BHP Billiton

Rio Algom Limited

Elliot Lake
Uranium Mine Site Reclamation

Information Package

August 2001

Table of Contents

BHP Billiton

Rio Algom Limited, Elliot Lake, Ontario

Responsible mining is our commitment to the communities we operate in as well as our employees and shareholders to ensure that all of our activities throughout the mining cycle demonstrate responsible stewardship of the resources we develop and meet or exceed industry standards for the protection of the environment.

The uranium mines played a major role in the development of Rio Algom Limited, contributing to the company's growth and setting the standards for all of its operations. Following the mine closures, Rio Algom Limited has played a key role in Elliot Lake's diversification efforts to achieve a stable economy and a promising future. Although all of the mine sites have been rehabilitated, we recognize that we have an ongoing commitment to manage our properties responsibly to maintain a healthy environment for the people who live in the Serpent River Watershed.

Art Coggan
Manager, Environment & Reclamation
Elliot Lake, Ontario, Canada

BHP Billiton

Rio Algom Limited

Elliot Lake Operations

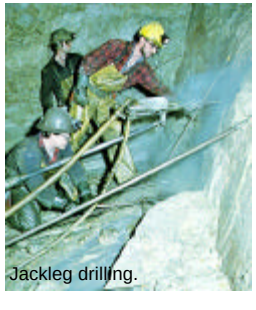
Historical Overview

Rio Algom

Responsible Mining for the 21st Century

HISTORICAL OPERATIONS

The Elliot Lake workforce was highly skilled, trained and motivated, and were able to have a significant effect on the overall productivity of the mines using the latest technology. The mines were modern, efficient business operations founded on recognized management structures and, necessarily, on the input and safety of all employees.



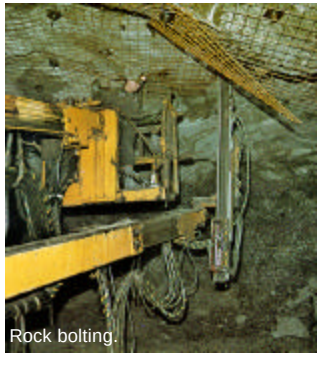
Jackleg drilling.

In spite of the modern, productive and safe operations established in Elliot Lake throughout the 45 years of mining history, as a result of low ore grades and recent market conditions (low power demands, increased uranium supply) the uranium mining camp in Elliot Lake was found to be no longer viable by the late 1980s and since 1990 all of the recently operating mines have closed.

For more than 40 years, the economy of Elliot Lake was driven by the mining industry. In spite of the closing of all of the mines, today Elliot Lake is a diversified community with a promising future. The mine sites have been rehabilitated and are being restored back to nature as much as possible.

Rio Algom has a long history in the Elliot Lake region. The discovery of uranium in the Algoma region in 1953 by Franc Joubin enabled the founding mining companies to benefit from significant contracts with the United States. Twelve mines were quickly brought into production. Rio Algom and its predecessors operated nine of the twelve mines.

Milliken Mine, 1950s.



Rock bolting.

Tailings management is a necessary part of the business of mining. In 1969, Rio Algom began experimental work to stabilize the surface of the uranium tailings at their inactive mines. The long-term care and maintenance of waste management sites was, and is, an issue, and it is very important that industry be able to carry out its operations in as socially responsible a manner as possible.

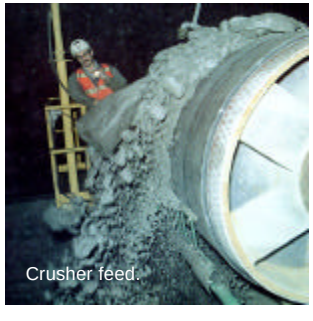
Stanleigh Mine, circa 1996.

Construction of Nordic Mine.

From the beginnings of Rio Algom's operations, comprehensive safety programs were set up at each mine as was the industry standard. First aid training was made available and was mandatory for supervisory staff. Miners were required to wear protective boots and safety glasses were issued to everyone. In an effort to reduce accident rates at all of the mines, the Elliot Lake Mines Safety Group was formed in January 1958. Underground ventilation exceeded industry standards and continued to be improved over the years to reduce the hazards of radon gas and silica dust.

In 1989, employees at Stanleigh Mine established a new safety record for hard-rock mining in Canada, surpassing the previous record of 1,339,360 hours without a lost-time accident. At the end of the year, Stanleigh was the only fully operating mine in Elliot Lake to achieve a zero-frequency for lost-time accidents throughout the year. Stanleigh continued to set new records, achieving 1,736,716 hours on April 15, 1990.

Mine rescue training.



Crusher feed.

Safety and productivity were recognized as fundamental essential goals for the mines. Achievements in these areas were the result of the key role played by the unions and the employees in establishing and maintaining procedures and standards for the workplace.

Mine rescue exercises.

Rio Algom Limited is a Canadian mining and metals distribution company with headquarters in Toronto. The company is a major producer of copper, with mines in Chile and British Columbia. Other mining interests include uranium in New Mexico; coal in British Columbia; and a royalty interest in a zinc/lead mine in the Canadian arctic. Rio Algom's development properties include a uranium deposit in Wyoming, a zinc/copper deposit in Wisconsin, and new projects including an outstanding new copper/gold property in Argentina and a copper property in Peru.

Rio Algom also owns and operates one of North America's premier metals distribution businesses. With 62 centres servicing more than 50,000 customers, it is one of the largest distributors of stainless steel and aluminum on the continent.

Rio Algom Limited
Elliot Lake Division

HISTORICAL HIGHLIGHTS

1948 Carl Gunterman and Aimé Breton discover radioactive rock in Long Township, east of Blind River. Claims are allowed to lapse when significant deposits of the radioactive element cannot be found.

1952 Franc Joubin discovers a uranium deposit in Spragge. The following spring, drilling reveals an extensive ore body.

1953 Joseph Hirshhorn signs a contract with Eldorado Mining and Refining Ltd., the sole government agent to supply the enormous demand for uranium for western defense. Pronto Mine is rushed into production in Spragge.

In July, news that Joubin and Hirshhorn had staked 1,400 claims in the Algoma bush attracts hundreds of prospectors to the area. Another 8,000 claims are filed that summer.

1954 In January, work begins on Highway 108, following an old logging trail. Within three months, trucks are moving along the road all the way to Quirke mine site. A total of 11 mines are being brought into production in the Elliot Lake area.

1955 In September, the Improvement District of Elliot Lake is created by the Province of Ontario. Residential, commercial and industrial investment is about $40 million and total mine investment exceeds $340 million.

Pronto Mine opens in October.

1956 Hirshhorn merges his Canadian interests with The Rio Tinto Company of London, England to create a new company, The Rio Tinto Mining Company of Canada, which acquires Pronto, Pater, Spanish American, Milliken, Quirke, Panel, Nordic, Buckles and Lacnor mines.

Quirke Mine opens in October. During construction, trucks take six hours to travel the 28 miles from Highway 17 to the mine site.

1957 Buckles, Nordic and Lacnor mines open.

1958 Eldorado estimates that Algom has 320 million tons of uranium ore deposits with an average grade of 2.38 pounds per ton.

Panel, Milliken, Spanish American and Stanleigh mines open.

Buckles Mine closes when ore reserves are exhausted.

1959 Spanish American Mine closes due to water seeping from a fractured zone. Only 79,000 tons of ore have been mined from this property.
In November, the United States government announces that the contracts with Eldorado will not be renewed beyond 1963. At that time, 7,400 people were employed by the mining companies.

1960 The population of Elliot Lake is at its peak of 24,887.

Rio Algom Mines Limited is created by the amalgamation of Pronto, Nordic, Spanish American, Lacnor, Milliken, Quirke and Panel mines. Stanleigh Mine is owned by Preston Mines, which is also controlled by Rio Algom. Operations are consolidated at the most productive mines, and the existing contracts with Eldorado are “stretched out” to November 1966.

1960 Pronto, Lacnor and Quirke mines close. The mill at Pronto is converted to a copper concentrator and continues to operate until 1970 to process copper ore from nearby Pater Mine.

1961 The Ontario Reformatory - Elliot Lake, opens at Quirke minesite in March for minimum security offenders.

Pater Mine on the north shore of Lake Huron opens.

Panel and Stanleigh mines close.

The media refers to Elliot Lake as a “ghost town” since many of the homes are abandoned and boarded up.

1964 Milliken Mine closes. However, the buildings are left standing (like other closed mines) with the expectation that the mine may reopen at a later date.

The CANMET lab is set up by the federal government on the Nordic property to study rock mechanics, underground stability and other mining concerns.

1965 The Elliot Lake Centre for Continuing Education opens to retrain residents of Northern Ontario in new job skills. Arts and crafts courses are also offered to students.

The federal government announces a five-year program to stockpile uranium for the new CANDU nuclear reactor.

1966 The population of Elliot Lake has bottomed out at 6,664.

The Elliot Lake Centre establishes a successful Summer School of the Arts.

Rio Algom is the only company still producing uranium oxide under long-term contracts with the Atomic Energy Authority of the United Kingdom and Ontario Hydro for their new nuclear reactor at Douglas Point.

1968 Nordic Mine closes but a yellow-cake processing plant remains open until the shutdown of Quirke and Panel mines in 1990.

Quirke Mine reopens.

1970 There is renewed interest in the uranium market as more countries begin to build nuclear reactors.

Revegetation of the 80-hectare tailings area at Nordic commences. Work is also carried out at Pronto, Lacnor minesites, as well as Crotch Lake, which holds the tailings from Milliken and Stanleigh mines.

Pater Mine closes.

The population of Elliot Lake has grown to 9,043.

1975 Rio Algom secures additional long-term contracts from major utility companies around the world.

A new housing construction program will provide accommodation for the 1,500 additional people required at Quirke and Panel mines.

1977 A major provincial environmental study is under way to determine the impact of the expansion of uranium mining in the Elliot Lake area.

1978 A long-term contract is signed with Ontario Hydro for the delivery of 72 million pounds of uranium oxide from Stanleigh Mine from 1984 to 2020.

1979 The final report of *The Expansion of the Uranium Mines in the Elliot Lake Area* is published. The mining companies (Rio Algom Limited and Denison Mines Limited) are predicted to have a workforce of 7,910 employees by 1988, and the population of Elliot Lake is expected to reach 30,940.

Panel Mine reopens, and the operations at Quirke Mine are expanded to meet the increased demand for uranium. Rio Algom hopes to sign additional contracts to reopen Milliken Mine as well.

The world spot market price of uranium begins to decline.

1981 Construction of homes begins at the new subdivision south of Elliot Lake.

1983 Stanleigh Mine opens.

1986 The spot price for uranium oxide drops to $US15 a pound and the future of the mining industry in Elliot Lake is uncertain. Ontario Hydro revises its contract with Rio Algom to reduce deliveries and improve costs, which will keep Stanleigh Mine operating until 1993.

1990 Quirke and Panel mines shut down on August 31.

The provincial government announces the creation of the Elliot Lake Research Field Station, which is an extension of Laurentian University.

Rio Algom submits application to AECB for mine decommissioning licenses for Quirke and Panel.

1991 Rio Algom negotiates an amendment to its contract to keep Stanleigh open until 1996.

1992 Demolition work proceeds at Quirke and Panel minesites. Construction work at the two tailings management areas also commences, and flooding of 160 acres of tailings at Quirke is in progress.

AECB refers decommissioning proposal for Rio Algom (and Denison) to FEARO (Federal Agency for Environmental Assessments) for a public review.

1994 Demolition work begins at Nordic and Lacnor mines.

1995 The mine sites at Nordic, Lacnor, Spanish American, Quirke and Panel are hydro-seeded. Test plots are established at Pronto Mine to develop a program to improve growth of plants and trees in areas which have been difficult to revegetate. Milliken mill is demolished.

1995 In June, Rio Algom announces likely closure of Stanleigh Mine within one year.

1996 In June, the FEARO Panel issues its report to the government.

Stanleigh Mine ceased production on June 28, and Rio Algom declared the mine and mill cleaned out and ready for demolition on September 20.

Rio Algom completes the Comprehensive Study for decommissioning of Stanleigh and submits it to the Atomic Energy Control Board for approval.

All remaining buildings at nearby Milliken Mine are demolished.

A new lime slaker is constructed at Nordic to replace the Stanleigh slaker.

1997 In April, the federal government issues its response to the FEARO Panel Report.

In October, Rio Algom received a license from the Atomic Energy Control Board and an authorization from the DFO for Stanleigh Mine decommissioning. This allowed for the demolition of the buildings to commence, and construction of new dams at the tailings management area to provide for the long-term containment and flooding of the tailings.

Nordic townsite and trailer park were closed, buildings removed and site graded in preparation for seeding.

New effluent treatment plants were constructed at Nordic and Pronto for the long-term treatment of site discharges.

1998 Rio Algom completed public consultation sessions as part of the process to have Prescribed Substance Licenses issued by the Atomic Energy Control Board for tailings at Pronto, Nordic/Buckles, Lacnor, Milliken and Spanish American sites.

Site reclamation activities at Stanleigh progress to substantial completion both on the mine site and in the TMA.

Remediation and upgrading commences for the long-term stabilization of the old, dry tailings management areas at Lacnor, Nordic and Pronto.

Rio Algom Limited contracted Mine Waste Management Inc. to carry out the operation of the effluent treatment plants and environmental monitoring programs for all of its Elliot Lake properties.

Rio Algom Limited established a public advisory committee, Decommissioning Review and Advisory Committee, made up of ten members from the three communities in the Serpent River Watershed : Elliot Lake, Township of the North Shore, and Serpent River First Nation. The committee's mandate is to provide input and feedback to Rio Algom on the community concerns regarding decommissioning and ongoing monitoring.

1999 Reclamation work is completed at Stanleigh mine site and tailings management area. Removal of the western freshwater diversion dams is successfully completed. In the tailings management area all containment dams and the spillway are completed and flooding is underway.

New spillways at the Quirke and Panel tailings management areas are constructed.

Environmental Assessment document is issued to support the application for a Prescribed Substance License for tailings at Pronto, Nordic/Buckles, Lacnor, Milliken and Spanish American sites to the Atomic Energy Control Board.

The population of Elliot Lake is estimated to be approximately 13,500, which includes about 4,000 seniors who have moved to the community in recent years in response to the very successful Retirement Living Program initiated by Rio Algom, Denison Mines, and the City of Elliot Lake in 1987.

