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1 PURPOSE AND SCOPE

The Material and Waste Management Plan for the Project addresses the transportation, handling, storage and disposal of domestic and construction wastes and materials used in the construction process. For the purposes of this report, domestic waste is defined as kitchen, biological, and general camp waste. Construction waste and materials consist of the machinery, materials, fuels, and chemicals and are by-products of the construction of the Project.

2 EXISTING INFORMATION

The following Environmental Guidelines are available Online at http://www.enr.gov.nt.ca/library/publications.htm:

Waste Lead and Lead Paint

Waste Batteries

Waste Paint

Waste Asbestos

Waste Antifreeze

Waste Solvents

Ozone Depleting Substances

The General Management of Hazardous Waste

Industrial Waste Discharges

Ambient Air Quality Standards for Sulphur Dioxide and Total Suspended Particulate

Biomedical Waste in the NWT

Northwest Territories and Nunavut Workers Safety and Compensation Commission, (http://www.wcb.nt.ca/index.html) – offers WHIMIS and other worker training courses.

3 MATERIALS AND WASTE MANAGEMENT DURING CONSTRUCTION

The construction phase is anticipated to generate the vast majority of waste associated with this development. With a clear, detailed project design and efficient logistical planning, waste generation can be minimized and materials will be available when and where required.

3.1 PRE-CONSTRUCTION ACTIVITIES

3.1.1 Project Design

The project will be designed to include:

an inventory of required materials, equipment and waste generation volumes (by category), and associated with the project schedule;

practices and protocols associated with the Reduce, Re-use, Recycle philosophy;

waste stream monitoring, to evaluate the volume and types of waste generated at each work site and camp, and to identify any issues that may arise;

centralized trans-shipment points and waste transfer stations (presumably in Hay River, Fort Smith and at the Twin Gorges site).

areas designated for:

waste collection and transfer (secured from intrusion by wildlife);

hazardous materials / waste storage;

the incineration of food wastes (secured from intrusion by wildlife);

a sewage waste storage and treatment; and

3.1.2 Worker Training and Qualifications

Prior to participation in field activities associated with this project, all personnel will be required to complete the training outlined below. Completion of this training will be documented with a signed acknowledgement from each employee.

Where applicable, workers will be required to participate in training related to:

a review of the overall waste management plan and site specific logistical activities;

Workplace Hazardous Materials Information System (WHMIS) training; and

Transport of Dangerous Goods.

3.1.3 Overall Waste Management

The construction planning will include:

the construction of material and waste storage areas;

the installation, routine maintenance and use of waste management systems (sewage treatment systems, incinerators, etc.);

routine equipment maintenance;

routine shipments to dispose of waste off-site, as required;

the transfer of materials and waste between different modes of transportation;

any special handling protocols for hazardous materials or bulk shipments (TDG requirements, for example);

material inventory assessments, waste audits, and site inspections (to maintain general site cleanliness); and

the demobilization of materials, waste and equipment from each work site and camp.

3.2 GENERAL MATERIAL AND WASTE MANAGEMENT PROTOCOLS

3.2.1 Material Inventory Tracking

The Project will develop and implement a Material and Waste Tracking system. The system will include the following components.

Each project worksite, sub-worksite and camp is assigned a unique identifier that will be used to track inventory movements.

An accurate manifest is associated with all in-bound and out-bound shipments.

Each package being shipped is clearly labelled indicating at minimum, the destination site, the contents and the owner. Special handling instructions will also be provided, where applicable.

A Chain-of-Custody system is implemented to aid in tracking of shipments and to identify irresponsible carriers (parties responsible for breakage, etc.).

3.2.2 Waste Disposal Tracking

Pre-authorized acceptance of waste will be obtained from landfills prior to transfer. The disposal of all bulk waste will be carefully documented, and records must include information related to:

the type of waste and physical state (solid, liquid, powder, sludge, etc.);

approximate volumes of waste prior to disposal;

methods of disposal (incineration, transport off-site, on-site treatment, etc.);

the date and time of disposal; and

location of waste generation.

Special documentation is required under these conditions:

If hazardous materials are involved, *Transportation of Dangerous Goods* regulations must be followed. These include specific requirements for classifying, labelling and manifesting waste shipments;

If wastewater is treated on-site, documentation associated with monitoring programs and treatment applications must be prepared. This documentation may be used to support applications for regulatory authorizations regarding the release of treated water into the environment;

a logbook will be kept for each incinerator;

manifests will be kept for each shipment of waste; and

information associated with routine and non-routine system maintenance (incinerators, treatment systems, etc.) will also be documented.

3.2.3 Trans-Shipment Nodes

It is anticipated that several trans-shipment nodes may be required to efficiently execute the construction phase of this project:

Materials, supplies and equipment may be transported from southern Canada via rail to *Hay River*. Shipments destined for the East Arm of Great Slave Lake or sites northward will then be transferred to barge, while shipments destined for the southern project area (areas accessible by winter road from Fort Smith) will be transferred to trucks for shipment eastward;

If economical, shipments via truck from southern Canada could be delivered directly to staging areas in the southern project area. However, other options such as establishing staging areas in *Fort Smith* (to maximize the efficiency of the winter road usage) or at the *Twin Gorges* site (to improve traffic flow and inventory control) may also be considered; and

The majority of materials destined for the substation sites at the diamond mines, will presumably arrive in *Yellowknife* via truck or barge from Hay River and originate from southern Canada. A staging area in Yellowknife may maximize the efficiency of transport via the winter roads to the mines.

At these trans-shipment nodes, opportunities for further efficiencies will be undertaken as feasible:

Waste generation at the project sites can be reduced by removing unnecessary packaging before shipment. There is also the potential for waste generation at these sites resulting from breakage, spoilage or contamination of materials. Unusable materials should be separated from useful materials at the trans-shipment nodes; and

Staging areas in Fort Smith and Yellowknife may also improve the overall project efficiency by allowing just-in-time delivery practices during the winter months (minimizing the on-site footprint of storage areas) and reducing the volume of unused construction materials that will

need to be demobilized from the work sites when construction is complete.

3.2.4 Shipment Loading and Unloading Activities

During transit, the loading and unloading of shipments is the responsibility of the carriers and these activities may be monitored by representatives of the Project Management.

Once at the final destination, shipments will be unloaded by site personnel under the direction of a site supervisor.

The construction contractor will follow all applicable heath and safety regulations and will establish appropriate handling protocols for moving:

heavy or bulk loads requiring specialized equipment, such as crane trucks, hoists or large fork lifts;

loads that require the use of a small forklift; and

loads that may be lifted manually or with the use of hand-operated equipment such as a dollies or pallet lifts.

3.2.5 Material Transport via Truck

All transportation via truck will be the responsibility of the carriers awarded contracts to provide these services. Carriers are expected to maintain all of the required qualifications, follow all applicable regulations, and to develop individual plans to ensure their shipments arrive at the destinations, intact and on time.

Carriers will be expected to:

enforce a zero tolerance policy for drugs and alcohol abuse;

implement a program to monitor drivers for fatigue and other forms of impairment;

ensure that vehicles and trailers are properly maintained; and

be responsible for loss, damage or theft to shipments while in their care.

Carriers will also ensure that their drivers:

adhere to all posted speed limits and adjust vehicle speed according to the weather conditions;

remain aware. Watching for hazards such as wildlife, vehicle accidents and pedestrians on the road, and monitoring issues such as driver fatigue;

ensure that vehicles are checked for problems prior to departure;

ensure that all loads are properly secured; and

cooperate with project-related manifesting, Chain-of-Custody and inventory tracking practices.

3.2.6 Barge Landing Sites and Material Transport via Barge

All barging activities, including loading and unloading, will be the responsibly of the carrier.

3.2.7 Twin Gorges Airstrip and Material Transport via Airplane

The airstrip may be used for the transport of essential, time-sensitive materials or supplies. Upgrades to the airstrip may be required prior to extensive use during the construction phase of the project. Airstrip maintenance will be the responsibility of the construction contractor.

All aircraft will be the responsibly of the air carrier. Air carriers during construction will be expected to apply the protocols outlined in Section 3.2.5 to their operations in the sky. Specific requirements will be outlined in the contract documents. Air carriers will also be required to adhere to the *Air Traffic Protocols for Wildlife Protection* contained within the *Human-Wildlife Conflict Management Plan* of this project.

Loading and unloading activities will be a shared responsibility between the air crews and the construction personnel designated as ground crew.

3.2.8 Temporary Heliports and Material Movements via Helicopter

All helicopter activity will be the responsibly of the company awarded that contract. The construction contractor will share responsibility for preparing and maintaining temporary heliports to the satisfaction of the air crew.

Helicopter carriers will be expected to apply the protocols outlined in Section 3.2.5 to their operations in the sky. Specific requirements will be outlined in the contract documents. Air carriers will also be required to adhere to the *Air Traffic Protocols for Wildlife Protection* contained within the *Human-Wildlife Conflict Management Plan* of this project.

Loading and unloading activities will be a shared responsibility between the air crews and the construction personnel designated as ground crew.

3.2.9 Marshalling Yards

Marshalling yards will act as on-site staging and lay down areas for materials and supplies. The construction and logistical contractors will share responsibility for activities at marshalling yards and will ensure that:

the layout of the yard permits efficient flow of vehicular and pedestrian traffic, and that haul vehicles have sufficient space to maneuver;

materials and supplies are secure from wildlife activity; and

where possible, materials and supplies are stored off the ground surface and protected from the elements.

3.2.10 Hazardous Materials

The contractor generating (or supervising activities that generate) hazardous waste is responsible for ensuring that the waste is classified, labeled and stored and removed properly.

The handling of hazardous materials requires:

- proper training and certifications (TDG, WHIMIS, spill response, etc.);
- all generators, carriers, and receivers of hazardous waste must be registered with the GNWT Environmental Protection Service prior to transport; and
- transport is in accordance with *Transportation of Dangerous Goods Regulations*, which is administered by the GNWT Department of Transportation.

If possible, hazardous waste will be stored in original containers; if not possible, then containers that are designed for that particular hazardous material will be used. The containers must be sealable, not damaged or leaking and be clearly labeled according the guidelines provided in WHIMIS and TDG regulations. The containers must be sealed at all times when not in use.

Toxic materials will be stored in sealed steel or plastic drums and shipped off site for disposal. Waste oil will be collected in sealed drums. Chemicals such as glycol, acids, solvents, battery acids, and laboratory agents will be collected in lined trays and drums, and stored in suitable sealed containers in the waste transfer area. These chemicals will be shipped off site for disposal or recycling. Some of the waste may be transferred to the Yellowknife Solid Waste Site. Other recyclable waste such as waste oil, glycol, and batteries will be transferred to waste facilities outside of the NWT.

To prevent accumulation and/or runoff of glycol at the airstrip from aircraft de-icing operations, aircraft will be sprayed in a specific area that will be equipped with swales to collect excess glycol. Upon aircraft departure, puddles of glycol in the swales will be removed by pump and deposited into waste glycol drums, for shipment to recycling facilities.

Explosive waste falls under the jurisdiction of Natural Resources Canada under the *Explosives Act* and should only be handled by certified personnel. The handling and disposal of radioactive materials (which may be found in some specialized equipment) is administered by Atomic Energy Control Ltd. If any existing or proposed electrical equipment at the project sites contains polychlorinated biphenyls (PCBs), specific handling and disposal instructions will be prepared.

The construction contractor will be expected to identify the proposed methods of disposing of hazardous material, including modes of transport and disposal facilities that have agreed to accept each type of waste. These plans should also identify any specialised emergency response contractors that may required to manage a spill beyond the capacity of local and regional resources.

3.2.11 Camp Re-Supply

Construction camps will be re-supplied via truck, barge or aircraft with food and other domestic supplies. This will be the responsibility of the construction contractor and within reason, stocks will allow for any anticipated or unexpected site visitors.

3.2.12 Construction Demobilization

As construction is completed at each worksite, all materials, equipment and temporary buildings will be transported off-site or re-located to another worksite. Waste will be removed from the work site or disposed of in accordance with the applicable regulations and permits.

Unused construction materials may be:

stockpiled at Twin Gorges and other infrastructure sites for future repairs;

sold back to the manufacturer;

sold locally to industry or others; and

recycled, where facilities exist.

3.2.13 General Industrial Waste

In the waste transfer storage areas, non-toxic, non-food solid wastes will be sorted into four types - combustible, non-combustible, recyclable, and reusable. Combustible items will be burned in the incinerator (if suitable for disposal), while non-combustible and recyclable items will be placed in storage to be removed to a landfill or recycled, where practical.

Inert bulk wastes that cannot readily be recycled or re-used, such as general debris or incinerator ash, will be stored in bins and dumpsters in the waste transfer storage area and transferred to an off-site landfill.

