REHABILITATION - ITS MANY FACETS AT ONTARIO HYDRO

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ABSTRACT

The term facets has many definitions as does the term rehabilitation. When these terms are linked with the issues identified by members of this Association in the survey taken in 1985, the spectrum becomes very broad. These issues, or facets, range from toxic waste sites to land use planning to ecosystem renewal. In all cases, they depict various concerns and point out the need for subsequent activities for the reclamation, rehabilitation and restoration of our environment. Industries and governments are not exempt from these issues and activities, most of which are regulated by environmental legislation. At Ontario Hydro, it is not a case of what to do, but more one of how to do it to comply with environmental requirements. In order to undertake any project, some research is required. Sometimes this means breaking new ground, such as in reclamation to establish vegetation on fly ash or on spoil piles excavated from new generating station sites. Abandoned gravel pits on rights-of-way must be rehabilitated through revegetation and sometimes landscaping to assist in protecting the security of the lines. The greatest activity, however, is in the area of restoration. Restoration is required because of Ontario Hydro's land based activities in forested and agricultural lands and as a result of natural occurrences. Through the interaction of water with the components of the landscape unit, Nature herself, or Ontario Hydro operational activities, many erosion problems must be dealt with and corrected. Other land based restoration problems stem from various sources, and involve many different stages. These may be pipelines utilizing right-of-way lands, adjacent subdivisions and their drainage problems, construction, and acts of nature. Each has its own unique solution, and each is one of the facets of rehabilitation undertaken by Ontario Hydro and other utilities across Canada.

INTRODUCTION

The term facet has many definitions. It can mean outside, exterior, surface, skin, or facade. However, the best-known definition is: "one of the small polished surfaces of a cut gem". The various aspects of our own work programs and the areas covered by the program at this annual meeting are facets of the major gem: "rehabilitation".

Rehabilitation, reclamation and restoration are sometimes used interchangeably, but each has its own distinct definition. Reclamation means to claim back, or to make capable of being cultivated or lived on. Restoration is defined as a putting or bringing back into a former, normal, or unimpaired state or condition. Finally, rehabilitation means to restore, to put back in good condition, or to re-establish on a firm, sound basis.

When the facets of rehabilitation are linked with the issues identified by members of this Association in the survey taken in 1985, the spectrum becomes very broad. Some examples of these issues, in descending order of priority, include toxic waste sites, cost effectiveness, reclamation after abandonment, regulation and legislation, land use planning, public awareness, reclamation performance, political trade-offs, high technology, and so on.

Industries and government are not exempt from these issues and activities, most of which are regulated by environmental legislation. At Ontario Hydro, the environment is defined as the natural system of land, air, water, plants, and animals, including man and his interaction with the system. Because of this interaction, it is not a question of what to do, but how to do it in compliance with environmental requirements.

RECLAMATION

In order to undertake any project, research is required, and sometimes this means breaking new ground, such as trying to establish vegetation on fly ash at our Nanticoke Generating Station. In this reclamation project, the initial seeding yielded very poor results because of the different consistencies of ash, which ranged from very coarse to very fine. Grasses simply died; legumes also died, but held on for a longer period of time. Greenhouse testing using soil additives and many different species of grass was used to find out what should be done. The best results were shown on the coarse ash.

Another reclamation project occurred at the Darlington Nuclear Generating Station. The station site was excavated down to bedrock for stability purposes. The resulting spoil pile covers approximately 37 hectares (90 acres), is 45 meters high (150 feet), and contains 15 million cubic meters (20 million cubic yards) of excavated material. A testing program was established to determine the best vegetation mix for the site, with the result that, two years later, vegetation is established on the slopes of the pile.

REHABILITATION

In the area of rehabilitation, gravel pits are always a problem. When the Niagara escarpment was crossed by a 500 kV transmission line, Ontario Hydro made a commitment to rehabilitate the site. Treatment of the site included regrading, hydroseeding, and planting of trees along the road and hawthorne on the upper slopes. Hawthorne was used because a local farmer leasing the land wanted to graze sheep on the property and it was felt hawthorne would keep the sheep off the upper slopes. Unfortunately, the farmer never did graze sheep on the property.

At the Colwell pits just south of the Essa Transformer Station, rehabilitation was also necessary. Red pine was planted over 10 years ago and did very poorly because of sandy and very dry site conditions. Some jack pine which was accidentally mixed with the red pine planting did extremely well. This suggests that the proper plant material must be selected to meet specific growing conditions. Carolina poplar and black locust have recently been planted on the site.

RESTORATION

A great amount of time is spent on restoration at Ontario Hydro because of land-based activities on forested and agricultural lands and because of natural occurrences. To minimize the disturbance to the environment, forest areas are selectively cut. In areas of soils with a high potential for both wind and water erosion, windbreaks are sometimes left to protect the soil and encourage the establishment of cover crops. This was done during the construction of a new 500 kV line through the Northumberland County Forest. When the cover crops are well established, the windbreaks will be removed, as they will eventually be incompatible with transmission lines.

