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GUIDELINES

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(LAND) (Mary Tapsell)

FOR

ENVIRONMENTAL ASSESSMENT REPORT

PRAIRIE CREEK PROJECT

SAN ANDREAS RESOURCES CORPORATION LTD.

Prepared By:

REGIONAL ENVIRONMENTAL REVIEW COMMITTEE

ENVIRONMENT & CONSERVATION
NORTHERN AFFAIRS PROGRAM
YELLOWKNIFE, N.W.T.

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TABLE OF CONTENTS

- 1.0 PURPOSE OF THE DRAFT GUIDELINES
- 2.0 INTRODUCTION
- 3.0 BACKGROUND AND PROJECT RATIONALE
- 4.0 DESCRIPTION OF EXISTING BIOPHYSICAL AND SOCIAL ENVIRONMENT
 - 4.1 Physical Environment
 - Geology
 - Permafrost
 - Ground Instability
 - Climatology
 - Hydrology
 - Water Quality
 - Water Quantity
 - Sediment Quality
 - 4.2 Biological Environment
 - Vegetation, Including Wetlands
 - Fish, Other Aquatic Life and Habitat
 - Birds, Wildlife and Habitat
 - 4.3 Socio-economic Environment
 - Community Profiles
 - Community Consultations
 - Community Economic Base
 - Social and Economic Policies
 - Renewable and Non-Renewable Resource Uses
 - 4.4 Archaeological and Heritage Sites
 - 4.5 National Parks
 - 4.6 Environmental Health
- 5.0 DESCRIPTION OF THE PROPOSED PROJECT
 - 5.1 Mine Site Components
 - Geology/Mineralogy
 - Mining Methods
 - Ore Processing
 - Mill Tailings
 - Waste Rock Disposal
 - Acid Rock Drainage
 - Water Supply and Management
 - Lake Dewatering
 - Water Diversion

- 5.2 Associated Infrastructure
 - Winter Roads
 - All Weather Roads
 - Airstrip Facilities
 - Housing Facilities
 - Storage Sites
 - Borrow Pits and Quarries
 - Sewage Treatment and Disposal
 - Solid Waste Management
 - Hazardous Waste Management
 - Power Generation

- 6.0 ENVIRONMENTAL IMPACT ASSESSMENT
 - 6.1 Effects on the Physical Environment
 - Geology
 - Permafrost
 - Ground Instability
 - Climatology
 - Hydrology
 - Water Quality
 - Water Quantity
 - Sediment Quality
 - 6.2 Biological Environment
 - Vegetation, Including Wetlands
 - Fish, Other Aquatic Life and Habitat
 - Birds, Wildlife and Habitat
 - 6.3 Effects on the Socio-economic Environment
 - Community Profiles
 - Community Consultations
 - Community Economic Base
 - Social and Economic Policies
 - Renewable and Non-Renewable Resource Uses
 - 6.4 Effects on Archeological and Historical Sites
 - 6.5 Effects on the Nahanni National Park Reserve
 - 6.6 Effects on Environmental Health

- 7.0 ALTERNATIVES AND POTENTIAL FUTURE DEVELOPMENTS
 - 7.1 Project Alternatives
 - 7.2 Potential Future Developments

- 8.0 CUMULATIVE IMPACTS
 - 8.1 Project Specific Cumulative Impacts
 - 8.2 Cumulative Impacts Among Projects in the Project Area

- 9.0 MITIGATIVE MEASURES AND RESIDUAL IMPACTS
 - 9.1 Mitigative Measures
 - 9.2 Residual Impacts
- 10.0 LAND CLAIMS
- 11.0 CONTINGENCY PLANS
- 12.0 ENVIRONMENTAL SURVEILLANCE AND MONITORING PROGRAMS
 - 12.1 Biophysical
 - 12.2 Social and Economic
- 13.0 RESTORATION and ABANDONMENT PLANS
- 14.0 INFORMATION PROGRAMS AND PUBLIC INVOLVEMENT
- 15.0 CODE OF GOOD ENVIRONMENTAL PRACTICE