3.2.14 Slash and Spoil

Slash refers to the vegetative debris that is generated when sites are cleared to provide access and facilitate construction activities. Slash is often windrowed stored in linear piles. Slash can either be placed into a landfill for natural biodegrading or be burned during the winter (with the appropriate burn permits).

Spoil refers to extracted rock and mineral soil that is generated through excavation. Spoil from the Twin Gorges facility construction will be placed in stockpiles in a

natural gully immediately southwest of the low point in the ground level along the canal. Drill hole materials will be tested for acid-base accounting to ensure that there will be no issues related to Acid Rock Drainage. Overburden and extracted rock will be kept separate in order to facilitate the future use of either material.

Excavated rock may be processed and used for either concrete aggregates or as surfacing material for dam rehabilitation, with the appropriate authorizations. Once excavated, the material will be examined to determine suitability for construction purposes and potential contamination (such as ammonia from explosive residues).

3.3 CAMP WASTE

3.3.1 Combustible Camp Waste

Incineration is an effective waste disposal option and is preferred for combustible camp waste. Incineration destroys any harmful organisms, reduces bulk and results in a "cleaner waste" that can be sent to a landfill. Specific items, such as plastic, will not be incinerated as they could produce toxic air emissions. Air emissions associated with incinerators will meet the regulatory standards.

Combustible camp waste (food, untreated building material, etc.) will be:

- collected in appropriate containers and stored in a secure waste storage area;
- incinerated as soon as possible to reduce the attraction of wildlife; and
- ash and the remnants of incinerated waste will be buried or transported to an appropriate landfill facility at regular intervals.

Incinerators will be:

- located at each camp site (portable incinerators may be used, where small temporary camps are established);
- enclosed within a fenced area or otherwise secured from wildlife;
- routinely maintained and evaluated for efficiency;
- routinely monitored for air emissions; and
- monitored closely and fuelled appropriately when operated in cold temperatures.

Incinerator ash will be collected and buried on site in accordance with permit requirements or transported to an appropriate landfill facility.

3.3.2 Recyclable Waste

Recyclable waste will be collected in appropriate containers, stored in the enclosed waste storage area, and regularly transported to an appropriate facility to reduce the attraction of wildlife.

3.3.3 Sewage and Bio-hazardous Waste

Sewage and other bio-hazardous waste will be contained on site, and treated according to all applicable regulations or regularly transported off-site to an appropriate facility.

There will be sufficient storage capacity and transport so that tanks and bins are never filled to more that 75 percent capacity.

Transport personnel will possess the appropriate training and certifications.

3.3.4 Waste Collection

Within all worksite and camp buildings, separate bins will be provided for:

incinerator waste (food waste, paper, packaging, etc); and

domestic recyclables (pop cans, juice boxes, etc.).

Where appropriate, separate bins or dumpsters will be provided for:

landfill waste (all inert, non-reactive waste such as wood, metal),

industrial recyclable waste (including batteries, aerosol cans, oil filters and oil); and

hazardous waste and related products (used spill pads, etc.).

These bins will be monitored for potential wildlife activity and misdirected waste streams; practices will be adapted to address any issues.

A contained area will be established for the handling and temporary storage of wastes. Non-food waste products that are not incinerated will be collected, sorted, and placed in designated areas within the contained area.

4 PROTOCOLS FOR MANAGING MATERIALS AND WASTE SPILLS

4.1 NON-HAZARDOUS SPILLS

The construction contractor will be responsible for responding to on-site, non-hazardous spills. This will include activities such as:

preparing an incident report with photographs of initial scene;

reporting the incident to the project manager and appropriate agencies;

extracting equipment / vehicles not immediately drivable;

gathering, containing and re-packaging spilled loads;

separating unusable, contaminated or damaged materials from reclaimable materials;

re-loading reclaimable materials for delivery to final destination;

properly disposing of unusable, contaminated or damaged materials; and

repairing and remediating the spill site.

Each carrier will be responsible for responding to any off-site spills involving their vehicles. The construction contractor may provide support, if it is practical to do so, but the overall responsibility will remain with the carrier.

4.2 HAZARDOUS WASTE SPILLS

During mobilization, construction, operations, and demobilization, the Project will maintain an emergency response team to respond to any spills of hazardous materials. Although the transfer of diesel fuel and oil will be carefully controlled to minimize the likelihood of spills, such spills are still possible. Where such spills occur, any pooled liquids on the surface and hydrocarbon-contaminated snow will be cleaned up immediately, using appropriate technologies, and transferred into containment storage designated for that purpose.

An external hazardous materials spill response contractor will be identified prior to mobilization to ensure an efficient response to any major incident that may be beyond the capacity of the Project emergency response team to manage.

All spills will be reported by the Construction Supervisor to:

the Project Manager; and

the 24-hour NWT Spill Report Hotline (867-920-8130), if appropriate.

Hazardous waste may be generated as part of spill response activities. Expended neutralizing agents and other waste products will be treated as hazardous waste and will be stored in sealed drums until disposal. Depending upon the nature of the spill and associated regulations, these may be transported off-site for disposal or incinerated on-site. Hydrocarbon contaminated soil will be removed from the spill site and transferred to a remediation cell.

5 ENVIRONMENTAL APPROVAL AND TASK RESPONSIBILITY

5.1 TRANSPORTATION CARRIERS (TRUCKS, BARGES, PLANES, HELICOPTERS)

All transportation carriers will be responsible for their own personnel, vehicles and equipment;

Carriers will be held liable for any damage incurred or waste generated during transport; and

The responsibility for loading and unloading activities at trans-shipment points will be shared by the carriers involved.

5.2 GROUND CREWS

"Ground crews" will be specialized teams of construction labourers (employed by the construction contractor) that will be responsible for:

loading and unloading of materials and waste from the various shipment modes;

the on-site movement of material and waste to support construction activities;

the operation and maintenance of incinerators;

the packaging of waste for shipment off-site; and

the tracking of inventories and preparing shipment manifests.

When not performing "ground crew duties" these workers may be assigned to non-specialized construction activities.

5.3 LOGISTICAL COORDINATOR

The logistical coordinator will:

supervise the ground crews and activities at the marshalling yards;

liaise with the transportation carriers;

ensure that material resources are available when and where required;

ensure that waste is disposed of properly; and

ensure that TDG and other applicable regulations are followed.

5.4 PROJECT MANAGER

The project manager will:

liaise with the logistical coordinator;

liaise with regulatory agencies; and

ensure that all approvals are in place before work begins and that all terms are met (refer to Table 5 – 1 for some examples).

Table 5-1: Approvals and Regulations for Materials and Waste

Approval / Task	Agency / Regulation
Materials Handling	NWT Workers Compensation Board / WHIMIS, TDG, Safe Lifting Practices, etc.
Storage of Flammable or Hazardous Materials	NWT Office of the Fire Marshall (MACA) / National Fire Code
Hazardous Materials Management on Crown or Commissioner's Land	Indian and Northern Affairs Canada (INAC) / ENR Environmental Protection Division
Transport of Hazardous Waste	ENR Environmental Protection Division / GNWT Department of Transportation / Transport Canada TDG Guidelines
Transportation of Dangerous Goods	GNWT Department of Transportation / Transport Canada
Explosive Materials	Natural Resources Canada - Explosives Act
Storage and Treatment of Contaminated Soil	ENR Environmental Protection Division / Indian and Northern Affairs Canada (INAC)

6 REGULATORY AGENCY CONTACTS

The Project Manager will liaise with the following agencies, as appropriate, throughout the construction phase of the Project:

Table 6-1: Regulatory Agency Contacts

Contact	Name	Office	Alternate
Environmental Protection Service, ENR, GNWT	TBD	(867) 873-7654	TBD
GNWT Department of Transportation	TBD	(867) 874-5000	TBD
GNWT Office of the Fire Marshal	TBD	(867) 873-7469	TBD
NWT Workers' Compensation Board	TBD	1-800-661-0792	(867) 920-3888
Transport Canada	TBD		TBD
Indian and Northern Affairs Canada	TBD	(867) 669-2589	TBD

Contact	Name	Office	Alternate
Explosives Division, Natural Resources Canada, Western Region	TBD	(403) 292-4766	TBD
"TBD" = To be determined.			

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1 PURPOSE AND SCOPE

The purpose of this Erosion and Sediment Control Plan is to provide general direction to mitigate erosion and sedimentation potentially associated with the proposed construction of the Taltson Hydroelectric Expansion Project. Adherence to this document will be a specified requirement under all construction contracts related to the Project. It will also provide guidance to the construction contractor(s) in the development of more detailed, site specific Erosion and Sediment Control Management Plans.

This plan includes protocols for the following:

Pre-Construction Mitigation Activities;

General Mitigation Activities at All Project Worksites;

General Mitigation Activities in Specific Construction Areas;

Incident Management; and

Record Keeping and Reporting to Responsible Authorities.[1]

2 EXISTING INFORMATION

Existing information can be found in the following resources:

California Stormwater BMP Handbook, Construction Volume - Section 3: Erosion and Sediment Control BMPs. January 2003. Available online at: http://www.cabmphandbooks.com/Documents/Construction/Section_3.pdf

Environment and Natural Resources, Government of the Northwest Territories. November 2005. Commercial Timber Harvest Planning and Operations Standard Operating Procedures Manual. Available Online at: http://forestmanagement.enr.gov.nt.ca/forest_resources/forest_harvesting/Timber%20SOPs%20-%20December%2005.pdf

Fisheries and Oceans Canada, Northwest Territories Operational Statements, Available online at: http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/nt/index_e.htm

Manitoba Hydro, July 1995. Fur, Feathers, and Transmission Lines. Available online at: http://www.hydro.mb.ca/environment/publications/fur_feathers.pdf

[1] The term 'Responsible Authority' refers to the agency or organization with clearly articulated legislative or regulatory authority related to an aspect related to or potentially impacted by the Project.

3 AVOIDANCE AND MITIGATION

This section reviews the practices intended to ensure the avoidance and mitigation of erosion and sedimentation during the construction phase of the Project. Such practices can also be utilized during post-construction reclamation activities and may also be applicable during the eventual decommissioning of related infrastructure.

The specific mitigation options selected for erosion and sediment control at any particular location will be determined (at a later date) based on site specific conditions and will be addressed in the environmental management plans developed by the construction contractors. A discussion of the best practices associated with erosion and sedimentation control is the focus of this section.

3.1 PRE-CONSTRUCTION MITIGATION ACTIVITIES

Several opportunities for mitigation exist at the planning and design phase of Project development.

3.1.1 Project Permitting

Project infrastructure will be designed to minimize erosion during operations, so as to preserve the stability of ground surrounding facilities and other Project installations. The potential for scouring downstream of structures and the potential impacts of sudden changes in flow volume will be considered.

For all major watercourses that may be directly impacted by the Project, profile drawings specifying the proposed bank stabilization and erosion control methods will be prepared. Drawings will also be prepared for each construction area (barge landing sites, marshalling yards, the Twin Gorge Facility site, the Nonacho Lake site, mine site substations, etc.) specifying the proposed erosion control methods, drainage characteristics and general layout of storage areas. These drawings will be submitted to the responsible authorities (DFO and others as required) for comments.

Worker Training and Qualifications (if not fully trained):

Short courses on erosion / sediment control design and inspection will be given to all managers and supervisors prior to construction activities.

Environmental monitors will participate in a short course or seminar on inspection activities associated with erosion / sediment control.

An ‘Erosion Awareness and Identification’ module should be a component of Project specific training provided to all workers.

3.1.2 Baseline Observations

Baseline reports referenced and appended to the Development Assessment Report for the Taltson Expansion Project will be reviewed to identify any areas sensitive to erosion or instability.

3.1.3 Overall Project Scheduling

Wherever practical, site preparation and construction activities will be restricted to the winter months (a period when the soil is frozen and less prone to erosion).

3.2 PROJECT-WIDE MITIGATION ACTIVITIES

This section describes the temporary erosion / sediment control practices that will be incorporated into the proposed construction activities as required. The installation of particular control measures will be based on site conditions but may include: silt fences, temporary weirs, ditch checks, siltation basins, and biodegradable filter fabrics.

The intent here is to provide a "toolbox" describing the various erosion control options. Manuals detailing best management practices should be consulted by the construction contractor. The workers in the field will then decide what needs to be installed and in which locations.

3.2.1 Silt Fences

These installations consist of a very fine, mesh or "filter fabric" that has been entrenched beneath the soil surface and is supported vertically with poles to form a short fence. The filter fabrics are sometimes backed with a plastic or wire mesh to make the fence more rigid. The intent is to detain sediment-laden water (runoff) and promote sedimentation behind the fences.

