

RECLAMATION OF GRAVEL PITS - PROVINCE OF ALBERTA

N.J. HERTZ

PAST PRESIDENT, ALBERTA SAND AND GRAVEL PRODUCERS ASSOCIATION

In the province of Alberta the Department of Environment is responsible for the development and reclamation of gravel pits under the Land Surface Conservation and Reclamation Act of 1973 and the Land Conservation Regulations as filed Alberta Regulation 125-75. There have been various amendments to the Act but generally the intent is the same.

Under the Act, the regulations are specific but still allow the applicant to detail the contents of an application. It is the responsibility of the applicant to design the method of extraction as well as provide for reclamation that will, in the eyes of the Department of Environment, return the land to its best use.

The sand and gravel industry, prior to the introduction of reclamation standards and policies, certainly did not have a very good public image in the province of Alberta. One only needs to travel in the province to see the many scars that were left prior to the enactment of legislation. The unreclaimed pits are still a serious problem which has to be faced by the Municipal Districts, Counties, and/or the Provincial Government. Many of the operators who were responsible for the untidy operations are no longer in business and therefore the pits remain looking like a bombed-out area.

It is interesting to note that the sand and gravel industry in the province formed a closely knit association and approached the provincial government with a view of having some type of standard introduced in order to upgrade the public image of the sand and gravel industry.

At that time, the Department of Environment responded and drafted regulations which were reviewed both by government and industry members and eventually were accepted by the government and which still form the basic concepts in the reclamation regulations.

In the last decade we have had increasing concerns regarding the land use after the conclusion of the actual sand and gravel operations.

Alberta Environment defines reclamation as including all desirable and practical methods for:

- a) designing and conducting a surface disturbance in a manner that minimizes the effect of the disturbance and enhances the reclamation potential of the disturbed land;
- b) handling surficial material in a manner that ensures a root zone that is conducive to the support of plant growth required for future uses;
- c) contouring the surface to minimize hazardous conditions to ensure stability and to protect the surface against wind and water erosion; and
- d) that allowed the loss and re-establishment of the ground water aquifers is a major consideration in reclamation technology, present knowledge does not permit specific guidelines other than stating the objective of replenishing the ground water source for beneficial use.

Having said all that, it still leaves us with the problem of having to come up with a plan and a method of operation that will enable us to get the best land use both during and after the sand and gravel operations are complete. In most counties and municipal districts, a sand and gravel operation now requires a development permit. One of the conditions of this development permit normally is that the Department of Environment approve the plan of operation which includes reclamation.

The applicant or the sand and gravel operator is responsible to draw up a set of plans which outline the method of operation, the sequence in which he will operate his deposit, and the contour to which the property will be reclaimed. There are certain criteria in the regulations which control this type of operation and some of them are:

- a) topsoil or blackdirt as it's referred to, is removed and stockpiled separately. We have in some instances just spread it over an area that is being cropped. We just increase the depth of black dirt and in this way, it is simple to control weeds.

- b) The next layer, the root zone, which could be anywhere from 12" to 3', is removed and stockpiled separately, and then the clay or whatever sand overburden which overlays the gravel deposit is removed and stockpiled which then exposes the pitrun gravel. Pitrun gravel meaning the gravel in its raw state in the deposit.

The operations of the sand and gravel pit differ immensely in certain parts of the province. In some areas where the overburden, the topsoil and root layer might only be 6", and then you're into the gravel deposit. In other areas of the province, we strip as high as 35 to 40' of overburden to reach the gravel deposit. This, of course, presents a much more serious problem, both in operations and reclamation. In most rural areas, gravel pits are reclaimed to where the land use will be agricultural. However, we now have many gravel pits inside City limits and very close to urban areas and these present various alternatives to the pit owner.

One of the major uses of worked out gravel pits in urban areas has been a sanitary landfill and in Edmonton, in particular, we have the City of Edmonton active sanitary landfill on the site of worked out gravel pits.