1.0 BACKGROUND AND PURPOSE OF THE DRAFT GUIDELINES

The purpose of the Draft Guidelines is to assist San Andreas Resources to prepare an Environmental Assessment (EA) Report for its proposed Prairie Creek Base Metal Mine Project, Prairie Creek, NWT. A preliminary review of San Andreas Project Description Report (December 1994), has indicated that, due to a number of factors, it would be in the best interest of all parties concerned that detailed guidelines be provided to the proponent for the preparation of an EA. They are: 1) the need for rigorous environmental screening required under the Canadian Environmental Assessment Act (CEAA); 2) the level of public concern about the project, expressed by the number of letters received, and due in part to the location of the project in close proximity to the Nahanni National Park Reserve; 3) the probable need for a 163 km all weather access road; 4) potential conflicts with the tourist industry of the area; and 5) the high probability that DIAND's environmental screening could be expanded into a Comprehensive Study or a panel review under CEAA.

The first stage of CEAA requires that a screening or a comprehensive study be conducted. The factors listed above indicate that the comprehensive study route would be more appropriate than the screening route and this has also been the opinion of federal agencies with interest in the project. The EA report would form the basis of the comprehensive study and submission to the Minister of the Environment and the Canadian Environmental Assessment Agency.

DIAND, as regulator for land and water will assume the lead role of Responsible Authority (RA). DIAND will be assisted by the Regional Environmental Review Committee (RERC), which includes all federal agencies with interest in the project (DOE, DFO, MOT and Heritage Canada).

2.0 INTRODUCTION

This section should introduce the project, the proponent, the time frames for the overall project, and the plans for community consultations.

3.0 BACKGROUND AND PROJECT RATIONALE

This section should provide the project history, the economic data for its justification, the mining methods, the projected life of the mine, the benefits to the region or otherwise and the overall rationale for project.

The proponent should identify the need for the project, alternative means to carrying out the project that are technically and economically feasible and the environmental effects of any such means.

The proponent should indicate all decision making processes and supporting rationales, including how the proponent reached conclusions concerning significance of environmental impacts, mitigation of adverse environmental impacts and determining the likelihood of occurrence of significant adverse environmental effects.

4.0 DESCRIPTION OF EXISTING BIOPHYSICAL AND SOCIAL ENVIRONMENT

This section should document the existing baseline physical, biological, ecological and socio-economic environments, and to the extent possible and relevant as they existed prior to the proponent's exploration activities. Emphasis should be placed on those components of the environment that are likely to be affected by the project and on those identified as issues of public concern.

The description of the existing environment should be in sufficient detail to permit the identification, assessment and determination of significance of potentially adverse effects which may be caused by the project and should cover the construction, operation, reclamation and abandonment phases of the project.

Traditional knowledge may be particularly valuable in providing information on the past and existing environment and should be included. The source of the information should be identified.

4.1 Physical Environment

The focus should be on the components of the physical environment that are likely to be affected by the Project. Consideration should be given to appropriate spatial and temporal boundaries and to components and processes such as: Geology; Permafrost; Ground Instability; Climatology; Hydrology; Water Quality and Quantity; and Sediment Quality.

4.2 Biological Environment

Consideration should be given to components of the biological environment that are likely to be affected by the Project. Consideration should be given to appropriate spatial and temporal boundaries and should include the following components and processes: vegetation, including wetlands; fish, other aquatic life and habitat; birds, including migratory birds; wildlife and habitat.

4.3 Socio-economic Environment

The profile of the existing socio-economic environment should describe conditions at the affected communities, at the regional and territorial levels. Consideration should be given to: demographics; social and cultural patterns; land and resource use; local, regional and territorial economy; employment, education and training; services and infrastructure.

4.4 Archaeological and Heritage Sites

Consideration should be given to: archaeological, paleontological, cultural, heritage and burial sites.

4.5 National Parks

Consideration should be given to present and future use of the Nahanni National Park Reserve.

4.6 Environmental Health

Consideration should be given to human health.

5.0 DESCRIPTION OF THE PROPOSED PROJECT

5.1 Mine Site Components

A description of the mine site components listed below will be required.

