

GUIDELINES FOR THE
RECLAMATION OF LAND
IN ALBERTA

December 1977

Land Conservation and Reclamation Council
Alberta Environment and
Alberta Energy and Natural Resources

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OSRIN NOTE

A similarly titled document found in the University of Alberta Cameron Library (Guidelines for the Reclamation of Land Affected by Surface Disturbance), also dated 1977, contains a January 30, 1978 letter from the Chairman of the Land Conservation and Reclamation Council, presumably to industry, that explains how the Guidelines were created and why Guidelines were issued instead of regulations.

The letter is appended to the end of this version of the Guidelines for completeness purposes.

INTRODUCTION

The legislative authority governing the preparation and submission of applications for Development and Reclamation Approvals and for reclamation inquiries is contained in The Land Surface Conservation and Reclamation Act, 1973, and in the Land Conservation Regulation filed as Alberta Regulation 125/75 as amended and various Regulated Surface Operation Regulations made under that Act. The Act and the Regulations specify factors to be included in the application, but leaves the detailed contents of the application to the applicant.

Section 35 of the Act provides for the making of regulations which prescribe the standards of criteria to be used by the Land Conservation and Reclamation Council in determining whether the disturbed land surface has been satisfactorily reclaimed. In the absence of regulations, Section 36 allows the use of standards satisfactory to the Council.

It is the Council's opinion that regulations at this point in time would be too inflexible for satisfactory application and that more flexible guidelines would be more applicable.

The attached 'Guidelines for the Reclamation of Land Affected by a Surface Disturbance' are intended to be an expression of the Land Conservation and Reclamation Council's expectations with respect to the detailed content of applications for approvals of surface disturbances and the reclamations of lands and will until further notice take the place of regulations under Section 35.

GUIDELINES FOR THE RECLAMATION OF LAND AFFECTED BY A SURFACE
DISTURBANCE

Since the implementation of The Land Surface Conservation and Reclamation Act, questions pertaining to the reclamation of disturbed lands in Alberta, and increasing concerns over the land use after the conclusion of the disturbance, have resulted in

- (a) a re-evaluation of various concepts of soil science, range ecology, and land use that have formed the basis of land management philosophies in the past, and
- (b) the adoption of requirements for long term planning relating to the conservation of soil, water, air, and associated biota

to assure as a goal the return to, or the continuation or resumption of some appropriate land use upon the conclusion of the surface disturbance.

As a result of the re-evaluation, the concept of "reclamation" of land has been defined as including all desirable and practicable 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 lands;
- (b) handling surficial material in a manner that ensures a root zone that is conducive to the support of plant growth where required for future use;

- (c) contouring the surface to minimize hazardous conditions, to ensure stability, and to protect the surface against wind or water erosion;
- (d) Although the loss and re-establishment of groundwater aquifers is a major consideration in reclamation technology, present knowledge does not permit specifying guidelines other than stating an objective of replenishing of the groundwater source for beneficial use.

The "Reclamation Criteria", hereinafter attached as Appendix 1, are based on the foregoing conceptual considerations.

The Criteria and the "Guidance Document for Preparation of a Reclamation Plan", hereinafter attached as Appendix 2, are intended to guide the proponent of any surface disturbance to which The Land Surface Conservation and Reclamation Act applies

- (a) in planning the operation that will result in the surface disturbance in a manner that will minimize the effect of the disturbance after the conclusion of the disturbance,
- (b) in describing, in its application for a Development and Reclamation Approval under the Act, how it proposes to reclaim the disturbed land upon the conclusion of the operation, and
- (c) in performing the reclamation of the land as required under the Approval, the Act and the regulations thereunder.

The Criteria, concurrently, will be applied

- (a) by the approving authorities under the Act and regulations in the review of applications for a Development and Reclamation Approval;
- (b) by the members of the Land Conservation and Reclamation Council in exercising their authority and discretion while conducting inquiries to determine whether land to which the Act applies has been reclaimed in accordance with the applicable Development and Reclamation Approval, including the Development and Reclamation Plan, the Act and the regulations, and
- (c) by the members, Chairman and Deputy Chairmen of the Council when deciding whether or not to issue reclamation certificates or reclamation orders.

APPENDIX 1

RECLAMATION CRITERIA

General

1. (1) In these Guidelines,

(a) "Act" means The Land Surface Conservation and Reclamation Act;

(b) "Approving Authority" includes the Land Conservation and Reclamation Council;

(c) "Land Conservation Regulations" means Alberta Regulation 125/74 as amended from time to time and any regulations made in substitution therefore;

(d) "Regulated Surface Operation Regulations" means any regulation designating any operation or activity named in Section 23 (1) of the Act to be a regulated surface operation pursuant to that section.