Rio Algom Limited
Elliot Lake Division

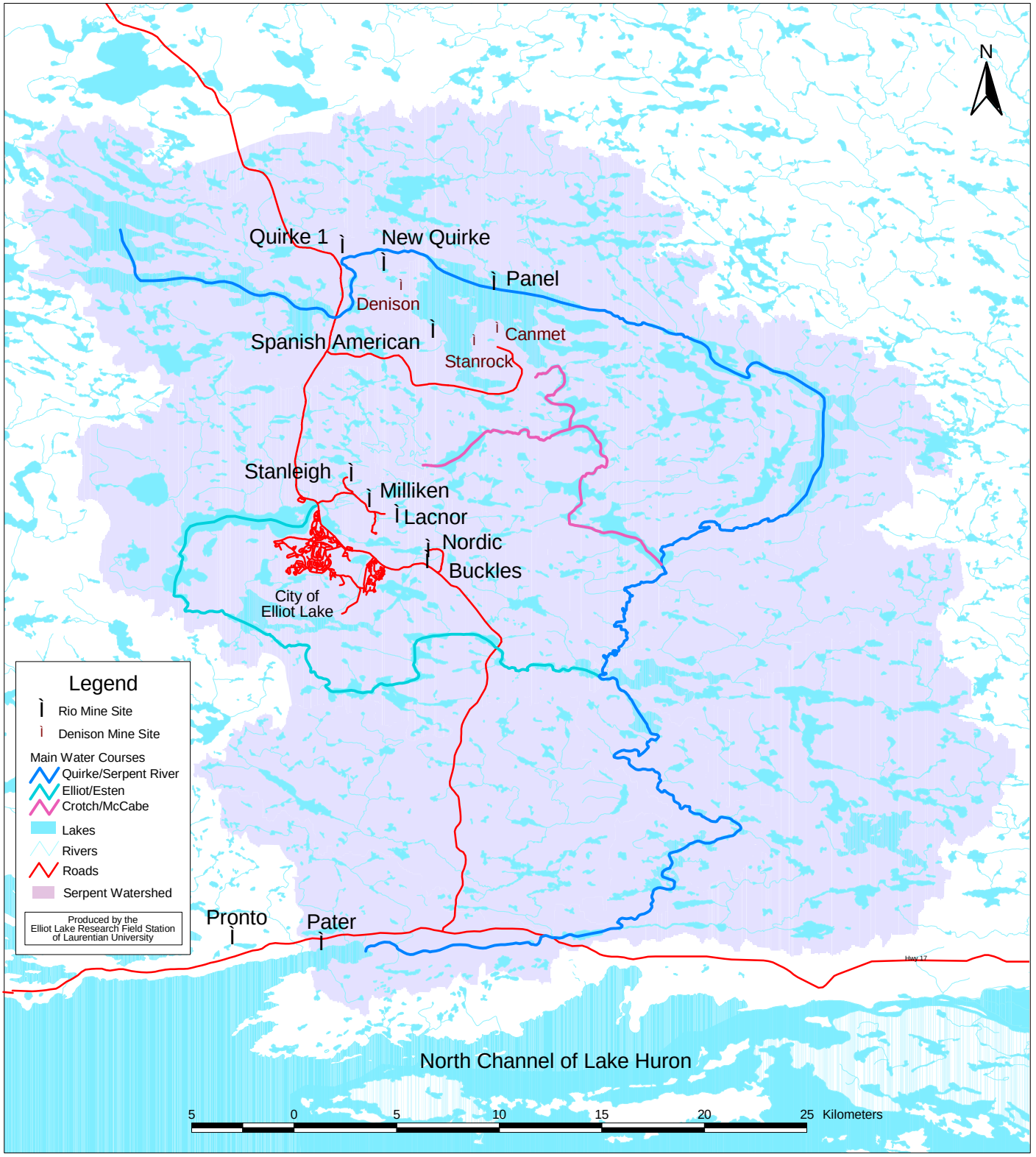
Mine Status Report

Rio Algom Limited owned and operated nine uranium mines in Elliot Lake. All of these mines have now been closed and mine closure plans have been implemented.

Mine	Date Operations Ceased
Stanleigh	June 30, 1996
Quirke	August 31, 1990
Panel	August 31, 1990
Spanish American	1959
Milliken	1964
Lacnor	1960
Nordic	1968
Buckles	1958
Pronto	1960

In addition, Pater Mine, a copper mine which operated from 1960 to 1970 and shipped ore to the Pronto mill for processing has been fully reclaimed.

Serpent River Watershed
Former Mine Site Locations



Stanleigh Mine, circa 1996

Stanleigh Mine underground shift

Rock bolting, Stanleigh Mine

BHP Billiton

Rio Algom Limited

Elliot Lake Operations

Key Issues

Rio Algom Limited
Elliot Lake Division

KEY ISSUES

There are a number of central issues or concerns that Rio Algom Limited has taken into consideration in developing and implementing their decommissioning plans in Elliot Lake. These issues include:

- The Objectives of the Decommissioning Plans
- The Regulatory Process
- The Timeframe for Decommissioning
- Site Specific Issues
- Selection of Contractors and Contractor Employee Training
- Public Information Needs and Consultation Processes
- Financial Assurances
- The Long-Term Requirements
  - **Care and maintenance of sites**
  - **Environmental monitoring issues**
- Site Management
  - **Regulatory and public involvement issues**
  - **Proposed land use once decommissioned**

Uranium Tailings:

- Low level radioactive wastes

- Potentially acid generating wastes and mines

Fundamental Mine Reclamation Issues

Two primary issues related to the Elliot Lake mine reclamation programs are:

A. Risk (long-term structural stability)
B. Institutional Burden (care and maintenance)

Studies to respond to these concerns typically include:

- Risk and probability of failure
- Environmental consequences of failure
- Care and maintenance program
- Anticipated present-day-cost of care and maintenance

Rio Algom Limited
Elliot Lake Division

SUMMARY OF DESIGN CRITERIA AND OBJECTIVES FOR ONGOING CARE AND MAINTENANCE

Issues	Criteria and Objectives	Reference
Dam stability	• **Static factor of safety of 1.5** • **Dynamic factor of safety 1.2** • **Design seismic event 1 in 1,000 years** • **Peak ground acceleration 0.049g** • **No catastrophic failure under the maximum credible earthquake of 0.065g**	**CANMET, MNDM, Canadian Dam Safety Guidelines**
Hydraulic Design	• **System to safely convey the Probable Maximum Flood without jeopardizing integrity of dams and spillways** • **Drain system to handle 1 in 100 year flows (7.6 inches of precipitation in 12 hours)**	**MNDM**
Environmental	• **Minimize acid generation** • **Effluent to meet C of A criteria (at Nordic) set out by AECB and other regulatory agencies** • **Reduce airborn pollution** • **Reduce radionuclide exposure**	**AECB**
Mine Stability	• **Cap all mine openings to surface** • **Identify or manage areas of potential surface instability**	**MNDM**
Mill Site Rehabilitation	• **Dispose of and remediate contaminated soils and waste** • **Return site to pre-development state**	**MNDM**
Esthetics	• **Establish vegetative growth on tailings** • **Provide adequate water cover**	**MNDM**
Care and Maintenance	• **Minimize human intervention and active care**	**MNDM**

BHP Billiton

Rio Algom Limited

Elliot Lake Operations

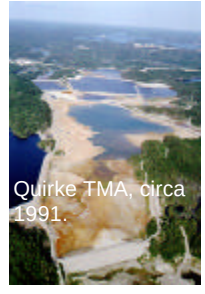
Site Remediation

MINE CLOSURES AND REMEDIATION

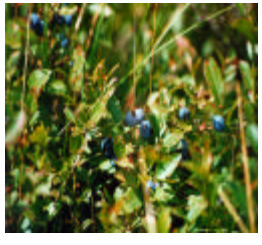

Marshland downstream from Stanleigh Mine.

Rio Algom, as owner-operator of three recently producing mines together with six much older, non-producing facilities, commenced a rigorous program of issue assessment, closure and decommissioning plan preparation and site rehabilitation in 1990 addressing all of their nine Elliot Lake properties.

In decommissioning the Quirke, Panel and Stanleigh tailings areas, the primary environmental issues were preventing or controlling the long-term production of acid and the contamination of water by radioactive materials. In 1996, a public review panel appointed by the Canadian Environmental Assessment Agency accepted and supported Rio Algom's proposal to cover these tailings with water. Dams and dykes were built to create ponds that submerged the tailings. Since the material is no longer exposed to air, the formation of acid is limited. The water also acts as a barrier to radiation releases. Water flowing off the sites will continue to be treated until water quality in the tailings ponds has stabilised and meets public objectives.

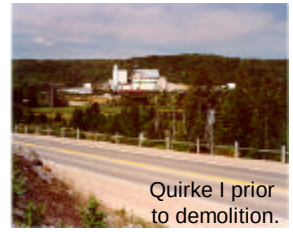

Quirke TMA, circa 1991.


Quirke TWMA, circa 1996.



The geography around some of the older sites does not allow for the safe flooding of tailings. Instead, these areas have been vegetated to control dust and surface run-off, and seepages are collected for treatment.

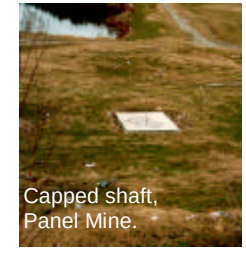

Field work, Quirke TMA.


Quirke I prior to demolition.

Rio Algom Limited is very pleased that they have been able to design decommissioning plans that seem to meet the needs of all key stakeholders. During the 1990s, most visible structures, including mills, storage tanks and conveyors were removed. Mine entrances were sealed, and the land recontoured to reflect its natural shape and revegetated. The continuing reclamation is one of the largest projects of its kind in North America.

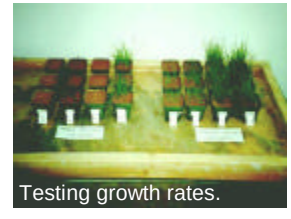

Quirke I after demolition.

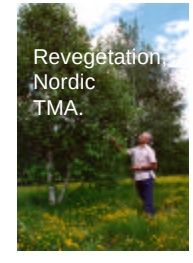

Quirke TMA.


Capped shaft, Panel Mine.

Rio Algom's environmental reclamation work is viewed within the mining industry as a case history in proper reclamation as they are seen as meeting current industry standards and the high expectations of society. As such, the sites continue to attract a high level of interest from the public, regulatory agencies, and the mining industry. Environmentally sound mine closure and reclamation programs combined with effective public consultation and community relations are critical elements in the overall mining life cycle and to the future health of a mining company like Rio Algom.


Panel Mine before demolition.


Testing growth rates.


Revegetation, Nordic TMA.

Currently, Rio Algom is a participant in a number of collaborative research projects in Elliot Lake and around the world. These include university-based research into water covers and the effects of dissolved organics on metal toxicity in fish, and government studies of aspects of the milling process and the effects of weathering on mine rock and tailings. Rio Algom is a founding member of the new International Network on Acid Prevention.


Panel Mine after demolition.

Since 1985, Rio Algom has dismantled and cleaned up mine sites in the Elliot Lake region, working with the government, the community, the Serpent River First Nation, and interest groups. In 1997, Rio Algom was presented with the Prospectors and Developers Association of Canada Environment Award for its work in the area.


Dry cover revegetation, Lacnor TMA.

Rio Algom Limited
Elliot Lake Division

SITE REMEDIATION

General Objectives

- Return sites to natural state/conditions.
- Ensure all emissions to environment (in perpetuity) meet relevant regulated levels (air, water, ground water).
- Safe for present and future generations.
- No need for active, long-term institutional controls, passive systems

Demolition/Site Restoration Plan

Rio Algom followed seven steps in implementing their decommissioning plans.

Objective	Implementation Steps
1. Define the final objective taking into account regulations and company objectives	
2. Conduct an environmental and safety audit of the property	• Hazardous materials • Hydrocarbons • Designated substances • Potential physical hazards to contractors unfamiliar with the property
3. Determine regulatory requirements for disposal, permits, etc.	
4. Determine disposal sites for hazardous materials, recyclable materials and non-recyclable materials	
5. Develop a comprehensive list of tasks to be completed	• Catalogue saleable assets and remove to a central area • Remove and dispose of hazardous materials • Disconnect services, possible provide for ongoing services to effluent plant or other buildings • Demolish buildings • Sort and dispose of recyclable and non-recyclable demolition debris • Break foundations • Grade site, provide drainage • Apply topsoil • Conduct a post remediation survey • Seed • Any other tasks
6. Develop a timetable	
7. Determine whether or not to contract project management or do in-house	

Regulatory Process and Experience

Decommissioning of minesites is a government-regulated process under which land previously used for mining is reclaimed and restored in a manner designed to protect the environment and public health and safety. This process involves the comprehensive review of a mining facility in order to determine possible alternatives for decommissioning.

Because the Elliot Lake mines mined uranium, decommissioning is regulated by the **Canadian Nuclear Safety Commission** and its many Federal and Provincial advisory agencies. These include:

- Federal Department of Oceans and Fisheries
- Environment Canada
- Department of Indian Affairs and Northern Development
- Transport Canada
- Ontario Ministry of Northern Development and Mines
- Ontario Ministry of the Environment
- Ontario Ministry of Natural Resources
- Ontario Ministry of Labour

Decommissioning Plan in Summary

A. Underground

- Remove hazardous material and dispose of correctly
- Seal all openings to underground
- Demonstrate short and long-term stability of mine (studies)
- Demonstrate no adverse environmental impact of mine flooding (studies)

B. Surface

- Clean out all circuits
- Remove and dispose of correctly all potentially hazardous materials
- Demolish all structures
- Rehabilitate site to allow natural revegetation
- Demonstrate no adverse environmental impact

C. Tailings Management Area

- Contain wastes by placing in a natural rock lined and rimmed valley of very low permeability with properly engineered and constructed low permeability dams at all low points
- Flood tailings surface to reduce or eliminate radiation emission or acid generation
- Demonstrate long-term safe and stable containment with no unacceptable adverse environmental impacts

Demolition and Reclamation Project Management Alternatives

Two Options were assessed and implemented for the demolition and reclamation of the minesites.