5.1.1 Geology/Mineralogy of the Ore Deposit and Mining Methods

Provide detailed characterization of the ore body and the mining methods to be used. This should include mineralogy, the type of deposit and associated bedrock, the lithologies and the mineral associations found in the region, projected life span of the ore deposit, proposed mining methods, ore handling procedures (including temporary storage plans), the location of ore storage pads and plans for contouring to control seepage, dust handling procedures during mining and measures to be taken which will prevent wind and water erosion in the stockpiles.

5.1.2 Ore Processing Plant, Extraction and Concentration

Describe the location of the ore processing plant, processing methods, chemicals to be used and rates, water use rates, processing capacity, rate of ore extraction, annual amount of concentrates to be shipped out and shipment mode and route, nature and quantity of atmospheric emissions during extraction.

5.1.3 Mill Tailings: Treatment and Disposal

Provide a comprehensive description of the process, structures, operations, including treatment and disposal options, proposed to manage tailings and waste rock generated during the entire life of the operation. A 'cradle to grave' tailings management plan should be considered.

Describe all aspects of the mill tailings treatment system, including treatment options, potential ranges in tailings composition and anticipated quality of the final effluent. Provide data on the expected quantity and quality of effluent generated in the milling process. Examine conservation and recycling options.

Discuss the effects of permafrost on structures used to contain tailings (i.e., dams, spillways, dikes, berms, etc), the effects of the active layer on the stability of structures and the effects of the range of temperatures that can be anticipated on treatment processes.

Describe the tailings discharge process and the disposal method for decanting of spring runoff. Describe methods for controlling and monitoring groundwater seepage from the tailings area, the control of groundwater seepage at the tailings dam, and storm and flood retention capabilities.

5.1.4 Waste Rock Disposal

Provide a plan for waste rock handling, treatment and disposal, including acid rock drainage (ARD). Address potential disposal options.

If disposal of waste rock in a manner that will allow its freezing in a permafrost condition is contemplated, the method of disposal must be described. A review of similar operations elsewhere, research data on the freezing of tailings, applicable modelling information, the long term thermal stability of the underlying permafrost and frozen waste, and a conceptual monitoring program must be provided.

Provide bathymetric maps of proposed underwater disposal areas for acid generating waste rock and an estimate of the tonnage of rock these storage areas will accommodate; thoroughly investigate the chemical stability of the tailings placed under water; assess the long term quality of the water bodies receiving the waste rock and the potential for this water to impact on other water bodies; describe the possible treatment methods of water from the waste rock areas and the possible impacts on downstream water quality; provide a long term management plan to maintain water levels after closure; and discuss the possibility of seepage through dams or berms into downstream water bodies.

Provide mineralogical descriptions, ranges of composition and the results of static tests and, if in a marginal range, kinetic tests for waste rock to be stored on land.

5.1.5 Acid Rock Drainage

Describe and assess the physical and chemical characteristics of seepage from the waste rock piles and tailings structures and describe appropriate control measures; the waste rock piles should be designed with decommissioning in mind. Investigations on the physical and chemical stability of representative samples of waste rock should be undertaken regarding the long term acid generation potential of the waste rock; plans should be included for diverting surface water away from the waste rock piles.

5.1.6 Water Supply and Management

Provide a water management plan for the mine, including water supply source, on-site use and final discharge to the environment during the developmental, operational and close-out phases.

The following items should be included: water use in the mine, waste handling and treatment; water use in the mill, waste handling and treatment; water use in the camp; the alteration of drainage patterns and any treatment of surface and subsurface water which may become contaminated; diversions and their implications; current, operational and abandonment water levels of any impacted watercourses; and water conservation measures. The mine water management plan should also include estimates of mine water volumes and potential use of the mine water.

5.1.7 Dewatering of the Underground Works

Since ground water may have accumulated in the underground working areas, dewatering may be required. Information on dewatering methods, areas which may be impacted, mine water quality and the disposal of the mine water should be provided.

5.1.8 Water Diversions

Since the tailings pond will be in the flood plain, a description of any diversion channels that may be required to provide long term stability to the tailings pond should be given.