Areas requiring vegetative cover are handled in different ways. Rights-of-way in the north are seeded from the air by fixed-wing aircraft, as helicopters are too expensive. Seeding is often done in southern Ontario from a spreader drawn by a snowmobile and, for small areas, the hand-held cyclone seeder is used. The ultimate results are good catches of reed canary grass and champ timothy in the north, and crown vetch, creeping red fescue, tall fescue, clover, and other plant materials in the south. In both situations, cover is established not only to protect the environment, but also to provide competition for unwanted woody vegetation which could grow into the lines.

Immediately after construction, areas of rights-of-way must be restored. The areas around tower bases are graded and hydroseeded. In specific instances, fabric materials are installed to help stabilize slopes and prevent erosion while vegetative cover is being established. Once construction has been completed, access roads across agricultural lands must be removed. The stone and filter fabric under the stone are lifted, the area is chisel-plowed and, finally, rotovated in preparation for seeding. In some instances where major drainage ditches are involved, interlocking brick has been used to protect the tower

footings. Installations in this kind of situation are generally designed to withstand a one-in-a-hundred-year flood.

Other land-based restoration problems stem from various sources and involve many different stages. Pipelines use rights-of-way and can cause problems, especially at stream crossings. The Interprovincial Pipelines crossing of the Oakville Creek offered potential for serious erosion, which could threaten not only the watercourse but the pipeline and the security of the towers on the right-of-way. The finished product involved gabions for toe protection, rip rap, subsurface breakers, and vegetative cover.

The York Durham sewer is another example of secondary use of a right-of-way. The installation of the "big pipe", as it is affectionately called, required special precautions to be taken to protect wetland areas, but even then silt still bypassed the berms and straw. After installation of the sewer, the area was regraded in preparation for seeding.

Subdivision adjacent to rights-of-way are another type of problem. Various soil conditions, ranging from wet organics to sand, create drainage difficulties. Even though what seem to be appropriate protective measures are taken, such as the installation of sandbag groynes and gabion mats, they sometimes fail and have to be redone in a more elaborate manner. This includes the installation of catchment basins, rip rap, and sod. Once again, a combination of methods is used to correct a specific problem.

Because of water interacting with components of the landscape unit, nature herself, or Ontario Hydro operational activities, many erosion problems need to be dealt with and corrected. The Mississagi River required bank protection because of water level fluctuations caused by Ontario Hydro in its operation of the Red Rock Falls generating station. Approval was received in 1982 from government agencies to proceed with remedial action. Stabilization of the banks just above the water level was achieved by means of rip rap, which was dumped on an access road and placed in position by means of a gradall. Testing of plant materials, which included both shrubs such as alder, willow, and red osier dogwood, and grasses, was undertaken to determine which was most suitable for the location. The final product was a combination of rip rap and vegetation which extended for approximately 18 kilometers, used 240,000 tonnes of material, and to date has cost over six million dollars.

Riverbank erosion can cause considerable concern for the security of a tower line, as evidenced by the erosion taking place on the Saugeen River. Gabions were used extensively at two locations from the toe up the bank to overcome this problem. Extra reinforcement had to be installed at one curve to prevent the ice from ramming the tower legs and causing damage to the towers. Rip rap and vegetative material was used to complete the project.

At one of our transformer stations in Toronto, Balfour

Junction, erosion problems affecting underground cables were related to station drainage and drainage of the surrounding area. Because of the steepness of the slope, and the attitude of local ratepayers, much of the work had to be done by hand. Once the cables were exposed, new K-Crete was used to cover the oil-filled cables, as the old K-Crete had shifted because of subsurface erosion. In the channel around the cables, filter fabrics, drainage pipe, and subsurface headers had to be installed to ensure water drained away to prevent further erosion.

On the East-West line at the Magpie River crossing, erosion problems threatened the security of the line. The slope was regraded, seeded, and a fabric material installed. The success of the solution is indicated by the new growth coming through the fabric.

Acts of nature, although brief, can be quite devastating. Massive transmission towers can be toppled and crumpled like pretzels, as happened during a tornado in southern Ontario in 1985. The immediate task, of course, was to get those lines back in service, with restoration taking place once the necessary repairs had been made. Lands under temporary access roads had to be restored, and sensitive areas required appropriate treatment to overcome the six-foot-deep ruts.

Through all of the work of reclamation, rehabilitation, and/or restoration, it must be remembered there are three specific stages - research, implementation, and maintenance and monitoring. Each problem has its own unique solution, each is one of the facets of rehabilitation undertaken by Ontario Hydro and other utilities across Canada, and each involves these three specific stages. By taking appropriate steps necessitated by man's interaction with the natural environment, we can avoid the lingering aftermath of nature's ravages and look forward to tranquility and the assurance that our lights will remain on.

