RECLAMATION ACTIVITIES OF THE ALBERTA FOREST SERVICE

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ABSTRACT

Reclamation activities of the Alberta Forest Service fall into three general areas. It is involved in the process of application, approval, and inspection of all operations relating to resource exploitation in the green zone, and in certification of reclamation completed by industry. It also undertakes reclamation and cleanup of disturbances in the green zone which by statute become the responsibility of the crown. The third role of the Alberta Forest Service is in the area of limited applied reclamation research which it undertakes in the oil sands area, and in the mountain and foothill areas.

INTRODUCTION

Alberta Forest Service reclamation activities date back several years to before the enactment of the provincial Land Surface Conservation and Reclamation Act of 1973. Several of the earlier operational reclamation projects were cleanups of sites resulting from small industrial activities on miscellaneous leases and permits in the green zone. The Reclamation Act of 1973, administered by the Department of the Environment, provides for stringent controls over industrial activities (other than timber harvesting, which is governed by a different act) which result in land disturbances, and provides for complete reclamation of lands so disturbed. There are several clauses in the earlier Public Lands Act relating to reclamation; these have become inoperative since the enactment of the Reclamation Act, which has become the province's major statute regulating land disturbances and their subsequent reclamation.

Several of those parts of the Reclamation Act which affect crown lands have been delegated to the Department of Energy and Natural Resources, which manages crown lands in the province. The Alberta Forest Service (AFS) therefore continues to play a major role in reclamation in the green zone. The role of the AFS is carried out within three general areas: application, approval, inspection, and certification of industrial activities; operational reclamation; and applied reclamation research. This paper will discuss very briefly the involvement of the AFS in each of these three general areas of activity.

Application, Approval, Inspection, and Certification of Industrial Activities

The basic objective of AFS activities in the area of application, approval, inspection, and certification is to ensure that for industrial operations in the green zone all parties follow mutually recognized standards for resource exploitation and carry out reclamation procedures which will enhance reclamation success. AFS activities in this area aim at ensuring that regulations stipulated in the Reclamation Act, and in any act administered by the AFS, are upheld and standards met. The AFS also enforces all basic provincial policies for resource exploitation activities, such as those stated in the Eastern Slopes Zoning Policy for Resource Development.

All industrial applications for activities which would result in land disturbances within the green zone are handled by the Forest Land Use of the AFS, working very closely with the Regional Forests and Ranger Districts. Where appropriate, the Reforestation and Reclamation or other appropriate branch of the AFS becomes involved. All applications for development and annual reports of existing industrial operations within the green zone are reviewed by the Reforestation and Reclamation.

The regulations enforced by the AFS relate to exploration, development and construction, operation, maintenance, and restoration following abandonment as these relate to any operation which causes a land disturbance in the green zone. Of these, the two areas of more intensive regulatory involvement are in exploration (such as geophysical exploration and search for sand, gravel, clay, marl, quartz mineral, and coal deposits) and in development and construction (such as the granting of licences of occupation for access roads, and surface leases for well sites, pipelines, transmission lines, and sand, gravel, clay, and marl quarries). Resource exploitation activities which come under the jurisdiction of the AFS in the green zone include developments such as pipelines, transmission lines, well sites, coal mines, oil sands operations, sand and gravel pits, and seismic and other exploration activities. For each of these activities, specific operating guidelines are provided by the AFS. Basic operational conditions for exploration and development, timber and debris disposal, erosion control, and reclamation after abandonment (among other things) are specifically outlined for each type of activity. Provisions are made, however, to accommodate site-specific problems. In evaluating an application, the AFS is authorized to request any necessary details from the applicant.

Inspections are carried out during all phases of an operation. Regular inspections are carried out by AFS field staff, usually the Reclamation Council Member for the appropriate Ranger District, during the operating life of a development. These inspections are made to ensure that the conditions of approval are being met and to provide the regulatory agencies the opportunity to discuss any operational problems the operator may be having. The final action is the last inspection leading to the issuance to the operator of a reclamation certificate relieving the operator of all responsibility for further restoration work or liability for past work, if no erosion hazard remains, the plant cover established appears to be self-sustaining, and no other serious problems are foreseen.

Operational Reclamation

Active operational reclamation has been an ongoing program of the AFS since before the enactment of the Reclamation Act. The program has been accelerated since the government made monies available for

reclamation and restoration from the Alberta Heritage Savings Trust Fund beginning six years ago. These monies have been applied in the green zone for reclamation projects if (a) the disturbances were the result of activities in resource exploitation, including forestry activities, (b) the disturbances pre-date the effective dates of specified clauses in the Reclamation Act and include land left or abandoned in an unreclaimed or inadequately reclaimed condition, and (c) there is no legal obligation for continuing reclamation responsibility by an operator, be it an individual, a small company, or a conglomerate.