There are many end land uses for worked out sand and gravel pits. In most cases, particularly in rural areas, the site will be reclaimed to agricultural use. The final land use will revert back to the use prior to the aggregate removal operation.

In urban areas such as the City of Edmonton, which is one I'm most familiar with, there are other land uses.

With proper planning, a gravel pit can have multiple uses. With the correct zoning, the land can have three economical uses:

- 1) as a sand and gravel operation;
- 2) as a sanitary land fill; and
- 3) as a park/recreation facility.

The City of Edmonton uses approximately 20-25 acres of land per year for sanitary land fills. This doesn't sound like a lot of land in one year but taken over a twenty year period, we're looking at 400 acres. This area represents more than one depleted gravel pit.

Some of the same cost savings are common to all land uses. Transportation short haul for the gravel operation makes the operation more competitive, similarly, the short haul for waste cuts down the cost to the city. And finally, a park close to the city allows more use of the facilities.

In smaller centres where there is not as large a land requirement for sanitary land fills, the depleted gravel pit can be reclaimed direct to a park. We should also not overlook the fact that depleted gravel pits in urban areas are developed into residential or industrial subdivisions.

The single most important item when planning to open a gravel pit is what will the land use be when the pit is depleted.



**NINTH ANNUAL MEETING
CANADIAN LAND
RECLAMATION ASSOCIATION**

**RECLAMATION IN MOUNTAINS,
FOOTHILLS AND PLAINS:
DOING IT RIGHT!**

**AUGUST 21-24, 1984
Calgary, Alberta, Canada**

CANADIAN LAND RECLAMATION ASSOCIATION

NINTH ANNUAL MEETING

RECLAMATION IN MOUNTAINS, FOOTHILLS AND PLAINS

DOING IT RIGHT!

AUGUST 21 - 24, 1984

CONVENTION CENTRE

CALGARY, ALBERTA

A C K N O W L E D G E M E N T S

These proceedings are the result of dedication and commitment of many people including members of the Canadian Land Reclamation Association, technical contributors within and outside Canada, industrial organizations and government bodies. The contribution of all these groups to the Ninth Annual Meeting is gratefully acknowledged.

In particular, we would like to recognize the financial assistance provided by:

Alberta Environment
Alberta Oil Sands Industry Environmental Association
Alberta Public Affairs Bureau
R. Angus Alberta Limited
BP Canada Inc.
Burnco Rock Products Ltd.
Canadian Land Reclamation Association, Alberta Chapter
Prairie Seeds Ltd.
Westmin Resources Limited

and the support of the meeting by Management and Staff of the following groups:

Alberta Energy Resources Conservation Board
Alberta Sand & Gravel Producers Association
Coal Association of Canada
Canadian Petroleum Association
XV Winter Olympic Organizing Committee
Gregg River Resources Limited
Gulf Canada Limited
Parks Canada
Reid, Crowther and Partners Limited
Bank of Montreal

The Organizing Committee for the Ninth Annual Meeting was:

Chairman	Jennifer Hansen, J. Hansen Consulting
Functions	Lynda Watson, Techman International Limited
Technical Sessions	P.D. Lulman, TransAlta Utilities Corporation
Registration	A.J. Kennedy, Esso Resources Canada Limited
Public Relations	M.K. Ross, Crows Nest Resources Limited
Field Tours	Karen Natsukoshi, Manalta Coal Limited Julia Fulford, Fording Coal Limited
Commercial Displays	L.A. Panek, Montreal Engineering Company Ltd.
Audio Visual	A. Schori, Monenco Consultants
Alternate Programs	Holly Quan, TransAlta Utilities Corporation

Citation

The citation of this document in all references is:

1984 Canadian Land Reclamation Association
Ninth Annual Meeting, Calgary, Alberta, August 21st - 24th

CANADIAN LAND RECLAMATION ASSOCIATION
PROCEEDINGS OF THE NINTH ANNUAL MEETING

TABLE OF CONTENTS

Wednesday, August 22

1. Wildland Reclamation and Reforestation of Two Coal Strip Mines in Central Alberta
(J.C. BATEMAN, H.J. QUAN)
2. Successful Introduction of Vegetation on Dredge Spoil
(K.W. DANCE, A.P. SANDILANDS)
3. Planning and Designing for Reclaimed Landscapes at Seton Lake, B.C.
(L. DIAMOND)
4. Reclamation of Urad Molybdenum Mine, Empire, Colorado
(L.F. BROWN, C.L. JACKSON)
5. Effects of Replaced Surface Soil Depth on Reclamation Success at the Judy Creek Test Mine
(A. KENNEDY)
6. Preparation of Mine Spoil for Tree Colonization or Planting
(D.F. FOURT)
7. Control of Surface Water and Groundwater for Terrain Stabilization - Lake Louise Ski Area
(F.B. CLARIDGE, T.L. DABROWSKI, M.V. THOMPSON)
8. Montane Grassland Revegetation Trials
(D.M. WISHART)
9. Development of a Reclamation Technology for the Foothills - Mountain Region of Alberta
(T.M. MACYK)
10. A Study of the Natural Revegetation of Mining Disturbance in the Klondike Area, Yukon Territory
(M.A. BRADY, J.V. THIRGOOD)
11. Landslide Reforestation and Erosion Control in the Queen Charlotte Islands, B.C.
(W.J. BEESE)
12. The Use of Cement Kiln By-Pass Dust as a Liming Material in the Revegetation of Acid, Metal-Contaminated Land
(K. WINTERHALDER)

Thursday, August 23

13. Managing Minesoil Development for Productive Reclaimed Lands
(W. SCHAFER)
14. Reclamation Monitoring: The Critical Elements of a Reclamation Monitoring Program
(R.L. JOHNSON, P.J. BURTON, V. KLASSEN,
P.D. LULMAN, D.R. DORAM)
15. Plains Hydrology and Reclamation Project: Results of Five Years Study
(S.R. MORAN, M.R. TRUDELL,
A. MASLOWSKI-SCHUTZE, A.E. HOWARD,
T.M. MACYK, E.I. WALLICK)
16. Highvale Soil Reconstruction Reclamation Research Program
(M.M. BOEHM, V.E. KLASSEN, L.A. PANEK)
17. Battle River Soil Reconstruction Project: Results Three Years After Construction
(L.A. LESKIW)
18. Gas Research Institute Pipeline Right of Way Research Activities
(C.A. CAHILL, R.P. CARTER)
19. Subsoiling to Mitigate Compaction on the North Bay Shortcut Project
(W.H. WATT)
20. Effects of Time and Grazing Regime on Revegetation of Native Range After Pipeline Installation
(M.A. NAETH, A.W. BAILEY)
21. Revegetation Monitoring of the Alaska Highway Gas Pipeline Prebuild
(R. HERMESH)
22. Post-Mining Groundwater Chemistry and the Effects of In-Pit Coal Ash Disposal
(M.R. TRUDELL, D. CHEEL, S.R. MORAN)
23. Assessment of Horizontal and Vertical Permeability and Vertical Flow Rates for the Rosebud - McKay Interburden, Colstrip, Montana
(P. NORBECK)
24. Accumulation of Metals and Radium - 226 by Water Sedge Growing on Uranium Mill Tailings in Northern Saskatchewan
(F.T. FRANKLING, R.E. REDMANN)
25. How Successful is the Sudbury (Ontario) Land Reclamation Program?
(P. BECKETT, K. WINTERHALDER, B. McILVEEN)
26. Methodology for Assessing Pre-Mine Agricultural Productivity
(T.A. ODDIE, D.R. DORAM, H.J. QUAN)
27. An Agricultural Capability Rating System for Reconstructed Soils
(T.M. MACYK)