

# **Muskwa Kechika Joint Project**

**Teck Cominco Limited  
Ministry of Sustainable Resource Development**

## **2004 Work Summary and Churchill Copper Mine Reclamation Completion Report**



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## **1.0 INTRODUCTION**

Remediation work for the Wokkposh Corridor Access route and the former Churchill Copper Mine in the Muskwa Kechika Management Area was carried out during July, August and September 2004. This project was jointly funded by Teck Cominco Limited (TCL) and the Muskwa-Kechika Trust Fund. Work was done under contract administered by Ministry of Sustainable Resource Development (MSRD). As a result of discussions with Muskwa Kechika (MK) Program, Ministry of Sustainable Resource Development (MSRD), Ministry of Energy and Mines (MEM), Ministry of Land, Water and Air Protection (MLWAP) and Federal Department of Fisheries and Oceans (DFO) officials, regulatory requirements to allow for work to proceed were received. A Joint Venture Program between TCL and MSRD was signed based on an approved 50/50 cost sharing work plan. TCL was the contractor for the remediation work.

The Wokkposh Corridor Route road which was constructed in the late 1960s, was partially funded under the Provincial Government's "Roads to Riches" program. This road was used as an access road for the Churchill Copper mine. The mine operated for several years and has been inactive since 1975. The Mill Site was located at the confluence of the Racing River and Delano Creek, 8.5 km northwest of Mount Roosevelt in the Muskwa Range in northeastern British Columbia. The Mine Site is located in the alpine headwaters of Delano Creek.

## **2.0 REMEDIATION WORK**

The following items were carried out as part of the 2004 Remediation Plan:

- Reconstructed as instructed by the MK program, the Wokkposh Corridor road to allow heavy equipment access;
- Relocate Racing River landfill material to a new landfill located at Mill building foundation and cover with local gravel source;
- Excavate most of the tailings remaining from North Tailings Pond and placed above river flood plain;
- Remove incidental refuse from bank of Racing River and the Mill area and place in landfill;
- Excavated approach to the grizzly ore dump at the Mill Site with the backhoe (this isolated the grizzly at the top of the crusher building);
- Covered using material from local borrow pit, seeded and fertilized mine boneyard and foundations;
- Investigated spillway for North Saddle Dam on South Tailings Pond and plugged decant culvert;

- Covered with soil, seeded and fertilized all foundations at the Mill Site.
- Dismantle bridges and removed piers, recontoured approaches and seeded Racing River, Wokkpash and MacDonald Creeks bridges with all steel buried above the flood plain;
- Road narrowed at several locations to allow access for ATV only as requested by MK program.

### **3.0 GOVERNMENT PERMITTING AND APPROVALS**

All required BC Government Ministries and DFO approvals and permits were received in order to carry out the remediation plan. A roster of permits and approvals is shown below.

- MEM Reclamation permit to allow work to be carried out on Crown land (Appendix A).
- MWLAP and Land Water BC (LWBC) approval to allow construction of landfills on Crown land. Pending permit to Ministry of Energy and Mines from MWLAP for landfills.
- MWLAP (Wildlife Act, Access Management Area Regulations) permission to enter MK management area (Appendix B).
- DFO approval to allow for fording river and creeks with heavy equipment and to remove bridges (Appendix C).

### **4.0 NOTIFICATION**

The MK Manager requested that the local Guide/outfitter be notified before work began. Dave Wiens of Stone Mountain Safaris Ltd. of Toad River, B.C. was contacted. As a result of this discussion, changes to the work schedule were implemented to conform to his hunting schedule.

### **5.0 ENVIRONMENTAL CONSIDERATIONS**

Hydrophobic oil absorbent sheets were at each fuel storage site. All heavy equipment carried oil absorbent and spill prevention supplies.

No significant oil spills were experienced during the project. All used sheets were gathered and stored in a watertight container. These oily materials were removed from the Muskwa Kechika.

A gasoline powered pressure washer was available for washing all equipment before fording the river or creeks.

The environmental impact to flora was limited to reactivating previously existing roads.

In-stream work was limited to placing a short gravel approach to the east side of the Racing River Bridge and pulling pilings from the Racing River and MacDonald Creek.

All soil/gravel covered areas were seeded and fertilized. However, no fertilizer was placed within 100 feet of any water body.

