FISHERIES AND OCEANS CANADA (DFO)
CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)
SCREENING REPORT

GENERAL INFORMATION

1. **Environmental Assessment (EA) Title:**
   Ruby Creek Molybdenum Mine – Tailings Impoundment Area in Headwaters of Ruby Creek
2. **Proponent:** Adanac Molybdenum Corporation
3. **Other Contacts:**
   Klohn Crippen Berger Limited
4. **Role:**
   Consultant for Adanac Molybdenum Corporation
5. **Source:** Canadian Environmental Assessment Agency
6. **EA Start Date:** November 20, 2006
7. **CEAR No.:** 06-01-23875
8. **PATH No.:** 05-HPAC-PA1-000-000024
9. **DFO File No:** 5300-10-134
10. **Provincial/Territorial File No.:** B.C. Environmental Assessment Office File No. 30200-20/Ruby-05-06

BACKGROUND

11. **Background about Proposed Development:**

Adanac Molybdenum Corporation is proposing to develop a molybdenum mine in the headwater area of Ruby Creek, located in north-western British Columbia. The proposed development will include an open pit mine, milling facility, waste rock dumps, ore stockpiles, tailings disposal pond (tailings impoundment area), dams required for the tailings disposal pond, diesel power plant, maintenance shops, administration buildings, employee accommodation and associated infrastructure. The mill is expected to process 20,000 tonnes per day and the mine is expected to operate for at least 20 years.

ENVIRONMENTAL ASSESSMENT

12. DFO Trigger(s):	13. Act & Section(s):
1. The authorization of the harmful alteration, disruption or destruction (HADD) of fish habitat of the bed, channel and riparian zone of Ruby Creek associated with the proposed construction of dams for the Tailings Impoundment Area (TIA).	1. Subsection 35(2) of the *Fisheries Act*.
2. Regulations to be made by the Governor in Council are contemplated to list the headwaters of Ruby Creek as a Tailings Impoundment Area on Schedule 2 of the *Metal Mining Effluent Regulations* (MMER) pursuant to paragraphs 36(5) (a) to (e) of the *Fisheries Act*.	2. Paragraphs 36(5)(a) to (e) of the *Fisheries Act*.

14. **Other Responsible Authorities (RAs) and Regulatory Bodies (RBs):**
    None
15. **CEAA Trigger(s) of Other RA(s) and RB(s):**
    None
16. **Lead RA:**
    Fisheries and Oceans Canada (DFO)

17. Other Jurisdiction:

This development proposal is also being assessed by the government of the Province of British Columbia (BC). The governments of BC and Canada co-operated in the conduct of the environmental assessment process in accordance with the Canada–British Columbia Agreement on Environmental Assessment Cooperation (2004).

18. Federal Environmental Assessment Coordinator (FEAC):

Canadian Environmental Assessment Agency

19. Rationale for FEAC:

The development proposal is subject to the environmental assessment process of another jurisdiction, the government of the Province of BC.

20. Expert Federal Authority(ies) (FAs):

Environment Canada

Health Canada

21. Area(s) of Interest of Expert FA(s):

Water quality

Human health

22. Other Contacts and Responses:

Fisheries and Oceans Canada notified the Taku River Tlingit First Nation regarding the environmental assessment as the proposed development is located within their traditional territory. Representatives of the Taku River Tlingit participated in the cooperative BC-Canada environmental assessment process.

23. Scope of Project (details of the project subject to screening):

Fisheries and Oceans Canada has determined that the scope of the project for the federal environmental assessment pursuant to the *Canadian Environmental Assessment Act* is the construction, operation, decommissioning and abandonment of the main dam and the seepage recovery dam in the headwaters of Ruby Creek and the slurry (tailings) pipeline from the milling facility to the TIA, and includes the removal and disposal of vegetation and overburden soils from the footprint area of the TIA and the deposit of a deleterious substance (tailings and potentially acid-generating waste rock) into the TIA.

Hereafter, the term "Project", refers to the project as scoped in the preceding paragraph.

24. Location of Project:

The Project is located 24 kilometres northeast of the community of Atlin, BC and 80 kilometres south of the BC - Yukon border.