3.2.2 Sediment Traps

These are containment areas where sediment-laden runoff is temporarily detained, thus allowing the particles to settle out before the water is discharged into the surrounding environment. These can be constructed through excavation or by creating an earthen embankment across a ditch or low drainage area. Any outlet should be reinforced with rocks or vegetation to reduce flow velocity, thereby promoting further sedimentation and reducing potential erosion.

3.2.3 Check Dams

These small barriers are constructed within swales or drainage ditches with the intent of reducing the velocity of runoff and thereby promoting sedimentation. They are often constructed in a series along the length of a ditch and may be composed of rock, gravel bags, sand bags, fiber rolls, slash material or reusable products.

3.3 TEMPORARY CONTROL MEASURES

Temporary control measures will be installed prior to construction, and removed only after construction is complete, unless directed otherwise by a responsible authority.

Temporary control measures will be inspected regularly and maintained throughout the construction period. Maintenance will include all necessary repairs, reinforcement, installation of additional control

measures, and removal of sediment (from sediment traps, etc.) required to ensure continuous and effective erosion control.

3.3.1 Work Scheduling and Equipment Operation

All work will be scheduled and all equipment will be operated, in a manner that:

minimizes disturbance to *riparian zones* so as not to cause increased sedimentation;

minimizes disturbances to the soil surface in general;

minimizes the degradation of permafrost and other frozen ground features;

limits activity in areas known to have only a thin layer of soil;

avoids intense vehicular activity or excavation during periods of heavy rainfall or in saturated soil conditions; and

limits activity on slopes exceeding a 10% grade which is underlain by soil or unconsolidated rock.

For the purpose of this Management Plan, **Riparian Zones** are defined as areas within 15 m of any watercourse (rivers, creeks or lakes).

3.3.2 Transportation and Mobile Equipment

Where logs may be required to stabilize shoreline approaches and vehicle pathways during ice-free conditions (at barge landing sites, in saturated soils or at temporary river crossings), consultation with and approval by DFO is required. The use of alternatives such as swamp mats, etc. will be used for short term activities.

Where logs are required to stabilize shoreline approaches of ice roads, they will be bound securely and removed either before or immediately following the spring freshet.

Shoreline approaches and other riparian areas will not be graded and if disturbance occurs, will be restored to the original condition if possible. If not possible, consultation with DFO and a Geotechnical Engineer will occur to determine the most appropriate remedial actions to stabilize and repair the shoreline.

All stream crossings must be carefully planned and thus will only occur under the direct observation of a construction supervisor.

All wheeled equipment and vehicles should have mud flaps to limit the Projection of soil material.

The washing of vehicles and equipment will only occur in a relatively flat area, away from any waterbody (so as to prevent sedimentation) designated for that specific purpose; berms, diversion channels, temporary silt fences, sediment traps and other measures will be used in this area if required to prevent excessive runoff.

Water used to clean concrete trucks, chutes and mixers will not be allowed to enter any surface waters directly. To reduce the concentration of lime, such wash waters will be treated in a temporary impoundment system and/or percolated through the soil, after hardened concrete has been removed. *Also see section 3.2.7 b) and c) of this document.*

The recreational use of any motorized vehicles or equipment associated with the Project will not be permitted. Access to vehicles will be strictly controlled to prevent unauthorized use and potential disturbance to the soil surface.

Upon completion of work in any particular area, all significant rutting or soil compaction resulting from vehicles and equipment will be remedied to the extent practical.

Vehicle speed limits will be imposed in sensitive areas to reduce the potential for mechanically-induced erosion.

3.3.3 Material Storage

Practices related to Material and Waste Management are discussed in a separate plan; the protocols outlined below are directly relevant to erosion and sediment control.

Marshalling yards will be located *at least 15 m from the edge of any riparian zone (30 m from any river or lake)*, unless an exception is granted by the regulatory authorities.

Such marshalling yards will be clearly marked on Project drawings and on-site with appropriate signage.

Materials will be stored in elevated piles (on cross beams), if possible. This will facilitate drainage and limit the channelization of runoff. The layout of materials will be consistent with effective erosion control practices.

If practical, granular materials (sand, soil, etc.) will be stored furthest away from watercourses and stabilized with the use of erosion control blankets or tarps until required.

Spoil piles should be covered with biodegradable fabrics (of the types typically used in the NWT), tarps or planted with grasses and shrubs (using seedling stock approved by ENR Forestry).

The marshalling yards will incorporate the use of berms, filter fences and ditches (with ditch checks), where appropriate. Berms will have regular breaks with siltation traps and filter fences to facilitate the controlled release of runoff. Excavated waste rock or gravel may be used to reinforce the soil surface (as a protective cover) at the work site, with the approval of the responsible authorities.

3.3.4 Sensitive Sites

The greatest degree of consideration for erosion mitigation will be given to any activity in riparian zones, near sensitive habitats, on steep slopes, in permafrost areas, and in fire impacted areas, regardless of the particular construction area. Specific actions to mitigate Project impacts will include:

planning construction activities so that these areas are avoided to the extent possible;

designing site specific mitigation options where impacts are likely to occur (such as utilizing thermosyphons when towers are installed in permafrost soils);

sensitive areas will be clearly marked on Project drawings and on-site with appropriate signage; and

traffic speed limits may be imposed in these areas, as appropriate, to reduce the potential degree and magnitude of mechanically-induced erosion.

3.3.5 Borrow Sites

Where practical, borrow sites furthest from watercourses will be given priority for development.

To the extent practical, the pit walls will be stabilized prior to closure and exposed materials will be protected from erosion.

The natural re-vegetation of borrow sites will be encouraged. If a borrow site is located near a watercourse, artificial re-vegetation or reinforcement of the soil surface may be required to prevent sedimentation.

During the planning phase of the Project, DFO should be consulted in regards to potential sedimentation issues associated with specific borrow pit locations.

3.3.6 Infrastructure Development, Excavation and Related Earth Works

If dewatering of excavations or natural depressions is necessary, the flow will be directed away from water courses and filtered through siltation traps, if required.

In situations or during activities where the potential generation of large volumes of sediment is expected, the construction of a temporary impoundment system will be considered. Such a system may include a settling pond and a second pond for water clarification. Specific directives may be issued by DFO or contained in the water license for the discharge of sediment laden water.

The system described in above, will be specifically considered in addressing large volumes of concrete wash water. Such a system or an

appropriate alternative will be used to mitigate the potential impacts of concrete wash water.

Where topsoil is stripped from a worksite, it will be stockpiled in a location where natural drainage will not be impeded and will be covered with tarps or protected by other means; after construction is complete, the top soil will be used for site remediation (re-grading of the site), as appropriate.

Where construction sites are located adjacent to *riparian zones*, excess excavated soil will be removed to high ground, graded and allowed to naturally revegetate. Spoil may also be stockpiled for future use at approved locations, away from the *riparian zone*.

3.3.7 Vegetation

Practices related to Vegetation Management are discussed in a separate plan; the protocols outlined below are directly relevant to erosion and sediment control.

To the extent practical, the spatial extent of clearing will be minimized and vegetative buffer zones will be left adjacent to and within *riparian zones*. The vegetation cleared from storage yards will be limited to the extent necessary, especially on slopes and stream approaches, so as to reduce the amount of exposed soil and to decrease potential erosion.

Trees will not be felled into watercourses if at all avoidable.

All slash falling into a watercourse will be removed by hand and will not be dragged across the watercourse or the soil surface.

Slash material will not be left in *riparian zones*.

Trees on the immediate bank of watercourses, except those overhanging a watercourse, will be hand cleared.

In disturbed areas, natural re-vegetation will be encouraged. Where artificial re-vegetation is required to immediately protect the soil surface, the use of tree seedlings and native plant cuttings or propagules, will be the preferred alternative. Seeding should be avoided to the extent practical and only seed mixes approved by regional ENR staff will be used. Any such seed mix will be free of invasive, alien species, sub-species or varieties.

Vegetation along the transmission line corridor will be scattered flat on the ground or windrowed according to the protocols identified in the *Materials and Waste Management Plan* and the *Vegetation Management Plan*.

3.4 MITIGATION PROTOCOLS BY CONSTRUCTION AREA

This section is intended to outline general mitigation protocols for Project activities at specific construction locations.

3.4.1 Road Construction

Any required water crossings will be located to minimize approach grades and will be at right angles to the channel. Winter water crossings will only be constructed with clean ice and snow materials.

Winter roads will be constructed with clean snow and ice with a minimum thickness of 10 cm. Monitoring will occur along the entire roadway, throughout the season, to ensure adequate snow / ice depth and sufficiently frozen soil to prevent rutting, compaction or admixing.

After construction, the all season road and the winter road both will be monitored for signs of deterioration for the duration of the Project construction period. When no longer required, these roads will be decommissioned in a manner that minimizes the potential for Project-induced erosion.

When decommissioned, ice bridges will be V-notched to reduce potential ice jams, flooding and bank erosion.

The all-weather sections of road will be constructed with culverts at appropriate locations to accommodate natural drainage patterns.

3.4.2 Barge Landing Sites, Marshalling Yards and Campsites

Materials for the construction of temporary erosion control works will be stockpiled at each barge landing site, marshalling yard and campsite.

Helicopter landing locations will be selected to avoid dust generation from rotor wash where feasible. If such a location is not available, reinforcement of the soil surface with gravel or cobbles may provide adequate protection. The application of dust suppressants will be avoided. All designated landing sites will be clearly marked.

The marshalling yards will be graded to facilitate construction related activities and to reduce potential erosion of the disturbed soils; riparian areas will not be graded.

Appropriate portable ramps and protective mats will be used for loading / unloading operations at barge landing sites, where permitted by DFO.

Where permitted by DFO and other responsible authorities, corrugated pathways may be constructed in high traffic areas which have moist soils.

Where temporary moorings and docks may be required for barge loading / unloading activities, these will be constructed according to DFO's Operational Statements for the NWT (listed in Section 6.0) and if necessary, approved by DFO field inspectors prior to installation.

Materials and waste will be stored in locations and in a manner that limits the channelling of surface runoff. This includes the use of cross beams to elevate materials from the soil surface and the creation of regularly spaced pathways to allow for the dissipation of runoff energy.

Activity in *Riparian Zones* will be avoided and marshalling yards will be at least 30 metres from any watercourse. To the extent practical, vegetative buffers will be maintained between construction areas and *riparian zones*.

Speed limits may be imposed on activities adjacent to watercourses.

3.4.3 Twin Gorges

Any permanent drainage control ditches will accommodate natural drainage patterns to the extent possible.

Excavation for the new 1,250 m water conveyance canal, the footings of the new Powerhouse, the footings at the new Switch Yard and the tailrace will follow industry standard best management practices for near water and in-water construction, as appropriate. Specific protocols for erosion and sediment control will be included in the construction contractor's management plans.

3.4.4 Nonacho Lake

When decommissioning existing structures, real-time sedimentation monitoring will occur. Where permitted by DFO and other responsible authorities, temporary sediment filters will be installed downstream, if practical and safe, before any decommissioning work begins. Surficial reinforcement will be incorporated into the design of any in-water or near-water earthen structures (including the backfilling / burying of the existing spillway).

Excavation and break-through of the new control structure should not occur during the spring freshet and the potential for sedimentation upon break-through will be assessed and mitigated to the extent possible during excavation.

The construction design should consider the appropriate bank slope angles, bank and bed reinforcement, and timing / duration of breakthrough activities (gradual spillover vs. rapid breakthrough) to minimize the potential for erosion and sedimentation.

In-water and near-water construction activities should be isolated in accordance with current, best-of-industry practices for minimizing sedimentation.

3.4.5 Transmission Line Right-of-Way (ROW)

When final routing of the transmission line has been determined, special consideration will be given to construction techniques used in areas with slopes exceeding a grade *to be determined by geotechnical engineers*, in saturated soils or in riparian areas. These areas will be identified and marked on construction drawings before construction of the transmission line begins. Helicopter pilots and work crews will be briefed on such areas before beginning work on new line segments.

The potential for the channelization of runoff from felling of vegetation along the linear ROW should be monitored.

Where appropriate, thermosyphons will be used to mitigate the impact of tower installations on poorly structured, permafrost soils.

3.4.6 Mine Site Substations

Erosion control measures installed for the construction of substations at the mine sites will be independent of, but to the extent possible, compatible with, the existing control measures in place at each mine.

Erosion and sediment control activities will form a component of the construction contractor's plan for excavation of the foundations of the Snap Lake, Gahcho Kue, Ekati, and Diavik substations and transmission line construction undertaken from these sites.

