



## Contaminated Site Remediation

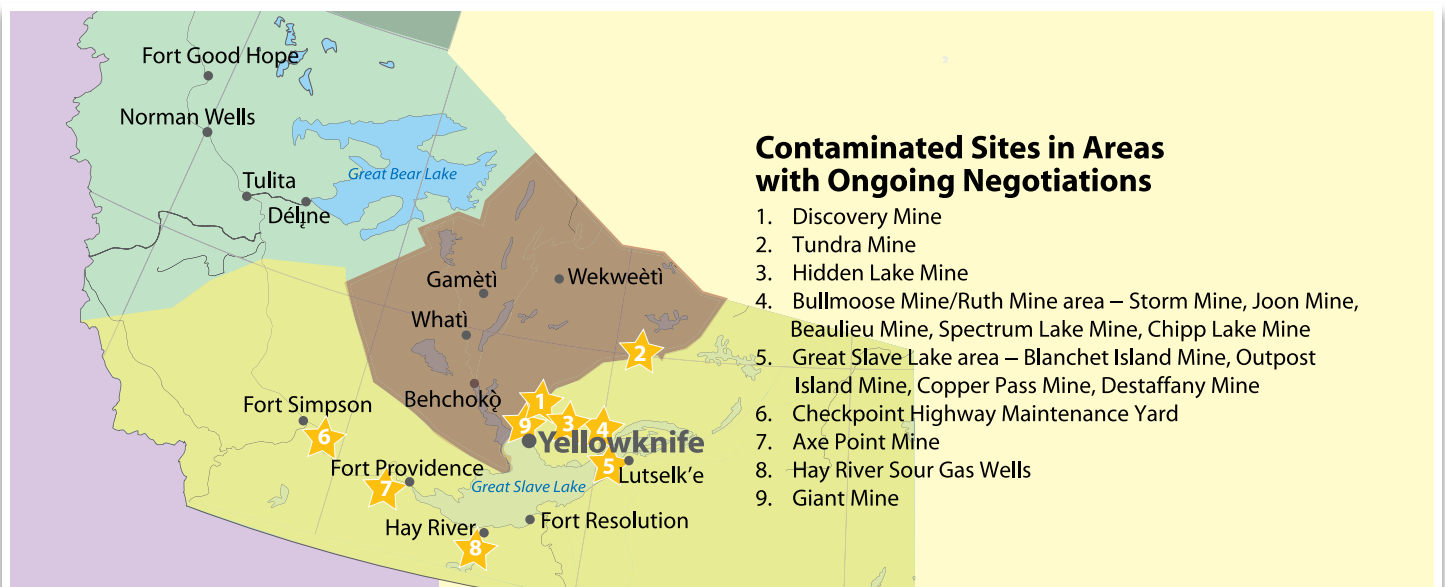
# What's HAPPENING in areas with Ongoing Land and Resource Negotiations in the NWT?

2009 in Review



## About the Contaminants and Remediation Directorate

Indian and Northern Affairs Canada (INAC) recognizes the importance of cleaning up contaminated sites and preventing future contamination. The Contaminants and Remediation Directorate (CARD) in the NWT currently manages over 20 contaminated sites at various stages of remediation. Many of these sites became the Government of Canada's responsibility after private owners relinquished their properties according to the legislation of the day, or when companies went bankrupt. The properties then reverted to the Crown, and as representative of the Crown, INAC became custodian of these properties and related remediation activities.



# 10-STEP PROCESS

In 1999, the Contaminated Sites Management Working Group (CSMWG) released the document *A Federal Approach to Contaminated Sites* outlining a 10-step process for addressing a federal contaminated site. These guidelines were developed to ensure that there would be a common approach to the management of contaminated sites.

## Step 1: Identify possible sites

Identify potentially contaminated sites based on activities (past or current) on or near the site.

## Step 2: Perform historical review

Assemble and review all historical information pertaining to the site.

## Step 3: Perform initial testing

Determine a preliminary characterization of contamination and site conditions.

