THE RECLAMATION ACTIVITIES OF ALBERTA ENVIRONMENT

By

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ABSTRACT

Ineffective surface reclamation legislation for many years left thousands of hectares of Alberta landscape scarred and abandoned after being disturbed by man's activities.

In an effort to reclaim some of these disturbed areas, a Land Reclamation Program was established in 1973 by the Alberta government with a budget of $600,000.

Administered by the Reclamation Branch of Alberta Environment's Land Reclamation Division, the program has since developed into a $5-million per year operation. This consists of a $3.5 million annual operational reclamation program actually reclaiming derelict lands and a $1.5 million annual reclamation research fund to find ways for improving and/or developing all aspects of land reclamation.

To date, the program has returned to productive use more than 1,200 individual parcels of land in the province. Without the program, these areas would have remained dangerous, weed-infested, useless sections of land.

INTRODUCTION

In Alberta, before effective surface reclamation legislation, (The Land Surface Conservation and Reclamation Act in 1973) many acres of lands throughout the Province were disturbed as a result of mineral and aggregate mining, oil and gas exploration and extraction, waste disposal, and the construction of required communications, transmission and transportation facilities and processing sites. These activities have resulted in some lands becoming derelict and devoid of productive vegetation, leading to wind and water erosion which cause further nonproductive processes to degrade the land, water, vegetative and animal resources. In addition some lands have deteriorated to become noxious weed seed plantations, human safety hazards, and scars on Alberta's scenic landscape.

The above factors led to the establishment of the present land reclamation program which is administered by the Reclamation Branch of the Department of the Environment.

The primary objective of the program is to fund reclamation projects and restore those lands for which no responsible operator can be ascertained in order that the land can be returned to a biophysically productive state.

Secondary objectives of the program are:

(a) The creation of a progressive land management attitude among industrial land users in particular and Albertans in general which can be passed on to future generations.

(b) The aesthetic improvement of Alberta's landscape.

(c) The employment of Albertans.

THE LAND RECLAMATION PROGRAM

The Alberta Land Reclamation Program was born in late 1973 as a result of a request by the Department of Advanced Education to the Department of the Environment for suitable sites to train heavy equipment operators. As a result of this request, the two departments worked together to organize a program for reclaiming two abandoned sites in the province.

The Department of the Environment purchased two abandoned coal strip mines. The first was a 48 acre site at Three Hills in central Alberta. This site was mined from 1909 to 1954 and then abandoned. The second was the Bow City site, mined from 1910 to 1944, it consisted of 270 acres of mine spoil and water bodies.

The reclamation of these two sites along with 5 small garbage dumps were the total program for 1974 and cost $305,000. for the land levelling.

In the second year of the program, an invitation to municipalities, towns and villages was sent out asking them for proposals for the reclamation of public lands, particularly abandoned gravel, sand, coal and land-fill pits and erosion problems. Special consideration was given to sites which would be restored to a "higher use", eg. parks, crop land, urban use, wildlife habitat, etc.

Reclamation projects that met the criteria of the Department were funded by contracting the work to the Applicant (Local Authority).

The criteria which had to be met in order to enter into a contract were:

1. Funds were to be used in reclaiming public lands (crown, municipal, or tax recovery land owned by the Department of Municipal Affairs).

2. Where possible, work was to be done by a local private contractor.

3. A maximum of $35,000. was to be paid to each municipality to ensure that benefits accrued to all parts of the Province.

4. Reclamation of private lands would require a transfer of ownership to the crown or municipality.

5. The priorities for funding were sites which would demonstrate before and after effects of mans activities and would be in the public interest and useful for education purposes.

Other government departments with jurisdiction over crown lands were included in the program: the Forestry Division of the Department of Energy and Natural Resources, whose list of projects includes abandoned access roads and seismic lines, landfill and sawmill sites, mine sites, communication sites, and stream bank crossings; the Lands Division of the Department of Energy and Natural Resources whose reclamation projects dealt with abandoned gravel pits and litter problems on crown lands; the Department of Transportation with abandoned roadways and gravel pits and, finally, the Provincial Parks Department whose sites are primarily abandoned roadways and eroded areas within provincial parks.

By the end of 1975, some 126 projects had been started which reclaimed approximately 1000 acres of land for agricultural, recreational and wildlife use at an investment of $761,636.00. The tables at the end of this paper summarize the types and costs of the projects for the years 1975-82.