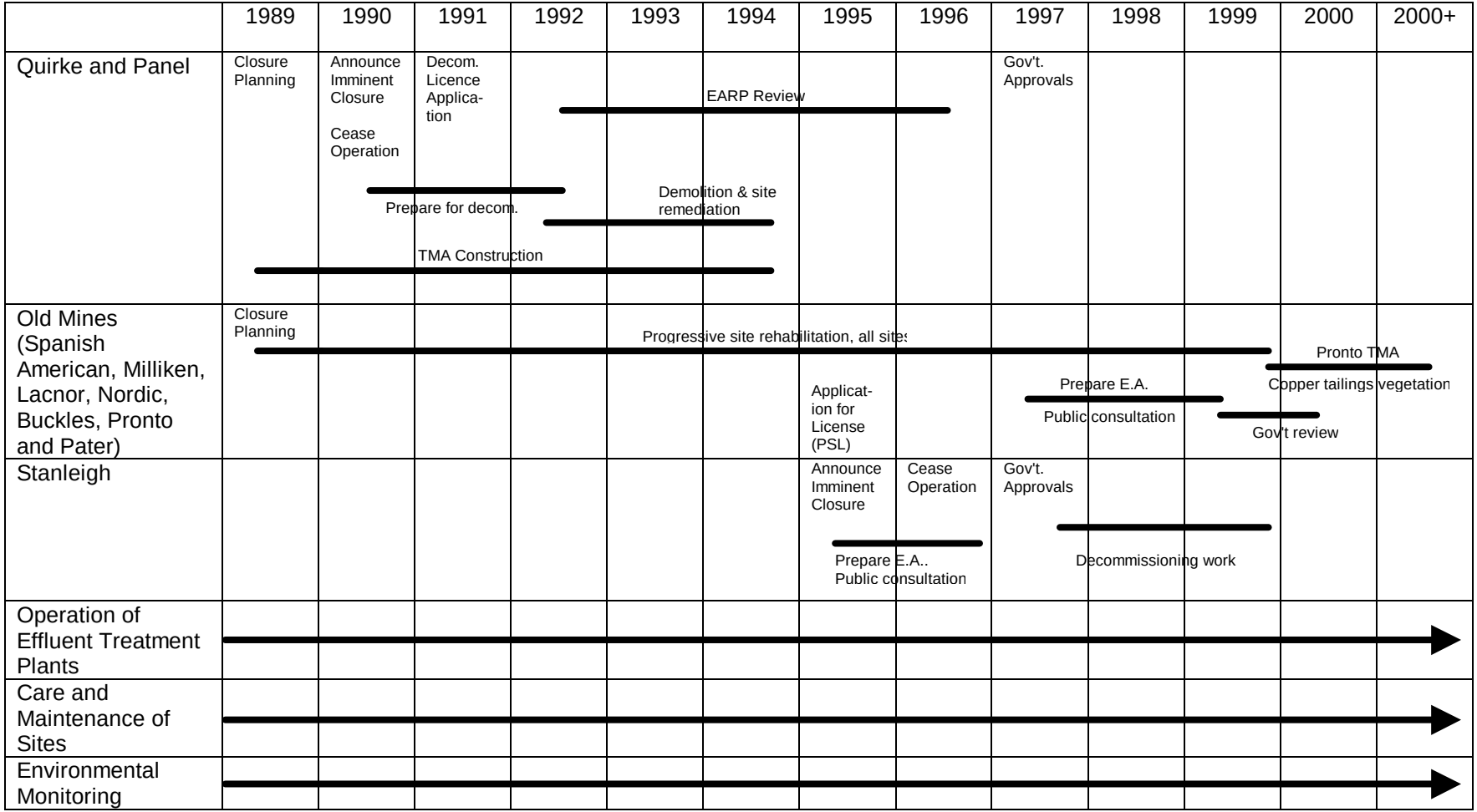
1. CONTRACT THE ENTIRE PROJECT TO A PROJECT MANAGER

- "Turnkey Project", site decontamination, demolition, asset sales, grading, etc. contracted as a package. Project management lies largely with the General Contractor.
- This option was used for the Quirke and Panel sites
- Main Drawbacks
  - few qualified companies in this field
  - more expensive

2. IN-HOUSE PROJECT MANAGEMENT

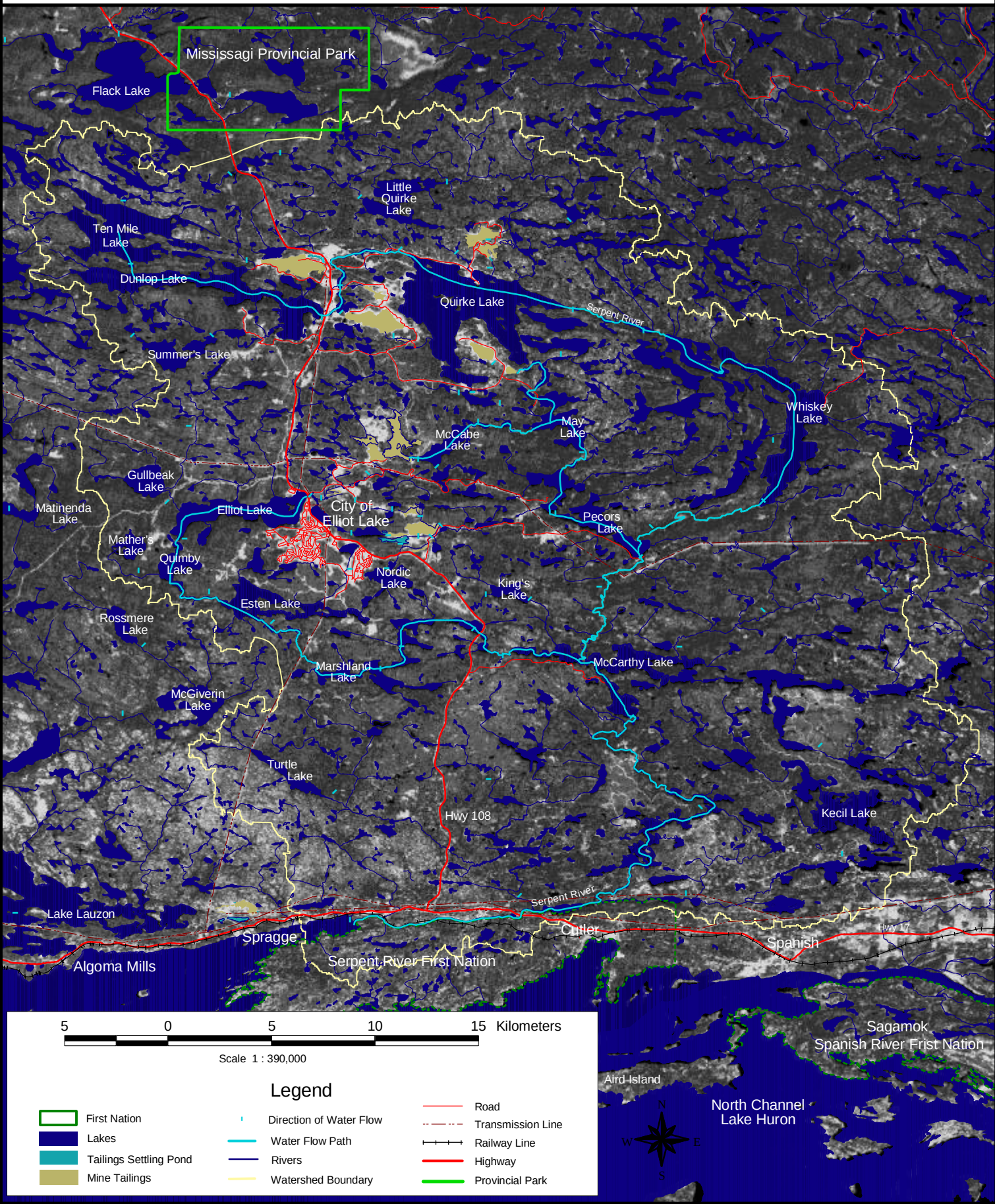
- Small in-house group performs project management
  - Project manager
  - Environmental/Safety person
  - Contract Administrator
- Tender individual tasks to qualified specialized contractors
- This option was used for the Stanleigh and closed minesites
- Advantages
  - Less expensive
  - Easier to maintain schedules and project control
  - Can be more selective in choosing contractors

Rio Algom Limited
Elliot Lake Mines - Closure Schedule



Elliot Lake and the Serpent River Watershed

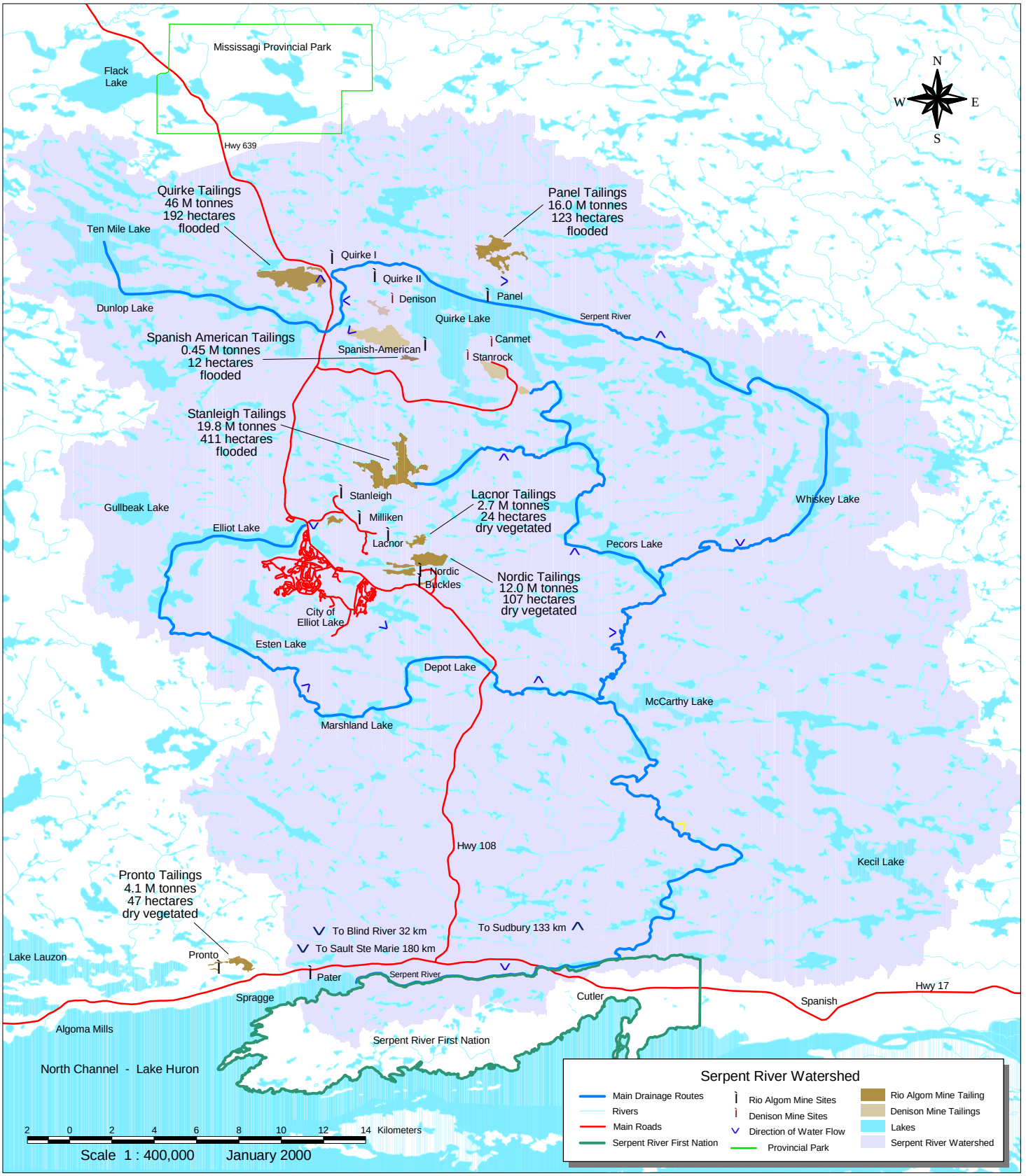
1986 Landsat Satellite Image and Significant Features



Legend

- First Nation
- Lakes
- Tailings Settling Pond
- Mine Tailings
- Direction of Water Flow
- Water Flow Path
- Rivers
- Watershed Boundary
- Road
- Transmission Line
- Railway Line
- Highway
- Provincial Park

Serpent River Watershed - Former Rio Algom Mine Site Locations



Nordic Mine Reclamation

1956
Mine at start of operations

1994
Prior to final demolition

1999
Revegetated site

Lacnor Mine Reclamation

1994
Prior to final
demolition

1995
Demolition
complete

1999
Revegetated site

Milliken Mine Reclamation

1994
Prior to
demolition

1995
Demolition started

1999
Revegetated site

Stanleigh Mine Reclamation

1994
Mine in operation

1998
Demolition near completion

1999
Revegetated site

Panel Mine Reclamation

1992
Prior to
demolition

1994
Demolition near
completion

1999
Revegetated site

Quirke Mine Reclamation

1988
In Operation

1994
Demolition near completion

1999
Revegetated site

Pronto Mine Reclamation

1957
Mine at start of operations

1994
During demolition

1999
Revegetated site

Spanish American Mine Reclamation

1957
Mine at start of operations

1994
During demolition

1999
Revegetated site

Asset Recovery and Sales Program

High pressure water cleaning of equipment

Scrap steel recovery

Cleaned equipment ready for sale

Hazardous Material Abatement and Disposal

Licenced PCB storage site of specially modified containers; prior to shipping for disposal.

Collection and sorting of hazardous materials for disposal by hazardous waste disposal company.

Asbestos siding removed by specialty contractor; disposal in dedicated asbestos landfill site in tailings management area.

Collection and storage of waste oils prior to shipping by waste oil handler.

Shaft Closure

Upgrading of collar and cap on previously filled and capped raises.

Repaired shaft collar in preparation for cap.

Placing reinforced concrete slabs on shaft collar.

Completed shaft cap with 4-inch concrete topping on slabs. Soil cover still to placed on concrete cap.

Site Remediation

Radiation scans and removal of above criteria rock and soils. Similar program carried out for hydrocarbons.

Final clean-up: placement of clean fill and regrading of mine site.

Disposal of all non-recyclable materials, demolition waste and site clean up debris in landfill site in tailings management area, covered with sand and then flooded. Hydrocarbon contaminated soil was disposed of in selected shafts.

Revegetated mine site. Seeding carried out with conventional agricultural equipment and hydroseeding.

