



## Contaminated Site Remediation

# What's HAPPENING in the Tłıchǫ?

March 2009



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## Colomac Mine

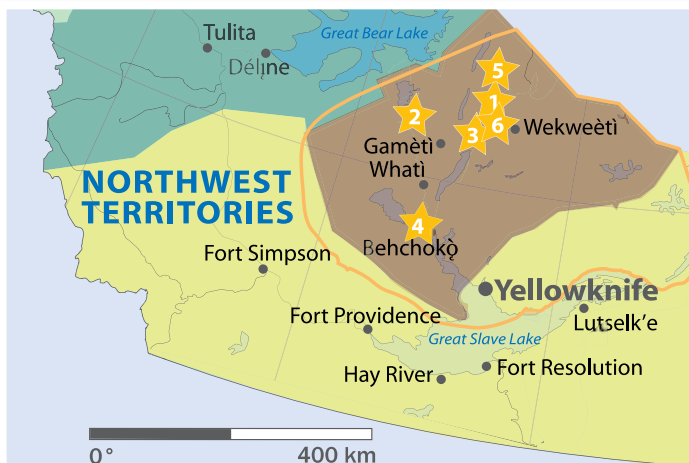
### Hydrocarbon Remediation Update

#### Soil treatment

Soil treatment at the site continued this year. Soil around the mill was contaminated with diesel that leaked during mill operations. The soil was dug up and taken to a lay-down area at the top of the hill for treatment. Fertilizer and water were added to the soil, which was turned weekly. By October, most of the soil met clean-up guidelines! The rest of the soil will stay on the lay-down area and be treated next year.

#### Collecting diesel from bedrock

A large amount of diesel fuel was spilled during mine operations and remains in areas of bedrock at the site. Removing the diesel has been a very slow process. To speed things up, two new systems were successfully tested this year. One is a pilot trench that was blasted into the bedrock, deep enough (10 m) to collect the diesel. The other is a vacuum extraction system that pulls the diesel out of cracks in the bedrock. Next year, both systems will be used so all of the diesel can be removed by 2010.



0° 400 km

### Contaminated Sites in the Tłıchǫ Region

1. Colomac Mine
2. Indore/Beaverlodge Mines
3. North Inca
4. Rayrock Mine
5. Spider Lake
6. Chalco lake



Diesel collection in the pilot trench

## Colomac Mine (continued)

### Steeves Lake Shoreline Cleanup

A plan is being developed to clean up diesel contamination of the Steeves Lake shoreline near the Colomac mill buildings. The plan will outline options that will be presented to Tłı̄ch̄o Elders at a meeting early in 2009. The Elders will help select the most appropriate technology to deal with the diesel contamination.

### Cleaning up barrels

At one time, there were thousands of used barrels stored at Colomac. Most of the barrels were empty, but at one time contained diesel fuel or oil. There were also some barrels that contained dangerous compounds like acids and anti-freeze. By April 2009, these barrels will have been dealt with. Barrels that contained petroleum will be washed, crushed and discarded in the onsite landfill. Barrels with dangerous chemicals will be specially packed and taken out via winter road, for disposal in a hazardous waste facility in Alberta.



Containment of diesel fuel along the Steeves Lake Shoreline

### Site Clean-up

During the summer of 2008, nearly 10,000 tonnes of clean scrap steel, tires and tailings pipe were placed in the non-hazardous landfill in the Zone 2.5 Pit. The waste materials were collected from the Boneyard, Hewitt Lake and around the Colomac site. All hazardous materials such as batteries, lubricants, oil and fuel were removed from old haul trucks and equipment within the Boneyard. The hazardous materials will be shipped south on the 2009 winter road for disposal.

While addressing a safety hazard of falling rock on the Zone 2 Pit walls, the site operator, Tli Cho Logistics, came up with a plan to provide a one-metre thick rock cover needed to place over the non-hazardous waste site in the bottom of the pit. By blasting down enough rock to cover the landfill, Tli Cho Logistics safely dealt with a hazardous condition on site, and provided a cost-effective remediation solution at the same time.



Zone 2.5 Pit with non-hazardous waste



Zone 2.5 Pit with landfill cover



# Water Management

## Tailings Lake

In 2006, the water in Tailings Lake met the discharge limits set out in the water license. As a result, the diversion ditch and Fuscum Lake dewatering programs were discontinued in 2007. In 2008, water levels were allowed to rise in Tailings Lake and by August, water started flowing out of Tailings Lake through the discharge channel.