3.5 ONGOING MONITORING – DURING NORMAL CONDITIONS

3.5.1 Baseline Comparison

Baseline information will be compared with measurements collected during and after the construction period, as well as with the successfulness (levels of efficiency) of the erosion control works, to better understand the impacts of the Project on erosion and sedimentation in the Project area. This approach will support reclamation activities.

3.5.2 Inspection of Erosion Control Measures

During construction, inspections will be undertaken to monitor the effectiveness of erosion control measures. Qualitative or quantitative criteria will be established for each type of control measure and/or soil conditions to ensure consistent evaluation across all Project sites.

A routine maintenance program will be developed to correct any gradual loss of efficiency of the erosion control works over the construction season.

Obvious damage to any erosion control device will be repaired as soon as practical.

3.5.3 Sampling and Monitoring Programs

The environmental monitoring schedule and sample parameters to be collected will follow the terms of the Project Land Use permits and any other applicable approvals. However, typical water quality measurements include turbidity, pH and temperature.

Field instrumentation may include rain gages, snow gages, water level gages and thermistor strings (to monitor permafrost).

Monitoring activities should:

be considered after events, such as heavy rainfall; and

occur before construction begins, during construction and after construction is complete.

3.6 POST-CONSTRUCTION / PRE-OPERATION ACTIVITIES

3.6.1 Inspection

Inspections will include the examination of all permanent sediment control measures to ensure proper installation and functioning, prior to operation.

All work areas will be examined for evidence of erosion, sedimentation and other forms of construction related soil disturbance.

3.6.2 Remediation

Areas disturbed during construction that have a history of erosion or sedimentation issues, will be remediated to the extent practical to reduce the potential for future issues.

Temporary erosion and sediment control measures will be removed and where appropriate, permanent measures should be installed.

3.7 ACTIVITIES DURING THE OPERATION PHASE

3.7.1 Routine Inspections

Routine inspections during Project operation will include assessments of all permanent sediment control measures and assessments of erosion or sedimentation at Project sites.

3.7.2 Materials for the Construction

Materials for the construction of temporary erosion control devices should be stockpiled at Project facilities for use during the operations phase.

4 INCIDENTS

This section describes how to manage various erosion related incidents.

4.1 INCIDENT RESPONSE AND MONITORING

Upon the discovery of minor or major incident at any Project site, the following protocols should be followed:

4.1.1 Minor Incidents

If rills or damaged / ineffective erosion control devices are observed, a worker shall:

record the time / location of observation or time of initial report;

report observations to a Field Supervisor as soon as practical;

the Supervisor will then, inspect the site of the incident and record the details; and

the Supervisor will instruct workers to take specific corrective actions as soon as possible. The Supervisor may consult with the Environmental Coordinator, as required.

4.1.2 Major Incidents

If gullies, mass movements, visible sedimentation, etc. are observed, workers shall:

stop work in the immediate area, and report to a construction supervisor;

the Field Supervisor will then, inspect the site of the incident;

record in a logbook the details surrounding the incident, including the names of workers involved, and any actions taken;

take photographs from various perspectives of the incident scene and of completed repairs / mitigation with the time / date code embedded in the photograph; and

consult with the site manager and others (including senior managers, geotechnical engineers and responsible authorities, as appropriate) to determine the best course of action.

4.2 SPECIFIC INCIDENTS

4.2.1 Mechanically Induced Erosion

Equipment operators shall:

verify with the Field Supervisor, that their work area has been clearly marked and that erosion control measures have been installed, so that any soil disturbance is isolated to that area;

repair minor soil rutting, as soon as practical, but before any heavy rainfall occurs; and

where circumstances warrant, an environmental monitor will be notified so that any natural erosion resulting from the initial mechanical disturbance, can be monitored.

Significant incidents (such as unusually deep vehicle ruts or collapse of soil structure) will be reported to a Field Supervisor, who will then direct workers, as appropriate to:

adjust procedures to avoid further soil disturbance, where possible;

install additional erosion control measures as necessary;

make necessary repairs to the soil surface, as soon as practical; and

ensure that all final repairs reflect the original site conditions, as closely as possible.

4.2.2 Discovery of Visible Sedimentation in a Watercourse

Equipment operators shall:

stop all activities adjacent to and immediately upstream of the sedimentation; and

report the incident to a Field Supervisor.

The Supervisor will then:

identify the mostly likely source of sedimentation through observation, consultation with the Environmental Coordinator and with workers in the area, and direct workers, as appropriate to:

adjust procedures to prevent further sedimentation;

install additional erosion control measures, in consultation with the Environmental Coordinator;

restrict activities in the probable source area and / or reassign workers to other areas, until the suspended sediments have settled and conditions improve; and

notify the Project Manager, if appropriate. The Project Manager may be required, under the terms of a permit or other approval, to report such incidents to regulatory authorities.

4.2.3 Changes in Permafrost Soils

Surface disturbance can impact soil structure and lead to settlement issues, such as permafrost thaw and the development of ice lenses. Upon the discovery of changes in a permafrost soil:

the issue will be reported to a construction supervisor, who may then:

immediately stop all work in the area, if deemed appropriate; and

consult with a geotechnical specialist to identify possible solutions, as soon as possible.

4.2.4 Rills

Rills are the tiny channels (usually only a few cm deep) that are created on a soil surface by the action of flowing water (runoff) and often develop during intense rain storms. They are a sign of moderate erosion. If discovered on a Project site, rills will be:

reported to a Field Supervisor;

plugged with gravel or other native material, and compacted; and

monitored bi-weekly and inspected after every heavy rainfall.

If left unchecked, rills can merge and grow into gullies.

4.2.5 Gullies

Gullies are relatively deep channels (tens of cm to several m deep) that are created on a soil surface by the enlargement and merging of rills during successive runoff events. They are a sign of serious erosion. If discovered on a Project site, gullies will be:

immediately reported to a Field Supervisor;

plugged with cobbles, gravel or slash material, and reinforced at the head wall;

protected to divert runoff pathways at gully head;

clearly marked and obstructed to prevent a fall hazard to people and wildlife;

examined to identify root causes of gully development;

monitored at least once a week and after every heavy rainfall; and

the surrounding area will be examined for evidence of other rills and gullies.

4.2.6 Mass Movements

Mass movements include stream bank collapse, slumps, land slides, and similar large-scale soil movements.

Before Construction begins, site specific solutions will be developed, in consultation with Project engineers, construction contractors and the responsible authorities, in areas likely to be impacted by mass movements. For example, a standard protocol for addressing riparian bank collapse should be developed in consultation with DFO. Workers observing a mass movement shall:

Immediately stop all construction activities and evacuate the local work area.

Report the incident to a Field Supervisor, who will then direct workers to:

monitor and if possible, stabilize the eroding soil;

avoid activities that cause further damage; and

work elsewhere, if there is obvious risk of continued mass movement.

The Field Supervisor will consult with the Environmental Coordinator, a geotechnical specialist and the responsible authorities, if deemed appropriate.

4.3 POST-INCIDENT MONITORING AND EVALUATION

The scene of any major incident will be monitored frequently for a period of sufficient duration to ensure that mitigation has been effective at stabilizing the site.

A root cause analysis will be undertaken to identify options for avoiding such incidents in the future.

5 TASK RESPONSIBILITY AND ENVIRONMENTAL APPROVALS

5.1 ENVIRONMENTAL MONITORS

Where appropriate, an Environmental Monitor will be assigned to each primary work site, and within the context of this plan, will be responsible for:

collecting environmental samples (soil and water), under the supervision of the Environmental Coordinator;

monitoring the assigned work site for evidence of erosion and sedimentation;

monitoring the condition and effectiveness of erosion control measures; and

recording daily field notes and providing a daily status report to the Environmental Coordinator.

5.2 ENVIRONMENTAL COORDINATOR(S)

The role of an Environmental Coordinator will be similar in nature to that of a Field Supervisor. Environmental Coordinators shall:

provide supervision to Environmental Monitors;

ensure that environmental samples are collected, processed, analyzed and tabulated, as required;

review the daily status report from each environmental monitor and provide weekly reports to the Project Manager;

provide direction and supervision for the installation, maintenance and repair of appropriate erosion control measures, as required;

formulate solutions for addressing observed environmental issues and consult with others as necessary;

liaise with regulatory authorities, as required;

provide assistance to the Project Manager when obtaining environmental approvals; and

ensuring that Environmental Monitors are properly trained, equipped and qualified to carry out their assigned tasks.

5.3 FIELD SUPERVISORS

Within the context of this plan, Field Supervisors will be responsible for:

ensuring that all required environmental approvals are in place before directing workers to begin new construction activity;

cooperating with the Environmental Coordinator to ensure that adequate erosion and sediment control measures are in place before new construction activities begin;

carefully supervising construction activities in erosion prone areas or in close proximity to erosion and sediment control measures (so as to prevent damage); and

ensuring that materials and equipment are available for the installation of erosion and sediment control measures.

5.4 PROJECT MANAGER

Within the context of this plan, the Project Manager will be responsible for:

reviewing environmental status reports from the Environmental Coordinators;

liaising with regulatory authorities, as required; and

obtaining approvals and ensuring that the terms of all required environmental approvals are met, including those associated with erosion and sedimentation, as identified in the Table 5-1.

Table 5-1: Environmental Approvals, Issues and Regulatory Agencies

Approval Type Sought	Potential Issues	Agency & Regulation / Guideline
Project Review / Authorization	Any activity potentially impacting a watercourse	DFO - Various NWT Operational Statements CWS – deals with toxicology and habitat issues under the Fisheries Act
Project Review / Authorization	Environmental Impacts and Mitigation	MVEIRB – Canadian Environmental Assessment Act / Mackenzie Valley Resources Management Act
Project Review / Support	Activities associated with vegetation removal and re-vegetation, as these have a direct impact on soil conservation.	ENR (Forest Management) – general direction is provided by the *Commercial Timber Harvest Planning and Operations Standard Operating Procedures Manual*, until more applicable guidelines are developed.

Approval Type Sought	Potential Issues	Agency & Regulation / Guideline
Project Review / Support	Reclamation	ENR (Environmental Protection) / INAC
Land Use Permit and Water License	Permissible Sedimentation Thresholds, Water Sampling Activities, Land Use Activities, Reclamation Plans, etc.	MVLWB / INAC – Acceptable sedimentation levels, water sampling schedule, parameters to be examined, etc. will be identified in the Land Use Permit and Water License.
Project Review / Authorization	Project economics, engineering and design	National Energy Board
Project Review / Support	Permits for use of explosives	Natural Resources Canada

6 REGULATORY AGENCY CONTACTS

The Table 6-1 below identifies contact information for regulatory agencies and government departments potentially involved in this Project.

Table 6-1: Regulatory Agency Contacts

Agency / Office	Primary Contact / Alternate
Fisheries and Oceans Canada – Yellowknife Office Suite 101 - Diamond Plaza, 5204 50th Avenue Yellowknife, NT X1A 1E2 Tel: (867) 669-4900, Fax: (867) 669-4940	Bruce Hanna
INAC - Yellowknife	To Be Determined
ENR Forest Management - South Slave / North Slave	To Be Determined
Mackenzie Valley Land and Water Board Box 2130, 7th Floor - 4910 50th Avenue Yellowknife, NT X1A 2P6 Tel: (867) 669-0506, Fax: (867) 873-6610 permits@mvlwb.com	To Be Determined

Agency / Office	Primary Contact / Alternate
Mackenzie Valley Environmental Impact Review Board 200 Scotia Centre, Box 938, 5102-50th Avenue Yellowknife, NT X1A 2N7 Tel: (867) 766-7050, Fax: (867) 766-7074 secretary@mveirb.nt.ca	To Be Determined
Natural Resources Canada	To Be Determined

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1 PURPOSE AND SCOPE

The primary goal of this Vegetation Management Plan is to reduce the impact of Taltson Hydroelectric Expansion Project (the Project) construction on vegetation. This primarily includes mitigation to reduce the Project footprint and manage forest fire risk. This document outlines the mitigation proposed to reduce effects to vegetation, to reduce the risk of forest fires being caused by the Project, and to reduce the risk of natural forest fires to the Project.

2 AVOIDANCE AND MITIGATION

Project construction and operations will inevitably lead to reduced vegetation cover. Mitigation is proposed to reduce effects to vegetation, as follows:

The transmission line right-of-way is nominally 30 m wide, but clearing may occur only within a 15 m wide swath between transmission towers.

Where topography will allow, the line will span over lowland areas.

In select areas, there will be selective clearing and retention of shrub vegetation at a height of up to 3 m in select areas (such as within the boundaries of the proposed East Arm National Park).

Adjustments to tower locations will be made during construction to avoid sensitive areas (such as wetlands and marshes).

Clearing for camps and staging areas will be limited to only those areas necessary to support the construction activities.

Substations will be developed adjacent to or near the existing mines.

Winter roads will use existing alignments where possible.