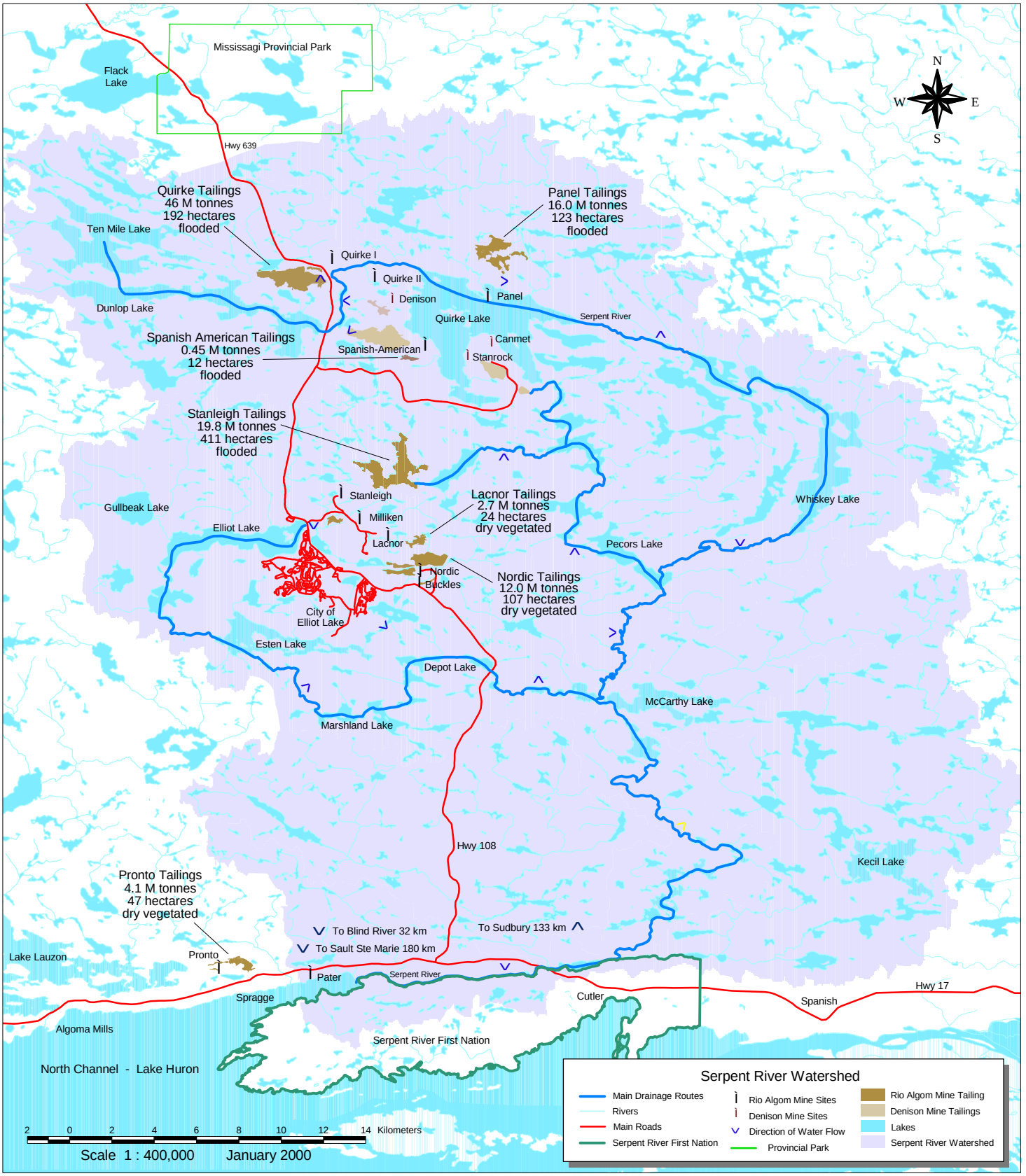
BHP Billiton

Rio Algom Limited

Elliot Lake Operations

Tailings Management

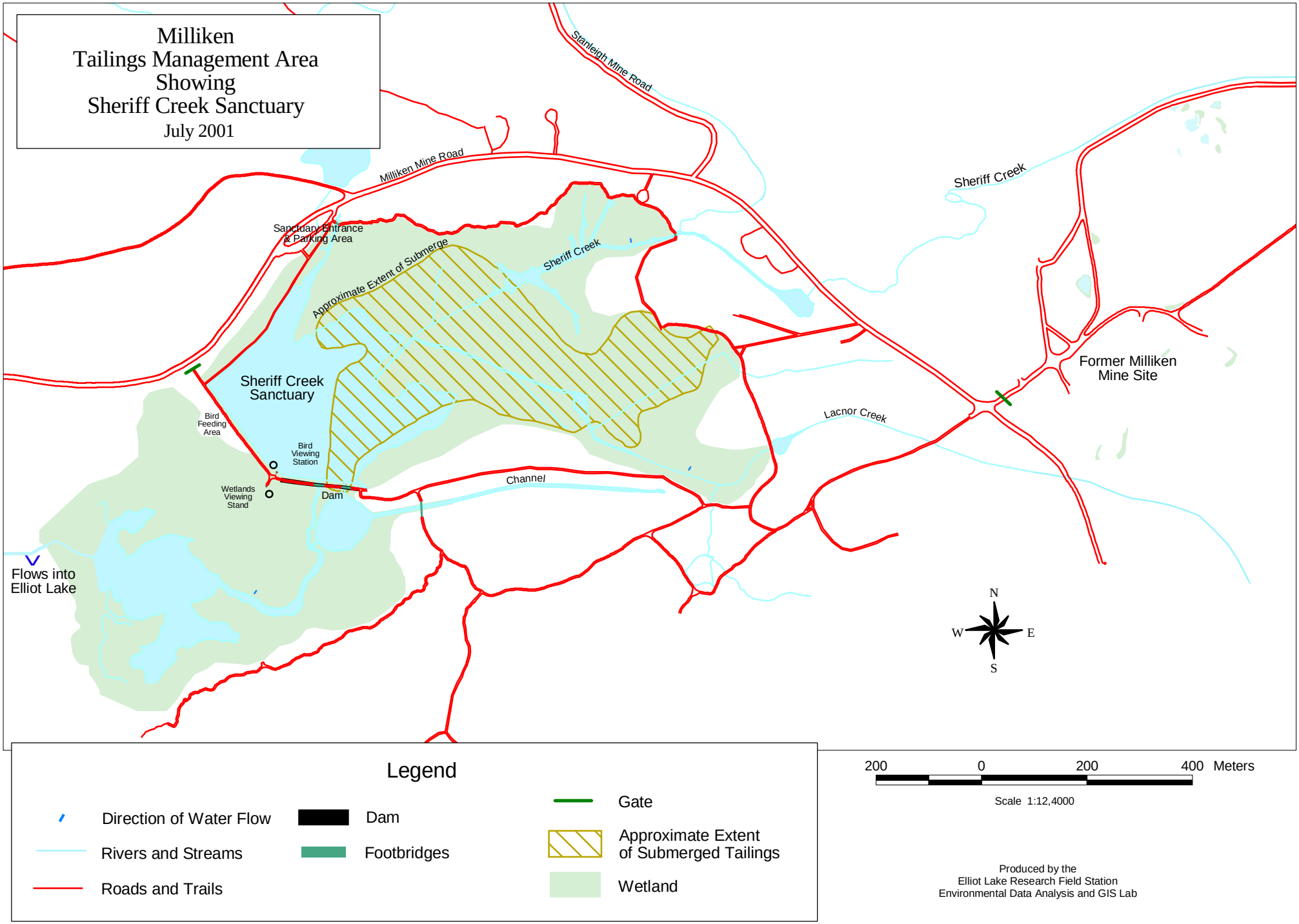
Serpent River Watershed - Former Rio Algom Mine Site Locations



Milliken
Tailings Management Area

Fact Sheet Photograph

Milliken Mine and Mill Site Viewed from the East - August 1999


Milliken
Tailings Management Area
Showing
Sheriff Creek Sanctuary
July 2001
Stanleigh Mine Road
Milliken Mine Road
Sanctuary Entrance & Parking Area
Approximate Extent of Submerge
Sheriff Creek
Sheriff Creek
Sheriff Creek Sanctuary
Bird Feeding Area
Bird Viewing Station
Wetlands Viewing Stand
Dam
Channel
Lacnor Creek
Former Milliken Mine Site
Flows into Elliot Lake
N
W
E
S
Legend
Direction of Water Flow
Rivers and Streams
Roads and Trails
Dam
Footbridges
Gate
Approximate Extent of Submerged Tailings
Wetland
200
0
200
400 Meters
Scale 1:12,4000
Produced by the
Elliot Lake Research Field Station
Environmental Data Analysis and GIS Lab

Lacnor
Tailings Management Area

Fact Sheet Photograph

Lacnor TMA Looking to the North-East - September 1999

Lacnor
Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

Surface drainage and seepage through the dams of the Lacnor TMA discharge to the Nordic TMA. These flows are collected with those from the Nordic TMA and are directed to the Nordic Effluent Treatment Plant (ETP). Projections of future acid production indicate the exposed pyrite above the water table could continue to generate acidic seepages for many years.

The Nordic ETP was replaced in 1998 and a lime slaking plant was installed and commissioned in 1996/1997. The ETP treats between 10 L/s and 700 L/s of effluent with lime to neutralize acidity. Plant operations are automated and monitored on a 24 hour a day basis. The ETP operates under a provincial Certificate of Approval issued under the *Ontario Water Resources Act*.

The Lacnor tailings basin was vegetated in the 1970s; however, much of the vegetation has died back as a result of acidic conditions. The bare tailings surfaces were revegetated in 1998-1999 through the placement of an engineered cover consisting of a rock/gravel layer under a layer of till as the growth medium.

Site operations include regular surface water quality monitoring of the adjacent water bodies, Lacnor Creek and Dumbell Lake. Historic and 1996 annual average values indicate little or no influence of the mining activities on either water body.

Lacnor Dam A Construction Winter 1999

HISTORY

The Lacnor mine operated from September 1957 to July 1960. The rated capacity of the mill was 2,720 tonnes/day, and the mill processed a total of 2.7 million tonnes of ore. The resulting tailings were deposited in a natural valley about 2 km east of the mill and minesite and contained by the construction of two pervious waste rock dams on the southern perimeter. The 24 hectare Tailings Management Area (TMA) also contains a landfill for contaminated materials and wastes arising from the Lacnor and Milliken mine/mill site demolition and reclamation. In 1998-1999 the tailings containment structures and precipitation run-off management facilities were upgraded to current Rio Algom Limited standards.

Surface water and dam seepage generated in the 100 hectare watershed of the Lacnor TMA is routinely monitored as it discharges to the Nordic TMA where it is collected and treated along with the Nordic effluent.

The water table in the TMA is near the surface and serves to control acid generation, radon and other radiation levels at surface.

Nordic
Tailings Management Area

Fact Sheet Photograph

Nordic TMA Viewed From the West - September 1999

Nordic Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

Surface drainage and seepage from the Nordic TMA are intercepted by a perimeter ditch which conveys the water to an Effluent Treatment Plant (ETP). Seepage from the West Arm is intercepted by the Westner Lake seepage collection system, and is pumped to the Nordic Settling Pond.

The Nordic ETP was replaced in 1998. A lime slaking plant was installed and commissioned in 1996/1997. The ETP treats between 10 L/s and 700 L/s of effluent with lime to neutralize acidity. Plant operations are automated and monitored on a 24 hour a day basis. The ETP operates under a provincial Certificate of Approval issued under the *Ontario Water Resource Act*.

The acidity loading reaching the Nordic ETP has declined from a peak of 3,500 tonnes of calcium carbonate equivalent per year in 1988 to 900 tonnes per year in 1998. Rio Algom anticipates that the effluent quality will continue to gradually improve over time to a point where treatment will no longer be required.

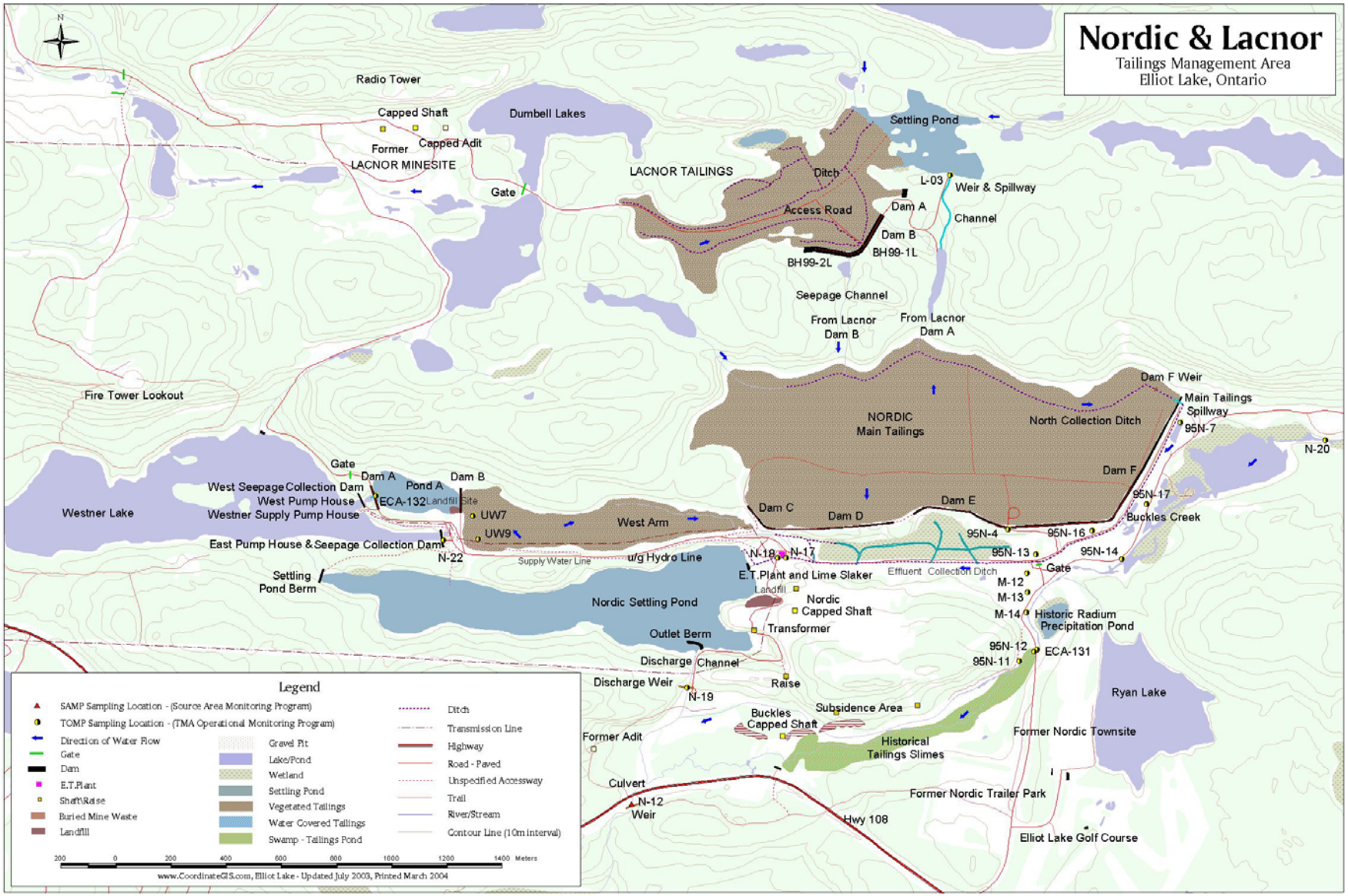
Nordic ETP and Former Mine Site 1998

Nordic Dam E Toe Berm Upgrade 1999

HISTORY

The Nordic mine operated from January 1957 to mid-1968. The mill operated at a nominal capacity of 3,000 tonnes per day. Twelve million tonnes of tailings were produced during the period of operations and are deposited in the Nordic Tailings Management Area (TMA) in two principal areas covering 107 hectares. The main tailings area measures 1,500 m long by 600 m wide and was constructed using mine waste embankments. The smaller western arm was developed first and measures 1,000 m long by 100 m wide. The surface of the tailings was successfully revegetated about 20 years ago. In 1998-1999 the tailings containment structures and precipitation management facilities were upgraded to current Rio Algom standards.

