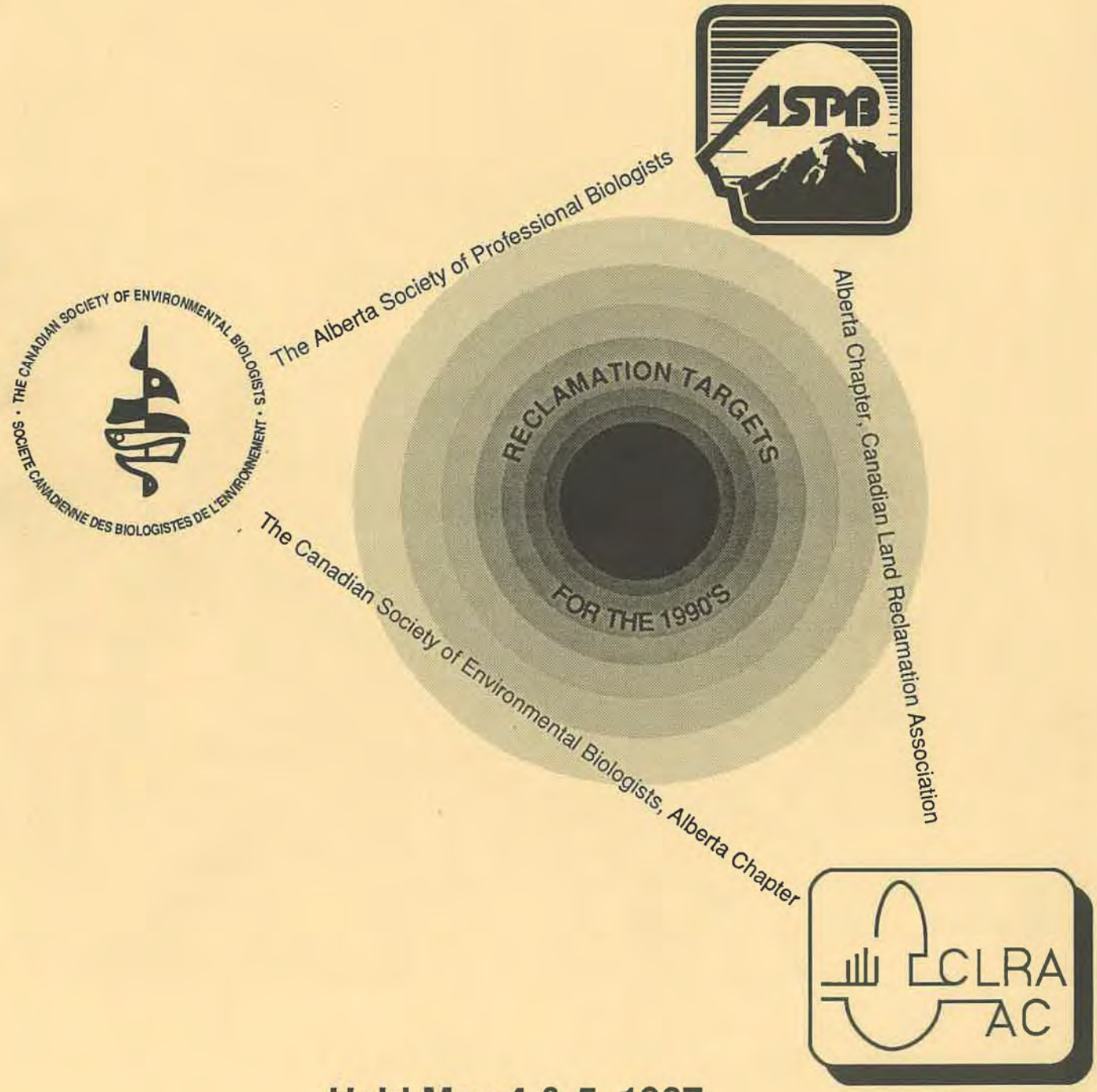

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- and -

to the Hon. Ken Kowalski, Minister of Environment, for delivering the opening address.

MESSAGE FROM THE ORGANIZING COMMITTEE

Reclamation practitioners and researchers have gone a long way to solving the problems posed by such disturbances as mining, drilling and pipeline construction. The future challenge for reclamation lies in applying our expertise in other areas such as industrial site decommissioning, habitat creation and restoration, and urban design.

The Symposium was designed to expose participants to a wide variety of "new" areas where reclamation science could be applied. These were the "targets" referred to in the Symposium title. The speakers did an excellent job in meeting this goal. Some of the participants felt the Symposium had not provided enough information on new methods to be employed in reclaiming these new disturbance types. While this was not the goal of the Symposium it remains a valid concern that should be addressed in a future symposium.

Finally, the Hon. Ken Kowalski, Minister of Environment, encouraged all participants to get out and preach the need for, and successes of, reclamation, and indeed all environmental programs. Telling ourselves in conferences how wonderful we are is preaching to the converted. We need to let those who benefit from our labours, that amorphous group known as the public, know what we have done for them. This, too, should be the topic of a future symposium.

The papers in this proceedings have been edited and retyped into a common format. The contents of the papers are essentially unchanged from the submitted manuscripts of the authors.

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