The discharge channel is designed so that under normal conditions, only a thin layer from the lake surface will flow out through it, and the water level in Tailings Lake will remain more or less constant. More water is likely to flow through the channel during spring run-off, or following heavier rains in the fall.

Tailings Lake water is monitored through the Surveillance Network Program, which includes monthly sampling at the point where water enters the discharge channel, and downstream at L-Shaped Lake. Monitoring shows us that the water quality in Tailings Lake is good.

Part of the long term monitoring for the Tailings Lake discharge will include studying the historic creek downstream that connected Tailings Lake with L-Shaped Lake before the mine was developed. If monitoring shows that the creek is beginning to flow again between the two lakes, and if it seems possible that fish could eventually move through the creek, a narrower, deeper channel would be dug at the bottom of the existing channel, so that fish could move upstream to Tailings Lake.

## Dam 1B

The annual geotechnical inspection took place in August 2008, and the geotechnical engineer confirmed that Dam1B is working as planned. Ground temperature data shows us that the foundation (where the dam meets the valley floor) and abutments (where the dam meets the valley walls) remain frozen.

With more than a year's worth of data on the dam's performance, plans are now being developed for dismantling the seepage collection system, which should be completed by February 2009. Tailings Lake water will be flooded into the rock infill between Dam 1 and Dam 1B and allowed to freeze in. The long-standing "pump shack" at Dam 1 will be removed, as well as the power trailer and pumpback line. A long-term monitoring plan for Dam 1 B stability and performance is also being developed, for use when site remediation work is finished.



Dam 1B and thermosyphon towers



Tailings Lake flow at discharge channel

## Water Quality Update

By the fall of 2007, water in both the Zone 2 Pit and Tailings Lake met the discharge objectives set out in the Water Licence. Water quality monitoring continued in 2008, in accordance with the Surveillance Network Program. As of June, 2008, some elements will no longer be monitored, including ammonia, total phosphorus, and thiocyanate, as monitoring shows us that levels of these elements are consistently low, and the Enhanced Natural Removal treatment is now complete. Copper concentrations in Tailings Lake were slightly above the maximum average discharge criteria in June and July, however monitoring shows that they are also decreasing over time.

Water quality monitoring will continue until all remediation work is complete, and a long-term monitoring plan put in place.



Ducks in Tailings Lake

# Colomac and the Community

Tłı̨ch̨o Elders and other community members have been actively involved with the remediation of the Colomac site since INAC took over care and control of the site in 1999. The Bathurst caribou herd moves through the Colomac area each year on its annual migration to and from their traditional calving grounds. Caribou are not only critical to the Tłı̨ch̨o as a primary food source—they form part of the Tłı̨ch̨o spiritual and cultural identity. The remediation of the Colomac site is therefore very important to the Tłı̨ch̨o, and INAC continues to work hand in hand with Tłı̨ch̨o Elders and the Tłı̨ch̨o Government towards this goal.

## Fence Project

In response to a request by the Tłı̨ch̨o, a comprehensive soil and vegetation survey of the Tailings Containment Area was completed in May 2008. The survey results show us that levels of contaminants—cyanide, arsenic and metals—in the soil and vegetation are much lower than they were in the previous survey done in 2003, and are well within acceptable limits. The vegetation is now safe for the caribou to eat. Elders visited the site in September to assess the fence and the tailings containment area, and to discuss plans for the taking down the fence.

Further meetings with the Tłı̨ch̨o Elders and the Tłı̨ch̨o Executive were held in October, 2008, and it was agreed that the fence should be taken down. Workers started to take the fence down in early November and was completed by the end of December. A ceremony to celebrate the success of the fence and the partnership between the Tłı̨ch̨o and INAC is planned for March 2009.



## Youth employment

Cordelia Bouvier, one of the Chief Jimmy Bruneau School students who participated in the Contaminants and Remediation Directorate's 2007 Youth Science Workshop in Yellowknife, got a chance to put her skills to work this past summer. Cordelia was hired as an Assistant Environmental Technician and assisted with the soil and vegetation sampling survey.



## Apprenticeship program update

Since the beginning of the Colomac Apprenticeship Project in 2006, Tli Cho Logistics has successfully established and maintained training priorities. Most of the apprentices have transferred their skills to employment with currently operating mines, one has moved onto other career opportunities and another remains on staff with Tli Cho Logistics as a heavy duty mechanic. The Colomac Remediation Project will continue to provide Tli Cho Logistics with training opportunities for Tłı̨chų community members until work at the site is complete.