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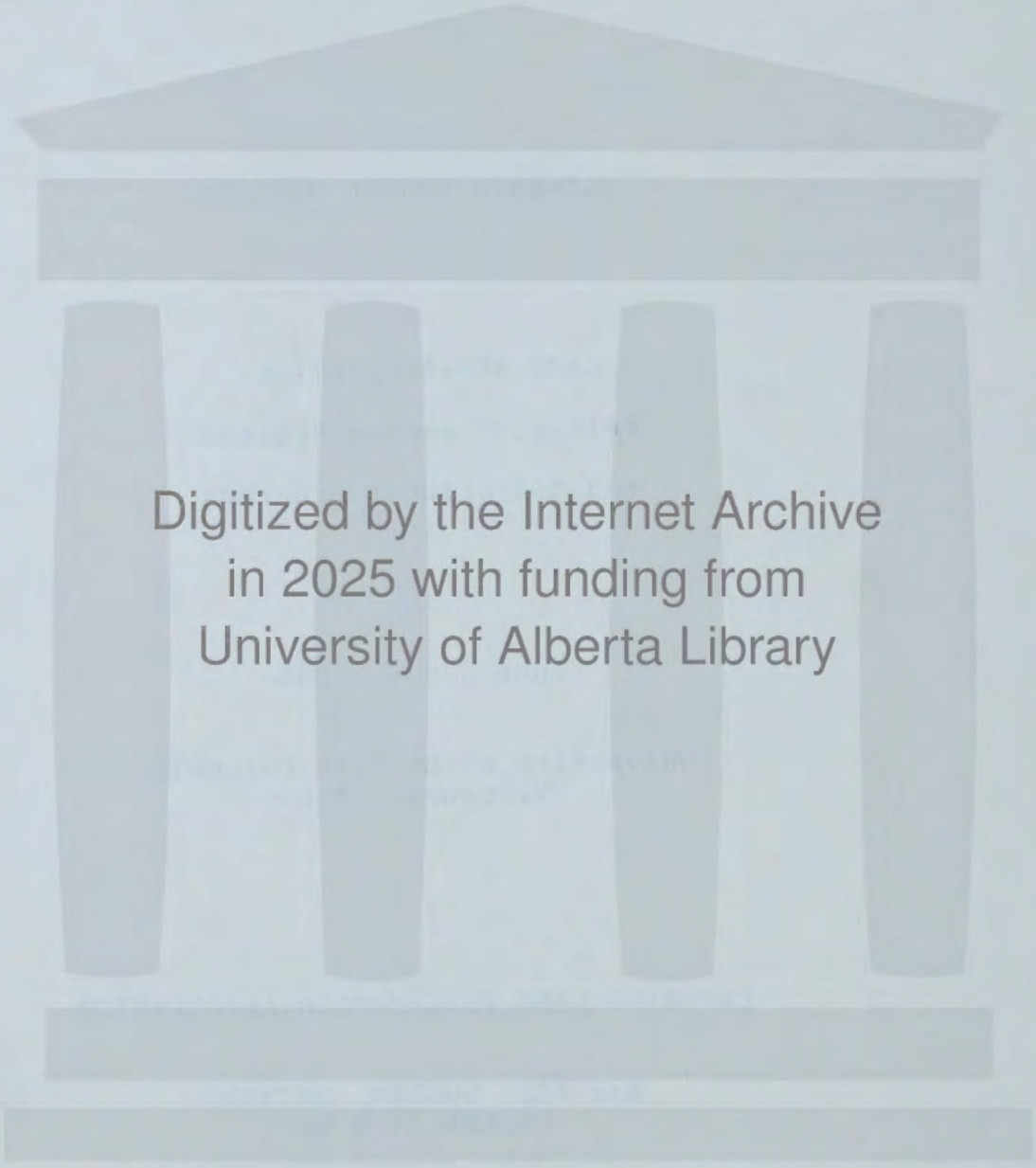

TABLE OF CONTENTS

FOREWORD

The British Columbia Chapter of the Canadian Land Reclamation Association was formed in 1985 to provide a local public forum for the exchange of information and experience in land rehabilitation. Comprised of professionals from a wide range of backgrounds and interests, this organization pulled together quickly to host the 1986 Annual Meeting. The diverse membership in the B.C. Chapter was realized in a program that expanded the scope of the conference to include many fields that have not been represented in past programs. The quality of presentations and range of topics kept audience participation at a spirited level. It is our hope that we have initiated a trend to widen the scope of the annual meetings so as to not focus on traditional mining or energy development issues.

I wish to thank all speakers and attendees for making this first formal function of the B.C. Chapter a success. The enthusiastic support of chapter members in the planning and administration of the conference demonstrated a strong desire for a quality meeting. This drive bodes well for the future of our chapter.

A great deal of effort went into the publication of the proceedings of the 1986 Annual Meeting. Care was taken to accurately reproducce all papers, however minor errors may have escaped the review process. We hope that this will not detract from the information presented by the authors.

May the CLRA and all local chapters continue to grow and function as a focal point for land rehabilitation.