25. Environment Description:

The Project is located in the northwest corner of BC, within the Yukon Plateau physiographic region. Landforms in the area have been created mostly as the result of extensive glacial action on the land surface. The land is dissected into large blocks by lakes, creeks and streams including Atlin Lake, Surprise Lake, Pine Creek and Ruby Creek. The mountain ridges form local drainage divides, and the regional drainage is to the west towards Atlin Lake, which drains northward to the Yukon River and into the Bering Sea. Elevations in the vicinity of the proposed development range from 668 metres ASL at Atlin Lake and 913 metres ASL at Surprise Lake, to close to 2000 metres ASL at the Project site.

The climate is characterized by long, cold winters and short, cool summers. Long-term temperature records for Atlin show a mean annual temperature of about 1 degree Celsius, with mean daily temperatures normally above freezing from April to October and temperature extremes ranging from -50 degrees Celsius to 31 degrees Celsius; freezing temperatures can be encountered at any time during the year. Average temperatures at the Project site are expected to be 2 to 3 degrees Celsius cooler than in Atlin. Total annual precipitation for the Project site is estimated to be 703 mm with highest precipitation, greater than 80 mm monthly rainfall or snowfall equivalent, in the months of January, July, September and October.

A small resident population of Arctic grayling reside in the headwaters of Ruby Creek within the area of the proposed dams and tailings impoundment. Recent study by the proponent estimates the population to be approximately 400 fish, not including young of the year fry. Both Arctic grayling and slimy sculpin are known to use the lowest reach of Ruby Creek, just above its confluence with Surprise Lake, but no fish were captured in the approximately 5 kilometres

between the lowest reach and the resident population of Arctic grayling in upper Ruby Creek during the proponent's baseline study of fish distribution. This appears likely to be due to the disruption of the stream channel by historic and recent placer mining activities which has resulted in the creation of numerous barriers to fish passage.

A number of valued wildlife species occur in the vicinity of the Project. These include woodland caribou, moose, Stone's sheep, grizzly bear, hoary marmot, and game birds (includes willow ptarmigan, ruffed grouse and spruce grouse). These species were identified as valued because the animals are traditionally hunted by Taku River Tlingit people, recreationally hunted, or are a species listed as endangered, threatened or at risk.

Adanac Molybdenum Corporation's Environmental Assessment Certificate Application (2006) provides a more detailed description of the environment in the vicinity of the proposed development.

26. Factors and Scope of Factors Considered:

As per the CEAA, the factors considered in this environmental assessment included the following:

- the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
- the significance of the environmental effects referred to above;
- comments from the public that were received in accordance with the CEAA and the regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
- alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such means; and
- the need for and the requirements of, any follow-up program in respect of the Project.

The environmental components that were considered likely to be potentially affected include the following:

- air quality;
- surface water quality;
- hydrology;
- groundwater quality;
- fish; and
- wildlife.

The assessment of the potential effects of malfunctions or accidents included:

- fuel spills from machinery used to construct or maintain the Project;
- slurry pipeline malfunction; and
- failure of main dam or seepage recovery dam.

The assessment of the potential effects of the environment on the Project included:

- avalanches;
- landslides; and
- earthquakes.

Other projects and activities in the Project area that were considered during the assessment of potential cumulative effects included:

- other components of the proposed development that were not included in the scope of Project for this assessment (i.e. mine pit, mill, waste rock dumps, camp, access road upgrades);
- placer mining;
- proposed Tulsequah Chief mine;
- forestry activities;
- proposed Pine Creek hydroelectric power project;
- possible power transmission line between Whitehorse and Atlin;
- traditional land use;

- recreation activities; and
- mineral exploration activities.

The scope of the factors considered were chosen to encompass the appropriate geographic area for each factor being considered. This included the area of the works and activities within the scope of the Project and in some cases extended beyond these. The time scales considered were construction, operation, closure and post-closure until the site is rehabilitated.

27. **Potential Environmental Effects:** (See also Table 1: Summary of the Potential Environmental Effects, Proposed Mitigation Measures and Significance of the Potential Environmental Effects of the Ruby Creek Project).

Adanac Molybdenum Corporation's Environmental Assessment Certificate Application (2006) provides a more detailed description of the potential environmental effects of the proposed development.