## Step 4: Classify site and assign priority

Classify contaminated site using the Canadian Council of Ministers of the Environment (CCME) National Classification System. Prioritize the site for future investigations and/or remediation/risk management actions.

## Step 5: Conduct detailed testing

Test specific areas of concern identified in Step 3 and conduct further in-depth investigations and analysis.

## Step 6: Reclassify site if necessary

Update the ranking based on the results of the detailed investigations, using CCME National Classification System.

## Step 7: Develop remediation/ risk management plan

Develop a site-specific plan to address contamination issues.

## Step 8: Implement remediation/ risk management plan

Implement the site-specific plan that addresses contamination issues.

## Step 9: Conduct confirmatory sampling

Verify and document the success of the remediation/risk management strategy.

## Step 10: Conduct long-term monitoring

If required, ensure that remediation and long-term risk management goals are achieved.



## ASSESSMENT SITES

### Steps 1–7

- Bullmoose Mine/Ruth Mine area  
— Storm, Joon, Beaulieu, Spectrum Lake, Chipp Lake Mine
- Great Slave Lake area — Blanchet Island Mine, Outpost Island Mine, Copper Pass Mine, Destaffany Mine

## SITES IN REMEDIATION

### Steps 8–9

- Tundra Mine
- Checkpoint Highway Maintenance Yard
- Hidden Lake Mine
- Hay River Sour Gas Wells
- Giant Mine

## REMEDiation COMPLETED/ MONITORING

### Step 10

- Axe Point Mine
- Discovery Mine

# ASSESSMENT SITES

## Steps 1-7

A number of contaminated sites have been identified and prioritized in the Akaitcho and Deh Cho Regions, and identification and assessment is ongoing. Site assessment involves a detailed analysis of the site to identify the nature and extent of the contamination.

## Bullmoose Mine/Ruth Mine Area — Bullmoose, Ruth, Storm, Joon, Beaulieu, Spectrum Lake, Chipp Lake Mines

These sites are being assessed together, due to their close proximity to one another. The sites are located within the asserted Akaitcho Dene territory, inside the M̄qwhì Gogha De N̄jłtłèè boundary of the Tłı̄ch̄ settlement area, and the traditional lands identified by the North Slave Métis Alliance.

### What's Next?

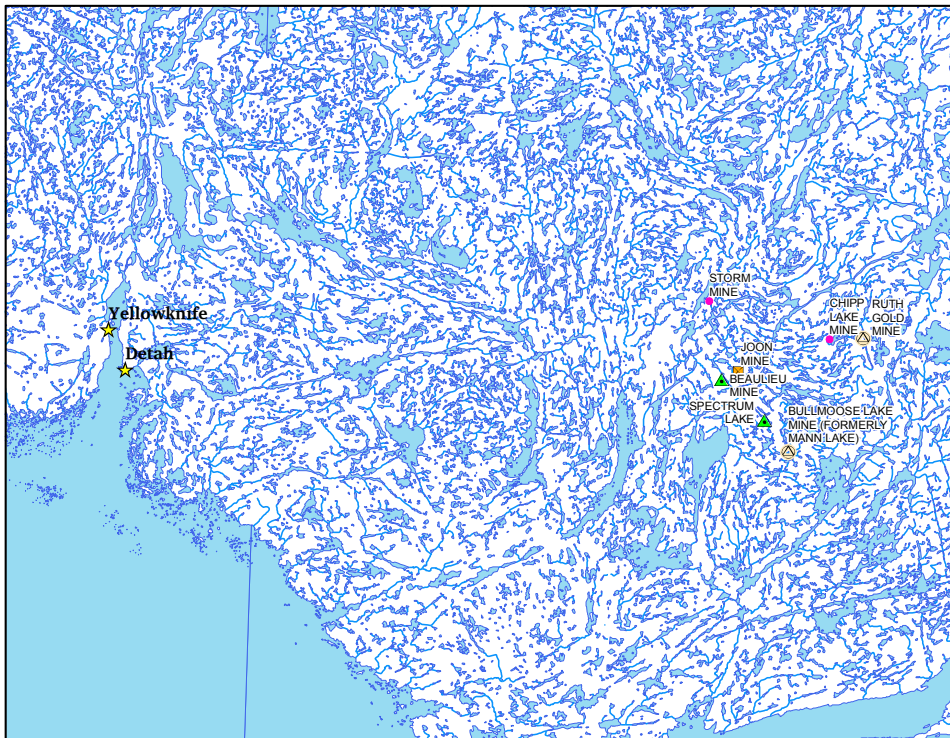
The site investigations for Bullmoose and Ruth mines are finished and draft Remedial Action Plans (RAPs) will be complete by the end of March 2010. Additional assessment information