5.2 Associated Infrastructure

Describe the over-land transportation options, including roads, slurry pipeline air strip and other infrastructures that will be required to operate the project.

5.2.1 Winter and All Weather Roads

Describe in detail and illustrate proposed routes or route alternatives for all existing/proposed transportation routes and access roads on 1:50,000 or larger scale maps. Criteria for determining transportation and access road routes must include the location of traditional land use areas and important wildlife habitats. Rationale for final route selection should be described.

Identify the location and description of any temporary or permanent facilities (i.e., bridges, camps, etc.) along the route.

Provide design standards for road construction, stream crossing sites and crossing structures able to withstand the relevant seismic and climatic conditions.

Provide a detailed description of winter and all weather road construction and maintenance methods/procedures and frequency of use, including road width and the use of dust suppressants.

Describe the type and number of vehicles to be used to transport materials and ore along the main transportation routes. Include the total number of trips expected daily and per season on the roads, the expected annual operating season of any winter roads and options if the winter road operating season is unexpectedly reduced.

5.2.2 Airstrip Facilities

Should an upgrading of the airstrip facilities at the mine site be required the relevant information will be required.

Describe airstrip and infrastructure characteristics; service roads; fuel tank, de-icing and containment systems; use of dust suppressants; drinking and waste water disposal systems; solid waste management plans; and the location of borrow materials. Discuss the selection of the airport sites and runway alignments in relation to the percentage of time operations may be limited by weather.

5.2.3 Housing Facilities

Provide a description of housing facilities.

5.2.4 Storage Sites

Describe the location and characteristics of storage systems, handling and containment methods, storage sites and quantities for fuel and ore concentrates.

5.2.5 Borrow Pits and Quarry Sites

Describe and map at a scale of 1:5,000 all sites that are to be used for borrow pits or quarries. Discuss the selection criteria and site selection justification for all borrow pits, quarry sites and access routes (including access to these sites).

5.2.6 Sewage Treatment and Disposal

Describe proposed sewage disposal options.

5.2.7 Solid Waste Management

Describe management plans for the handling, treatment and disposal of solid wastes.

5.2.8 Hazardous Waste Management

Develop a hazardous waste management plan that includes description of the types and volumes of hazardous wastes (including used/waste oil) to be used or produced by all project activities. Describe disposal methods for each type of hazardous waste, including disposal of containers used to transport or store hazardous materials.

5.2.9 Powerhouse

Describe the location of the power house with respect to prevailing winds and other infrastructure.

Describe the source of cooling water and the discharge area.

Describe all diesel power generation facilities, including sources, volumes and transportation of fuel, transfer point(s) and facilities and emergency clean-up equipment on hand.

6.0 ENVIRONMENTAL IMPACT ASSESSMENT

A comprehensive analysis of the short and long-term effects of the project on the physical, biological and socio-economic environments and on the interactions among these environments should be provided.

The impact assessment should be based on the assumption that management plans, commitments and policies described in the IEE have been put into place. The probable effectiveness of each plan, commitment and policy should be assessed.

The IEE should assess the long-term cumulative effects of the project when combined with potential future developments identified by the proponent. The boundaries of the cumulative effects assessment should cover the maximum area potentially affected by the development and may therefore extend beyond the San Andreas claims.

The prediction of effects should be based on both scientific and traditional knowledge. Consultation should be undertaken with traditional resource harvesters, community elders, the scientific community and government agencies in identifying project-environment interactions.

The IEE should contain an analysis of the significance of the effects it predicts. The significance of predicted effects should be assessed according to: magnitude; geographic extent; timing, duration and frequency; degree to which effects are reversible; ecological context; probability of occurrence; and the capacity of resources to meet the needs of the present and those of the future.

6.1 Effects on the Physical Environment

In assessing the effects of the project on the physical environment, consideration should be given to the following:

- a) the bedrock geology, surficial geology, geomorphology and soils, including eskers and other sources of aggregates;
- b) permafrost conditions, including areas of discontinuous permafrost, high ice content soils, thaw sensitive slopes, and stream-banks;
- c) areas of ground instability such as slumping or landslides;
- d) hydrological features such as lakes and streams, watershed boundaries, surface water flow, groundwater movement and aquifer recharge zones, flood zones and ice formation and melt patterns;
- e) water quality from both surface and groundwater sources;
- f) sediment quality and quantity;
- g) ambient air quality, dust levels and noise levels;
- h) climate; and,
- i) any other issues identified through public consultation.