During operations, some very fine grained tailings and precipitates from the treatment plant remained suspended in the original outflow from the Nordic TMA and settled out in a wetland area along Buckles Creek. The resulting 42,000 m^3 deposit will continue to be treated in-situ by the naturally occurring wetland. Buckles Creek now bypasses the deposit.


Nordic & Lacnor
Tailings Management Area
Elliot Lake, Ontario
Radio Tower
Capped Shaft
Capped Adit
Former
LACNOR MINESITE
Dumbell Lakes
Gate
LACNOR TAILINGS
Ditch
Settling Pond
L-03
Weir & Spillway
Channel
Access Road
Dam A
Dam B
BH99-1L
BH99-2L
Seepage Channel
From Lacnor
Dam B
From Lacnor
Dam A
Fire Tower Lookout
NORDIC
Main Tailings
North Collection Ditch
Dam F Weir
Main Tailings
Spillway
95N-7
N-20
Dam F
Gate
Dam A
Dam B
West Seepage Collection Dam
Pond A
West Pump House
ECA-132
Landfill Site
Westner Supply Pump House
Westner Lake
UW7
UW9
West Arm
Dam C
Dam D
Dam E
95N-17
Buckles Creek
95N-4
95N-16
95N-13
95N-14
Gate
East Pump House & Seepage Collection Dam
N-22
Supply Water Line
u/g Hydro Line
N-18
N-17
E.T.Plant and Lime Slaker
Effluent Collection Ditch
M-12
M-13
M-14
Historic Radium
Precipitation Pond
Settling
Pond Berm
Nordic Settling Pond
Landfill
Nordic
Capped Shaft
Transformer
Outlet Berm
Discharge Channel
Discharge Weir
N-19
Raise
95N-12
95N-11
ECA-131
Ryan Lake
Subsidence Area
Buckles
Capped Shaft
Former Adit
Historical
Tailings Slimes
Former Nordic Townsite
Culvert
N-12
Weir
Hwy 108
Former Nordic Trailer Park
Elliot Lake Golf Course
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Buried Mine Waste
Landfill
Gravel Pit
Lake/Pond
Wetland
Settling Pond
Vegetated Tailings
Water Covered Tailings
Swamp - Tailings Pond
Ditch
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m interval)
200 0 200 400 600 800 1000 1200 1400 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Pater Mine Site

Fact Sheet

Pater Mine in Operation. Circa 1970

HISTORY

Pater Mine was the only base-metal (copper), non-uranium mine in the Elliot Lake region owned by RioAlgom Limited.

The mine operated from 1961 to April 1970, producing some 2.3 million tons of copper ore at an average grade of approximately 2%.

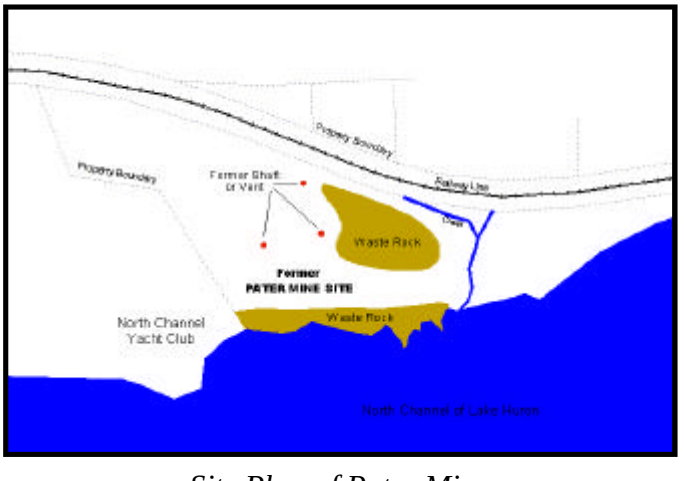
Ore raised to surface was trucked to the adjacent Pronto mine site for processing.

Site reclamation has been undertaken progressively since the mine closed and was completed in 1994/1995. Remediation comprised capping of the shafts, demolition and removal of all surface structures, regrading of the site and subsequent revegetation. The program is considered 100% complete and discussions have been initiated with the province for return of the property to the Crown.

Adjacent to the mine site, Rio Algom assisted in establishing the North Channel Yacht Club on lands originally owned by the mine.

Former Pater Mine from the North-East - 1999

The mine site now affords excellent views of the Serpent River estuary and the North Channel of Lake Huron.



Site Plan of Pater Mine

Panel
Tailings Management Area

Fact Sheet Photograph

Panel TMA Viewed from the West - September1999

Panel
Tailings Management Area
Fact Sheet

OPERATING REQUIREMENTS

The overflow from the Panel TMA South Basin enters the effluent treatment plant (ETP) where it is treated with a mixture of lime and barium chloride to neutralize acidity and remove radium. Given the water storage capacity of the TMA, it is only necessary to operate the plant during peak precipitation periods (spring and fall). Plant capacity ranges between 40 and 150 L/s with automated operations and 24 hour a day monitoring. The ETP operates under a federal Mining Facility Decommissioning Licence under the *Atomic Energy Control Act.*

In-basin addition of lime slurry was initiated in 1992 in order to neutralize historic acid products in the basin. Recent water column depth profiles indicate steady-state neutral conditions in both the Main and South Basins. Native aquatic plants and animals have established and are reproducing within the basin. A program for the assessment of in-basin surface water quality and habitat restoration as well as development of an on-going monitoring program commenced in the fall of 1999.

In 1999 the operating era emergency spillway was replaced with the permanent discharge spillway. Discharge from the TMA settling ponds is monitored daily, is of good quality, and consistently meets discharge limits. Surface water quality monitoring at nine locations relevant to the Panel site demonstrate that radiological and heavy metal releases are all very low and well within federal and provincial standards.

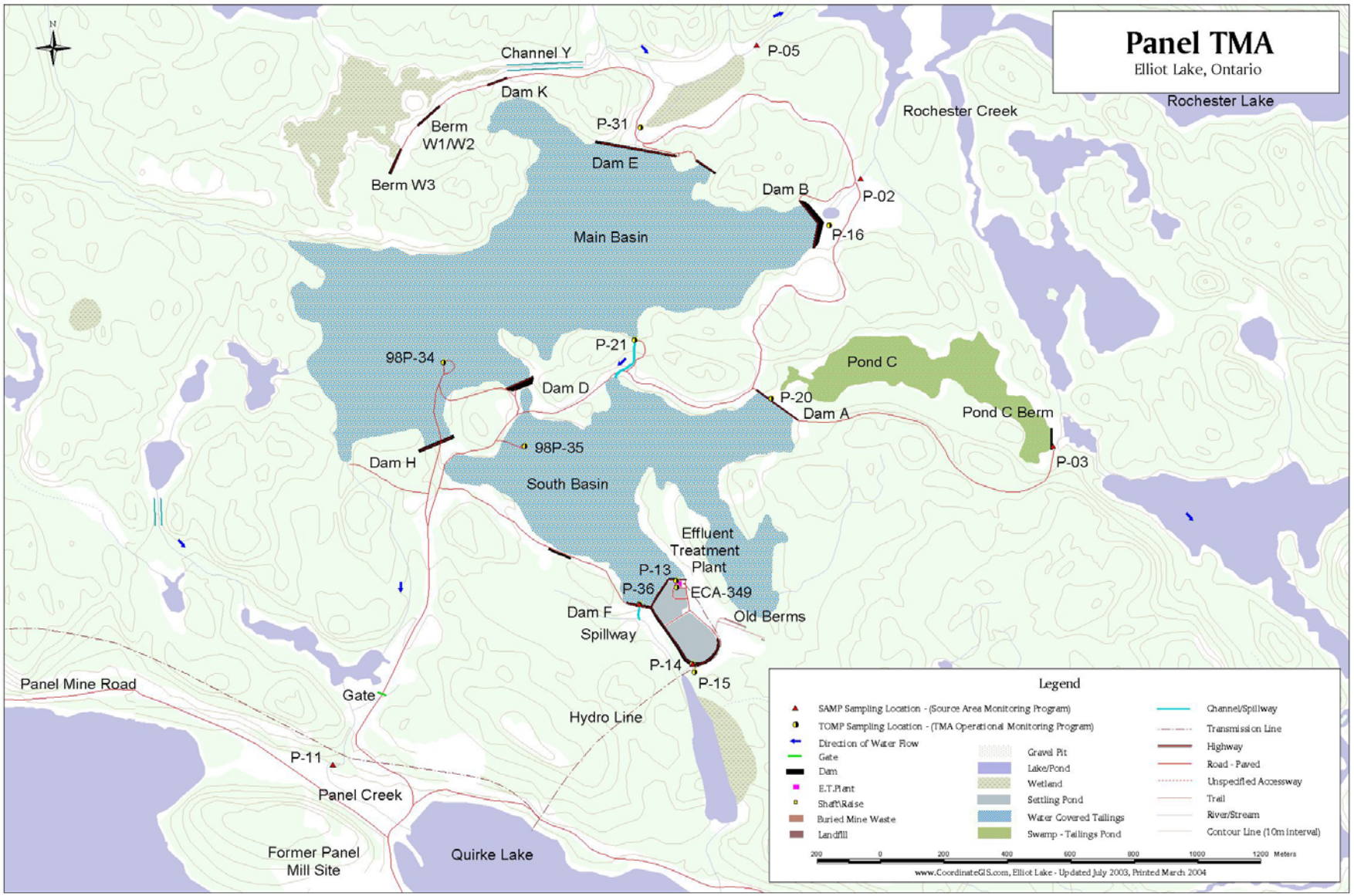
Panel Mine Site Post-Remediation Fall 1998

HISTORY

The Panel Mine and Mill produced uranium from 1958 to 1961, and following rehabilitation and upgrading, operated from 1979 to its closure in August 1990. The mill throughput design of 3,000 tonnes per day generated 15 million tonnes of tailings that were deposited in two bedrock-rimmed basins.

The Panel Tailings Management Area (TMA) is composed of the 84 hectare Main Basin and the 39 hectare South Basin with a total drainage area of 280 hectares. The South Basin contains a relatively small quantity of tailings deposited in the late 1950s that are retained by two engineered low permeability dams. The Main Basin tailings are contained within a bedrock basin enclosed by four engineered low permeability dams constructed along about 15% of the perimeter. Drainage from the Main Basin enters the South Basin via a spillway constructed in the rock rim between the basins. Flooding of both basins is preventing further acid generation and is reducing gamma radiation, radon and dust releases.

The TMA was extended in 1998-1999 to include the Panel Wetlands through the construction of an engineered dam at the outlet to Rochester Creek.


Panel TMA
Elliot Lake, Ontario
Channel Y
Dam K
Berm W1/W2
Berm W3
P-31
Dam E
P-05
Rochester Creek
Rochester Lake
Dam B
P-02
P-16
Main Basin
P-21
98P-34
Dam D
Pond C
P-20
Dam A
Pond C Berm
P-03
Dam H
98P-35
South Basin
Effluent Treatment Plant
P-13
P-36
ECA-349
Dam F
Spillway
Old Berms
P-14
P-15
Panel Mine Road
Gate
Hydro Line
P-11
Panel Creek
Former Panel Mill Site
Quirke Lake
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Buried Mine Waste
Landfill
Gravel Pit
Lake/Pond
Wetland
Settling Pond
Water Covered Tailings
Swamp - Tailings Pond
Channel/Spillway
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m interval)
200 0 200 400 600 800 1000 1200 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Pronto
Tailings Management Area

Fact Sheet Photograph

Pronto TMA Viewed From the South - September 1999

Pronto Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

Surface drainage from the entire 326 hectare site including the Pronto TMA is collected in the 24 ha holding pond. The pond drains westward to the Pronto effluent treatment plant (ETP).

The Pronto ETP was replaced in 1997/1998. The ETP operates 6 to 8 months/years with a maximum flow rate of 200 L/s. The effluent is treated with a mixture of lime and barium chloride to neutralize acidity and remove radium. Plant operations are automated and monitored on a 24 hour a day basis. The ETP operates under a provincial Certificate of Approval issued under the *Ontario Water Resources Act*.

The near surface acid-generating sulphides in the tailings are depleted. However, below a depth of 1 metre, the tailings are very wet and little acid generation has occurred. Acid production from the zone 0.3 m to 1 m in depth is declining, but will likely continue to require neutralization for many years.

Surface water quality monitoring is conducted at six locations relevant to the Pronto site. The Pronto mine effluent is of good quality, and consistently meets discharge limits.