is needed for the other sites and that must be completed before remediation of the area can begin. This work will be finished by the end of 2010. Next winter, a draft Remedial Action Plan will be prepared for all the sites and will be reviewed by affected and interested parties.

### Community Involvement

In addition to consulting on the draft RAP, interested parties will have the chance to have their questions and concerns addressed throughout the course of the entire project. Site tours will be held for all interested parties in 2010/2011.

Sites Within the Bullmoose/Ruth Area



Bullmoose Mine



Ruth Mine



Joon Mine

## ASSESSMENT SITES (continued)

### Great Slave Lake Area — Blanchet Island Mine, Outpost Island Mine, Copper Pass Mine, Destaffany Mine

These mine sites are located near or within the East Arm of Great Slave Lake, which straddles the boundary of the M̄qwhì Gogha De N̄it̄l̄èè boundary of the T̄ìch̄q̄ settlement area, the asserted Akaitcho Dene territory, and the traditional lands identified by the North Slave Métis Alliance. The sites are being assessed together, due to their close proximity to one another.

#### What's Next?

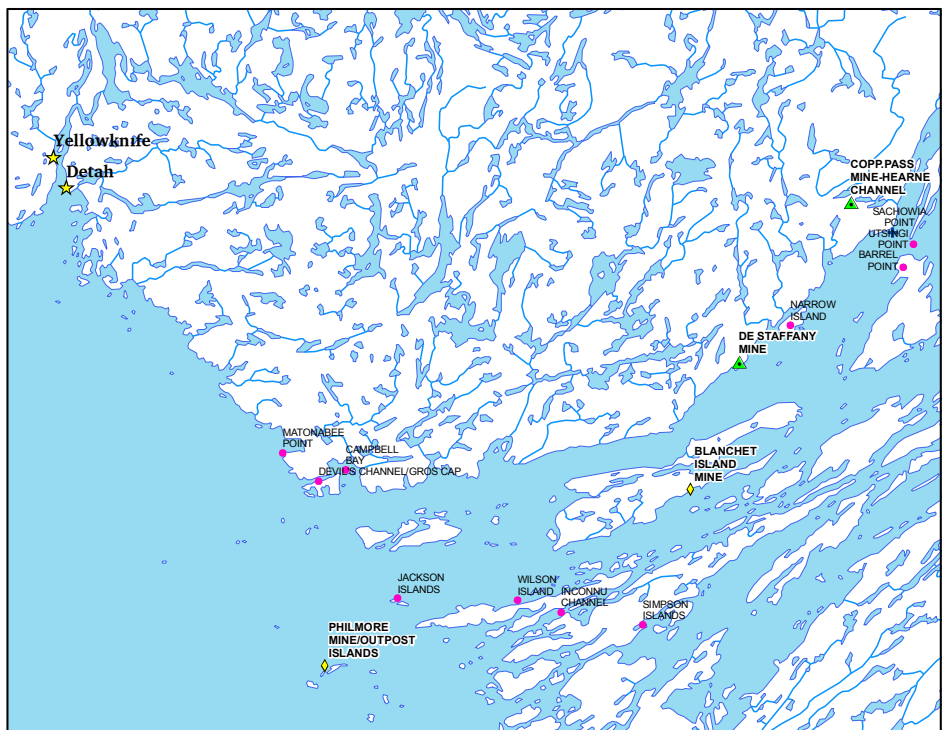
Assessment work will be completed at all sites in 2010. Upon completion of this work, a draft Remedial Action Plan (RAP) will be devised for the sites. This approach will allow the RAP to address potential logistical and cost savings by undertaking the remediation of the sites together. The RAP will be prepared and reviewed by affected and interested parties to confirm the appropriate remedial activities.