Definitions

(2) Any expression that is defined in the Act, the Land Conservation Regulations, any Regulated Surface Operation Regulations, and any applicable Exploration Approval or Development and Reclamation Approval has the same meaning herein.

2. Disturbed lands shall be reclaimed to the condition and to achieve the post-disturbance land use that is prescribed

(a) in the Development and Reclamation Approval issued in accordance with the applicable Regulated Surface Operation Regulations, or

Prescribed
Land Use

- (b) in the absence of an Approval, or other specified conditions, by the Council following consultation with the owner or operator, or both of them, as the case may require, or
- (c) in the contractual agreement, lease or license of occupation agreed to between the owner (public and private lands) and the operator.

DRAINAGE AND EROSION CONTROL

Drainage
Patterns

1. Water from catchment areas adjacent to the lands to be disturbed shall not be routed through the lands unless the operator takes precautions that in the opinion of the Approving Authority are adequate to prevent siltation and erosion of the lands to be disturbed.

Streamflow
Protection

2. Streamflows in and through natural drainage systems located on the lands to be disturbed shall be maintained by the operator through the installation of culverts or bridges, or the construction of interceptor or drainage ditches or other drainage systems that in the opinion of the Approving Authority are adequate to accommodate seasonal streamflows.

Surface
Drainage

3. All interceptor or drainage ditches constructed by the operator shall have outlets consisting of natural drainage ways, vegetative areas or other stable watercourses that convey runoff without causing erosion.

Erosion
Control

4. Where erosion is liable to occur, the operator shall construct diversion ditches, that in the opinion of the Approving Authority are adequate to ensure that the lands to be disturbed are protected from erosion.

Water
Quality

5. (1) The operator shall ensure that drainage from disturbed lands, under normally prevailing seasonal climatic conditions, shall only be discharged in accordance with Alberta Environment's surface water quality objectives or other methods prescribed by the Approving Authority to a receiving stream or other water-course described in the Guidelines or prescribed method.

(2) When directed by the Approving Authority, the operator shall cause to be designed and constructed any settling ponds or other facilities that may be necessary to settle sediments from run-off that is equivalent to at least a ten year flood condition, to the extent that the total suspended solids content in any water discharged from the settling pond or other facilities will not exceed the concentration permitted by the Approving Authority.

CONSERVATION OF MATERIALS FOR RECLAMATION

1. (1) Where, before the approved land disturbance, soil horizons on the lands to be disturbed are sufficiently well developed to support plant growth or in the opinion of the Approving Authority to be capable of supporting plant growth, the soil horizons shall be selectively removed in the manner prescribed by the Approving Authority.

Use and
Storage of
Plant
Growth
Material

(2) Whenever it is necessary to store soil and other surficial material suitable for reclamation, the geotechnical foundation of areas used by the operator for storage shall be stable and the storage areas shall be protected from wind and water erosion.

(3) The operator shall use all soil and surficial material suitable for reclamation to perform the reclamation in the manner prescribed by the Approving Authority.

BACKFILLING AND RECONTOURING

Bio-toxic Materials

1. Any material that is toxic to plants or animals, or in the opinion of the Approving Authority may be toxic to plants or animals, shall be disposed of by the operator by burial below the root zone or in the manner described in the Approval for the disturbance or as may otherwise be prescribed by the Approving Authority, at a location where groundwater quality will not be adversely affected.

Highwall and Foot- wall Stability

2. Highwalls, footwall, embankments and slopes shall be reduced or backfilled and graded as closely as possible to the same contours as the contours that existed before the disturbance and to a slope not greater than 2:1 unless the Approving Authority otherwise prescribes.

Filling of Excavations

3. All excavations shall be filled and reclaimed to the contours prescribed in the applicable Approval or as determined by the Approving Authority in consultation with the owner, having regard to the prescribed post-disturbance land use.

Geographic Contours

4. (1) Where the prescribed post-disturbance land use is agricultural production, the operator shall grade the land

(a) as closely to the same contours as the contours that existed before the disturbance, and

(b) to a slope, wherever possible, not greater than 5:1, but all contouring shall allow for soil subsidence and erosion control.

