

## **CORPORATE ENVIRONMENTALISM AND THE RECLAMATION OF DORMANT PROPERTIES**

### **GIANT NICKEL: A CASE STUDY**

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### **ABSTRACT**

Mining companies occasionally, through acquisition or purchase, inherit old mining sites. These mining sites may contain exploration potential or the potential for new mine development, and most contain environmental liabilities.

This paper describes how one company has evaluated their property holdings and, where the potential for further exploration or development is remote, has developed a strategy for reducing liability by reclaiming these dormant facilities.

Citing the example of the Giant Nickel property, located near Hope, B.C., Homestake Canada Inc's reclamation strategy will be followed from the first stage of site assessment, hazard identification, and reclamation work scheduling, through reclamation activities at the site, including the reclamation of the mill site and tailings ponds, closure of all workings open to the surface and the disposition of a collapsed crown pillar. This paper will also outline the steps taken to ensure that the reclamation work effectively accomplished the goals of the reclamation strategy.

### **INTRODUCTION**

Mining companies, along with other business organizations, are beginning to see that the economics of business and protection of the environment are not separate issues. Pro-active environmental policies are now being viewed as a necessary business investment, one which reflects an organization's obligations to society to maintain the environment, as much as it reflects a desire to reduce environmental liabilities. Homestake Canada Inc's approach to environmental issues reflects this new interpretation of corporate governance.

Homestake, during its merger with Corona in 1992, acquired a number of dormant properties with disturbance caused by mining activities. Dormant mines, closed in some cases decades ago, may leave a company at risk with outstanding environmental liabilities. Therefore, Homestake made a corporate decision to reduce its environmental liabilities associated with these acquired properties. The Company began this process by developing a 4-Stage program to evaluate and reclaim its dormant minesites.

In Stage-1 all properties with potential environmental liabilities were identified. These included land holdings obtained during past mergers as well as properties acquired for exploration potential. Of primary interest were lands associated with historical mine, mill and tailings facilities.

In Stage-2 an environmental review was conducted at each site. This process was a detailed review and analysis to assess all outstanding environmental issues. The Company developed a Dormant Facility Protocol to be used in determining the environmental conditions at these properties. This checklist was used at each site.

In Stage-3 environmental concerns, hazards and risks associated with each property were evaluated. If deemed necessary, some conditions were addressed immediately at this point. A Reclamation Plan was then developed for each property to address identified issues. These Plans included a schedule and budget for the project. Because a prerequisite for the success of this reclamation approach is the acceptance of the Reclamation Plans and activities by the responsible regulatory agencies, Plans were developed with the participation of these agencies. Also consulted at this stage were other stakeholders, whether neighbouring property owners, native groups or other land users.

In Stage-4 actual reclamation work began. First, safety risks, and hazardous conditions, or the storage of hazardous materials were addressed. Second, less hazardous environmental issues were addressed. The Company's primary objective was to reduce environmental liability by completing the work identified in the Plan. Once this was completed the Company could decide whether to surrender the property to the Crown, sell it to another user, or continue to hold it.

## **GIANT NICKEL MINE SITE**

The Giant Nickel property near Hope B.C. provides a good example of Homestake's 4-Stage program in operation.

Giant Nickel was operated from 1959 to 1974 producing both nickel and copper. Some reclamation activities were undertaken during the operating life of the mine and afterwards, including seeding activities, gating of some portals and salvage of some surface structures and equipment. When Homestake acquired the property in 1992 it had remained dormant for a number of years. Many surface structures remained, exposed tailings had developed a hardpan surface but no vegetation, and fencing around the glory hole had partially collapsed due to the heavy snow pack.

During the Company's Stage-1 assessment, Giant Nickel was identified as a dormant property with potential environmental liabilities. A Stage-2 environmental review was conducted at the property in 1993. A Stage-3 assessment of risks and hazardous conditions was also completed in 1993 and a preliminary reclamation plan developed. Identification of hazardous conditions led to some decommissioning work during that same year. Surface structures, equipment and scrap were removed from the mill site. After consultation with regulatory agencies, neighbouring municipalities, and local user groups a formal Reclamation Plan for the Giant Nickel property was developed in 1994. Stage-4 reclamation work began in the summer of 1994 with the development of two vegetation test plots on the tailings area and seeding and fertilizing of the mill platform.