Air Quality

Machinery used for site preparation and the construction and maintenance of the dams will be run on diesel and gasoline and will exhaust small quantities of sulphur dioxide, nitrogen oxides, carbon monoxide, volatile organic carbon, carbon dioxide, and other greenhouse gases. These will be mostly limited to the site preparation and construction phase. Burning of vegetation debris during construction would also emit these pollutants but would occur over a short term. These were evaluated by the proponent and reviewed by the appropriate government agencies during the BC environmental assessment process and the proponent has committed to mitigation measures in the BC Environmental Assessment Certificate and will be required to abide by the conditions of all permits (i.e. for burning waste) from appropriate government agencies. Emissions from Project activities are not expected to exceed Federal Ambient Air Quality Objectives and residual effects are expected to be insignificant and short term.

Dust emissions may be generated from the action of wind on disturbed or created surfaces associated with the TIA, dams or access roads and this could have local effects on the consumption of plants by wildlife or humans where the dust settles. These will be monitored and appropriate mitigation measures will be implemented by the proponent as per the BC Environmental Assessment Certificate under guidance or permit of appropriate Provincial government Ministries. Effects of dust emissions are expected to be substantially mitigated.

As the Project site is remote and not substantially influenced by anthropogenic emissions, the potential for residual effects to have a significant cumulative effect, in combination with other projects and activities in the area, is negligible.

Surface Water Quality

The proponent's analysis and modelling predict that any water leaving the tailings facility during the operation and post-closure phases will meet the BC Water Quality Guidelines for aquatic life or will be with in the range of baseline concentrations. The proponent has committed to an ongoing water quality monitoring program in accordance with guidance and permits from appropriate provincial government ministries and an environmental effects monitoring program as per the *Metal Mining Effluent Regulations* will be conducted and, if any water quality parameters are found to be unacceptable to the responsible government agencies then tailings impoundment water would either be contained within the tailings impoundment or otherwise addressed to ensure that water quality in Ruby Creek is not adversely affected by the Project. Cumulative effects analysis was not conducted for this potential effect as there are no other known anthropogenic contributors of contaminants to water quality in the Ruby Creek watershed.

Hydrology

The construction and operation of the dams and tailings impoundment have the potential to affect the flows in lower Ruby Creek, downstream of the Project. Filling the tailings impoundment will require capture of runoff water and during operations clean runoff water will be diverted around the Project to lower Ruby Creek. The proponent has calculated that the flow at the mouth of Ruby Creek could be reduced by up to 25% during initial filling of the TIA and by up to 20% during operation; however, after closure there will be only a minor reduction of flow in lower Ruby Creek. None of these flow changes are expected to adversely affect the use of lower Ruby Creek by fish or wildlife. Placer mining activities have changed the flow regime in lower Ruby Creek which has adversely affected the fish habitat values of lower Ruby Creek. However, it is not expected that addition of the anticipated effects of the Project will result in significant adverse cumulative effects and the storage of water in the tailings impoundment has the potential to moderate the current unstable nature of flows in the creek.

Groundwater quality

Seepage flows from the TIA will increase as the dam is raised and approximately 65% of the seepage flow is expected to be captured at the seepage recovery pond and pumped back into the TIA. Seepage water is expected to flush out metals from the tailings until there are no available metals left in the tailings. Seepage from the TIA would mix with Ruby Creek groundwater and eventually end up contributing to lower Ruby Creek and/or Surprise Lake. The proponent has estimated that, with dilution from natural groundwater, the combined groundwater entering Surprise Lake will meet the BC Water Quality Guidelines for all parameters except for aluminum and cadmium but the concentrations of these are expected to be within the range of baseline concentrations. Cumulative effects assessment was not conducted for this potential effect as there are no other known anthropogenic contributors of metals to water quality in the Ruby Creek watershed.

Fish and Fish Habitat

The construction of the dams and tailings impoundment would affect a small resident population of Arctic grayling that reside in the headwaters of Ruby Creek and would disrupt the habitat used by this population of fish. The population size has been estimated to be approximately 400 fish not including recently emerged fry (based on 2 years of survey) and the area of habitat used by the fish is estimated to be approximately 13,100 square metres of small stream channels. The proponent has developed a fish habitat compensation plan that consists of descriptions and designs of fish habitat enhancements that would create a total of 19,836 square metres of fish habitat for Arctic grayling in the Surprise Lake/Pine Creek watershed and proposes to relocate the resident Arctic grayling in the Project area to an appropriate location in the Surprise Lake/Pine Creek watershed prior to construction of the dams and tailings impoundment. As these measures are expected to mitigate the Project effects on fish and fish habitat, a cumulative effects assessment was not considered necessary.