Agricultural
Irrigation

(2) Where the prescribed post-disturbance land use is a use requiring irrigation, the operator shall grade the land as closely to the same contours and slope as the contours and slope that existed before the approved surface disturbance, or to contours and slope that are equivalent to the contours and slope of irrigated lands in areas adjacent to the reclaimed lands.

Commercial
Timber

(3) Where the prescribed post-disturbance land use is commercial timber production, the operator shall grade the land

(a) as closely to the same contours as the contours that existed before the approved surface disturbance, and

(b) to a slope, wherever possible, not greater than 3.5:1.

Other
Land Uses

(4) Where the prescribed post-disturbance land use is a use other than agricultural or commercial timber production, the contours and maximum slopes of the reclaimed lands shall not exceed equivalent contours and maximum slopes on lands in areas adjacent to the disturbed lands or as otherwise prescribed by the Approving Authority.

RESTRUCTURING OF THE ROOT ZONE

Root Zone

1. (1) Where the prescribed post-disturbance land use is agricultural production, the operator shall place root zone soil, having a depth that is sufficient to support agricultural plant growth, in proper sequence, on the surface of the reclaimed lands.

(2) Where the prescribed post-disturbance land use is a use other than agricultural production, the operator shall place soil or other plant-supporting materials on the surface of the reclaimed lands so that a restructured soil, having a depth, and chemical and physical characteristics suitable and sufficient for supporting plant life, is available to achieve the prescribed post-disturbance land use.

(3) Where sufficient soil or other surficial plant-supporting materials is available, the operator shall provide a root zone having a depth at least equal to the depth of the rooting zone of the plants that are being used in the reclamation process.

REVEGETATION

Revegetation

1. When required by the Approving Authority, the operator shall, as soon as practicable following placement on the lands of soil or other surficial plant-supporting material, seed or plant on the reclaimed lands, suitable plant species in the manner and to the extent prescribed by the Approving Authority in consultation with the owner.

Interim and
Permanent
Revegetation

2. (1) Where the prescribed post-disturbance land use is the establishment of permanent forest vegetation, the operator shall establish an initial vegetative cover that will not inhibit forestation that is achieved through the growth of approved tree species, through the invasion of native tree species, or through other forestation techniques or methods.

(2) The operator is responsible for the establishment of such additional indigenous plant species as may be necessary to achieve a self-sustaining forest plant community.

Reforestation

3. Where the prescribed post-disturbance land use is the establishment of permanent forest vegetation for commercial timber production, the operator is responsible for the establishment, in a manner prescribed by the Alberta Forest Service Regeneration Survey Manual, of a minimum of 320 established seedling trees as defined in the Timber Management Regulations, per acre of commercial tree species satisfactory to the Approving Authority.

Wildlife
Habitat

4. Where the prescribed post-disturbance land use is the establishment of permanent vegetation suitable for wildlife habitat, the operator is responsible for the establishment of various species and numbers of trees, grasses, forbs and shrubs of a density and composition which will provide food and cover for wildlife, consistent with the ecological zone of the region and satisfactory to the Approving Authority.

RESTORATION OF SERVICES AND UTILITIES

Replacement
Features

1. All survey monuments established under The Alberta Surveys Act and all roads and public utilities established before the approved surface disturbance shall be maintained or replaced by the operator as prescribed by law and by the Approving Authority.

Replacement
Agricul-
tural
Facilities

2. All domestic, municipal, irrigation and other agricultural water supply systems established before the approved surface disturbance shall be maintained or re-established by the operator to provide a level of service at least equivalent to that which existed prior to disturbance.

Abandonment
Roads

3. Access roads and haul roads that in the opinion of the Approving Authority, in consultation with the owner, are no longer necessary, shall be reclaimed by the operator in the manner prescribed by the Approving Authority.

AESTHETICS AND SAFETY

Aesthetics
Appearance

1. The operator shall leave the reclaimed lands in a state free of unnecessary structures and equipment, and shall landscape the lands so that they are aesthetically satisfactory to the Approving Authority.

Hazardous
Matters

2. The operator shall leave the reclaimed lands in a safe condition, free of

- (a) all hazards including any open excavations, unstable highwalls, footwalls, embankments or slopes;
- (b) any hazardous substances including explosives and toxic or radioactive materials, and
- (c) any garbage, debris or other waste materials.

LAND MANAGEMENT

1. (1) Where the prescribed post-disturbance land use is agricultural production, the operator shall remain responsible for the maintenance of the reclaimed land during the period of time that is required to demonstrate that the agricultural productivity of any soil placed by the operator on the reclaimed lands is comparable

- (a) to the agricultural productivity that existed prior to the surface disturbance, or
- (b) where the pre-disturbance use of the land was not agricultural production, to such other productivity standard as the Approving Authority may prescribe.