Consistent with Homestake's reclamation process, Stage-4 continued in 1995 with the completion of the remaining reclamation activities outlined in our Reclamation Plan. In order to expedite this process as quickly and efficiently as possible, Homestake hired a project manager, Ed Greg from bion research, to coordinate the remaining work.

The reclamation work outlined in the Plan was completed during the summer of 1995. Some additional work was also identified and completed at that time, including filling eroded areas of the dams, providing a spillway in the south pond, construction of an emergency spillway in the lower tailings dam, and blasting closed the Dolly Portal. Work at the site began with a bidders

meeting on June 8, 1995 and was completed with the replacement of cross ditches on October 20, 1995.

### Portals and Declines

Six portals and two vent raises were identified on the property. One of the portals had two associated waste rock piles. In order to assure the safety of people using the area, all portals were closed, five by backfilling and collapsing, one by blasting. The sixth portal had already collapsed and no further work was required. The two vent raises were closed as well. Specifically,

- One portal was closed by backfilling and collapsing rock above the opening. A drainage ditch was constructed to direct seepage from the portal, a large culvert in the road at the bottom of the decline was removed, and the road to the decline was completely reclaimed.
- A second portal and connected ventilation portal were backfilled and supporting timbers were removed. Additional material was pulled down from above to further bury the openings and flatten the grade. The area around the portals was seeded in September. This portal has two associated waste rock piles. The westernmost pile is composed of large coarse rock and is very stable. After consultation with MEMPR staff, the top and shoulder of this pile were scarified in preparation for seeding. The second waste rock pile was sloped and contoured to increase slope stability. Both waste rock piles were seeded in September. The small settling pond at the base of the waste rock piles was drained and leveled. Two small drainage ditches were created to direct water to a natural watercourse, and woody debris was scattered on the site to promote regrowth.
- A third portal was closed by collapsing the supporting timbers and backfilling with boulder sized rocks. The site was contoured and seeded.
- The fourth portal had been previously collapsed. It is surrounded by a thick alder and has a fairly consistent flow of water exiting the collapsed entrance. No further reclamation work was required at this site.
- The fifth portal (the Dolly Portal) is located in a fairly inaccessible location up a steep slope. The portal was collapsed about 2 m past the main entrance but, in order to discourage the public from attempting to access the site, the Company used dynamite charges to close the opening.

- The sixth portal was backfilled with boulder sized rocks. A small culvert was placed at the bottom of the rock-filled opening to direct a small amount of seepage away from the portal.
- All debris found at the site of the 144 vent raise was placed inside the opening. The raise was then backfilled and closed. The area will be left to revegetate naturally.
- The 512 vent raise was not identified in the Reclamation Plan. This raise, accessible from a partially revegetated branch road, was found to be open to the mine workings below. A thick metal plate was placed over the top of the raise, then covered with rock . The area was then contoured and seeded. The branch road was seeded and small seedlings were planted to accelerate the natural revegetation.

The reclamation of the portals and vent raises was completed according to the reclamation plan. When additional work was identified at the site, the project manager added it to the work plan and it was completed at the same time.

### Mill Site

Extensive reclamation work was completed at the mill site in 1993 and 1994 with the removal of surface structures and other hazards. In 1995 two drainage ditches were created (in addition to the one created in 1993) to direct water away from the platform and towards Texas Creek. The shoulders of all 3 drainage ditches were scarified and seeded with reclamation seed mix and locally harvested alder seeds. In addition, 75 Douglas Fir seedlings were planted in selected locations over the former plant site, and woody debris was scattered over the area (to add to the nutrient content of the soil and provide microhabitat for local fauna). All debris along the shoulders of Texas Creek was removed and the creek bank was contoured to reduce erosion.

### Tailings Area

In 1994 the Company constructed two large vegetation test plots, one on the upper and one on the lower tailings area. Inspection of these test plots in the spring of 1995 showed that the vegetation was well established. The Company therefore proceeded with the covering and seeding of the entire tailings area during the 1995 season.