Changes to flows due to the Project are not expected to affect the use of lower Ruby Creek by fish (see hydrology section above).

Wildlife

The Project has the potential to affect the following species of wildlife: woodland caribou, moose, Stone's sheep, grizzly bear, hoary marmot, and game birds (includes willow ptarmigan, ruffed grouse and spruce grouse). The proponent undertook Terrestrial Ecosystem Mapping (TEM) and a Wildlife Habitat Suitability Assessment in the area of the Project in order to predict the effects of the Project on these wildlife species in addition to gathering existing wildlife information for the area and acquiring information by conducting wildlife surveys. These species were identified as valued because the animals are traditionally hunted by Taku River Tlingit people, recreationally hunted, or are a species listed as endangered, threatened or at risk; however, surveys for waterfowl and amphibians were also conducted.

Construction of the tailings impoundment would result in the following:

- loss of a relatively small area of suitable feeding habitat for caribou, however this is not considered significant in the context of the total amount of feeding habitat that is available and did not warrant a cumulative effects assessment;
- negligible effect on Stone's sheep;
- loss of a relatively small area of suitable feeding habitat for moose, however this is not considered significant in the context of the total amount of feeding habitat that is available and did not warrant a cumulative effects assessment;
- negligible effect on Grizzly bear;
- negligible effect on hoary marmot; and
- negligible effect on game birds.

Malfunctions or Accidents

Fuel spills from the machinery used to construct the dams and prepare the tailings impoundment site could occur. Standard best practices are expected to be followed including appropriate storage and refuelling of vehicles and spill kits and personnel trained in spill clean-up will be on site. In the event of a spill it is expected that volumes will be small and local, and clean up would occur.

Malfunction of the tailings slurry pipeline from the mill to the tailings impoundment could occur but any spill of tailings

slurry would be local and would end up in the tailings impoundment as the slurry pipeline will be located at lower elevation than ditches that would be constructed to divert clean water around the Project site.

Failure of the main dam or the seepage recovery dam could occur, for example in the event of a large earthquake. In order to minimize the risk, the dam will be designed and constructed to withstand the maximum probable earthquake predicted for the area. In the event of a failure of the main dam, tailings could be washed downstream in Ruby Creek and, if the tailings were transported far enough, would settle out in Surprise Lake. This would likely result in a temporary effect (<1 month) on the use of the lake water by fish, wildlife and humans, due to the turbidity, until the sediment settles to the bottom of the lake; however, the dam design should ensure that the risk of dam failure due to an earthquake is low.

Effects of the Environment on the Project

Avalanches and landslides are unlikely to significantly affect the functioning of the tailings impoundment and dams but may require management and maintenance in order to ensure the tailings facility continues to function properly.

Other than potentially affecting the dam (see above) earthquakes are not expected to affect the functioning of the TIA. In the event of an earthquake causing a landslide in the vicinity of the facility some remedial works may be required to ensure the TIA continues to function properly.

Alternatives Assessment

The proponent assessed alternative methods and locations for disposal and storage of tailings which was substantially revised based on comments from Environment Canada. The revised alternatives assessment (*Ruby Creek Molybdenum Project: Alternatives Assessment*, July 4, 2007) evaluated eight options based on key engineering design and environmental considerations. Engineering design considerations included construction costs, foundation conditions/geological hazards, water management, ease of construction and ease of operation. Environmental considerations included total disturbed area, resources lost, effects on aquatic environment, effect on terrestrial wildlife, risks at closure and acid rock drainage (ARD) management.

Alternatives included thickened paste and filtered tailings which would not require storage in water however these options ranked low due to local conditions and high cost. Six alternative locations for storage of tailings under water were evaluated and a preferred site was proposed by the proponent (Upper Ruby Creek "A" site) because it ranked highest overall for both engineering and environmental considerations. One of the main disadvantages of the Upper Ruby Creek "A" site would be the displacement of fish and the loss of fish habitat in Upper Ruby Creek. As this site is located on waters frequented by fish, construction of the TIA dams would require authorization of the destruction of fish habitat under subsection 35(2) of the *Fisheries Act* and the deposit of a deleterious substance into the TIA, requires listing Upper Ruby Creek on Schedule 2 of the *Metal Mining Effluent Regulations*.