The new road corridor will preferentially the use of lake and wetland complexes.

Existing camps will be used where possible.

Helicopter construction methods will limit effects to vegetation between towers.

Winter access roads will only be used for three seasons .

Use of proven best management practices for road construction.

Where portage clearing will be required, the corridor will be single lane width.

To the extent possible, construction activity will be avoided within riparian zones (within 15 metres of the high water mark of any water body or watercourse).

Vegetation will not be removed from the immediate bank of any water body or water course, unless required by special circumstances.

Trees will not be felled directly into watercourses.

Any topsoil and organic soil material removed during site preparation will be stockpiled for use during reclamation activities.

To encourage natural re-vegetation, areas of moderate disturbance will be graded and stabilized. Local topsoil stockpiled during the initial stages of construction may be added where appropriate.

2.1 FOREST FIRES

Externals factors may lead to indirect loss or damage of vegetation within the Project area, forest fires in particular. Boreal forests across the NWT are naturally subjected to an intense fire regime, and the Project area is no exception. The following protocols will be implemented to mitigate the risks of the Project causing a forest fire, and from forest fires to the Project:

Environment and Natural Resources (ENR) Fire Hazard Reports will be monitored during the summer seasons.

During the construction period, the Fire Management Division of ENR will be notified of key Project assets and site locations prior to each fire season; the Project Manager will request to be advised by ENR, whenever a forest fire is within 50 kilometres of a Project site. The Project Manager will liaise with an ENR contact during the fire season to review current forest fire status;

Fuel sources (such hydrocarbon fuels) will be stored appropriately to reduce fire risk.

Slash material (vegetative debris) will be piled in windrows at the edge of cleared areas and compacted to lie flat. A buffer will be maintained between windrows and standing timber to avoid potential fire hazards and to protect standing timber from disturbance.

Open burning at Project sites will be strictly prohibited, unless authorized for the incineration of slash material.

Incinerators at the campsites will be closely monitored during fire seasons.

3 APPROVALS, PERMITS AND RESPONSIBILITIES

The ENR is currently revising the Forest Management Regulations to address forest impacts caused by land uses other than commercial or private forest harvesting. Forest clearing for this Project will require an authorization from ENR before any forest disturbance occurs (Smith, personal communication, 2008). The Project Manager will be responsible for submitting this information to receive authorization in advance of any activities. All terms and conditions that accompany the permit should be communicated to Project staff and incorporated into Project activity planning.

3.1 RESPONSABILITIES

All employees shall:

attend environmental awareness training programs and adhere to the protocols outlined in the Project management plans; and

report any non-compliance with the management plans to the Environmental Coordinator.

The Environmental Monitors shall:

be assigned as required, to keep watch when slash is being burned.

supervise all contractors undertaking direct loss activities

facilitate the implementation of mitigation in this plan;

provide employees with the appropriate training and awareness;

liaise with regulatory agencies.

4 SUPPLEMENTARY INFORMATION

Smith, Mr. Rafe., (February 22) 2008. Forest Management Division, ENR, GNWT. Personal Communication with Mr. Andrew Tofflemire via email. Re: Timber Harvesting Information.

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1 PURPOSE AND SCOPE

This Environmental Management Plan (EMP) is intended to establish protocols to mitigate and control human-wildlife interaction during the construction and operation of the Taltson Hydroelectric Expansion (Project). This EMP applies to everyone working, visiting or inspecting the construction and operation of the Project regardless of their relationship to Dezé Energy Corporation.

The two core components of this document are practices to avoid and mitigate human-wildlife conflict, and procedures to manage human-wildlife conflict if it occurs.

The EMP will be reviewed and adjusted as necessary to incorporate new procedures or change existing procedures. Feedback and suggestions from employees will be a key element in wildlife interaction prevention analysis.

2 EXISTING INFORMATION AND ONGOING STUDIES

A variety of wildlife inhabits the proposed Project area, including keystone species, such as woodland and barren ground caribou, grizzly and black bear, moose, wolves, and numerous small mammals, such as beaver and muskrat. Migratory birds also travel through the area.

The Project Developers Assessment Report, Section 9.5 (Biological Environment), presents a summary of wildlife within the Project area.

It is anticipated that the Project will impact local wildlife populations in a number of ways, such as:

the Project's physical footprint that directly removes wildlife habitat and may pose a barrier to movement across the landscape;

noise and vibration will be generated from vehicles, equipment, blasting, and aircraft operations, which may disturb wildlife; and

odours will be generated from vehicle exhaust, kitchen waste, etc. which may attract wildlife to, or discourage wildlife from, the Project work sites.

2.1 EXISTING REGULATIONS AND GUIDELINES

The Government of Northwest Territories has developed guidelines to protect wildlife during resource development activities. For this Project, helicopter protocols will follow guidelines listed in the "Flying Low" publication. Guidelines found in the "Safety in Grizzly and Black Bear Country" and "Safety in Bear Country: A Reference Manual" documents will be followed at campsites and worksites to prevent and mitigate bear-human interactions.

2.2 INFORMATION FROM OTHER DEVELOPMENTS

Waste management is another key element of effective wildlife conflict management. Waste management systems in place at existing developments in the Northwest Territories have evolved to include consideration of potential wildlife interactions and typically involve:

well planned and executed, waste management practices;

incineration of food waste and other attractants, with holding times minimized;

severe penalties for the feeding of wildlife;

rapid response, investigation and follow-up mitigation for nuisance wildlife;

employee training; and

hazardous waste storage in secure on-site locations and transport off-site for disposal, to prevent adverse impacts to wildlife and habitat.

An emphasis on limiting food availability and associated odours has reduced the number of scavengers attracted to northern development sites.

3 AVOIDANCE AND MITIGATION

The general avoidance of wildlife and sensitive wildlife habitat (such as raptor cliff-nests) is the preferred method for reducing human-wildlife conflict. The mitigation practices outlined below will be implemented to accommodate the natural behaviors of wildlife where possible; and where not possible, to deter wildlife from actively using Project construction sites. The protection of human life must be paramount; however the preservation of wildlife health and natural behaviors (patterns of migration, reproduction,) is also important to all Project partners and concerned people.

3.1 GENERAL PROJECT DESIGN AND PLANNING

The information below outlines general procedures that will guide Project design and planning to limit human-wildlife interactions and wildlife injury.

3.1.1 Vehicle and Heavy Equipment Protocols

Vehicle-wildlife collisions can result in injury or mortality to people and/or wildlife, as well as damage to vehicles. Vehicles used during construction may include ATVs, snowmobiles, pick-up trucks and large transport trucks. Heavy equipment may include bulldozers, crane trucks, cement trucks and other equipment typically used during infrastructure construction activities. The following strategies will be used to reduce these negative interactions:

establish and enforce speed limits. Vehicles should be driven at a speed safe for the road conditions;

drivers should be watchful of wildlife in order to avoid collisions;

Project roads should be designed to minimize blind curves and corners;

establish and maintain a policy giving wildlife the "right-of-way" on all transportation infrastructure and worksites; traffic should be reassigned to alternate routes or worksites, if possible; and

develop a warning system using signage and radio checks to alert drivers of wildlife moving through an area.

3.1.2 Potentially Hazardous Sites and Activities

There are several sites and activities that may require added surveillance and deterrent mitigation to protect animal welfare. These include:

fuel, hazardous material and chemical storage areas;

remediation cells; and

controlled zones in areas of surface blasting.

As the Project advances through permitting and procurement, a list of equipment/vehicle requirements will be developed and protocols adapted for each construction site and the types of work being performed. Site-specific deterrent protocols will also be part of the Project details as Deze advances the Project.

3.2 WILDLIFE SAFETY TRAINING

Prior to participation in field activities associated with the Project, all construction personnel will be required to complete the training outlined below:

basic bear awareness training;

human-wildlife conflict avoidance, particularly waste management practices;

a review of worksite deterrents and monitoring activities; and

a review of this management plan and other Project commitments.

Completion of this training will be documented with a signed acknowledgement from each employee.

3.3 HUMAN - WILDLIFE CONFLICT MONITORING

Wildlife monitoring and reporting is important to limit human-wildlife interactions. Effective monitoring and reporting can be used so that wildlife attractant issues are resolved, nuisance animals are dealt with effectively, and adaptive management may be applied to reduce the risk of future problems.

3.3.1 Wildlife Monitors

Wildlife Monitors will help with the following:

reduce the risk to workers from potential wildlife encounters;

routinely inspect physical wildlife deterrent practices and designs;

deflect wildlife away from potentially dangerous locations, or when interfering with emergency operations;

guide field supervisors in limiting the impact of the Project on wildlife and wildlife habitat; and

keep records of wildlife sightings and incidents.

All Wildlife Monitors will be provided with:

equipment such as, high-visibility vests, radios, binoculars, 12-gauge shotguns (or equivalent) with scare cartridges, rubber bullets, bean bags, live ammunition, pistol launchers with bangers, screamers signal flares, bear spray, and a field first aid kit;

specialized training on the safe use of firearms (with various types of ammunition), pistol launchers, and bear spray; and

first aid and bear awareness safety training.

3.3.2 Record Keeping

Monitors will be trained to properly report wildlife encounters and be made aware of how the information will be used.

All incidents will be investigated and documented by the Environmental Coordinator with the assistance of Wildlife Monitors.

The reports will be compiled and summarized by the Environmental Coordinator.

These summaries are to be submitted to regulatory agencies upon request, or as required.

3.3.3 Wildlife Sighting and Activity Logs

For each sighting of a predator or large mammal the following information will be reported by Project personnel, and recorded by the Wildlife Monitor:

general location of the observation;

species and apparent physical condition of individuals;

number of individual wildlife observed;

date and time of the observation; and

any other potentially relevant information, including any noticeable responses to Project activities.

This record will be reviewed by the Environmental Coordinator and a notice may be issued to all workers in the area to prevent future encounters. These records should also be forwarded to regulatory agencies, upon request.

3.4 DURING CONSTRUCTION

3.4.1 General Safety Protocols for Working near Wildlife

While working, all personnel shall:

work in groups, whenever practical. Wildlife deterrents should be available to all staff.

provide the work location to field supervisors and maintain regular communication with the base camp and other members of the work team; and

be familiar with the wildlife in the Project area, including behaviours and conditions when encounters are most likely to occur.

3.4.2 Handling and Disposal of Food and Domestic Waste

Wildlife are often attracted by food and other odours. Proper handling and disposal can reduce the potential for problem wildlife.

Upon arrival at a camp site, food will be immediately delivered to a kitchen or other indoor storage room.

Where practical, food should be transported in airtight, re-sealable packaging.

Garbage should not be allowed to accumulate.

Combustible food waste/packaging (cardboard packaging, spoiled leftovers,) will be disposed of daily, in a forced air, solid waste incinerator, and the ash will be buried at least 1 meter deep and 200 meters away from camp, or transported off site.

Non-combustible food waste (plastic packaging, metal cans,) will be stored in airtight containers and placed inside of a building, shipping container, or fenced area secure from wildlife. This non-combustible food waste will be stockpiled until transported off-site to a landfill or recycling facility, as appropriate.

Outdoor cooking will be prohibited.

3.4.3 Windrowing of Slash Material

Where slash material is windrowed, breaks will occur at least every 60 meters and be at least 10 meters wide to reduce the disruption of natural wildlife movements.

If practical, breaks will also be made along any linear snow banks exceeding 0.5 meters in height, according to the specifications above. Such breaks will be provided in areas where wildlife movements are known to be frequent.

4 WILDLIFE ENCOUNTERS

Wildlife encounters are usually inadvertent, caused by wildlife disorientation or curiosity, or by improper waste management at a Project site. However, if encounters and problem wildlife persist, deterrent actions or further mitigation may become necessary.

For wildlife deterrents to be effective there must be:

knowledgeable personnel who are able to select deterrent actions on a case by case basis for each unique wildlife situation;

the consistent application of deterrent actions for similar situations;

an evaluation of every encounter and deterrent action taken to determine the root causes and effectiveness of response; and

documentation of all deterrent actions prepared by the Wildlife Monitor and Environmental Coordinator; and forwarded to the Wildlife Division of the Environment and Natural Resources Department (ENR), Government of the Northwest Territories (GNWT) upon request.

4.1 PROJECTILE DETERRENTS

The use of Projectile deterrents should be a rare event, as the preferred method of addressing wildlife encounters will be to avoid confrontation and to allow wildlife to disperse from an area voluntarily. Where it becomes necessary to encourage wildlife to disperse, the following options will be available to wildlife monitors.

4.1.1 Field Response to Bear Encounters

The Project is proposed for an area located within the boreal forest and barren-ground . As such, there is the potential for workers to encounter both black bears (in the Boreal Forest region) and grizzly bears (in the Arctic Tundra region). Bears may be active from April through to October, although there are differences between grizzly bear and black bear, and between regions depending on climate.