Pronto Effluent Treatment Plant 1997

Pronto Paper Mill Sludge Test Plot 1999

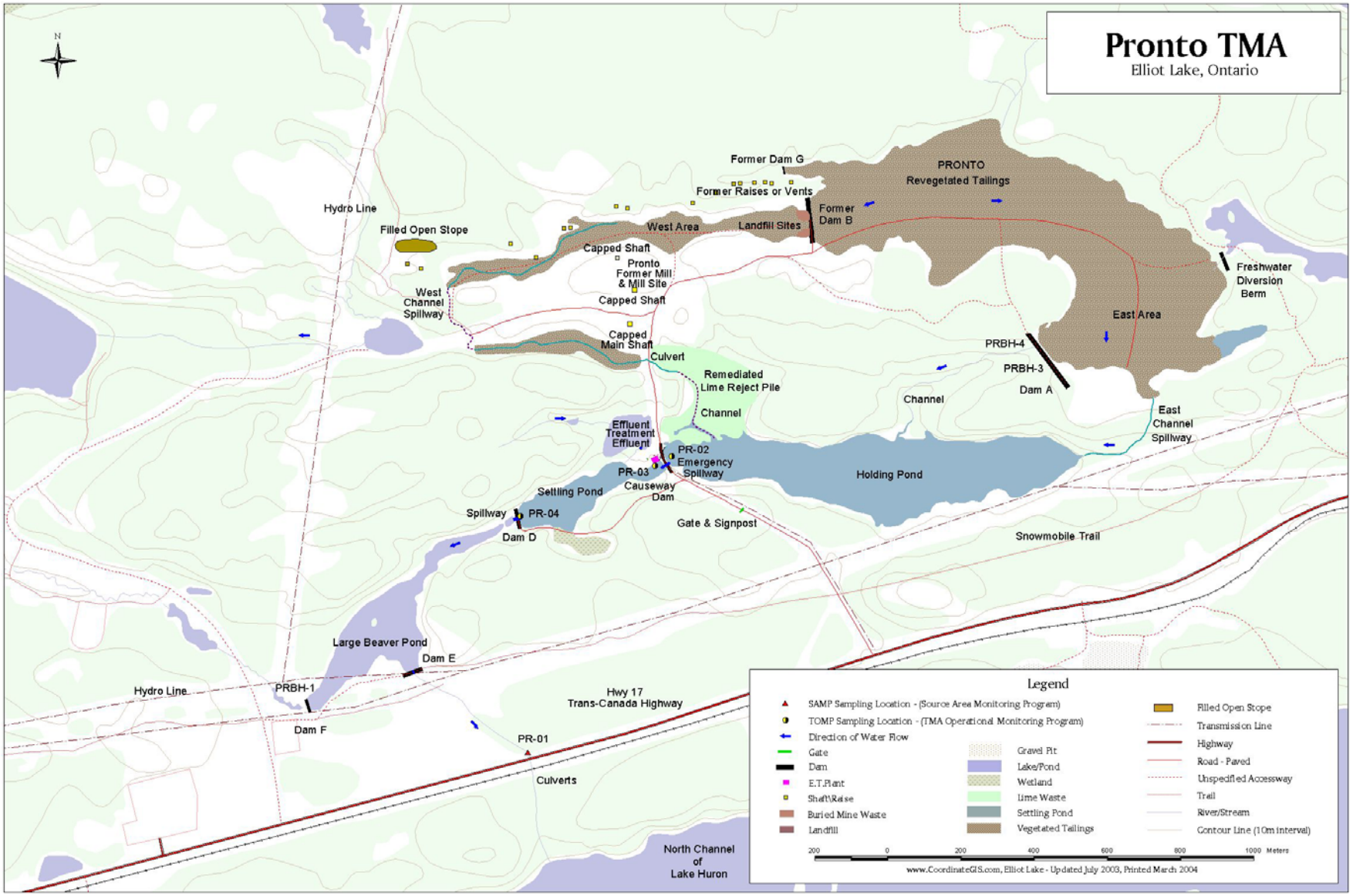
Water quality parameter levels in the receiving body (Lake Huron) approximate background levels.

HISTORY

The Pronto mill processed 2.1 million tonnes of uranium ore between 1955 and 1960. In 1960 the mill was converted to process copper ore from the Pater Mine located about 5 km to the east. Copper processing continued until 1970, producing an additional 2 million tonnes of tailings. The copper tailings are not prescribed substances subject to CNSC licensing.

Both uranium and copper tailings were deposited in a 47 hectare natural rock basin contained by a waste rock dam. In 1998-1999 the tailing containment structures and precipitation management facilities were upgraded to current Rio Algom Limited standards. The copper tailings generally overlay the uranium tailings and mitigate radiation levels released by the tailings.

The water table is generally high and is in part responsible not only for low rates of acid generation, but also for the partial failure of vegetation establishment at the site. Evaluation of paper mill sludge as a soil amendment to enhance establishment of sustainable vegetation is currently on-going at the Pronto site.


Pronto TMA
Elliot Lake, Ontario
N
Former Dam G
PRONTO
Revegetated Tailings
Former Raises or Vents
Former
Dam B
Hydro Line
Filled Open Stope
West Area
Landfill Sites
Capped Shaft
Pronto
Former Mill
& Mill Site
Capped Shaft
West
Channel
Spillway
Capped
Main Shaft
Culvert
Remediated
Lime Reject Pile
Channel
Freshwater
Diversion
Berm
East Area
PRBH-4
PRBH-3
Dam A
Channel
East
Channel
Spillway
Effluent
Treatment
Effluent
PR-02
Emergency
Spillway
PR-03
Causeway
Dam
Holding Pond
Settling Pond
Spillway
PR-04
Dam D
Gate & Signpost
Snowmobile Trail
Large Beaver Pond
Dam E
Hydro Line
PRBH-1
Dam F
Hwy 17
Trans-Canada Highway
PR-01
Culverts
North Channel
of
Lake Huron
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Buried Mine Waste
Landfill
Gravel Pit
Lake/Pond
Wetland
Lime Waste
Settling Pond
Vegetated Tailings
Filled Open Stope
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m interval)
200 0 200 400 600 800 1000 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Quirke
Tailings Management Area

Fact Sheet Photograph

Quirke TMA Viewed from the North-West - August 1999

Quirke Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

The overflow from the 275 hectare Quirke TMA drainage basin enters the effluent treatment plant (ETP) where it is treated with a mixture of lime and barium chloride to neutralize acidity and remove radium. The plant operates year round at a capacity of between 25 and 160 L/s. Plant operations are automated and monitored on a 24 hour a day basis. The ETP operates under a federal Mining Facility Decommissioning Licence under the *Atomic Energy Control Act.*

In-basin addition of lime slurry was initiated in 1992 in order to neutralize historic acid products in the basin. Recent water column depth profiles indicate steady-state neutral conditions in the upstream cells and improving conditions in downstream cells. Native aquatic plants and animals have established and are reproducing within the basin. A program for the assessment of in-basin surface water quality and habitat restoration as well as development of an on-going monitoring program commenced in the fall of 1999.

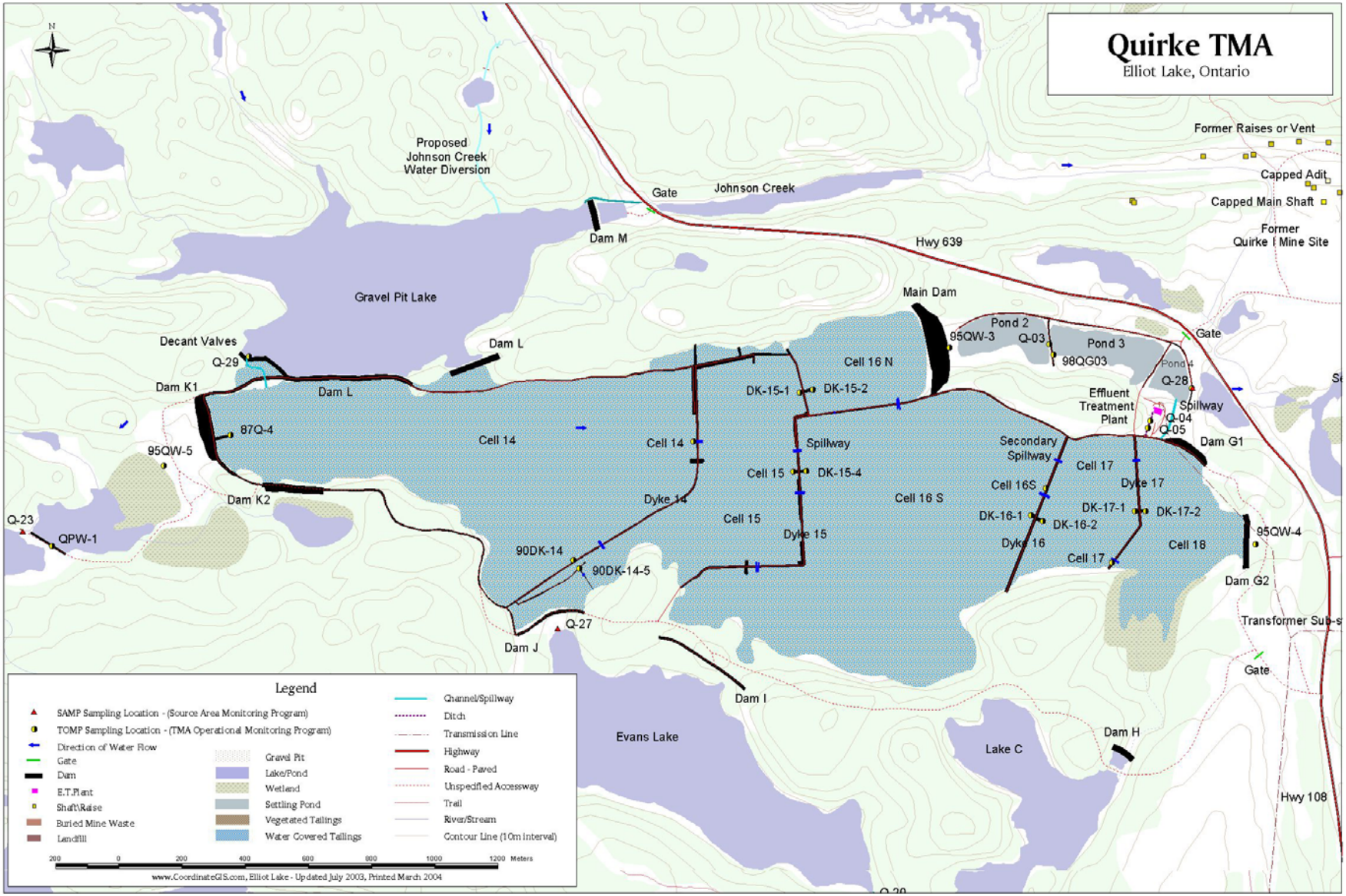
In 1999 the operating era emergency spillway was replaced with the permanent discharge spillway. Discharge from the TMA settling ponds is monitored daily, is of good quality, and consistently meets discharge limits. Surface water quality monitoring at twelve locations relevant to the Quirke site demonstrate that radiological and heavy metal releases are all very low and well within federal and provincial standards.

Loon Nesting in Cell 14 of Quirke TMA

HISTORY

The Quirke Mine and Mill operated from September 1956 to February 1961 and then again from mid-1968 to August 1990. The conventional acid leach milling circuit processed 2,700 tonnes per day (tpd) during early operations and up to 6,400 tpd during later operations. During operations some 42 million tonnes of neutralized tailings and 4 million tonnes of waste rock were deposited in the adjacent bedrock rimmed basin to form the Quirke Tailings Management Area (TMA).

Tailings are retained in the 192 hectare Quirke TMA by eight engineered low permeability dams constructed along about 20% of the perimeter. Several dykes have been constructed within the basin to form a flooded terrace configuration with a total drop in tailings surface elevation from west to east in the order of 14 metres. Since its installation in 1990, the resulting water cover has been shown to significantly reduce acid generation, radon levels and surface radiation.


Quirke TMA
Elliot Lake, Ontario
N
Proposed
Johnson Creek
Water Diversion
Gate
Johnson Creek
Dam M
Hwy 639
Former Raises or Vent
Capped Adit
Capped Main Shaft
Former
Quirke I Mine Site
Gravel Pit Lake
Main Dam
Pond 2
95QW-3
Q-03
Pond 3
98QG03
Gate
Pond 4
Q-28
Decant Valves
Q-29
Dam L
Dam K1
Dam L
Cell 16 N
DK-15-1
DK-15-2
Effluent
Treatment
Plant
Spillway
Q-04
Q-05
87Q-4
95QW-5
Cell 14
Cell 14
Spillway
Secondary
Spillway
Dam G1
Cell 15
DK-15-4
Cell 17
Cell 16S
Dyke 17
Dam K2
Dyke 14
Cell 16 S
DK-17-1
DK-17-2
Q-23
QPW-1
Cell 15
DK-16-1
DK-16-2
95QW-4
Dyke 15
Dyke 16
Cell 18
90DK-14
90DK-14-5
Cell 17
Dam G2
Transformer Sub-s
Q-27
Dam J
Gate
Dam I
Evans Lake
Lake C
Dam H
Hwy 108
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Buried Mine Waste
Landfill
Gravel Pit
Lake/Pond
Wetland
Settling Pond
Vegetated Tailings
Water Covered Tailings
Channel/Spillway
Ditch
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m Interval)
200 0 200 400 600 800 1000 1200 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Spanish-American Tailings Management Area

Fact Sheet Photograph

Spanish-American TMA Looking East to Quirke Lake - August 1999

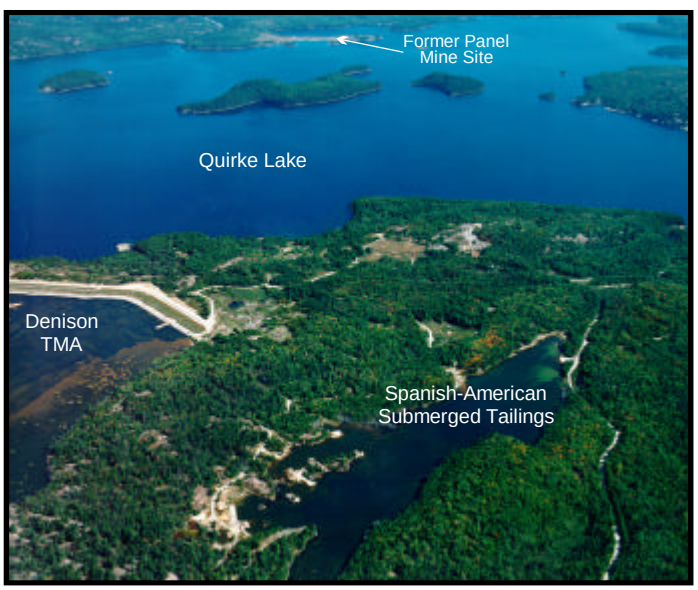
Spanish-American Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

The Spanish American TMA is drained by a creek which flows through a series of beaver ponds to Denison Mines Limited's Tailing Management Area 1 (TMA-1). The water cover of the Spanish American TMA continues to be routinely monitored and treated by the addition of lime when necessary. No treatment was required in 1995 or 1996.