## **6.0 COSTS**

The cost of the project was \$326,000. The cost was less than expected because different equipment was used and some aspects of the job were easier than estimated. The utilization of a special attachment on the backhoe allowed this equipment to carry out the work of a bulldozer. This equipment reduction resulted in less manpower and consumables to be needed. It also reduced cartage of supplies and mobilization/demobilization costs.

The demolition of the bridges was carried out much efficiently than expected. The need for contingency expenses was not required.

The re-construction of the access road took slightly longer than expected but was carried out with the available equipment in a cost efficient way. There was just a lot more material to remove from washouts especially from the Mill Site to Mine Site than expected.

## **7.0 SITE CONDITIONS**

### **7.1 Access Road**

The Wokkash Corridor Route begins at approximately Mile 401 on the Alaska Highway. The route was found to be accessible, but, with extensive re-construction needed on many sections of the road surface. These numerous washouts were found along the entire road right of way from the Alaska Highway to the Alpine. This access re-construction work required fourteen days.

As requested by the MK Manager, during demobilization, the road was reduced at several locations to allow only ATV access. The road above the Mill Site was one of those locations. A second road narrowing was completed near the air strip.

## 7.2 Mill Site

The site is located in the wide flat bottom braided Racing River. The mill site is reclaiming after 25 years in a natural way and as expected on a gravel area with no apparent soil enhancements (low shrubs such as cranberries, woody shrubs (alders) and conifers). Some areas near the Mill had not revegetated but no significant local erosion was observed.

Small amounts of metal scrap and several partially filled drums were found in the mill site and within Delano Creek drainage channel. Strands of a power line were found lying on the ground throughout the area. Sections of power cable were found to be strung two to three feet above the ground.

Durable concrete foundations were found at the crusher, mill, load out and maintenance structures. The concrete is in remarkably good condition but some exposed reinforcing bar was observed (photo 1).



**1-General Appearance of Mill Site Before Reclamation**

All Mill Site building foundation slabs and short walls were covered with soil. The reclaimed areas were seeded and fertilized (photo 2 and 3).



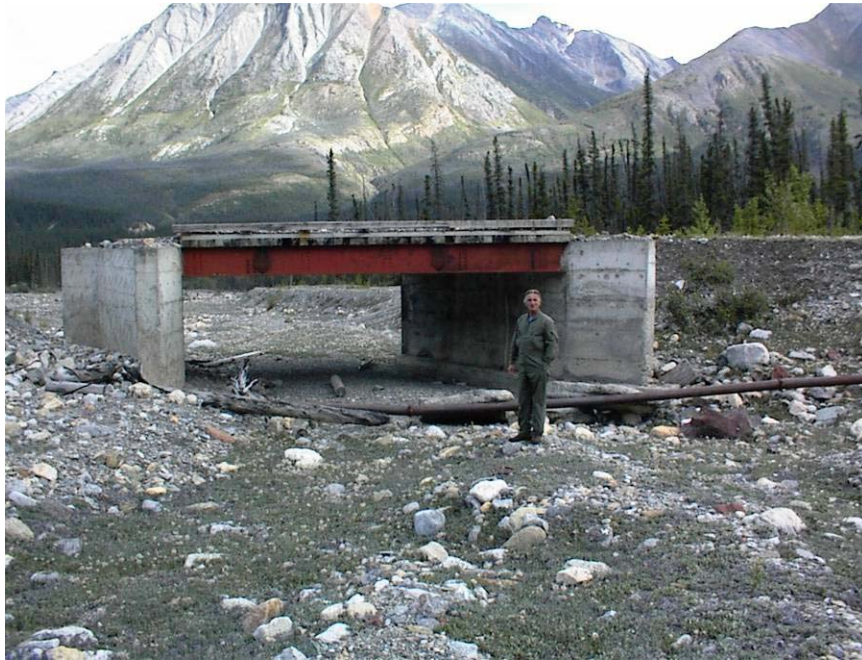


**2- Mill Site After Site Preparation**



**3- Mill Site After Site Preparation - looking south**

A bridge originally crossed a creek flowing from the north side of the Mill Site area. This creek has been naturally redirected to a new channel to the north of the site.



**4 - Bridge at Mill Site (2002) - looking east**

The bridge was demolished and the steel beams buried at the Mill Site Landfill (see section 8, Landfills). The bridge piers were pushed over and buried at the site (photo 5).