In order to properly mitigate human-bear interactions it is important to differentiate between grizzly and black bears. Both species may appear similar in size and can vary in colour from black or brown to cinnamon or blonde.

The response procedures below are provided as background only. For detailed directions on the most appropriate responses to grizzly bear and black bear encounters, refer to Safety in Grizzly and Black Bear Country, available from the Department of Environment and Natural Resources (or see www.nwtwildlife.com).

4.1.2 Response to a Bear at a Distance

If any worker observes a bear from a distance (more than 30 m away), the worker shall:

stop work immediately;

alert the closest Wildlife Monitor, the closest base camp, and all other workers in the vicinity; and

remain alert, and continue working, if in a group of 3 or more people. If working alone or in a pair, walk slowly towards the nearest a building or vehicle and prepare to take refuge, if it becomes necessary.

The distances noted in this section and those that follow are guidelines only and each encounter is different. Use your judgment to decide what is a safe distance.

4.1.3 Response to a Bear at Close Range

If any worker observes a bear at close range (within 15 m), the worker shall:

stop work immediately;

slowly back away from the bear, while observing its behaviour (aggressive or non-aggressive) and allow the bear to leave the area;

alert the closest Wildlife Monitor, the closest base camp, and all other workers in the vicinity; and

if a bear appears aggressive, workers should make themselves appear as large as possible and make noise to deter the bear from coming closer (as well as to alert nearby workers of the situation). Talking to the bear in a firm voice can also help the bear to identify humans.

4.1.4 The Response of a Wildlife Monitor

Upon arriving on the scene, the Wildlife Monitor will:

assess the bear for signs of potential aggression;

advise the field supervisor and nearby workers of the potential threat and how to respond;

use non-lethal deterrents, as appropriate to prevent the bear from approaching to within 15 metres of any worker;

if the bear approaches to within 15 metres, shows clear signs of aggression and the worker(s) is/are unable to retreat to a safer location, the Wildlife Monitor may use lethal force to protect the safety of the workers; and

record details of the incident and take photographs, as appropriate.

4.2 RESPONSE TO 'BEAR IN CAMP' SCENARIO

For detailed directions on the most appropriate responses to grizzly bear and black bear encounters or bears in camp, refer to Safety in Grizzly and Black Bear Country, available from the Department of Environment and Natural Resources (or see www.nwtwildlife.com). The response to a bear encounter at camp will be as follows:

a camp siren designated for emergencies will be sounded and a radio alert will be sent out to all workers at the camp and nearby worksites;

the senior field supervisor or manager at the camp will consult with the wildlife monitors in determining an appropriate response with the use of wildlife deterrents. The use of lethal force will be avoided to the extent possible, as there may be a risk of injury (from gunfire) to workers taking shelter in the various camp buildings;

a post-incident analysis will be undertaken to identify any factors contributing to the 'bear in camp' situation, and these factors will be addressed as soon as possible to limit the potential for a reoccurrence of the incident.

4.3 OTHER WILDLIFE DETERRENT PROCEDURES

Whenever numerous and frequent signs of wildlife are observed near areas of human activity, the potential causes should be investigated. If an animal has gained access to shelter, a potential hazard, or food source, immediate action will be taken to secure the site from re-entry by wildlife.

Generally wildlife should be left undisturbed. However, if the presence of an animal presents a risk to the animal or to humans, or causes material damage, deterrent action should be considered.If an animal is showing clear signs of being rabid, the animal should be killed, aiming for the body rather than the head, if it is safe to do so. Contact ENR to take any required tissue samples and to dispose of the carcass.

4.4 WILDLIFE HERDING PROCEDURES

In general:

wildlife will be given the "right-of-way". If wildlife are crossing or attempting to cross the winter road, site roads or airstrip, traffic will stop and wait for the animal(s) to cross; and

wildlife will not be blocked from crossing roadways and efforts will be made to accommodate natural movement patterns across Project sites.

Field Supervisors and/or the Environmental Coordinator may authorize deterrent actions, if an animal endangers itself or humans near roadways or the airstrip. Deterrent actions to be taken will begin at the lowest level indicated below and may increase to higher levels, as appropriate to the situation. The objective is to have wildlife voluntarily move away from potentially hazardous situations without causing unnecessary stress or possible injury.

Unless the situation is an emergency and requires immediate action, ENR will be contacted prior to any herding activity.

Herding strategies used by the Wildlife Monitors and the reactions of wildlife will be documented. This record will also include information surrounding the incident, such as weather conditions, date/time, and justification for actions taken.

ENR should be contacted as soon as possible after the incident, and provided with an incident report upon request.

The protocols listed below may need to be adapted or refined further before implementation, based on feedback from regulatory agencies.

Level 1

Approach the animal(s) from a distance while announcing your presence:

if the animal does not respond to the vehicle, wildlife monitors may slowly approach the animal on foot (if it is safe to do so), while maintaining a safe distance. Do only what is necessary to encourage the animal to move;

approach no closer than 50 m. If the animal starts to move off, stop the approach;

if the animal stops moving, continue the approach;

if the animal does not respond to an approach on foot, it may be necessary to increase the disturbance to the animal. Clap and / or shout to alert the animal to your presence;

if clapping and shouting do not cause the animal to move off, use an air horn; and

when the animal leaves the area, continue to monitor until it has moved approximately 100 m away from the road or airstrip.

Level 2

if the Wildlife Monitors approach to within approximately 50 meters of the animal(s) and it still remains, the wildlife monitors will stop their approach;

noise-making or explosive deterrents may be used to try and scare off the animal. If it is after dusk, use a noise maker that also emits light. This helps to illuminate the animal and provides another level of deterrence;

if the animal is not responding to noise-making deterrents at a distance, move to less than 50 meters and use the appropriate deterrent given the distance between the monitor and animal (refer to Table 4-1);

when the animal begins to move away, stop the deterrent action;

if the animal stops moving, resume the deterrent action; and

if the animal moves off, continue to monitor until it has moved approximately 100 m away from the road or airstrip.

Level 3

if the animal does not respond to the approach of people and deterrents, the animal may have become habituated to people or may be sick;

if the animal does not respond to noise making deterrents, use other non-lethal Projectiles. Select the type of non-lethal Projectile based on the species and distance from the animal .

when the animal starts to move away, stop deterrent actions;

if the animal stops moving, resume the deterrent actions using non-lethal Projectiles or noise makers;

if the animal moves off, continue to monitor until it is approximately 100 meters away from the road or airstrip; and

if the animal refuses to move or becomes aggressive, it may be necessary to kill the animal for safety reasons.

4.5 CARIBOU DISTRIBUTION DURING CONSTRUCTION

Barren-ground caribou are a migratory species that show a large degree of variation in migration routes from year to year. Although their movements are unpredictable at the small scale, there are distinct seasonal differences in distribution and travel rates at the scale of the annual range.

To mitigate effects to caribou during Project construction, and to focus caribou monitoring and mitigation efforts on the areas with the greatest likelihood of caribou presence, it is helpful to identify areas and seasons where caribou may occur. To do so, the historic movements of satellite-collared Bathurst caribou were compared with the proposed transmission line right of way (ROW). The number of crossings of the proposed ROW was mapped using GIS software, and areas of relatively density of crossings were identified subjectively. This process was repeated for the four seasonal ranges of the Bathurst caribou (spring migration, post-calving, autumn/rut, and winter), and the results were displayed diagrammatically. Figures 6.10.1 to 6.10.4 illustrate the sections of the ROW with high, moderate, low and very low likelihood of caribou presence, during each season. These figures illustrate both the shift in caribou range south of the treeline during winter, and the higher movement rates in the spring and summer.

As stated above, barren-ground caribou show a high degree of annual variation in movement, and Figures 6.10.1 to 6.10.4 attempt to estimate the likelihood of caribou presence based on past observations. The figures will be used as a mitigation tool to focus caribou monitoring efforts on the areas where caribou presence is most likely. Should large concentrations of caribou be identified by construction crews and environmental monitors, the procedures outlined below will be followed.

4.6 DEALING WITH AN INJURED ANIMAL

Upon encountering an injured animal:

stop work immediately and retreat to a safe distance;

alert the closest Wildlife Monitor and Field Supervisor; and

visually assess the type of injury (predator, vehicle impact).

4.6.1 Prey Injuries

If the injuries appear to be caused by a carnivore:

assume that a bear is present in the vicinity until otherwise determined (this is the worst case scenario from a human safety perspective);

alert all workers in the vicinity; and

follow protocols for Bear Encounters in Section 4.2.

4.6.2 Injuries caused by Human Activity

If the injures are the result of human activity:

the Wildlife Monitor will visually assess the extent of injuries;

where the injuries are deemed critical, the Wildlife Monitor may kill the animal for compassionate reasons, following consultation with ENR; and

a detailed report will be made to ENR, as soon as possible.

4.7 DEALING WITH CARCASSES

Carcasses are an indication that a predator may be nearby, so **never approach a fresh kill**. Also be cautious of loose piles of dirt, branches and vegetation, as predators sometimes cache carcasses.

Upon the discovery of a wildlife carcass:

alert the closest Wildlife Monitor and Field Supervisor; and

avoid the immediate area, until the Supervisor advises that it is safe to return.

The Wildlife Monitor shall:

assess the stage of decay and signs indicating a probable cause of death (predator kill, disease, drowning);

examine the area for other evidence of recent wildlife activity;

collect biological samples, if requested by ENR;

record the details of the incident, take photographs, and provide this information to the Field Supervisor; and

if necessary and with the assistance of workers, move the carcass a safe distance away from the worksite so as not to attract wildlife.

5 PROTOCOLS FOR AIR TRAVEL AND AERIAL WORK

The potential impact of noise disturbance to wildlife from airplanes and helicopters is an important issue common to large-scale northern developments. For this Project, the installation of the transmission lines will rely heavily on the use of rotary wing aircraft. To a lesser extent fixed wing aircraft will be used to mobilise personnel and light weight, perishable or otherwise critical supplies to the remote construction sites and camps. The airstrip at the Twin Gorges site may require rehabilitation prior to regular use; small fixed-wing aircraft equipped with floats or skis can provide support during seasonal construction activities in other areas.

There are many factors that influence the interactions between aircraft and wildlife, including:

proximity to wildlife;

aircraft characteristics (physical appearance, movements);

environmental conditions (weather and visibility);

exposure (timing, duration and frequency) and Exposure History (‘experience’); and

species and individual characteristics (behaviour, age, population density).

The protocols below will be implemented in an effort to mitigate these factors and any impacts that may result.

However, it should be noted that all pilots will be professionally licensed and must be allowed to make their own judgments regarding the operation of their aircraft. Air carriers should be involved in the refinement of these protocols so that Project expectations are realistic and that these protocols can be effectively implemented.

5.1 AIRCRAFT PROTOCOLS

During the construction period, elevated noise levels will be generated at the ground surface and may discourage wildlife from approaching air transportation infrastructure (permanent and seasonal airstrips, temporary heliports) in these construction zones. In addition animals may become startled (stressed) when aircraft (and the noise generated by aircraft) rapidly approach during take-off and landing manoeuvres, and while flying low.

air carriers will be prohibited from chasing or otherwise harassing wildlife by flying too low or too close with an aircraft (*relates to section 38 of the NWT Wildlife Act*);

unless required by the nature of work, aircraft will fly above an altitude of 1,000 feet (300 m) when not in take-off or landing manoeuvres (*stipulated by Transport Canada regulations*);

landing zones will be inspected (from the air or ground) prior to landing to reduce the potential for collisions or near misses with wildlife.

6 TASK RESPONSIBILITY AND ENVIRONMENTAL APPROVALS

6.1 ALL WORKERS

All workers will ultimately be responsible for:

following the protocols established in this management plan;

monitoring their surroundings when working at remote Project sites (which may not be monitored by dedicated wildlife monitors);

carrying appropriate wildlife deterrents, navigational aids and communication devices when working at remote construction sites;

their own personal safety and the safety of other team members when working at remote construction sites; and

installing and maintaining deterrent structures associated with their work areas

6.2 WILDLIFE MONITORS

Wildlife Monitors will be responsible for:

monitoring the Project site assigned to them and deterring potentially dangerous wildlife from approaching workers;

maintaining / inspecting physical deterrent structures;

herding wildlife away from critical infrastructure during time-sensitive (emergency) situations, when authorised by a Supervisor;

preparing wildlife encounter incident reports; and

assisting the Environmental Coordinators in any incident investigations.