#### Community Involvement

Success of remediation projects is due in a large part to the participation of those who use the land traditionally. Plans and activities onsite will be presented to the T̄ìch̄q̄, Akaitcho, and North Slave Métis for input. Future consultations will take place on the development of the RAP, licensing and economic potential for work on site. Once remediation is complete, a final consultation will be held to provide a summary of remediation activities and to discuss the need for long term monitoring. Consultations throughout the course of the project will include the incorporation of traditional knowledge into the project.



Great Slave Lake Area (East Arm)



# SITES IN REMEDIATION

Steps 8–9

## TUNDRA MINE

Tundra Mine is a former gold mine located 240 km northeast of Yellowknife. The mine is located within the M̄qwhì Gogha De N̄l̄t̄t̄èè boundary within the Wek'èezhì management area of the T̄l̄ch̄ settlement area, the asserted Akaitcho Dene territory, and the traditional lands identified by the North Slave Métis Alliance.

Mine operations began in 1964. This is one of three mines that reverted to the Crown in 1999 when the owner of the mines at the time, Royal Oak Mines Inc., went into receivership.

Royal Oak used the site to process ore and to dispose of tailings from nearby Salmita Mine (remediated in the late 1980s). The main concerns are arsenic and metals, the majority of which are contained within the 62.4 hectares Tailings Containment Area (TCA). The water in the TCA has elevated levels of arsenic. Water downstream from the TCA has been affected.

Tundra has been in care and maintenance mode since 1999 with activities including dam repairs, landfill repairs, geotechnical inspections of dams and water management and water quality monitoring. Water management is among one of the biggest challenges at Tundra. See "*Water Treatment Success!*" to learn about what's happening with water at Tundra.

In 2007, the first phase of the remediation was completed and included the removal of buildings and hazardous waste, construction of a non-hazardous landfill and the capping of mine openings. The second phase of remediation will focus on the TCA and waste rock still present at the site and is expected to begin in 2010.



## SITES IN REMEDIATION (continued)

(TUNDRA MINE *continued from page 5*)



Tłı̨chǫ Elders most recently visited the site in the summer of 2009 to tour the water management system.



Alice Mackenzie of Behchoko translates to Phillip Huskey of Behchoko and Joe Black of Gameti.

### Community Involvement

Throughout the year, the project team works to keep community members up to date on the work going on at Tundra. Representatives from the Yellowknives Dene First Nation (YKDFN), the North Slave Métis Alliance (NSMA) and the Tłı̨chǫ Government continue to meet with project team staff to discuss potential options to remediate the site. Most recently, the concerns and suggestions raised at these meetings were used to develop the Phase II remediation plan for the site.

Elders in particular play an important role in the remediation of Tundra Mine. They participate in site tours, and provide valuable knowledge, experience and suggestions in the determining of remedial options for the sites. Tłı̨chǫ

Elders most recently visited the site in the summer of 2009 to tour the water management system.

Elders from the Tłı̨chǫ have expressed concerns over the exposure of caribou to the tailings present onsite at Tundra. INAC is working closely with the Elders on this issue to develop plans to ensure the caribou are protected.

### What's Next?

The remaining remediation activities are scheduled to begin in June 2010, and include treating water in the tailings containment area, treating hydrocarbon impacted soils, covering tailings and waste rock, and decommissioning dams. It is expected that remediation will take two to four years to complete, followed by long term monitoring of the site.

## Water Treatment Success at Tundra!

In the summer of 2009, a contractor was hired to treat water from the tailings ponds at the site. The contractor used "Geotube®" containers to treat the water in the tailings containment area.