**5 - Mill Site Bridge After Reclamation - looking east**

The ore truck dump feeder that includes a metal grizzly was built against a hillside. This structure has several floors. The truck dump apron adjacent to the grizzly was backfilled with rock after the crusher building was constructed (photo 6).



**6 - Ore Grizzly At Mill Site Looking East (2002)**

The approach to the Grizzly was excavated to a depth of 12 feet. No access top of the grizzly is possible (photo 7).



**7 - Grizzly After Excavating Approach**

### 7.3 Tailings Areas

The tailings ponds were permitted to be constructed within the Racing River flood plain. Rob Fairservice, MELP (Prince George) confirmed in 2001 that the Ministry knew the ponds were in the flood plain when the environmental permits were issued. Two ponds were constructed on the site. The northerly pond located east of the mill site has been eroded but approximately 5,000 cubic meters of tailings remaining, mostly in the southeast corner. The tailings are grey with no oxidation staining.

The second tailings pond is located southeast of the mill site (photo 8). The embankment is in good shape. The pond is well used by ungulates and provides grazing and hiding cover. .

A geotechnical investigation of the south tailings dams by Harder Associates of Ft. St. John, B.C. was undertaken in August 2004. Mr. Edward A. Wilson, P.Eng concluded that the tailings area required the removal and burial of a wood skimmer structure. As well as exposing and backfill of the discharge culvert associated with skimmer and resloping to 2.5:1 around the backfilled area. All the above work was carried out under the supervision of Mr. Wilson. The geotechnical report signed by Mr. Ian H Harder, P.Eng., can be found in Appendix D.



**8 - North Saddle Dam**

Approximately 5,000 cubic meters of sand from the north tailings area were hauled out of the flood plain. The sands were excavated down to the organic layer underlying the material (photo 9 and 10). The remaining sands

were resloped and the slope armoured with coarse gravel. The excavated area was seeded to stabilize the slope.



**9 - Loading Sand From North Tailings Area**



**10 - Sand Hauling Out Of Flood Plain**

All the coarse sand piles above the flood plain were armoured with coarse gravel and seeded and fertilized.

## 7.4 Mine Site

The road to the mine adits approximately 21 kilometers from the mill required significant clearing to allow passage of heavy equipment (photo 11). Numerous washouts and a small abandoned bridge were found along the route.

The Adit access road above the former mine building site has collapsed and has naturally reclaimed over the years. Numerous mine openings and a wooden cribbed wall were located in the mine area.



### 11 - Hoe Building Road To Upper Alpine Mining Area

Six (6) Adits were inspected: two (2) at the mine building site and four (4) in the upper alpine. The upper most adit was found to be in accessible and no attempt to access the site with heavy equipment was undertaken. An inspection of this adit found an intact wooden wall covering the opening. A second adit was found to have been sealed by a rock slide.

The remaining upper alpine adits were plugged using heavy equipment. Wood and steel refuse were placed with the adit. The adits were closed with coarse rock and resloped (photos 12-15).

Metal refuse and many barrels were removed from Delano Creek above and below the Mine Site and placed in the landfill. This work was carried out by hand and no heavy equipment operated within the creek bed.

However, a site several kilometers beyond the adits, with six (6) barrels in an advanced state of deterioration were discovered. No attempt to access this area was undertaken. It was considered that environmental damage due to road

construction, to this fragile alpine area out weighed the value of any barrel removal.

All work by heavy equipment in the alpine was kept to a minimum. New sections of road constructed to the adits were reclaimed to pre-disturbance conditions.



**12 - Hoe Demolishing Wooden Entrance To Adit 1**



**13 - Sealed Adit 1**



**14 - Mine Adit 2 Before**



**15 - Adit 2 Sealed**

The two (2) adits found at the mine building site were sealed (photos 16 and 17). All wooden refuse found around the area was placed in the adit before sealing with coarse rock. These areas were seeded and fertilized.





**16 - Adit 3 Below Mine Building Area**



**17 - Adit 3 Sealed**

Mine building foundation slabs were found exposed (photo 18). The slabs were covered with soil (photo 19). The areas were seeded and fertilized.



**18 - Mine Building Foundations**



**19 - Building Foundations Covered With Soil**

A cribbed log wall was found at the mine building site (photo 20). This structure was demolished and covered with soil. The sloped area was seeded and fertilized (photo 21).