Because of past and continuing intensive exploration and resource exploitation activities in the green zone, the AFS in 1977 expanded its activities to include a reclamation group to undertake the operational reclamation program, working very closely with its forestry field staff. One of the functions of this group is to document all existing disturbances and coordinate all operational reclamation in the green zone where no agency, company, or individual can be legally held responsible for reclamation under a provincial statute. The main responsibility of the AFS in this area is to reclaim disturbed forest lands for timber production, wildlife benefits, watershed benefits, range use, and recreational uses.

As mentioned earlier, work on the AFS operational reclamation program was accelerated when monies from the Heritage Savings Trust Fund were allocated for the overall reclamation program across the province. An initial inventory of existing disturbances in the green zone was compiled at the onset of this program. The AFS field staff, who are familiar with almost all corners of every Ranger District, provided most of the information used in compiling the inventory, which has been kept up to date by a continuing review of the information.

Project priority is usually at the discretion of the concerned Regional Forest Headquarters, as it is they who undertake the field operations. In selecting disturbances to be reclaimed, inaccessible sites with little or no environmental impact receive a lower priority in order that costs maybe kept at a reasonable level. Before a project is approved, provincial records of all authorized surface operations are checked to ensure that the crown has legally assumed responsibility for its reclamation. If a project is found to be the responsibility of another party, the regulations are enforced and reclamation is undertaken by that party.

Since the onset of the AFS reclamation program six years ago, several hundred sites of varying sizes have been cleaned up or reclaimed at a total cost of approximately two million dollars. The accompanying tables summarize the types of projects and costs to the present level of completion

Table 1. Completed Alberta Forest Service reclamation projects, 1976/77 to 1981/82 (linear disturbances).

Disturbance Type	Number of Projects	Distance (km)	Cost ($)	Cost per km ($)
Access roads and trails	77	578.8	691,707.72	1,195.07
Seismic lines and coal exploration trails	26	234.8	341,801.20	1,340.72
Totals		813.6	1,006,608.92	1,237.01 Av.

Table 2. Completed Alberta Forest Service reclamation projects, 1976/77 to 1981/82 (non-linear disturbances).

Project Type	Number of Projects	Area (ha)	Cost ($)	Cost per ha ($)
Industrial sites	229	293.9	657,498.85	2,871.17
Mine sites	4	6.2	54,617.05	8,809.20
Gravel and sand pits	27	65.0	79,794.80	1,227.61
Erosion control	5	10.8	13,282.59	1,229.87
Site cleanup	33	39.0	71,746.09	1,839.64
Air strips	2	12.0	3,613.10	301.09
Recreation/camp sites	2	1.0	7,375.66	7,375.66
Other*	3	7.4	14,786.45	1,998.17
Totals		435.3	902,714.59	2,073.78 Av.

* Includes abandoned structures and a military base.

Table 3. Completed Alberta Forest Service restoration projects, 1976/77 to 1981/82 (projects other than linear and non-linear).

Project Type	Number of Project	Cost ($)	Unit Cost ($)
Brazeau Reservoir*	1	244,203.49	244.20/ha/yr.
Bridge removals	4	5,360.13	1,340.03
River and creek crossings	4	3,264.15	816.04
Abandoned vehicles**	9	17,662.50	143.60/veh.
Other***	2	4,868.97	2,434.49
Totals		275,359.24	

* Two years completed (project to last three years); area worked is 500 ha per year.

** Several vehicles involved in each project.

*** Towers.

In this type of program, results must be evaluated by criteria other than the number of projects completed and costs incurred. The extent of the success in achieving the objectives of the AFS to reclaim areas to productive land is the only real measure of results. It is often claimed that improved aesthetics alone resulting from successful reclamation work make the benefits of any such operation invaluable.

In the short term, in most instances the aim is to minimize erosion and/or clean up a mess. In the majority of cases, the AFS can claim to have been very successful in meeting its short-term objectives. But reclamation is most often not a single-shot undertaking; given the types of environment worked, the AFS expects to carry out followup and maintenance work in many instances. The long-term benefits are obvious.

Applied Reclamation Research

The scope of the reclamation research carried out by the AFS reclamation group is limited. Because of the limitation of some resources, work has concentrated primarily on the revegetation aspects of reclamation. Full-fledged field trials were started in 1978 with the establishment of experiments at the abandoned coal mine at Cadomin. Prior to 1978, AFS field studies were more in the line of demonstrations; considerable useful information was gathered from them.

The basic overall objective of this applied reclamation research has been to determine the best practical methods for solving present and anticipated problems in the AFS operational reclamation program in the green zone. In certain instances, field studies are required to provide solutions. Any research problem the AFS is unable to address internally because of limitation of resources is referred to the interdepartmental Reclamation Research Technical Advisory Committee (RRTAC). This committee assesses the problem and may decide to contract out the research.