Geotubes are super-strong 'bags' that hold huge amounts of water but allow it to slowly drain out through millions of small holes. Like a sieve, the Geotube can take water that is filled with sludge (like contaminated water) and filter it. The water inside the bags gets forced through the holes by its own pressure and the sludge stays inside the tube. What is left is a big bag of sludge that can be disposed of with minimal risk of exposure. Geotube containers are also relatively light so they are easy to transport to mine sites and contain no moving parts, which means they need minimal maintenance.

The containers proved to be very productive, allowing the project to treat and discharge more water than originally planned. Using these methods, an additional 80,000 cubic metres were treated onsite over the course of the summer.



The Geotubes treated 80,000 cubic metres of water at Tundra Mine this summer. That's more than the volume of 30 Olympic-sized swimming pools!



Geotubes are super-strong 'bags' that hold huge amounts of water but allow it to slowly drain out through millions of small holes.



The water inside the bag gets forced through the holes by its own pressure and the contaminants stay inside.

# CHECKPOINT HIGHWAY MAINTENANCE YARD

The former Checkpoint Highway Maintenance Yard is located near the junction of the Mackenzie (HWY 1) and Liard (HWY 7) Highways, 63 km south of Fort Simpson, in the Northwest Territories. The site is adjacent to the Jean Marie River waterway and approximately 60 km upstream of the community of Jean Marie River.

The site was originally a highway maintenance area which was built in the 1970s. While in operation, waste generated at the site was burned and disposed of in one section of the property. Then when it was abandoned, a majority of the equipment and materials which were not removed were buried there. In the early 1990s, the site was used for several years for a logging and milling operation.

Site assessments show that there are elevated levels of hydrocarbons and metals in groundwater at the site; however, there was no indication of contamination of Jean Marie River from these sources. There is a dump at the site, containing buried waste, crushed fuel drums, tires, wood, fibreglass insulation, metal debris, a culvert, and a vehicle. There is also surface domestic debris, including appliances, tires, empty drums and scrap building materials.

A second location at the site also has two trailers and associated heating fuel tanks, pieces of heavy equipment, storage sheds and an abandoned vehicle, as well as buried waste, consisting of wood, plastic, concrete and metal in the form of vehicles, machinery parts and related equipment. It does not pose an immediate risk but could break down over

time and potentially leach into the environment.

Remediation of the site is being carried out jointly by INAC and the Government of the Northwest Territories Department of Transportation. The proposed remediation work consists of removing site debris from the surface and subsurface, transferring contaminated soil, treating hydrocarbon-contaminated soil in a land farm and final grading of the site.

## Community Involvement

Consultation and engagement with nearby communities are an essential part of the remediation process. INAC commits to working collaboratively to ensure community concerns and input are taken into consideration throughout the project. A community information session will take place during the summer of 2010 to update the nearby communities on the progress of the remediation.

## What's Next?

The remediation work at Checkpoint has begun, and will continue until the contaminated soil has been cleaned to a safe level. Water quality monitoring will continue at the site until remediation is complete. During the 2010 work season, the team will continue to excavate and treat contaminated soils and dig up and dispose of buried waste.

The project is expected to take two to three years, with the final remediation happening in the summer of 2013.



The site was originally a highway maintenance area which was built in the 1970s.

## SITES IN REMEDIATION (continued)



Indian and Northern Affairs continues to conduct water quality monitoring at the former Hidden Lake Mine site.

## HIDDEN LAKE MINE

Hidden Lake Mine is a former underground gold mine located 45 km northeast of Yellowknife in the Northwest Territories. The mine is within the asserted Akaitcho Dene territory, inside the M̄qwhì Gogha De N̄j̄t̄l̄èè boundary within the Wek'èezhì management area of the T̄j̄ch̄q settlement area, and the traditional lands identified by the North Slave Métis Alliance. Prior to the development of the Hidden Lake Mine, Aboriginal peoples lived throughout the area around Hidden Lake for centuries.