Some problems were encountered with the contracts type of arrangement: (1) there was no continuity of reclamation among municipalities; (2) municipalities put a low priority on reclaiming these lands which meant a carry over of projects to the following year. This in turn upset budget estimates and spending; (3) monies were also misused, although not extensively enough to warrant a change in procedure.

The procedure for municipal projects was changed for the year 1977 to eliminate contracts completely. Instead, municipalities were asked to submit applications to the Reclamation Branch along with agreements allowing the branch the

right of entry to do reclamation work. They were also required to submit proof of land ownership in the form of a copy of the land title. This method of administration proved very effective as it left all phases of reclamation work from the planning stage through to completion totally in the hands of the Reclamation Branch. The Reclamation Branch with the aid of Reclamation Officers took over all facets of Reclamation of derelict lands in the white zone.

The Land Reclamation Program as it exists today consists of four stages of development from start to finish.

The first stage is application-screening. At this stage applications for reclamation projects are received from municipalities and other government departments, reviewed by the relamation engineers and accepted or rejected on the basis of information supplied by the applicant.

In the second stage the municipal project sites which meet the criteria for reclamation projects are inspected by the Reclamation Engineer and Reclamation Technologist. At this stage a reclamation plan is drawn up, a work method instituted, equipment selection made and a cost estimate done.

The Reclamation Technologist takes over the third stage, which is the actual physical work, and is responsible for hiring a contractor with suitable equipment and supervising the day to day operations. After the earthwork is completed, the seeding and fertilizing of the site is done in one of two ways depending on site conditions: (1) by conventional farming methods where farm machinery can be used, or (2) hydroseeding on areas that may be inaccessible to conventional equipment or that may pose soils problems from the standpoint of vegetation growth.

The fourth and final stage is the follow-up inspection done a year later. The site is evaluated as to the success of reclamation and additional work which may be required to bring the site up to a standard satisfactory to the department, is requisitioned. After this has been done, responsibility for maintenance passes to the municipality.

To give you more insight into the reclamation of abandoned lands in the Province, I will outline the procedures used to reclaim (1) abandoned garbage dumps, (2) abandoned sewage lagoons and (3) abandoned mines and mine hazards. These constitute the majority of the projects which are handled directly by the Reclamation Branch.

Abandoned garbage dumps are usually the most difficult and on a per acre basis, the most expensive projects to reclaim. As garbage was dumped at random on the site it is almost impossible to conduct the work in an organized progressive manner. The

loose surface garbage is usually piled up to one end of the dump site and then a trench or several trenches are excavated in order to provide a burial site for the piled up garbage. The garbage is dozed into the trenches, compacted with the dozer and covered with a minimum of two feet of clean fill which was obtained from the excavation of trenches. The entire area is then contoured to provide proper drainage and trimmed up. Any garbage remaining on the surface is hand picked and disposed. The site is then cultivated, seeded and fertilized.

Sewage lagoons are first drained of effluent during spring run-off and allowed to dry as much as possible before the start of reclamation. Different approaches are used, depending on the size of lagoon and the amount of sludge present. On larger lagoons with anerobic cells which are full of sludge a method is used whereby the area around the anerobic cell is levelled off. The berms of the anerobic cells are then dozed into the cells-in effect squeezing the sludge over the adjacent areas which were previously levelled. The sludge is then spread out over as large an area as possible and allowed to dry. The lagoon site is then trimmed up to provide proper drainage and cultivated to work the sludge into the soil. Last but not least it is seeded.

Reclamation of abandoned coal mines are projects which do not offer much in the way of selection or planning for the Reclamation Branch. The mines during their years of operation were not required to preplan, selectively strip and stockpile topsoil and subsoils, or recontour the spoil piles upon completion of mining. The most that can be done with this situation is to level the piles and establish proper drainage patterns in order to bring the land back to productive use. Our success at reclamation (revegetation) of mines of this nature has ranged from excellent for spoil piles with minimal or no soil limitations on plant growth to mediocre on mine sites with spoil piles that have severe limiting factors on plant growth.

OTHER TYPES OF PROJECTS

To date the Land Reclamation Program, including the sites reclaimed by other government departments, has reclaimed more than 1,200 individual sites ranging in size from 1/2 acre garbage dumps to abandoned strip mines up to 400 acres in size. The total investment to date of both operational reclamation and reclamation research is in excess of $14,000,000. This program has put derelict land back into productive use such as agricultural land for crop production, much needed park land, residential subdivision development, and wildlife refuge. The success and popularity of the program with the municipalities in the Province has assured the continuation of the program for at least the next 3 years.