(2) Where the prescribed post-disturbance land use is a use other than agricultural production, the operator shall remain responsible for the maintenance of the reclaimed lands until

- (a) the soil surface has been stabilized and the composition, density, growth and vigor of vegetation established by the operator is comparable to the composition, density, growth and vigor of vegetation that existed before the surface disturbance, or

Interim
Management

- (b) the condition of the land is comparable to the condition of other similar lands that have been reclaimed in a manner satisfactory to the Approving Authority.
- (c) 320 established seedling trees per acre are growing on the site without assistance when the prescribed post-disturbance land use is commercial timber production.

APPENDIX 2

GUIDANCE DOCUMENT

FOR

PREPARATION OF A RECLAMATION PLAN

The primary objective in land reclamation is to ensure that the mined or disturbed land will be returned, wherever possible, to a state which will support plant and animal life, or be otherwise productive or useful to man, at least to the degree it was before it was disturbed, as described in the Guidelines for the Reclamation of Land Affected by a Surface Disturbance.

A Reclamation Plan for lands to be mined normally includes seven components, namely:

- 1) Site Analysis and determination of post-disturbance land use
- 2) Surface Hydrology Analysis
- 3) Overburden Analysis
- 4) Mining Plan Analysis
- 5) Post Mining Land Use Plan
- 6) Materials Handling Plan, and
- 7) Revegetation Plan

The interrelationship of these components is shown on Figure 1. Other disturbance may not include all seven of the components.

Site Analysis

The productive capability of the land and its existing uses should be determined. Investigations should include an analysis of soil, vegetation, fish and wildlife and any unique features.

Surface Hydrology Analysis

This includes the identification of the surface drainage patterns including lakes, streams, and sloughs and the recording of mean annual flows.

Overburden Analysis

This is the determination of the chemical and physical characteristics of the overburden and the bedrock that would be used in the reclamation program. The information is used to prepare a detailed overlay or map showing the aerial extent and volume of overburden available for placement in the root zone.

Mining Plan Analysis

The information required from the mining plan is the determination of the total volume of overburden to be mined, the volume of overburden to be stored, for subsequent back-filling and root zone development, and the volume of overburden that will be placed in discard areas.

Post Mining Land Use Plan

Once the analyses have been completed and the volumes of the overburden materials in the mining plan are known, a potential land use plan can be prepared. The overlay or map should clearly show the anticipated topographic contours, the roads, utilities, location and area of lands to be reclaimed for agriculture, commercial timber, or wildlife habitat, including the location of streams, rivers, lakes and sloughs.

Materials Handling Plan

The materials handling plan should account for the use of all mined and/or excavated material on the site including the material used for back-filling, interim storage, dyking, landscaping or discard.

The plan should indicate the depth and type of overburden that will be used to form the root zone. It should describe the sequence, timing and method that will be used for the replacement of overburden and root zone material.

Revegetation Plan

The revegetation plan should describe the method and time frame required to manage and maintain the initial vegetative cover to obtain soil productivity or a self-sustaining plant community which will develop into a predetermined agricultural, forest, wildlife, or other use of at least equal productivity that existed prior to disturbance.

The plan should identify and describe the combination of plant species to be used, methods of seedbed preparation, the time, methods and rates of seeding and fertilization. Where site specific information is not available test plots may be necessary to determine the most practical treatment.

General

Depending upon the nature of the project, the applicant may also be required to submit additional soils, geology, groundwater, and geotechnical reports, where solutions to specific problems are required.

Reclamation plans shall be based on the use of the best applicable technology. Plans shall be prepared by qualified professionals in the appropriate fields of endeavour.