Overflow from the Spanish American TMA is monitored monthly by Rio Algom Limited at the outlet of Olive Lake. The water quality in Olive Lake is typical of flooded tailings that have been treated by lime addition. It is expected that the water quality will continue to improve over time and that the TMA will eventually become a wetland environment.



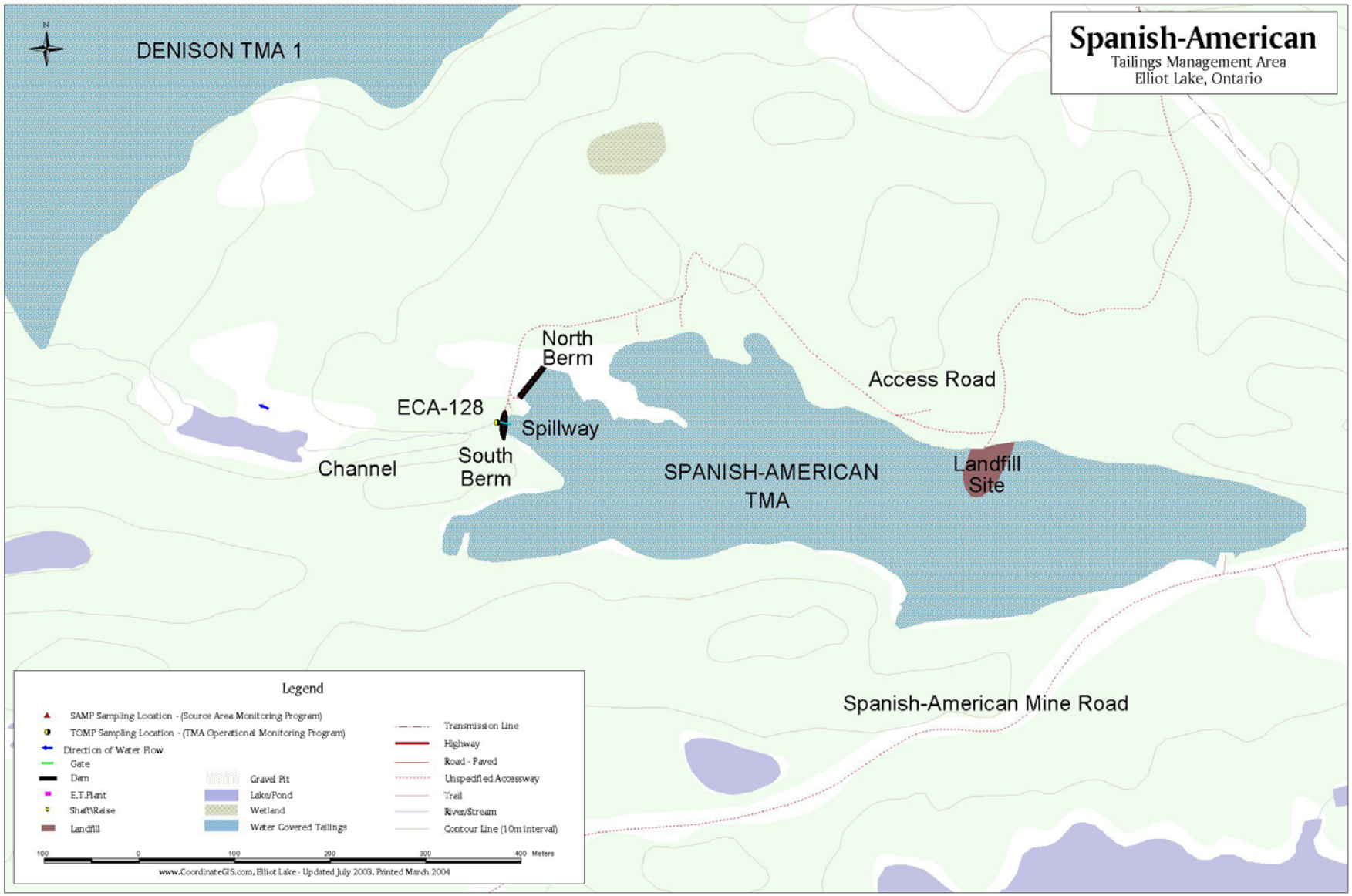
Spanish-American Viewed from the South-West Sept. 1999

Spanish-American Looking North-East to Quirke Lake 1997

HISTORY

The Spanish American mill operated from May 1958 to February 1959. Milling was done at a nominal capacity of 1,800 tonnes per day using feed ore predominantly from the Spanish American Mine but also from the Quirke and Buckles Mines. During operations, the tailings (0.45 million tonnes) were deposited into Olive (Northspan) Lake.

In 1994, the tailings were redistributed within Olive Lake to form the Spanish American Tailings Management Area (TMA) and ensure the tailings remain submerged and saturated. Two engineered berms were constructed at the west end of the TMA to raise the water level and keep the tailings deposit flooded. Flooding of the tailings should eliminate future acidic discharges and dusting, and reduce radon levels and surface radiation levels. The submerged TMA also contains other mine decommissioning debris such as rubber-lined steel, scrap steel, scrap mining equipment, process waste and general site debris.


Spanish-American
Tailings Management Area
Elliot Lake, Ontario
DENISON TMA 1
North Berm
Access Road
ECA-128
Spillway
Channel
South Berm
SPANISH-AMERICAN TMA
Landfill Site
Spanish-American Mine Road
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Landfill
Gravel Pit
Lake/Pond
Wetland
Water Covered Tailings
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m interval)
100 0 100 200 300 400 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Stanleigh
Tailings Management Area

Fact Sheet Photograph

Stanleigh TMA Viewed from the East - September 1999

Stanleigh Tailings Management Area

Fact Sheet

OPERATING REQUIREMENTS

Once flooding is complete, outflow from the 13.3 km^2 Stanleigh TMA watershed will be directed through the Stanleigh Effluent Treatment Plant (ETP) until such time as the effluent quality meets objectives without treatment. Upon completion of flooding the 520 L/s plant will operate during peak precipitation periods (spring and fall) to treat waste water with a mixture of lime and barium chloride to neutralize acidity and remove radium. Treated water is filtered to remove precipitates prior to release to McCabe Lake. Operations of the plant are automated and subject to 24 hour a day monitoring. The ETP operates under a federal Mining Facility Decommissioning Licence under the *Atomic Energy Control Act.*

In-basin addition of lime slurry was initiated in 1997 to neutralize historic acid products in the basin. Lime addition will continue during flooding until TMA water column depth profiles indicate that steady-state neutral conditions have been achieved.

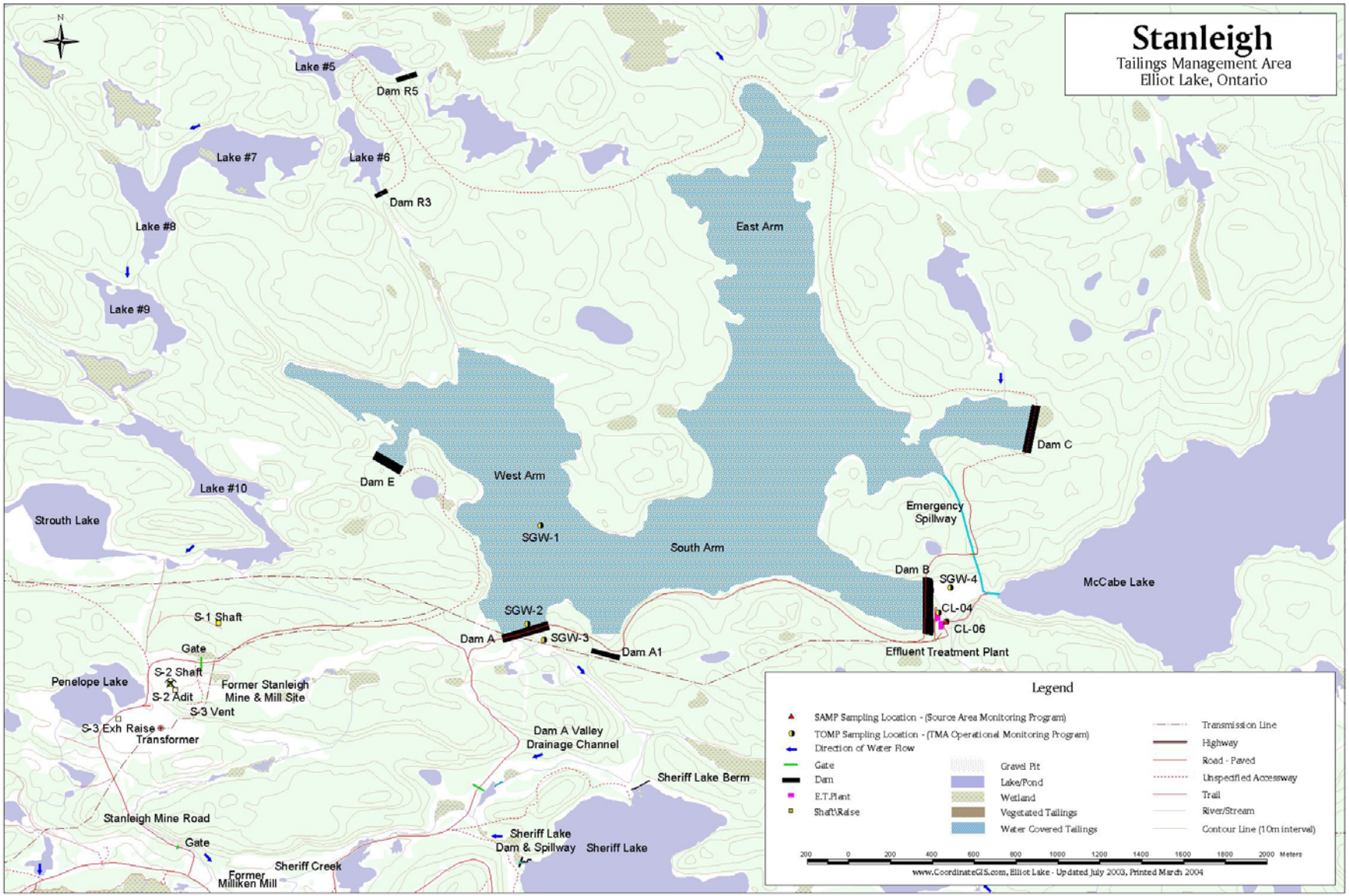
Effluent monitoring during operations confirmed that the effluent was of good quality, and consistently met discharge limits. Monitoring at twelve surface water stations including extensive monitoring of McCabe Lake as the primary receiving environment is used to confirm continued compliance with federal and provincial water quality objectives and to evaluate continued improvements in downstream surface water quality.

McCabe Lake Monitoring Winter 1998

HISTORY

The Stanleigh Tailings Management Area (TMA) contains tailings from both the Milliken and Stanleigh mines and mills. The Milliken mill operated from 1958 to 1964 at a capacity of 2,720 tonnes per day (tpd) and produced 5.7 million tonnes of tailings. The Stanleigh mill originally operated from 1957 to 1960 at a nominal rate of 3,000 tpd. Following refurbishing in 1983, the mill operated at a nominal rate of 4,550 tpd until the completion of uranium deliveries under contract to Ontario Hydro ceased on June 30, 1996.

With design capacity of 71 million tonnes of tailings, the Stanleigh TMA at closure contains approximately 20 million tonnes of tailings. Construction and raising of the five engineered low permeability dams was completed in 1999. Flooding of the basin to the final elevation of 1205 feet is expected to take three to four years. During this time no water will be discharged from the TMA; however, lime will be added to the basin to consume historic acid products.


Stanleigh
Tailings Management Area
Elliot Lake, Ontario
N
Lake #5
Dam R5
Lake #7
Lake #6
Dam R3
Lake #8
East Arm
Lake #9
Dam C
Dam E
West Arm
Lake #10
Emergency Spillway
Stroth Lake
SGW-1
South Arm
Dam B
SGW-4
McCabe Lake
CL-04
SGW-2
CL-06
S-1 Shaft
Dam A
SGW-3
Dam A1
Effluent Treatment Plant
Gate
S-2 Shaft
Penelope Lake
Former Stanleigh Mine & Mill Site
S-2 Adit
S-3 Vent
S-3 Exh Raise
Transformer
Dam A Valley Drainage Channel
Sheriff Lake Berm
Stanleigh Mine Road
Gate
Sheriff Lake Dam & Spillway
Sheriff Lake
Former Milliken Mill
Sheriff Creek
Legend
SAMP Sampling Location - (Source Area Monitoring Program)
TOMP Sampling Location - (TMA Operational Monitoring Program)
Direction of Water Flow
Gate
Dam
E.T.Plant
Shaft\Raise
Gravel Pit
Lake/Pond
Wetland
Vegetated Tailings
Water Covered Tailings
Transmission Line
Highway
Road - Paved
Unspecified Accessway
Trail
River/Stream
Contour Line (10m interval)
200 0 200 400 600 800 1000 1200 1400 1600 1800 2000 Meters
www.CoordinateGIS.com, Elliot Lake - Updated July 2003, Printed March 2004

Rio Algom Limited
Elliot Lake Division

GENERIC TAILINGS IMPOUNDMENT

The residual crushed and ground waste rock from the milling process, known as tailings, is contained within natural basins supplemented with engineered dams. The protective barrier of the natural rock comprising the Canadian Shield provides a watertight and secure containment. These tailings impoundments provide a low permeability, permanent storage facility for low level radioactive wastes.

Dam Design Criteria

Structural Stability	Static	1.5	Factor of Safety
	Dynamic	1.2	Factor of Safety
	Earthquake resistant for maximum credible earthquake - producing a ground acceleration of 0.065 cm/sec		
Impermeability	Criteria for the whole impoundment - minimum coefficient of permeability, k-1 x 10^{-5} cm/sec		
Flood Management	Facility to safely convey without damage or structure overtopping i. Regional storm (7.5" in 12 hours) ii. Probable maximum flood/precipitation (15" in 12 hours)		
	Dam crest elevation to provide safety factor against wave run-up.		
Dams	To be frost resistant		

Dam Construction Management

- Continuous technical on-site supervision by geotechnical consultant
- Maintain fully documented history of construction with photo record
- Prepare detailed "as constructed" reports

Tailings Management Area

- Regional geology assessment
- Regional hydrology review
- Site selection studies

Effluent Treatment

- Control pH in the final effluent
- Control levels of radioactive releases

Rio Algom Limited
Elliot Lake Division

TAILINGS MANAGEMENT AREAS

Rio Algom's Elliot Lake Tailings Management Areas (TMAs) fall into two categories:

Group A:

Group A can be considered the modern group. These TMA's were designed and constructed to the best engineering principles set in the late 1970s. Group A consists of flooded (saturated) tailings impoundments (measurements are in metric tonnes).