6.3 FIELD SUPERVISORS

Field Supervisors will be responsible for:

supervising construction activities and implementing the protocols established in this management plan are followed;

providing direction to Wildlife Monitors to ensure that wildlife are herded away / deterred from critical Project sites; and

determining if the Supervisor or Environmental Coordinator should be responsible for contacting the Wildlife Emergency Line and reporting the details of the incident (Table 6.1).

6.4 ENVIRONMENTAL COORDINATORS

Environmental Coordinators will be responsible for:

supervising the Wildlife Monitors and so that the protocols established in this management plan are followed;

reviewing incident reports prepared by the Wildlife Monitors;

preparing regular summary reports of wildlife incidents, encounters and monitoring programs;

liaising with regulatory agencies;

in emergency situations, providing direction to Wildlife Monitors so that wildlife is herded away / deterred from critical Project sites; and

determining if the Supervisor or Environmental Coordinator with the most knowledge of an incident will be responsible for contacting the Wildlife Emergency Line and reporting the details of the incident (Table 6.1).

Table 6-1: Consultation with Regulatory Agencies

Issue	Points of Contact
Any wildlife injury, mortality or other emergency.	ENR Wildlife Emergency 24-Hour Help Line (867) 873 - 7181 * This contact number is also provided at the bottom of each page.
Notifications regarding the initiation of Project activities that may impact wildlife. Information on periods and locations of local wildlife sensitivity.	ENR Regional Offices South Slave – Deborah Johnson, (867) 874-6408 North Slave – To Be Determined
Any situation involving Species at Risk.	Canadian Wildlife Service, Environment Canada ENR Wildlife Division
Report a Poacher	24-Hour Hotline: 1-866-762-2437 (1-866-POACHER) Or contact the Regional ENR Office

7 SUPPLEMENTARY INFORMATION

Bromley, M., 1985. Safety in Bear Country: A Reference Manual. NWT Department of Renewable Resources.

Also see: Safety in Grizzly and Black Bear Country. Available online at: http://www.nwtwildlife.com/Publications/safetyinbearcountry/safety.htm

AMEC Americas Ltd. July 2005. Mackenzie Gas Project Effects of Noise on Wildlife. Prepared for Imperial Oil Resources Ventures Ltd. Available Online at: http://www.ngps.nt.ca/Upload/Proponent/Imperial%20Oil%20Resources%20Ventures%20Limited/birdfield_wildlife/Documents/Noise_Wildlife_Report_Filed.pdf

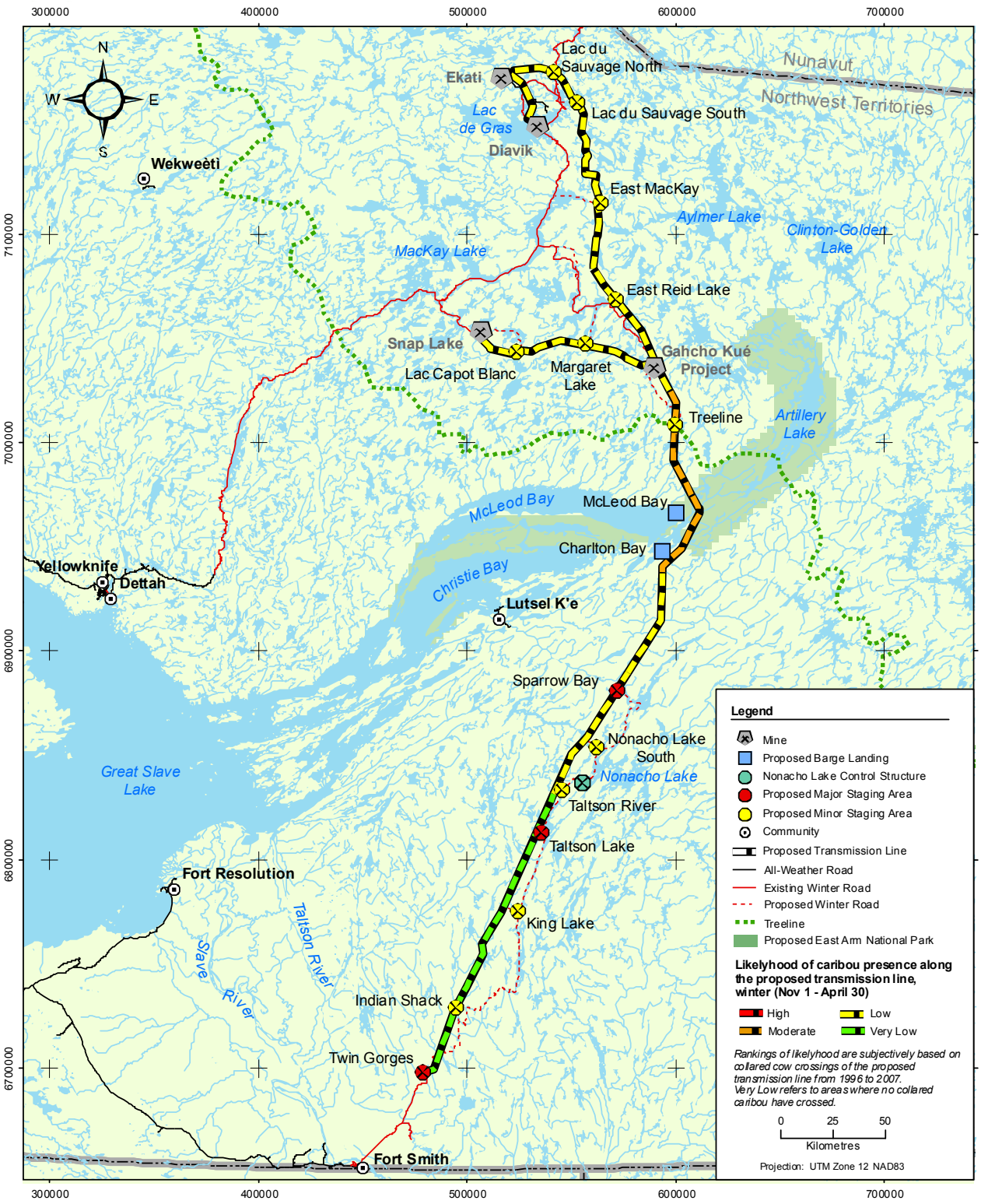
Manitoba Hydro, July 1995. Fur, Feathers, and Transmission Lines. Available online at: http://www.hydro.mb.ca/environment/publications/fur_feathers.pdf

Environment and Natural Resources, July 2007. Flying Low. *Document attached as an appendix.*

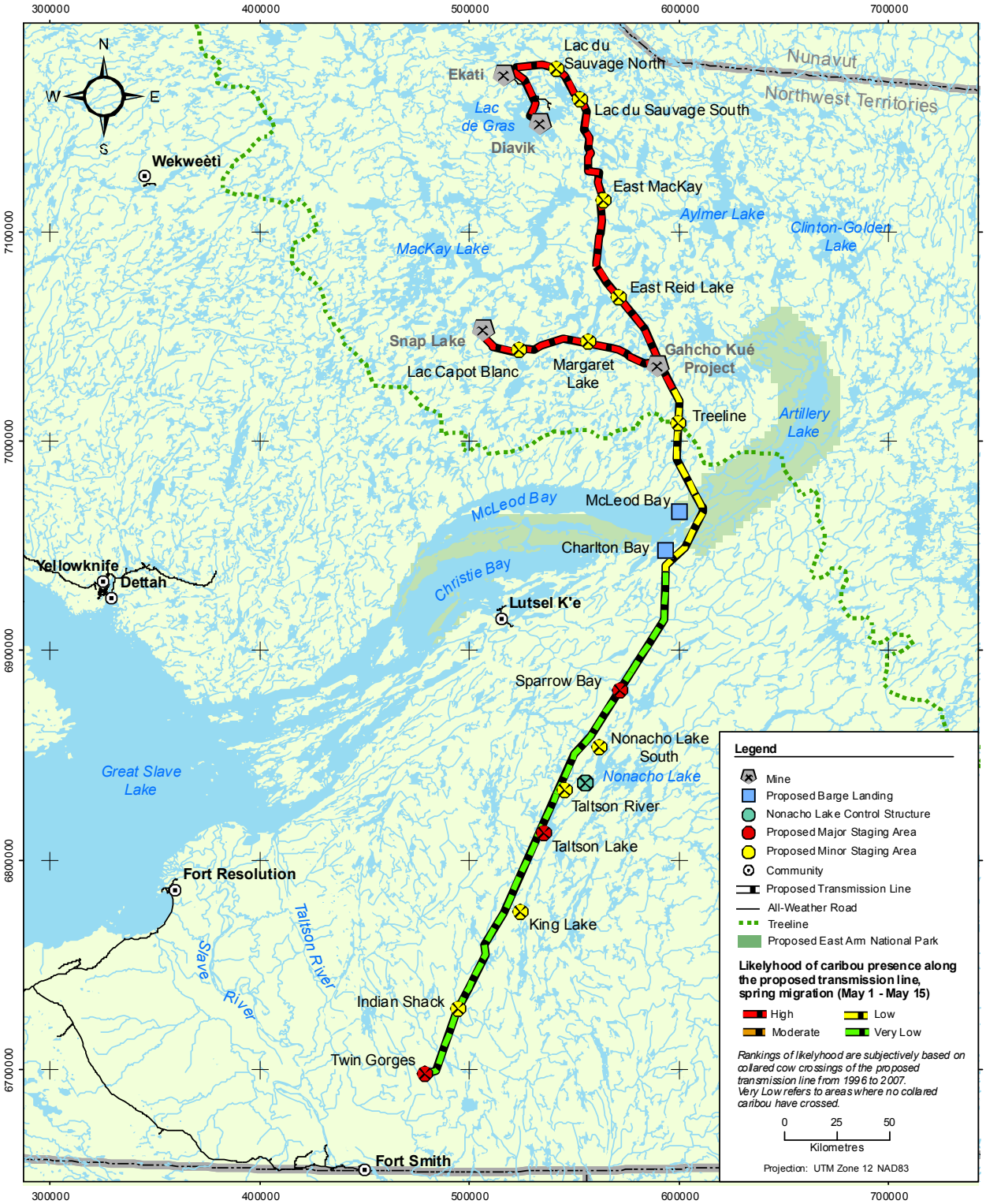
Resources, Wildlife and Economic Development, March 2002. Report a Poacher. *Document attached as an appendix.*

Internet Website:

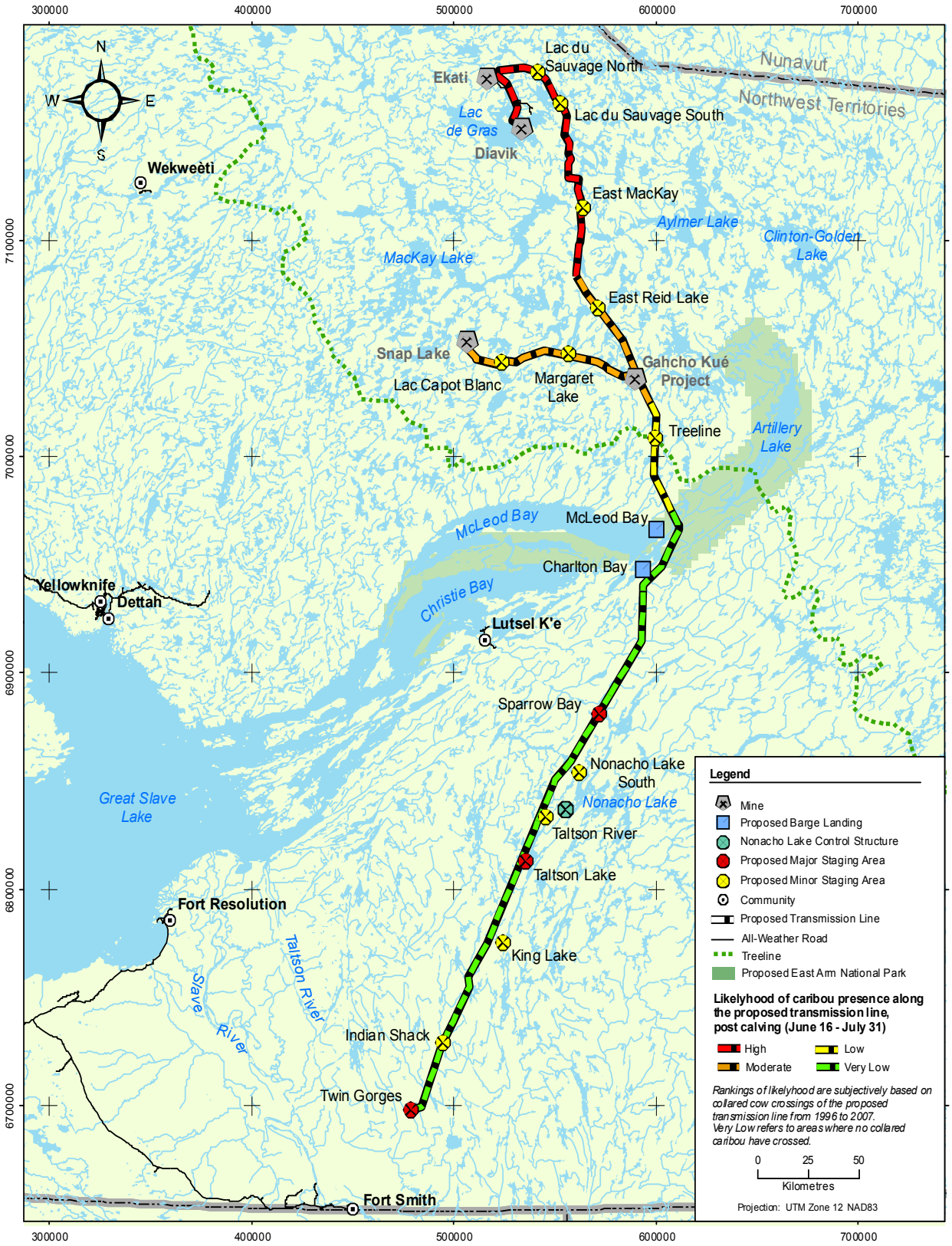
Wildlife Division, Environment and Natural Resources Department, Government of the Northwest Territories: http://www.nwtwildlife.com/