NUMBER OF RECLAMATION PROJECTS
AND APPROXIMATE COSTS - 1975

Nature of Industrial Uses	Municipal Purchased		Public		Green Area		Total	
Access Roads	(1)	7,090.45	(1)	10,990.00	(13)	10,000.00	(15)	28,080.45
Landfill and Mill Sites	(7)	19,984.90	(12)	8,130.00	(10)	8,000.00	(29)	36,114.90
Mine Sites	(5)	425,611.33			(1)	11,000.00	(6)	436,611.33
Communication Sites					(4)	20,000.00	(4)	20,000.00
Sand & Gravel Sites	(5)	77,867.98	(6)	81,255.97	(34)	20,000.00	(45)	179,123.95
Seismic Lines					(12)	8,000.00	(12)	8,000.00
Streambank Crossings					(9)	5,000.00	(9)	5,000.00
Oil Sands Sites	(1)	45,670.86					(1)	45,670.86
Mineral Surface Leases			(1)	35.00	(4)	3,000.00	(5)	3,035.00
Total	(19)	576,225.52	(20)	100,410.97	(87)	85,000.00	(126)	761,636.49

RECLAMATION PROJECTS AND APPROXIMATE COSTS - 1976

Nature of Industrial Uses	Municipal Purchased		Public		Green Area		Total	
Access Roads			(1)	125.00	(7)	34,328.23	(8)	34,453.23
Landfill Sites	(7)	15,354.48			(2)	3,627.58	(9)	18,982.06
Mine Sites	(7)	447647.89			(1)	83,055.24	(8)	530,703.13
Sand & Gravel Sites	(7)	12,789.10	(17)	10,518.20	(3)	22,000.00	(27)	45,307.30
Seismic Lines			(1)	3,400.00	(4)	28,000.00	(5)	31,400.00
Streambank Crossings					(1)	1,066.98	(1)	1,066.98
Surface Leases			(2)	2,875.00			(2)	2,875.00
Erosion Sites			(2)	3,098.00			(2)	3,098.00
Abandoned Airstripes					(1)	1,953.74	(1)	1,953.74
Total	(21)	475,791.47	(23)	20,016.20	(19)	174,031.77	(63)	669,839.44

RECLAMATION PROJECTS AND APPROXIMATE EXPENDITURES - 1977

Nature of Industrial Uses	Municipal		Public		Green Area		Total	
Access Roads			(3)	37,693.00	(7)	171,955.54	(10)	209,648.54
Sewage Lagoons	(9)	110,062.71					(9)	110,062.71
Garbage Pits	(14)	112,170.02	(2)	6,444.37	(1)	5,507.11	(17)	124,121.50
	(9)	24,298.47*			(1)	3,417.00*	(10)	27,715.47*
Mine Hazards	(42)	461,725.06	(1)	1,065.00			(43)	462,790.06
Sites			(1)	60,955.50*			(1)	60,955.50*
Sand & Gravel Sites	(2)	3,279.10	(45)	478,903.50*	(11)	20,358.62	(58)	502,541.22
Seismic Lines			(1)	400.00			(1)	400.00
Abandoned Airstrip			(1)	2,312.80			(1)	2,312.80
Total	(76)	711,535.36	(54)	587,774.17	(20)	201,238.27	(150)	1,500,547.80

RECLAMATION PROJECTS AND UNAUDITED EXPENDITURES FOR 1978

Nature of Industrial Uses	Municipal		Public		Green Area		Total	
Access Roads			(3)	26,312.77	(16)	84,894.90		111,207.67
					(2)	3,023.35*		3,023.35*
Sewage Lagoon	(28)	473,310.31						473,310.31
Garbage Pits	(29)	202,678.71	(4)	16,025.18	(10)	5,461.05		224,164.94
					(9)	9,192.01*		9,192.01*
Mine Hazards Sites	(22)	194,942.75						194,942.75
Sand & Gravel Sites	(9)	151,081.73	(8)	52,374.87	(5)	11,473.97		214,930.57
Seismic Lines			(1)	4,000.00	(4)	27,069.59		31,069.59
Water Storage Sites	(2)	8,575.30						8,575.30
Borrow Pit Sites	(2)	4,949.50						4,949.50
Abandoned Recreation Site	(1)	3,590.04						3,590.04
Erosion Control Projects			(1)	5,317.00*	(1)	7,109.68*		12,426.68*
Industrial Sites			(3)	1,952.40	(85)	141,030.69		142,983.09
Coal Exploration Trails					(3)	66,905.51		66,905.51
Well Sites					(5)	19,038.62		19,038.62
Tower Site					(1)	755.47		755.47
Reclamation Research								730,071.03
Total	(93)	1,039,128.34	(20)	105,982.22	(140)	375,954.84	(253)	2,251,136.43