In addition to traditional land use, the Hidden Lake Territorial Park (adjacent to the site) and the abandoned mine itself are frequently visited by Yellowknife residents and tourists.

The mine opened in 1959 with most of the mining production taking place in 1968. Since closure in 1969, there has been very limited activity at the site.

In 1998, the Tibbitt Lake forest fire burned down all of the buildings and structures leaving physical hazards such as abandoned mining equipment, two unsecured mine openings, scattered metal debris and drums, buried scrap metal and submerged metal drums near the dock area. There are environmental concerns including waste fuel, deposits of tailings with metals and hydrocarbon contamination, and surface fuel contamination around the sites of old buildings and fuelling areas.

Historical records indicate that the Hidden Lake Mine was a small scale operation with a small footprint (0.5 hectares). Nonetheless, it is important that the site is cleaned up so it does not pose a risk to people or the environment especially given the close proximity to the Hidden Lake Territorial Park and the City of Yellowknife.

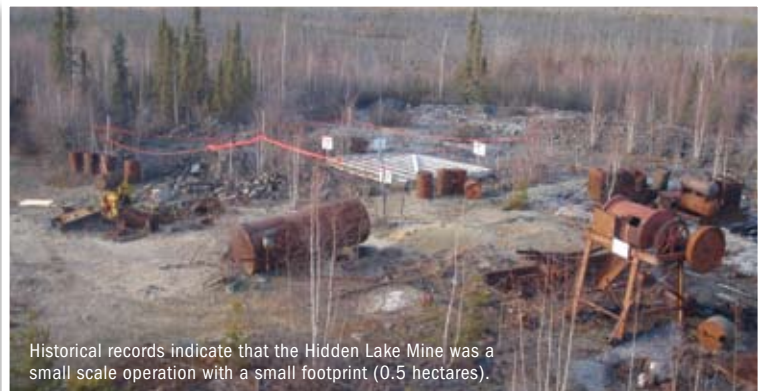
### Community Involvement

Community members have been actively involved in the remediation of Hidden Lake since the beginning of the project. Meetings were held in 2008 with the Yellowknives Dene First Nation, the North Slave Métis Alliance and T̄j̄ch̄q groups to discuss the draft Remediation Action Plan. Concerns and suggestions raised at these meetings were used as the basis to develop a final plan for the site.

The final Remediation Action Plan was provided to all groups during the summer of 2009 and a consultation meeting and site tour was conducted for all interested parties on August 26th, 2009 and September 25th, 2009 respectively to review the clean up plan for the site and hear feedback.

### What's Next?

The Remedial Action Plan (RAP) was finalized in July 2009 and is based on the preferred remedial plan decided upon during consultations held in 2008 with the T̄j̄ch̄q, the Yellowknife Dene First Nations and North Slave Métis Alliance. Water quality monitoring continues at the site. The implementation of the RAP is planned for the summer of 2010, with site mobilization in March 2010 and demobilization in March 2011 (by winter road).



Historical records indicate that the Hidden Lake Mine was a small scale operation with a small footprint (0.5 hectares).



## HAY RIVER SOUR GAS WELLS

There are seven abandoned gas wells near the Hay River Golf Course/Ski Club, approximately 12 km outside the Town of Hay River. The site is within the Akaitcho Territory Dene First Nations Interim Measures Agreement Area, under jurisdiction of K'atlodeeche First Nations, Ka'a'gee Tu First Nation, West Point First Nation, Hay River Métis Council and Hay River Métis Nation.

In 1922, and again in the 1940s, test wells were drilled in the area by the Frobisher Exploration Company Limited of Yellowknife. Although some gas was discovered at first, there was no actual oil found and the wells were abandoned. In 2005, CARD was notified that three of the gas wells were in questionable condition.

The wells were tested for hydrogen sulphide, their overall stability, and re-abandonment options were examined. Although only insignificant levels of hydrogen sulphide were found, it was concluded that the wells should be more permanently secured using modern methods. Even though the gas levels do not pose an immediate threat to human health and wildlife.