A total of 14.25 ha was covered with 71,000 m<sup>3</sup> of overburden material, spread to a minimum depth of 0.5 m. The material was scarified, then helicopter seeded and fertilized with a seed and fertilizer mix developed by C. E. Jones. A locked gate was placed at the main entrance to the tailings area to restrict vehicle traffic access to the tailings.

A borrow pit, 0.6 km east of the tailings area, was developed in 1994 for the covering of the tailings test plots. This borrow pit was expanded in 1995 to complete the covering of the tailings. After completion of the capping, the floor of the borrow pit was scarified and the entire area was seeded and fertilized with the same mixture used on the tailings area. A large berm was constructed across the access road to the borrow area to prevent vehicle access to the reseeded borrow pit and tailings area.

The existing overflow at the north end of the lower tailings dam consisted of a 0.5 m diameter culvert. To ensure that a zero-maintenance emergency overflow existed, the culvert was removed and a spillway created. The spillway was constructed to ensure that the depth and grade allowed for a minimum of 1 m of freeboard from the lowest point of the tailings.

A small marshy pond is located to the south of the upper tailings area. Regulatory agencies agreed with the Company that the established marsh habitat should be preserved, but they requested that the level of the pond be stabilized. Therefore, a small spillway was created on the south side of the pond, and overflow from the pond will now flow into a small tributary of Texas Creek.

Recreational use of the tailings dams by off-road motorcycles has created some areas where erosion of the surface of the dams is evident. This erosion is minor and of no consequence to the integrity of the dam structures, however, both the Company and regulatory agencies would like to limit the use of these areas. Therefore, rock was placed in the gullies created by motorcycle traffic and the areas were fenced off and signed.

### Glory Hole

Two glory holes occur on the property. One has collapsed, but the second (Brunswick #2) is open to the surface. Various options for remediation of this hole were investigated by the

Company. In consultation with the Lower Mainland Mine Development Review Committee, construction of a high integrity fence around the hole was chosen as the preferred remediation method.

Construction of the fence proceeded in August. All the galvanized posts were drilled into rock or had bases poured for them. Galvanized cable joined the fence posts. The completed fence encloses the entire hole, the exposed portions of which have posts a minimum of every 3 m. Signage was placed around the circumference of the fence. Posts on the lower north side of the fence are expected to be exposed to high stress due to the movement of the winter snow pack. Therefore, rock buffers were placed above the affected posts. The relative movement of the rocks will allow the Company to judge whether additional reinforcement is required.

Several large trees with exposed roots were removed from above the glory hole to prevent them from falling onto the fence.

A barricade was constructed across the road at the top of Zofka Ridge and the access road down to the glory hole was completely removed. Ditching was created along the reclaimed roadway to reconstruct natural watercourses.

### Roadways

Portions of the mine road not required by the B.C. Forest Service or International Forest Products Ltd. were completely deactivated in 1995. Deactivation included de-compaction of the road bed, the positioning of stumps, boulders and other obstacles along the road, and the replacement of natural water courses by ditching.

### **SUMMARY**

The work outlined in the Reclamation Plan has been completed. By having a project manager on site to oversee the work in progress and to identify any additional work while construction equipment was on site, the Company was able to complete all reclamation work required, including work not originally identified in the Plan. This spring, a Company post-reclamation inspection will occur to evaluate the work completed, and in the autumn, an inspection with

members of the regulatory agencies will be conducted. The Company will then seek regulatory approval for the work completed at Giant Nickel.

In keeping with Homestake's overall environmental strategy, the goal of the 4-Stage reclamation program is to reduce or eliminate the environmental liabilities at the dormant properties. By completing the 4-stage program at Giant Nickel we now hold a property with significantly reduced environmental liability. The Company can, at this stage, leave the property in a monitoring phase until a decision on its future is made.

In general, Homestake Canada Inc's pro-active policy of evaluating and reclaiming its dormant properties has significantly reduced its overall environmental liabilities in a short period of time. This strategy is not only cost effective, but has also helped establish Homestake as an environmental leader in Canada's mining industry.

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