## Public Involvement – continuing Elders’ support

Tłı̨chų Elders identified the Colomac Mine Site as a major concern early in the Tłı̨chų land claim negotiation process. The late Joe Migwi, Johnny Nitsiza and Alexis Arrowmaker identified the cleanup of Colomac as a priority concern for the Tłı̨chų during the negotiations.

The Colomac Remediation Plan was developed in partnership with Elders, including Eddie Camille, Mary Adele Rabesca and the late Joseph Pea’a and Harry Simpson, who provided traditional knowledge and advice about caribou migration around the Colomac site and traditional land use in the Indin Lake area.

In 2008, two Elders’ tours were held on site; the first on July 30th and 31st, and the second on September 28th and 29th. Elders visited the site to examine site remediation progress, the tailings containment area and the pilot trench and to discuss removal of the caribou fence.

Tłı̨chų Elders continue to play an extremely important role in the project, and the Colomac Project Management Team would like to take this opportunity to thank all the Elders for their hard work and concern for the land and water at the site. Masicho!

## Health and Safety

Following a serious health and safety challenge early in 2008, the project management team reviewed site health and safety systems in preparation for the 2008 remediation season. High-risk remediation activities such as drilling and blasting, excavation and hauling, and remote area clean-up were all completed without major incident. This is a testament to the commitment of all involved to health and safety at Colomac. Quarterly health and safety audits of site operations continued throughout 2008. There was also an external management review of the Colomac Environment, Health and Safety – Management System (EHS-MS).



The late Joseph Pea'a and Harry Simpson



Elders on a tour of the Colomac mine site



Elders walking into the pilot trench

# What's Coming Up?

## Winter 2008/2009

- Continue barrel washing through the winter. Drums with waste oil and water in them are steam cleaned and the oil is burned in waste oil furnaces to provide heat in the maintenance shop.
- Continue hydrocarbon remediation. Monitoring wells around the maintenance shop will be further tested.
- Build winter road, beginning in January 2009. Approximately 600,000 L of diesel and assorted dry goods will be shipped to the site as part of the annual re-supply.
- Remove mill assets, Crown assets and hazardous materials on the winter road.
- Remediate airport quarry in March.
- Develop plans for the remediation of Steeves Lake shoreline, in consultation with the Tłıchǫ.

## Summer/Fall 2009

- Continue to collect diesel, and treat hydrocarbon-affected soil and water.
- Begin remediation of Steeves Lake shoreline, as well as restoration of Truck and Spot Lakes.
- Conduct geomagnetic survey of the waste rock dumps, and continue with site clean up.
- Decontaminate mill and associated facilities, beginning in the fall.

## Winter 2009/2010

- Build 2010 winter road to re-supply the site and the North Inca remediation operations.
- Decontaminate and demolish mill.

## Summer/Fall 2010

- Complete diesel collection, and treatment of hydrocarbon-affected soil and water.
- Remediate Steeves Lake shoreline and complete final site clean up and restoration.

## Winter 2010/2011

- Demobilize from site in March 2011.
- Start long term monitoring.

# North Inca

The North Inca site is located approximately 190 km north of Yellowknife and 70 km east of Wekweètì, in the Mǫwhì Gogha Dè Nı̀ttèè area of the Tłıchǫ land claim. The site was a gold exploration property that operated between 1945 and 1949. On-site exploration activities included geological mapping, surface and underground drilling, including an exploration shaft. There has not been significant activity at the site since 1949.

There are a number of concerns at the site, including a partially open mine shaft, deteriorating buildings, two above-ground fuel storage tanks, and possible asbestos-containing materials.



Fred Mantla and Eddie Camille, North Inca, July 2007

In April 2008, Tłıchǫ Elders partnered with the Contaminants and Remediation Directorate Tłıchǫ Project Team to evaluate remediation options for the site. The preferred options identified in this session were used to create the North Inca Remedial Action Plan.

Plans are being developed to start remediating the site in April 2009. Equipment will be brought to site on the 2009 Colomac winter road. Work at site will take place during the summer of 2009 and will include demolishing all structures, removing non-hazardous materials to Colomac and hazardous materials south for disposal, constructing an engineered cap on the open mine shaft, and re-contouring the waste rock dump.



A. Y. Jackson pencil sketch of the North Inca site, July, 1928  
Courtesy of the Estate of the late Dr. Naomi Jackson Groves  
From the collection of the Prince of Wales Northern Heritage Centre, Yellowknife, NT.