	Quantity of Tailings Impounded
Quirke	46.0 mT
Panel	16.0 mT
Stanleigh	19.8 mT
Spanish American	0.45 mT
	82.25 mT

These impoundments are located in natural bedrock controlled valleys/basins with low head, engineered low permeability containment dams situated at low areas of the basin perimeter to provide the requisite level of storage capacity.

It is expected that short-term treatment (5 years estimated) of the effluent will be required once flooding is complete in order to manage the pre-flooding acidic pore water inventory.

Group B:

Group B consists of historic (old) tailings areas established in the 1950s and now inoperative for over 30 years. These are dry tailings surfaces, stabilized through the establishment of vegetation with the waste contained by structurally sound perimeter dams.

Generally, the dams are permeable, waste rock structures founded either on bedrock or competent overburden.

These older structures have been upgraded to meet the general stability requirements of modern dams.

Nordic	12.0 mT	
Lacnor	2.7 mT	
Pronto	4.1 mT	(2.1 mT uranium, 2 mT copper)
	18.8 mT	

These facilities will remain as "collect and treat" impoundments. Two modern effluent treatment plants manage effluent quality. Treatment will be required for the long-term (estimated 20 to 100 years).

Typical Tailings Analysis

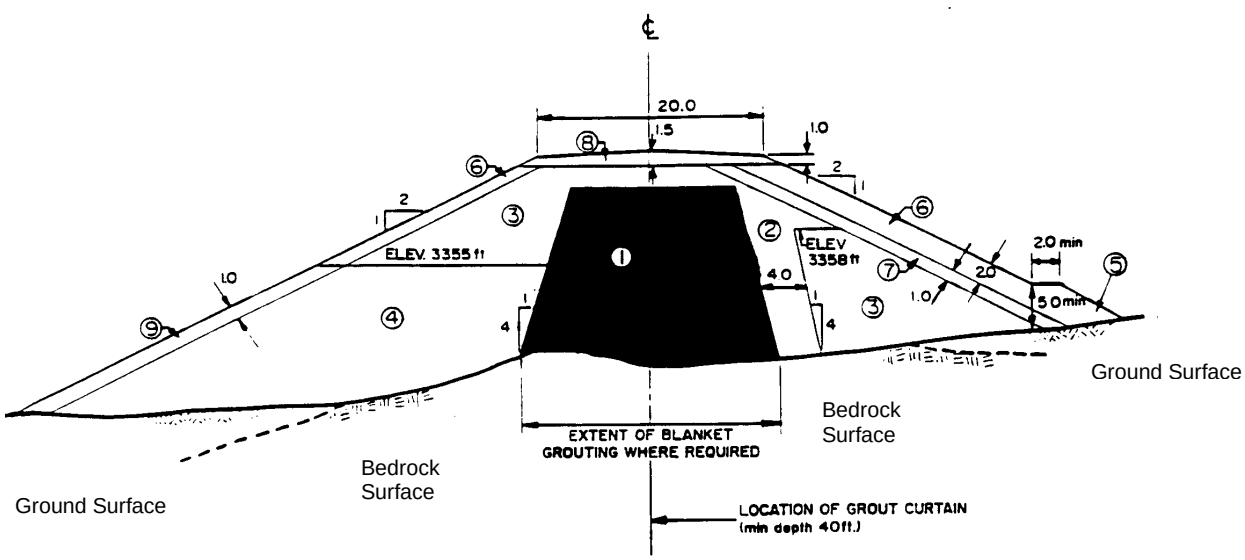
Parameter	Units		Parameter	Units	
Aluminum (Al)	%	3.88	Manganese (Mn)	%	0.004
Barium (Ba)	%	0.024	Nickel (Ni)	%	0.003
Boron (B)	%	0.0004	Potassium (K)	%	2.32
Calcium (Ca)	%	1.21	Silicon Oxide (SiO_2)	%	76.9
Cobalt (Co)	%	0.004	Sodium (Na)	%	0.21
Copper (Cu)	%	0.006	Sulphate (SO_4)	%	2.74
Iron (Fe)	%	2.51	Sulphur (S)	%	2.68
Lead (Pb)	%	0.025	Titanium (Ti)	%	0.049
Magnesium (Mg)	%	0.19	Zinc (Zn)	%	0.007
Lead	Bq/g	8.0	Thorium-232	Bq/g	0.8
Polonium-210	Bq/g	7.0	Total Thorium	%	0.032
Radium-226	Bq/g	7.5	Uranium	%	0.018
Thorium-228	Bq/g	1.2	Dry Density	t/m^3	1.3
Thorium-230	Bq/g	8.0			

Summary

- Material is substantially quartz/silica sand (80%+)
- Contains pyrite, approximately 5% to 7%
- Contains radioactive material - residual uranium, thorium, etc. (0.05%)
- Low levels of base metals

Typical Dam Cross-Section

Construction Material Zones:



1 Glacial Till - Core
2 Processed Sand - Filter
3 Sand and Gravel - Shell
4 Tailings Sand - Upstream Shell
5 Processed Gravel - Drain
6 Cobbles - Erosion Protection
7 Select Sand and Gravel - Bedding for Erosion Protection
8 Granular "B" - Road Surfacing
9 Mine Waste Rock

Source: Golder Associates Limited, 1989

Elliot Lake Tailings Dams Construction Progress

Foundation preparation

Bedrock preparation

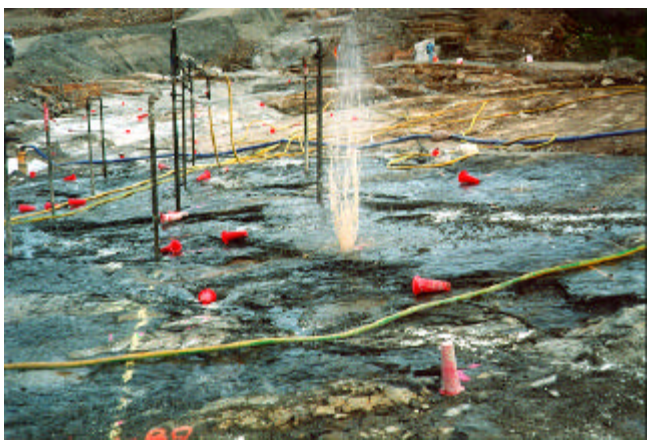
Bedrock cleaning

Bedrock washing

Foundation grouting

Bedrock drilling

Curtain preparation



Grout hole testing and washing

Grouting

Dam building commences

Dam construction well advanced

Dam nearing completion showing final slope

Upstream slope of completed dam

BHP Billiton

Rio Algom Limited

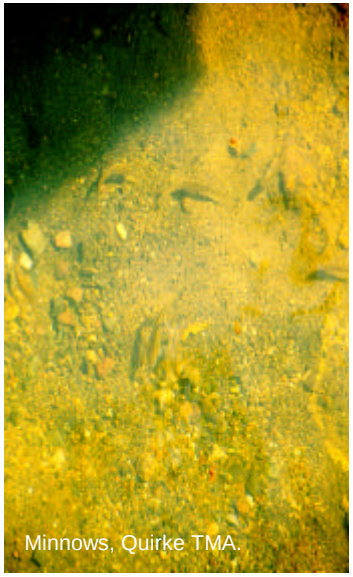
Elliot Lake Operations

Effluent Management

ENVIRONMENTAL MONITORING

With the substantial completion of the on-site reclamation activities, the focus of attention is now on compliance monitoring and performance assurance together with the ongoing needs for care and maintenance of the facilities. Extensive environmental monitoring and reporting programs are in place to confirm the receiving environment continues to be safe and healthy.

For over thirty years, responsible management of Rio Algom's mining operations has led to improving conditions on the Serpent River watershed. The Serpent River is healthy and supports diverse wildlife and aquatic populations.


Minnows, Quirke TMA.

RIO ALGOM LIMITED

environmental, health and safety policy

Rio Algom Limited is committed to achieving excellence in all aspects of its operations, including environmental protection,health and safety. The Corporation undertakes to act responsibly as steward of the resources in its charge, working for the well being of its employees and the communities and countries in which it operates. Where the company does not have any operating responsibility, it will work with its associate companies to adopt practices consistent with this policy.

specifically, the company will:

- implement site-specific environmental, health, hygiene, safety and emergency response policies, management programs and practices, with the aim of continuing improvement;

- design, operate, decommission and evaluate its facilities to ensure compliance with government and company requirements and to minimize risks to health, safety and the environment;

- train and equip employees with the understanding, skills and facilities to achieve an injury free and healthy workplace and to fulfill their environment obligations;

- educate its employees on practices to improve the environment, wellness and safety on and off the job;

- require its contractors to implement practices consistent with company health, safety and environmental policies and procedures;

- encourage conservation and pollution prevention measures;

- provide information and training for the safe handling, use, transport, and disposal of our products;

- communicate openly and on a timely basis with employees, the public, governments, and other stakeholders on activities involving environment, health and safety;

- research processes, practices and technologies that will lead to improved environmental, health and safety performance;

- conduct regular environmental, health, hygiene, safety, and emergency response audits, and implement action plans called for by these audits;

- report regularly to the Board of Directors on environment, health, hygiene, safety and emergency preparedness.


A biologist inspecting a loon's nest within the Quirke TMA.


Fishing on the Serpent River.

Rio Algom has commissioned a number of studies to ensure that their approaches to environmental issues are socially responsible. Implementation of the current monitoring program is contracted to a services provider, Denison Environmental Services, who also undertake the operation of the effluent treatment plants and care and maintenance of all the sites and facilities.


Tailings dam, Stanleigh TMA.

The residual crushed and ground waste rock from the milling process, known as tailings, is contained within natural basins supplemented with engineered dams. The protective barrier of the natural rock comprising the Canadian Shield provides a watertight and secure containment.


Effluent Treatment Plant, Nordic mine site.


Monitoring water quality.

Acidic drainage results from the exposure of naturally occurring by-product minerals, such as pyrite, associated with the ore and is contained in the tailings. Essentially, when these by-product minerals are exposed to oxygen, a natural chemical process called oxidation occurs. Pyrite oxidation produces sulphuric acid, which is harmful to the environment if not properly managed.

Rio Algom has investigated effective ways to address this issue. We have participated in a joint industry-government initiative, the Mine Environment Neutral Drainage (MEND) program and were able to implement the findings of MEND in the Elliot Lake region, including providing a water cover over exposed tailings that will prevent air from reacting with the pyrite in the tailings, virtually eliminating acid generation. As a result, Rio Algom has developed a water cover over their tailings management areas at Panel, Quirke, Spanish-American and Stanleigh Mines. For the dry cover waste management areas, revegetation allows for their stabilization. This means that effluents can be monitored and treated.


Effluent Treatment Plant, Panel TMA

Water treatment is required and provided at most sites for discharges from the tailings management areas. Lime is added to neutralize the pH and barium chloride is added to precipitate dissolved minerals prior to the release of the wastewater. Effluent treatment plants will continue to treat the run-off from the tailings management areas until treatment is no longer required.

The Serpent River database, jointly supported by Rio Algom, provides detailed data on the water quality in the Serpent River watershed. A copy of the database is located in the Nuclear and Mining Museum in Elliot Lake for the public to access.

Rio Algom Limited
Elliot Lake Division

EFFLUENT MANAGEMENT

The primary issue at most mines is the potential for acidity to be generated by the waste rock or tailings in the impoundment areas. The flooded tailings areas at Quirke, Panel, Spanish American and Stanleigh mines, where the tailings are contained within natural rock basins, is the best solution to prevent further acid generation. However, the same solution is not feasible for mining properties where the tailings were not deposited into natural rock basins, or where there is an insufficient watershed to maintain a water cover.

After extensive research work by Rio Algom and the federal CANMET laboratory, the tailings management areas at Nordic and Pronto were revegetated by seeding the tailings after adding sufficient quantities of lime and fertilizer to promote growth. Although both tailings management areas have been stabilized by the vegetation, the acidic runoff from the properties will have to be treated for many years. At Pronto, the effluent also has slightly elevated radium levels and will be treated with barium chloride for as long as is necessary.

Rio Algom has constructed new effluent treatment plants at Nordic and Pronto. Both plants are fully automatic, and the discharge from each of the effluent treatment plants meets current industry standards.

Effluent treatment plant, Nordic mine site

Effluent treatment plant, Panel tailings management area

Elliot Lake Operations Licenced Discharge Limits
Final Point of Control

Location		PH	Cu mg/l	Ni mg/l	Pb mg/l	Zn mg/l	TSS mg/l	Ra-226 Diss Bq/l	Fe(T) mg/l	NH_3 as N mg/l	Regulatory Authorities
Quirke Panel Stanleigh	Monthly Arithmetic Mean	6.5 - 9.5	0.3[1]	0.5[1]	0.2[1]	0.5[1]	25.0[1]	0.37[1]			AECB
	Composite Sample	6.0 - 9.5	0.45	0.75	0.3	0.75	37.5	0.74(W)[2]			AECB
	Grab Sample	5.5 - 9.5	0.6	1.0	0.4	1.0	50.0	1.11			AECB
Pronto	Monthly Arithmetic Mean Concentration	6.0 - 9.5	*	*	*	*	15.0	0.37	1.0[3]		MOE
	Grab Sample							1.11			
Nordic	Monthly Arithmetic Mean	5.5 - 9.5	0.6[4]	1.0[4]	0.4[4]	1.0[4]	15.0[4]	1.0[4]	1.0[4]	1.0[4]	MOE

1. The sum of the monthly arithmetic mean dissolved concentrations of Cu, Ni, Pb, Nz must be $\leq$ 1.0 mg/l.
2. Based on weekly composite.

* Monthly arithmetic mean of all samples analyzed (Cu, Ni, Pb, Zn) within a calendar month must be $\leq$ 1.0.

3. Monthly arithmetic mean of all samples analyzed (Fe(T)) within a calendar month must be $\leq$ 1.0.
4. Exceedence of a concentration is deemed to have occurred when the arithmetic mean concentration of twelve (12) consecutive samples analyzed for (Cu, Ni, Pb, Zn, TSS, Ra-226Diss, Fe(T), NH_3 as N) is greater than the corresponding concentration listed.
5. These Ra-226 criteria are waived if total Ra-226 average annual loading is as follows.

Stanleigh < 100 Bq/s Quirke < 39 Bq/s Panel < 12 Bq/s

September, 1998