6.2 Effects on the Biological Environment

In assessing the effects of the project on the biological environment, concepts of ecosystem integrity, biological diversity and the carrying capacity of renewable resources should be considered, as follows:

- a) **for fish species and other aquatic life of ecological, economic or other human importance:**
 - 1) the regional occurrence of the species,
 - 2) relative seasonal abundance and distribution of the species, and an estimate of the productive capacity of the water bodies,
 - 3) health of the species and contaminant loading,

- 4) the migratory patterns and routes and the corresponding sensitive periods where these routes cross habitat affected by the project,
- 5) habitat areas, including spawning, nursery, feeding and over-wintering areas, and the identification of any sensitive periods for each of these habitat areas,
- 6) management or other protected areas,
- 7) habitats of any rare species or species with federal, territorial, regional or local designated status (vulnerable, threatened, endangered or extirpated),
- 8) any other issues identified through public consultations; and

b) for birds and wildlife of ecological, economic or other human importance, and in particular caribou, grizzly bear and fur-bearing animals:

- 1) the regional occurrence of the species,
- 2) relative seasonal abundance and distribution of the species,
- 3) health of the species and contaminant loading,
- 4) the seasonal range or habitat use, movements, and population status,
- 5) the migratory patterns and routes and the corresponding sensitive periods where these routes cross habitat affected by the project,
- 6) significant habitats such as eskers, calving and rearing areas, breeding and denning/nesting sites, migratory bird staging areas and migration stops, and special locations such as mineral licks, water crossings and insect relief habitats,
- 7) wildlife management areas and established or proposed sanctuaries or other wildlife areas,
- 8) habitats of any rare species or species with federal, territorial, regional or local designated status (vulnerable, threatened, endangered or extirpated), and
- 9) any other wildlife issues identified through public consultations;

c) for plant and vegetation communities of ecological, economic or other human importance, including wetlands such as bogs, fens, marshes, swamps and shallow waters:

- 1) the regional occurrence of the species,
- 2) relative seasonal abundance and distribution of the species,
- 3) health of the species and contaminant loading,
- 4) rare or unique species or species assemblages, including plant species with federal, territorial, regional or local designated status (vulnerable, threatened, endangered or extirpated), and
- 4) any other issues identified through public consultations.

6.3 Effects on the Socio-economic Environment

The assessment of positive and negative effects upon the socio-economic environment at the community, regional and territorial levels as relevant should consider the following as well as any other issues identified through public consultations:

a) demographics

- 1) the effects of the project on demographics, such as project-induced changes in population numbers, migration and distribution, and the effects of these changes, including the interaction between local residents and non-residents;

b) social and cultural patterns

- 1) the effects of the project on the cultural life of the communities,
- 2) the effects of the project on the traditional way of life and on the use of land for traditional purposes,
- 3) the effects of the project on the social life of communities, on family and community stability, on social stability, on alcohol and drug problems and on crime and violence, including the effects of a major employment base away from the communities;

c) land and resource use

- 1) the effects, and local perceptions of the effects, of the project on changes in the use of land and renewable resources, including traditional land use; hunting, trapping or guiding areas; commercial, aboriginal and sport fishing areas; conservation areas; territorial and federal parks; International Biological Program Sites or other ecological reserves or preserves; recreation and tourism areas and recognized scenic areas; navigable waters; and industrial and commercial areas;

d) local, regional and territorial economy

the effect of the project over its life on the local, regional, territorial and national economies, having regard to direct, indirect and induced effects on income and employment, in particular:

- 1) the effects on wage and salary employment by skills category over the life of the project, including estimates of northern, local and aboriginal participation,
- 2) the effects of the project on opportunities for local, regional and territorial businesses to supply goods and services both directly to the project and to meet the demand created by the expenditure of new income by employees and suppliers,
- 3) effects of the project on opportunities to diversify the northern economic base to produce and to supply new goods and services,