RECLAMATION PLAN PREPARATION

CONCEPTUAL FLOW DIAGRAM

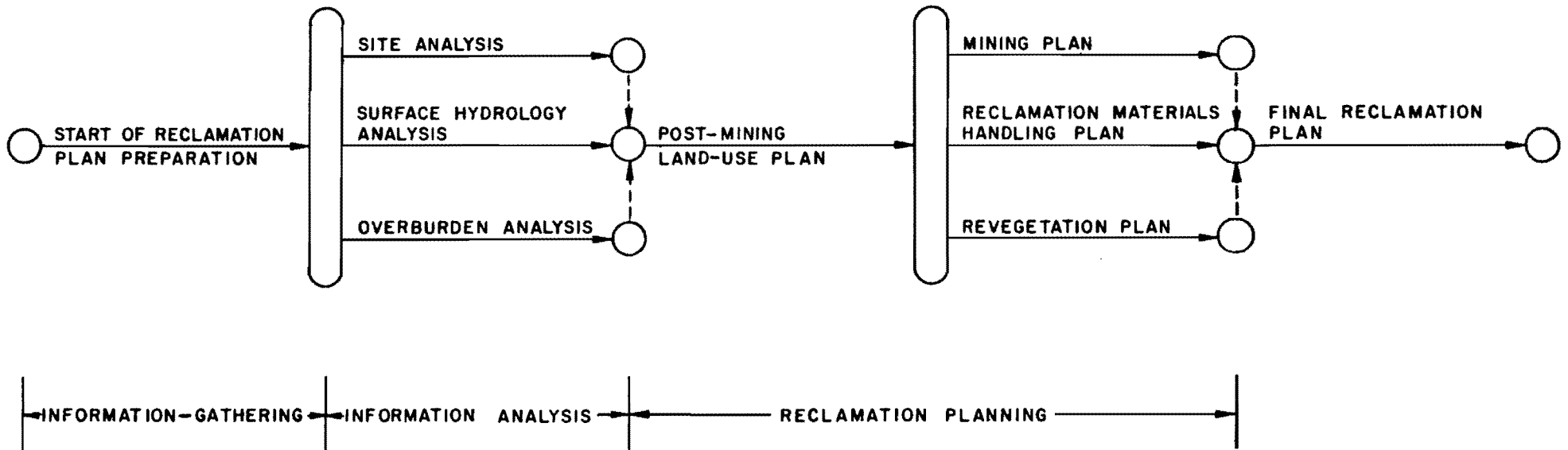


FIGURE 1

JANUARY 30, 1978.

RE: RECLAMATION GUIDELINES

DURING THE PAST MONTHS, YOUR ORGANIZATION HAS BEEN EXTREMELY HELPFUL TO US IN COMMENTING ON OUR PROPOSED RECLAMATION CRITERIA AND REGULATIONS UNDER THE LAND SURFACE CONSERVATION AND RECLAMATION ACT.

THESE WERE DEVELOPED BY THE CONSERVATION AND UTILIZATION COMMITTEE WHICH INCLUDES REPRESENTATION FROM THE DEPARTMENTS OF AGRICULTURE, ENERGY AND NATURAL RESOURCES, ENVIRONMENT, TRANSPORTATION, MUNICIPAL AFFAIRS, RECREATION, PARKS AND WILDLIFE AND SEVERAL OTHERS INCLUDING THE RESEARCH COUNCIL AND THE ENERGY RESOURCES CONSERVATION BOARD.

AS A RESULT OF YOUR COMMENTS AND ADVICE, WE HAVE DECIDED THAT GUIDELINES RATHER THAN REGULATIONS WOULD BE MORE APPROPRIATE AT THIS TIME. FOR THIS REASON WE ARE ISSUING THE ATTACHED RECLAMATION GUIDELINES WHICH WILL BE REVIEWED AGAIN AFTER MARCH 31, 1979, AFTER WE WILL HAVE HAD ONE FULL YEAR TO ASSESS THEIR APPLICABILITY.

EFFECTIVE JANUARY 1, 1978 THESE GUIDELINES WILL BE USED IN THE ASSESSMENT OF DEVELOPMENT AND RECLAMATION PLANS AS WELL AS THE INSPECTION OF SITES REQUIRING THE ISSUANCE OF RECLAMATION CERTIFICATES.

WE WOULD BE PREPARED TO MEET WITH YOU AND PROVIDE STAFF TO ELABORATE

.../2

JANUARY 30, 1978.

ON ANY ASPECTS CONTAINED WITHIN THE RECLAMATION GUIDELINES.

THE IMPORTANT CONCLUSION IS THAT THE RECLAMATION GUIDELINES ARE OBJECTIVES TO BE ACHIEVED BY THE INDUSTRY IN CONJUNCTION WITH THE COUNCIL.

YOURS VERY TRULY,

A handwritten signature in cursive script, appearing to read "H. W. Thiessen".

H. W. THIESSEN,
CHAIRMAN.

HWT/vj
ENC.

CC: MR. C. E. PAQUIN, DEPUTY CHAIRMAN
MR. F. W. MCDUGALL, DEPUTY CHAIRMAN

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