Drums at Indore Mine



Abandoned Bristol Freighter aircraft at Beaverlodge Mine

## Indore/ Beaverlodge Mines

Indore Mine and Beaverlodge Mine are located 12 km apart on Hottah Lake, approximately 100 km north of Gamèti in the Northwest Territories, in the M̄w̄hì Gogha Dè Nìttèè area of the Tłı̄ch̄o land claim. Indore Mine was originally staked for uranium exploration in 1950, and operated off and on until closed in 1956. Beaverlodge Mine is a former uranium mine which had various owners between 1943 and 1977, after which responsibility for the site reverted to the Crown.

At Indore Mine, a small quantity of tailings remain on land, along with some suspected underwater tailings. The site also has slightly elevated radioactive waste rock and sediment, a former dumpsite, and miscellaneous debris and materials which may contain asbestos. There is also a mine opening and shaft, and the remains of former buildings.

At Beaverlodge Mine, the remediation will address shafts and pits, groundwater quality, radiation levels in waste rock near the pits, drums, burned remains of former buildings, and miscellaneous debris and scrap that may contain asbestos.

No site remediation activities have occurred to date. Assessment work has been ongoing since 2006, including:

- Sampling water, soil and vegetation on site and vicinity
- Studying fish and invertebrates
- Determining type and amount of hydrocarbon contamination
- Assessing mine openings and crown pillar stability
- Determining potential borrow sources
- Measuring and monitoring gamma radiation and radon, as appropriate
- Conducting a detailed Site Specific Human Health and Ecological Risk Assessment

Using the site assessment data and the results of the Site Specific Human Health and Ecological Risk Assessment, remediation options for the site remediation and risk management will be reviewed in 2009, in consultation with the Tłı̄ch̄o. A Remedial Action Plan for the sites will be developed in 2010. Remediation activities will take place during the 2011 summer season. Long term monitoring will begin in 2012, once remediation activities are complete.

## Rayrock Mine

The 2008 monitoring program was completed in August and the last of the annual monitoring programs is scheduled for the summer of 2009. Starting in 2010, the site will be monitored once every ten years. Before the project moves into that phase however, INAC, through consultation with Tłı̄ch̄o, will assess all monitoring data and recommendations towards the development of an Action Plan to address the remaining remediation work required at the site. The Action Plan will also look at any maintenance that may be required at the site on a more frequent basis.



Remediated tailings ponds at Rayrock Mine

## Assessment Sites

A Phase II Environment Site Assessment was completed in the summer of 2008 on the former exploration site, Spider Lake, and a Phase I ESA was completed for Chalco Lake. Phase II and III assessments are scheduled for the summer of 2009.



Tli Cho Logistics employee recognition ceremony, Colomac Mine, November, 2008

# Thank you Tli Cho Logistics

INAC would like to take this opportunity to thank Tli Cho Logistics for a job well done in its role as site operator at Colomac since April 2002. A recognition ceremony was held at Colomac on November 27, 2008 to thank Tli Cho Logistics and its staff for all their hard work and dedication on the Colomac Remediation Project.

Employee	Length of Service
Mike Bosch	6 years
Barry Franklin	6 years
Eddie Koyina	4 years
Lawrence Mackenzie	4 years
Graham Fuglsang	3 years
Jackie Chase	3 years
Tina Lamouelle	2 years
Gary Lafferty	2 years
Steve Giesbrecht	2 years

Thank you all for a job well done!

## Old mine site buildings to have new life in communities!

Three steel warehouses from the Colomac Mine site will be enjoying new lives in two Tłı̨chǫ communities. Two of the warehouses will be moved to Edzo, where they will be used to store equipment for the heavy equipment operators' training program. The third warehouse will be moved to Wekweètì for use as a maintenance garage. The warehouses will be moved from site over the 2009 winter road.

Published under the authority of the  
Minister of Indian Affairs and Northern  
Development and Federal Interlocutor for  
Métis and Non-Status Indians  
Ottawa, 2008  
www.ainc-inac.gc.ca  
1-800-567-9604  
TTY only 1-866-553-0554

QS-Y318-000-EE-A1  
ISSN:1918-8056

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Cette publication est aussi disponible en français sous le titre :  
Que se passe-t-il dan le Tłı̨chǫ? mars 2009

## Have you seen a suspected contaminated site?

For more information on contaminated sites in the Tłı̨chǫ,  
or to report a suspected contaminated site, contact:

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