- 4) the effects of the project on the traditional economy,

- 5) the effects of the project on the relationship between the wage economy and the harvesting economy,
- 6) the effects of the project on activities such as tourism, outfitting, harvesting and recreation,
- 7) the effects of the project on prices and cost of living;

e) employment, education and training

- 1) the effect of the project on opportunities for participation by regional and territorial workers in wage and salary employment, considering such factors as the extent to which the skills of the available workers match job requirements, the level of interest in mining work, and commuting arrangements to allow these workers to reach the site,
- 2) the effect of competition for labour between the project and existing businesses, institutions and traditional activities,
- 3) the adequacy of training opportunities available to northerners to take advantage of jobs created by the project, including training by the proponent;

f) services and infrastructure

- 1) the effects of the project on the use of existing social, institutional, and community services, transportation facilities and services, and infrastructure,
- 2) any permanent changes to infrastructure and services caused by the project;

g) government services

- 1) the effect of the project on revenues accruing to federal, territorial, and local government, and net incremental costs imposed on these governments by the project, including savings realized and incremental costs of infrastructure and services, and,
- 2) the effects of the project on community and local government organization.

6.4 Effects on Archeological and Historical Sites

a) cultural sites

- 1) the effects of the project on archaeological, paleontological, burial, cultural and heritage sites;

6.5 Effects on the Nahanni National Park Reserve

- a) The effects of the project on the Nahanni National Park Reserve.

6.6 Effects on Environmental Health

- a) the health effects of the project on workers, their families and other residents of the NWT.

7.0 ALTERNATIVES AND POTENTIAL FUTURE DEVELOPMENTS

This section should summarize the alternative means of developing the project and the future development scenarios proposed for the Prairie Creek project. This summary should describe the alternatives to project components or activities and future development scenarios.

7.1 Project Alternatives

The focus of this section should be on alternatives to project components or activities that have an effect on the physical, biological or socio-economic environment. The EIS should contain sufficient information for the reader to understand the reasons for selecting the preferred alternative and for rejecting others.

The range of options considered for the pace and scale of the operation should be discussed, and the option selected justified. San Andreas should include an evaluation of the threshold for economic viability of the project, the different scenarios contemplated for the lifespan of the mine, and a consideration of the timing of phases and components of the project.

7.2 Potential Future Developments

An assessment of cumulative effects requires an understanding of the future development scenarios on the San Andreas claim. San Andreas should therefore discuss the potential for further development on its claim. The discussion should include such possibilities as the exploration and development of new ore bodies, increasing the capacity of the on-site ore processing plant, alternative locations for tailings disposal.

8.0 CUMULATIVE IMPACTS

8.1 Project Specific Cumulative Impacts

The proponent will integrate the impacts of the project by considering the linkages among ecosystem components. Interactions among impacts should be identified as additive, multiplicative or synergistic. A discussion of the likelihood of these interactions, and their significance, should be included. Impacts shall be discussed in terms of potential changes in water quality, the potential to affect human health or to exceed ecosystem limits.

8.2 Cumulative Impacts Among Projects in the Project Area

The proponent shall describe and assess the ecological and socio-economic cumulative impacts of its project in relation to past, present and known future projects in the area, including activities in the Nahanni National Park Reserve, mineral developments in the area, transportation infrastructure expansion, hydroelectric development, hunting, fishing and tourism activities. The likelihood of occurrence of cumulative impacts and the significance of the predicted impacts shall be discussed.

9.0 MITIGATIVE MEASURES AND RESIDUAL IMPACTS

This section should identify and summarize San Andreas plans to mitigate the negative effects of the project, enhance positive effects, and should identify any residual effects. San Andreas should comment on the rationale and effectiveness of the proposed mitigation and enhancement measures.

9.1 Mitigation

San Andreas should describe general and specific measures intended to mitigate the potentially adverse effects of the project. For the purposes of this guideline, mitigation is taken to mean "the elimination, reduction or control of the adverse effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means."