28. Mitigation Measures (including Habitat Compensation):

Mitigation measures are described in Table 1: Summary of the Potential Environmental Effects, Proposed Mitigation Measures and Significance of the Potential Environmental Effects of the Ruby Creek Project (attached to this report).

29. Significance of Adverse Environmental Effects:

The determination of significance of adverse environmental effects is described in Table 1: Summary of the Potential Environmental Effects, Proposed Mitigation Measures and Significance of the Potential Environmental Effects of the Ruby Creek Project and section 27 of this screening report.

30. Public Participation in Screening under Subsection 18(3) of CEAA:

Was it considered appropriate in the circumstances? Yes

The public will be provided an opportunity to examine and comment on the screening report under section 18(3)(b) of the CEAA.

31. Summary of Public Comments and Concerns Related to Screening under Subsection 18(3):

See section 44.of this screening report

32. Follow-up Program:

Was it considered appropriate in the circumstances? **No**

A follow-up program was not considered necessary because the proposed Project does not involve technology or mitigation measures that are new or unproven and it is anticipated that the proposed mitigation measures will address the predicted environmental effects. Furthermore, the residual environmental effects of the Project have been identified and are unlikely to be different than predicted in the EA.

33. Other Monitoring and Compliance Requirements:

Implementation of all mitigation measures will be monitored under approvals or permits from government agencies and departments. Site visits, inspections or reporting will be conducted by consultants or contractors working on behalf of the proponent and the results of these will be provided to the appropriate government agencies or departments. This will included monitoring to ensure compliance with the *Fisheries Act* and the *Metal Mining Effluent Regulations*.

SCREENING CONCLUSION

34. Conclusion on Significance of Adverse Environmental Effects:

Fisheries and Oceans Canada has completed the screening of the Project under the CEAA. DFO has determined, taking into account the implementation of the proposed mitigation measures, that the Project is not likely to cause significant adverse environmental effects.

35. Prepared by: original signed by **36. Date:** September 28, 2007

37. Name: Mike Engelsjord

38. Title: Biologist / Environmental Assessment Analyst

39. Approved by: original signed by **40. Date:** Sept 28/07

41. Name: Adam Silverstein

42. Title: Manager, Environmental Assessment and Major Projects

PUBLIC PARTICIPATION UNDER PARAGRAPH 18(3)(b) of CEAA

43. Application of Paragraph 18(3)(b) of CEAA:

The public will be provided with an opportunity to comment on the screening report and project-related records included in the Registry.

44. Summary of Public Comments and Concerns Related to Screening After Application of Paragraph 18(3)(b) of CEAA:

To be completed following public consultation.

COURSE OF ACTION DECISION

45. Course of Action Decision: (under Section 20 of CEAA)

☐ DFO may exercise its power, duty or function, i.e. may issue the authorization - where the Project is not likely to cause significant adverse environmental effects. Confirm below the specific power, duty or function that may be exercised.

- ☐ DFO to issue *Fisheries Act* Authorization or Approval
- ☐ DFO to recommend to Governor in Council to exercise power, duty or function
- ☐ DFO to proceed with project (as proponent)
- ☐ DFO to provide financial assistance for project to proceed
- ☐ DFO to provide federal land for project to proceed

☐ DFO may not exercise its power, duty or function - the Project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances.

☐ DFO shall refer the Project to the Minister of the Environment for referral to a mediator or review panel if it is uncertain whether the Project is likely to cause significant adverse environmental effects.

☐ DFO shall refer the Project to the Minister of the Environment for referral to a mediator or panel - the Project is likely to cause significant adverse environmental effects that may be justified in the circumstances.

☐ DFO shall refer the Project to the Minister of the Environment for referral to a mediator or review panel - public concerns warrant a reference to a mediator or review panel.

46. Approved by: _____ **47. Date:** _____

48. Name:

49. Title:

50. References:

Ruby Creek Molybdenum Project – Environmental Assessment Certificate Application and Appendices. July 2006, prepared by Adanac Molybdenum Corporation.

Ruby Creek Molybdenum Project – Alternatives Assessment. July 4, 2007, prepared by Adanac Molybdenum Corporation.

*Both of these references are available on the British Columbia Environmental Assessment Office website at http://www.eao.gov.bc.ca/epic/output/html/deploy/epic_project_doc_list_258_r_app.html