**20 - Wooden Cribbed Wall At Mine Site**



**21 - Wooden Cribbed Wall Area Contoured And Covered With Soil**

## **7.5 Access Road Bridges**

### **7.5.1 Racing River, Wokkpash and MacDonald Creeks**

All approaches to the Racing River Bridge were completely eroded. The bridge piers, metal superstructure and wood decking were found to be in an advance state of deterioration but still standing (photo 22).



**22 - East Approach To Racing River Bridge**

It was necessary to reconstruct the approach to the east side to allow workers to get onto the bridge (photo23). The bridge was cut into manageable pieces to aid in the demolition (photo 24)



**23 – East Approach To Racing River After Re-Construction**



### **24 – Steel Cutting Racing River Bridge**

After the beams and decking were removed from over the river channel, the steel pilings were removed with the aid of the backhoe (photo 25 and 26). The bridge was removed from the river with very little river bed disturbance. Most of the work was undertaken with the hoe positioned on the shore. Steel section and pilings removal was carried out using the long reach of the backhoe.



**25 - Removing Steel Pier From East Side Of Racing River Bridge**

Only the middle pier required the backhoe to work in three inches of water.



**26 - Removing Beam From Racing River Bridge**

Both approaches were resloped. Special care was taken to ensure that excavated material did not fall into the river (photo 27). The slope was seeded (photo 28). No fertilizer was applied within 100 feet of any water body.



**27 - Contouring Racing River Western Approach**



### **28 - Seeding Bridge Approaches**

The same method carried out on the Racing River, was used to reclaim the Wokkash and MacDonald Creek bridges and approaches (photos 29 and 30).





**29 - Contouring Wokkpush Creek Southern Approach**



**30 - Contouring Macdonald Creek Southern Approach**

## **8.0 CLEANUP AND LANDFILLS**

In 2001, an exposed refuse landfill was found near the southeast corner of the northerly tailings area. The land fill appears to be the source of incidental refuses found along the west shore of the Racing River such as metal pipe, newspaper, and plastic bags. In addition, metal refuse and underground mine cars were found at the Mine Site in the alpine (photo 31).



**31 - Mine Site Steel Refuse**

A landfill was established near the mine building site. Any steel or wood was moved and deposited within the landfill. The landfill was covered with soil, seeded and fertilized (photo 32).



**32 – Reclaimed Mine Site Landfill**

A second landfill was located in the foundation of the Mill building at the Mill Site (photo 33).