Provision should be made for the environmental effects caused by malfunctions or accidents that may occur in connection with the project. This should include any effects the environment may have on the project.

The description of mitigation measures should include:

- a) procedures that would be used to avoid environmentally sensitive areas or periods of the year;
- b) mitigative procedures which would be implemented during construction, operation, closure and post-closure of the project;
- c) contingency programs and procedures designed to respond to accidents and emergencies;
- d) restorative procedures to be implemented on disturbed sites; and
- e) compensation programs for damage caused by San Andreas activities to the environment, to property, or to the land and resource use of others.

With regard to compensation for losses incurred by users of the land and its resources (e.g., tourism operators, trappers, subsistence hunters), San Andreas should describe any existing or proposed programs including administrative procedures and criteria for eligibility.

A comparison with other compensation programs for mining and other resource development activities should be provided.

Other mitigation measures, if any, that were considered should be identified, and the rationale for rejecting these measures should be explained. Trade-offs between cost savings and effectiveness of the mitigation measures should be justified.

9.2 Residual Effects

The Proponent should describe and assess residual effects (i.e., those effects that may remain after the proposed mitigation measures are implemented).

10.0 LAND CLAIMS

There are no Aboriginal land claims negotiations in the project area. The Aboriginal organizations in the general area (Deh Cho Tribal Council, Fort Liard Band and Nahanni Bute Band) must be fully informed and consulted by the proponent.

11.0 CONTINGENCY PLANS

Conceptual contingency plans and emergency measures should be described for the handling of hazardous materials, tailing spills, dam leakages and accidental fires.

12.0 ENVIRONMENTAL SURVEILLANCE AND MONITORING PROGRAMS

An environmental monitoring program designed to detect problems and allow timely implementation of corrective measures should be described. Monitoring parameters, sampling regimes and general locations of sampling points should be identified.

12.1 Biophysical

Areas for monitoring include, but are not limited to, water quality, climate and ice conditions, wildlife impacts/mitigation and fishery impacts/mitigation. The monitoring programs should be implemented throughout the life of the project, from pre-construction through abandonment and post abandonment phases.

12.2 Social and Economic

Plans to maintain communications and working relationships with the affected communities, aboriginal organizations and government agencies throughout the life of the project should be provided. The intent of this communications plan would be to monitor, identify and alleviate harmful socio-economic and cultural impacts created directly or indirectly by the project, including impacts on renewable resource harvesting.

13.0 ABANDONMENT AND RESTORATION

Restoration should be an on-going activity through out the life on the mine and not only undertaken at the time of abandonment. A conceptual program of progressive restoration during project operation, the containment and control program for temporary shutdowns should be described.

Issues such as long term stability of structures, disturbed areas, ecological stability, aesthetics, no maintenance and no monitoring, with the ultimate goal of eventual site stabilization requiring no additional corrective action, should be considered.

Financial commitments would be required to ensure that sufficient funds are available to properly restore the affected sites, including contingency plans to address unexpected closure of the mining operation.

14.0 INFORMATION PROGRAMS AND PUBLIC INVOLVEMENT

A description to explain how the public has been informed and consulted about the project and how the public may contribute to the design of monitoring programs and management plans should be provided.

A consultation plan, identifying issues to be discussed with each community, including potential land-use conflicts and the process and techniques by which the Proponent will engage in dialogue with the communities to identify and to address community concerns, should be provided.

Plans to maintain communications and working relationships with the affected communities, aboriginal organizations and government agencies throughout the life of the Project should be described in general terms. The intent of this communications plan would be to involve these groups in monitoring, identifying and working toward reduction of adverse physical, biological or socio-economic effects, and enhancement of positive effects.

In addition to the Aboriginal organizations (listed in sec 10), consideration should be given to include the busines organizations in the area (i.e. Fort Simpson Chamber of Commerce, Nahanni Ram Tourist Association) should be included in any public information/involvement program.

15.0 CODE OF GOOD ENVIRONMENTAL PRACTICE

An environmental policy which will provide corporate guidance on environmental issues and environmental management, with specific reference to the Prairie Creek Project, should be provided.