* Not Alberta Heritage Savings Trust Fund

RECLAMATION PROJECTS AND APPROXIMATE EXPENDITURES - 1979

Nature of Industrial Use	Municipal		Public		Green Area		Total	
Access Roads	(6)	154,149.69			(14)	50,094.83	(20)	204,244.52
Sewage Lagoons	(23)	354,927.35					(23)	354,927.35
Garbage Pits	(28)	268,429.38			(12)	11,380.18	(40)	279,809.56
Mine Hazards Sites	(20)	136,084.48					(20)	136,084.48
Sand & Gravel Sites	(5)	74,492.77			(4)	5,015.47	(9)	79,508.24
Seismic Lines					(7)	28,788.92	(7)	28,788.92
Water Reservoirs	(3)	29,526.73	(1)	4,330.00			(4)	33,856.73
Industrial Sites					(197)	362,210.25	(197)	362,210.25
Dams	(1)	2,417.03					(1)	2,417.03
Refinery Site	(1)	30,986.47					(1)	30,986.47
Abandoned Bridges					(3)	2,176.08	(3)	2,176.08
Coal Mines	(1)	50,597.00	(1)	20,475.00			(2)	71,072.00
Total	(88)	1,101,610.90	(2)	24,805.00	(237)	459,665.73	(327)	1,586,081.63

RECLAMATION PROJECTS AND APPROXIMATE EXPENDITURES - 1980 - 81

Nature of Industrial Use	Municipal		Public		Green Area		Total	
Access Roads and Abandoned	(2)	25,058.47			(12)	117,385.10	(14)	142,443.57
Sewage Lagoons	(16)	313,260.38					(16)	313,260.38
Garbage Pits	(26)	323,470.01			(4)	8,335.00	(30)	331,805.01
Mine Hazards	(6)	15,358.06					(6)	15,358.06
Gravel Pits	(11)	137,310.50	(2)	4,700.00	(2)	5,383.02	(15)	147,393.52
Seismic Lines					(10)	59,619.95	(10)	59,519.95
Water Reservoirs	(3)	224,997.69			(1)	145,010.05	(4)	370,007.74
Industrial Sites	(1)	1,378.39	(1)	4,500.00	(25)	125,759.31	(27)	131,637.70
Mine Sites	(6)	538,378.48					(6)	538,378.48
Total	(71)	1,579,211.98	(3)	9,200.00	(54)	461,492.43	(128)	2,049,904.41

RECLAMATION PROJECTS AND APPROXIMATE EXPENDITURES - 1981 - 82

Nature of Industrial Use	Municipal		Public		Green Area		Total	
Access Roads					(15)	273,475.00	(15)	273,475.00
Sewage Lagoons	(22)	515,220.25					(22)	515,220.25
Garbage Dumps	(24)	251,817.25			(1)	324.00	(25)	252,141.25
Mine Hazards	(5)	3,631.15					(5)	3,631.15
Sand & Gravel	(6)	264,127.00	(5)	15,200.00	(2)	7,980.00	(13)	287,307.00
Seismic Lines					(7)	69,413.00	(7)	69,413.00
Water Reservoirs	(3)	9,540.78					(3)	9,540.78
Industrial Sites	(6)	50,017.96			(31)	90,215.00	(37)	140,232.96
Dams								
Refineries	(2)	36,373.30					(2)	36,373.30
Abandoned Bridges	(6)	200,000.00					(6)	200,000.00
Coal Mines	(9)	343,369.57					(9)	343,369.57
Total	(83)	1,674,097.26	(5)	15,200.00	(56)	441,677.00	(144)	2,130,704.26

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CLRA
CANADIAN LAND RECLAMATION ASSOCIATION

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INTRODUCTION

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.

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