At present, AFS field trials are concentrated on coal mining in the mountains and foothills and to a limited extent in the oil sands area. The trials are designed primarily to provide initial vegetative ground cover; as the trials continue, however, there is a trend towards concentrating on the woody species which in most cases would be expected to represent the final vegetative cover on a reclaimed piece of land.

The trials in the mountains and foothills have utilized both native and introduced or cultivated species. Three experiments employing cultivated grasses and legumes are presently under way. One experiment is studying the adaptability of selected cultivated legumes and grasses to the high-elevation environment encountered on coal mine sites in the green zone, using both raw spoil and spoil topdressed with soil. A second experiment is studying erosion control methods on a steep mine spoil. A third experiment is studying seeding rates of a recommended seed mix, and fertilizer treatments, on mine spoil and mine spoil topdressed with soil.

Four sets of experiments employing native grasses follow essentially the same objectives and pattern as do the three experiments with cultivated species outlined above. One of the experiments with a native grass seed mix is studying different methods of establishing a plant cover on an unamended mine overburden. Two sets of experiments are studying different native grass seed mixes, fertilizer treatments, seeding rates, and companion crop treatments on raw overburden and topdressed overburden. The fourth set of experiments is studying the adaptability of fifteen native grass species to topdressed overburden and raw overburden at high altitudes.

Studies involving woody species in the mountains and foothills are now gaining some prominence. This is due to difficulties frequently encountered in trying to establish woody species under heavy competition from the ground cover initially established to provide immediate erosion control. There is an ongoing experiment in two locations on woody species. The primary purpose of this experiment is to determine the optimum seeding rate of a cultivated grass-legume seed mix to allow for a less difficult reforestation with local commercial tree species. The major project on woody species, however, encompasses the entire mountain and foothill area. It involves the selection of native woody species for reclamation. So far a survey of woody species invading old disturbances has been carried out and the number of species to be studied short-listed. Seed collections have been carried out over the past two years. Seeds of some of the species are presently being studied for their pre-treatment requirements for germination. The next step will be the raising of seedlings for actual field experiments. A similar woody species project is also under way for the oil sands area, with other agencies involved as co-investigators. Here, both exotic and native species are being studied.

In addition to its applied reclamation research, the AFS is also involved in the administration of reclamation research under the umbrella of an interdepartmental committee. The AFS does not foresee its direct involvement in reclamation research going beyond the present level. Other government agencies charged with the responsibility for reclamation research should handle further research needs.

Progress reports for most of the AFS experiments are available for free distribution.

#CLRA/AC 82-1
ISSN-0705-5927

PROCEEDINGS:

ALBERTA RECLAMATION CONFERENCE

Edmonton, 1982

CLRA
CANADIAN LAND RECLAMATION ASSOCIATION

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Last Spring the Provincial Government's Reclamation Research Technical Advisory Committee presented a two day Reclamation Research Seminar at the Chateau Lacombe. We were surprised by the large turnout and an overwhelming majority of those in attendance indicated the desirability of an Annual Reclamation Conference for Alberta which would focus on Policy and Practice as well as Research and which would include industry, academic and government participation.

These were very sensible suggestions though their implementation would exceed the mandate and manpower of the Reclamation Research Technical Advisory Committee. So various groups were contacted to sponsor and help organize the Conference. Positive responses where received from the Canada Land Reclamation Association (CLRA) The Alberta Government's Land Conservation and Reclamation Council, The Coal Association of Canada and The Oil Sands Environmental Study Group (OSESG).

The CLRA authorized formation of an Alberta Chapter to serve as the umbrella organization with a Program Committee consisting of representatives of the Government and the two Industry groups. Through this Conference and perhaps other functions the Alberta Chapter of the CLRA can fulfill two important roles:

1. To provide an opportunity for members of the Reclamation community to meet, exchange experiences or argue and otherwise improve communications among its industry, government and academic factions.

2. To provide a public forum for reclamation activities, capabilities, issues and challenges.

This was the first function of its kind in Alberta. Special thanks are due the Sponsors, Speakers and the other Members of the organizing Committee: Jennifer Hansen, Malcolm Ross and Al Fedkenheuer. Their talents and efforts made the Conference a success.

One final word on the Speakers: they were given very short notice of the Conference and not only responded enthusiastically but prepared presentations which were of remarkable quality and consistency. We are fortunate to have individuals of this caliber working in the Field of Reclamation in Alberta.

This Publication may be cited as:

Ziemkiewicz, P.F. 1982 Proceedings: 1982 Alberta Reclamation Conference, April 1982, Edmonton, Alberta Canadian Land Reclamation Association/Alberta Ch. Pub. 82-1