The wells are not easily accessible by the public nor are they located near residents. As a safety precaution, until the wells are permanently secured, signs and flagging tape have been posted in the area of the well sites to alert the public to the possible danger of gas.

### Community Involvement

It is essential to work with First Nations, the Town of Hay River, the ski club, golf club and other interested parties to keep them up to date as the project progresses.

### What's Next?

Now that investigations of these wells are complete, CARD has hired a design/build contractor to design and close the wells. In 2010/2011, the contractor will engage with all interested parties to determine the approach and complete the re-abandonment of the wells. Final site clean up and inspection of the closed wells is planned for 2012.



It was concluded that the wells should be more permanently secured using modern methods, even though the gas levels do not pose an immediate threat to human health and wildlife.

# REMEDICATION COMPLETED/ MONITORING

## Step 10

## AXE POINT MINE

Axe Point is located on the Mackenzie River, 60 km west of Fort Providence, in the Dehcho region of the Northwest Territories. The site was in operation for several years as an airstrip, staging area and camp along the winter road to Norman Wells for the American military during World War II. The site also supported the construction of the CANOL Project, an oil pipeline between Norman Wells and Whitehorse.

Investigations found elevated levels of hydrocarbons and metals in soils and groundwater on site. Geophysical surveys identified buried materials onsite. There were seven collapsed buildings, metal debris, a boiler, heavy equipment and old batteries at the location. There were elevated levels of arsenic, lead and uranium in some soil at the site, as well as iron, manganese, cadmium and selenium.

Remediation work at the site concluded in 2007. Activities included regulatory approval of the remediation strategy, site visits, community meetings and consultation, an archaeological study, brushing of trails used for monitoring, removal of surface and hazardous debris from the site, filling in and grading cellars, and water quality monitoring. The archaeological study found nothing of significant importance on the Axe Point site but classified the old village site, adjacent to the west, as a site of significant historical importance.

### Community Involvement

The participation of community members was very important to the success of this project. Traditional knowledge studies provided data on the historical and traditional uses of the site, as well as information on soil and groundwater quality.

### What's Next?

Now that the site remediation is complete, no additional site specific monitoring is required.

### DISCOVERY MINE

Discovery Mine is an abandoned gold mine located on the west shore of Giauque Lake, approximately 80 km northeast of Yellowknife. The site is within the traditional territory of the Akaitcho First Nations, and also falls inside the Mowhı Gogha De Nııttıèè boundary, within the Wek'èezhıı management area of the Tııchq Agreement.

The mine operated from 1949 to 1969 and at the time was one of the most profitable gold mines in the country. When the mine closed, the town site and mine structures were left standing. During operation, approximately 1.1 million tonnes of acid-generating tailings containing mercury had been spread over 32 hectares of land and 3.7 hectares of lake sediment, above the low water level. There was also asbestos, lead-based paint, unsealed mine openings and soil containing spilled fuel, oil and gas on site that posed health and/or safety risks.

The remediation of Discovery Mine was completed in 2008 and short-term monitoring began in 2009. Monitoring will be conducted every year for at least five years to make sure that the site conditions are improving.

#### Community Involvement

INAC's approach in the remediation of Discovery has been to involve Aboriginal people from affected communities in the planning of the project from start to finish. The benefit to this approach is that community issues and concerns were dealt with early on and incorporated into plans for the site. Now that the site has entered the monitoring phase, findings during monitoring will be presented at regular meetings to representatives of the Yellowknives Dene and Tııchq First Nations.

#### What's Next?

Now that all site remediation work has been completed, annual monitoring of water, geotechnical (soil stability) and vegetation has begun. Fish will also be monitored. So far, results of the monitoring program have been positive. After five years, INAC will make a recommendation to the Mackenzie Valley Land and Water Board on how often and the type of monitoring will be done in the future.



Monitoring at Discovery will be conducted every year for at least five years to make sure that the site conditions are improving.

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**If you see a contaminated site or have  
questions about sites in your area, contact us:**

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