**33 - Mill Site Landfill Before Filling**

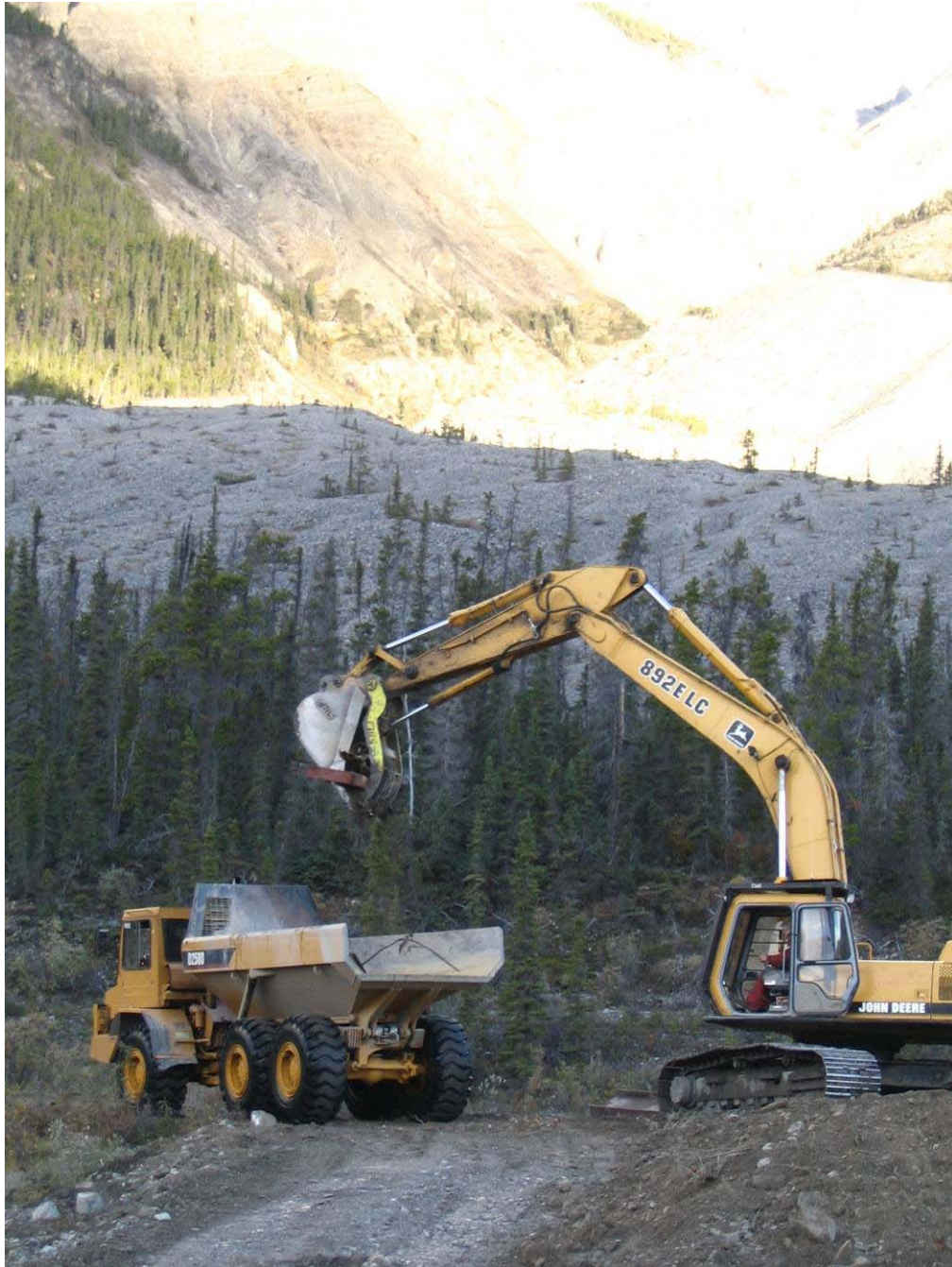
Steel and refuse were placed in this landfill such as the beams from the Mill Site Bridge, steel pipe found in the creek flowing to the north of the site and electrical transmission cable (photo 34). In addition, the landfill near the shore of the Racing River was excavated and placed in this landfill.



**34 - Filling Mill Site Landfill**

The landfill was also used to encapsulate tailings sand. The landfill cover of soil/gravel mixture was sloped (photos 2 and 3). The area was seeded and fertilized.

Exposed metal culverts and steel refuse was gathered from the access road as the equipment was moving from the site (photo 35).



### **35 - Cleaning up Wokkash Corridor Road**

A third landfill was established near the Racing River above the flood plain. All road cleanup material and the metal and wood from the bridge were deposited in at this site (photos 36 and 37).



**36 – Filling Racing River Landfill**



**37 – Racing River Landfill**

A fourth smaller landfill was developed on the east side of the Racing River. This site was established to allow burial of steel from the bridge without having to drag the steel through the river (photo 38).



**38 - Hauling Steel To Landfill Above Racing River Flood Plain**

A final landfill was located near MacDonald Creek to bury refuse gathered along the Wokkpush Corridor from the Racing River. This site was also used to place the MacDonald Creek's bridge steel beams and pilings.

**Landfill Coordinates**

#1	North 58° 25.9'	West 125° 24.8'
#2	North 58° 30.037'	West 125° 9.085'
#3	North 58° 33.45'	West 125° 03.84'
#4	North 58° 33.46'	West 125° 02.54'
#5	North 58° 41.50'	West 124° 53.51'

## **9.0 CONCLUSIONS**

The project achieved all objectives set out in the 2004 Work Plan. The work was carried out over fifty seven (57) days in July, August and September 2004.

Five (5) landfills were established as a result of bridge demolition and wood/steel refuse cleanup from the Mill, mine, and Wokkash Corridor road. The landfills were placed above the flood plains.

A Geotechnical Investigation Report by Harder Associates Ltd. concluded that a culvert through the North Saddle Dam required plugging. This work was carried out with the supervision of a Professional Engineer.



## **Appendix A**

## **Appendix B**

## **Appendix C**

## **Appendix D**