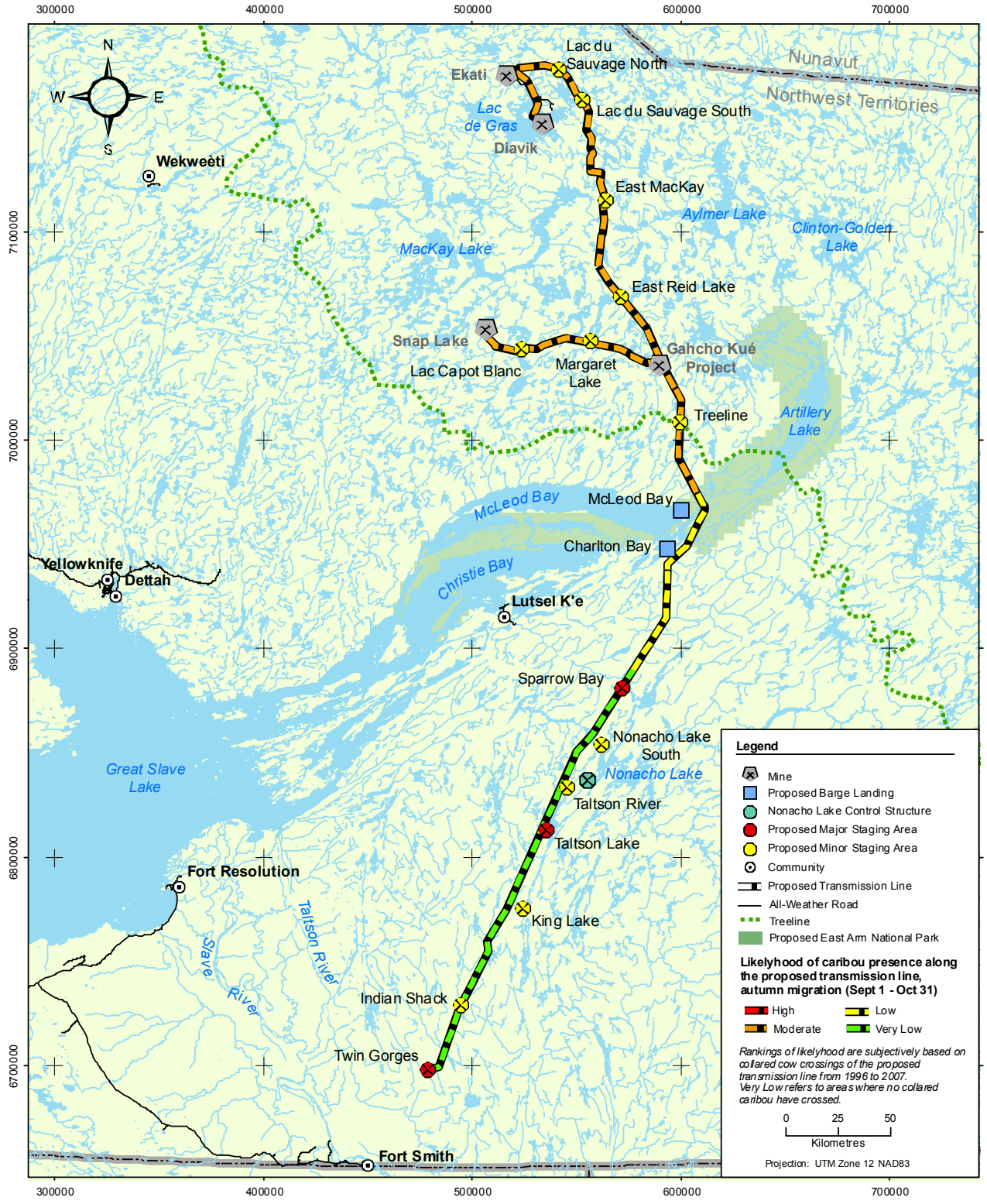
TALTSON HYDROELECTRIC EXPANSION PROJECT	Developer's Assessment Report 2009	Likelyhood of Caribou Presence Along the Proposed Transmission Line, Winter (Nov 1 - April 30)	Figure 1



TALTSON HYDROELECTRIC EXPANSION PROJECT	Developer's Assessment Report 2009	Likelyhood of Caribou Presence Along the Proposed Transmission Line, Spring Migration (May 1 - May 15)	Figure 2



TALTSON HYDROELECTRIC EXPANSION PROJECT	Developer's Assessment Report 2009	Likelyhood of Caribou Presence Along the Proposed Transmission Line, Post Calving (June 16 - July 31)	Figure 3



TALTSON Hydroelectric Expansion Project	Developer's Assessment Report 2009	Likelyhood of Caribou Presence Along the Proposed Transmission Line, Autumn Migration (Sept 1 - Oct 31)	Figure 4

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1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Taltson Hydroelectric Expansion Project (Project) is a development that will add a new 36 to 56 megawatt generating station at the site of the existing 18 megawatt Taltson Twin Gorges generating station, located approximately 56 km northeast of Fort Smith, NT. This expanded facility, and related Project infrastructure, will supply power to the existing Ekati and Diavik diamond mines, the Snap Lake mine and the Gahcho Kue mine, through 690 km of new transmission line. In addition to the Twin Gorges site and the new transmission line, construction activities will take place along various winter roads, at Nonacho Lake, at each of the 4 mine sites, and at 12 marshalling yards.

The purpose of this Spill Contingency and Response Plan is to provide a course of action, to ensure an efficient and organized response to spills and emergencies, which may occur during construction and operation of the Project infrastructure.

This Preliminary Spill Contingency and Response Plan will be finalized once detailed design, construction logistics, and owner-construction contractor responsibilities and personnel are more clearly defined.

1.2 COMPANY NAME AND ADDRESS

The Project Proponent is the:

Dezé Energy Corporation Ltd.

Suite 206, 5102 50th Avenue

Yellowknife, NT

X1A 3S8

1.3 PROJECT LOCATION

A detailed-design site map that identifies all sites associated with the Project will be prepared following detailed design of the Project. Table 1-1 identifies the supervisor by the Project site (to be updated prior to construction).

Table 1-1: Project Sites and Supervisors

Site ID	Site Name	Site Supervisors	Location
	Twin Gorges Facility	(Insert Names and Contact Numbers)	60º 23'N 111º 21'W

1.4 LIST OF HAZARDOUS MATERIALS ON-SITE

Table 1-2 provides preliminary details regarding hazardous materials that will be required during construction.

Table 1-2: Project-Related Hazardous Materials Storage

Type	Total Units	Capacity per Unit	Distribution	Total Volume
Diesel	4 Tanks	10,000L	2 at Twin Gorges 2 at Nonacho Lake	40,000 L
Diesel	65 Drums	205L	5 at each staging area (12) 5 at Twin Gorges	13,325 L
Aviation Fuel	13 Tanks	5,000L	1 at each staging area (12) 1 at Twin Gorges	65,000 L
Aviation Fuel	52 Drums	205L	4 at each staging area (12) 4 at Twin Gorges	10,660 L
Gasoline	52 Drums	205L	4 at each staging area (12) 4 at Twin Gorges	10,660 L
Propane	26 Bottles	45kg (100lb)	2 at each staging area (12) 2 at Twin Gorges	1,170kg (2,600lbs)

1.5 HAZARDOUS MATERIALS HANDLING AND STORAGE

All fuel containers (tanks, drums, etc) will be clearly marked with the contractor's name (or Project name), product type, and year purchased or filled;

Fuel caches will be located 30m from the high water mark of any waterbody, and stored in such a manner that prevents the contents from entering any waterbody frequented by fish;

Fuel caches will be inspected on a regular basis and the locations of all caches will be provided to the appropriate regulatory agencies;

Where practical, an impervious liner (such as self-supporting insta-berms) will be used to provide secondary containment in barrel storage areas;

Spill kits will be available at each fuel or hazardous materials storage area, and during all fuel transfers;

To reduce the risks of fire, tanks will have a minimum separation of 1m and fuel storage areas will be equipped with fire extinguishers (as specified in the National Fire Code);

Secondary containment or surface liners (drip pans, fold-a-tanks, etc) will be placed under all inlet and outlet connections during fuel transfers;

Fuel transfers will only occur under the supervision of trained personnel;

Decanting of snow or water from berm areas will only proceed once chemical analysis demonstrates that the requirements of Section 36(3) of the Fisheries Act have been met;

Waste manifesting will be implemented to ensure proper use, storage and management of materials.

1.6 DISTRIBUTION LIST

Copies of this plan will be posted near each fuel cache, refueling station, with each Spill Kit and also where personnel at each Project worksite have access to it. In addition, copies will be provided to:

The Project Manager(s)

All Site Supervisors

All Companies involved as contractors or subcontractors on the Project

1.7 CORPORATE ENVIRONMENTAL POLICY

The Dezé Energy Corporation recognizes the complex relationship between environmental stewardship and the pressures associated with northern economic development. By establishing effective policies and procedures for the construction of the Project, it will be possible to minimize environmental impacts through a proactive approach. To this end, Project contracts will require that:

all regulatory obligations are addressed before work proceeds;

all Project contractors and personnel comply with applicable National and Territorial environmental legislation and that any infractions, are quickly identified and addressed. All appropriate contractors and personnel will be given training to ensure that everyone has a clear understanding of their role, as it relates to the environment, and;

environmental compliance is tracked and documented throughout all stages of construction and operation. This will include periodic environmental audits, ongoing environmental monitoring and site inspections to assess potential risks.

2 INITIAL INCIDENT RESPONSE

The following procedures provide guidance in the event of a spill of fuel, oils, lubricants and most other potentially harmful substances. In all hardcopies of this plan, this page should be tabbed for quick reference during any incident.

2.1 SPILL INCIDENT RESPONSE PROCEDURE

Ensure Safety, Identify Product and Assess Hazards

Eliminate the Source (when possible)

Stop the Spread

Secure the Area

Report the Spill **(NT 24 Hr Spill Report Line: 867-920-8130)**

Initiate Approved Spill Clean Up Activities

(Circumstances may dictate another sequence of events)

2.2 POST - INCIDENT PROCEDURES

Debriefing

Closure of Spill Incident File

Please refer to the following pages for a more detailed summary of Incident Response Procedures.

2.3 INITIAL RESPONSE SUMMARY

STEP 1 – Ensure Safety, Identify Product and Assess Hazards

Never rush in, identify the spilled product prior to taking action (refer to MSDS if necessary).

Alert all persons in the immediate area that a spill has occurred.

If the material is flammable, eliminate all possible sources of ignition.

Where life or property is in danger, there is an emergency. Get help. Contact the nearest base camp so that response teams can be activated.

Keep all persons not directly involved with containment procedures away from the spill site.

Ensure all personnel involved in the containment procedures are aware of the hazards and are issued personal protective equipment.

NOTE: Immediately contact the Site Supervisor / Project Manager, if a spill response exceeds the abilities/capabilities of on-site personnel or equipment, and/or if there is a high potential of adverse effects to off-site areas and/or sensitive ecological or human receptors.

STEP 2 – Eliminate the Source (if possible)

Once STEP 1 has been completed, act quickly to locate the spill source(s), and if safe to do so, stop the spill from continuing:

Close valves, shut off pumps and/or set containers upright;

Attempt to plug minor holes or leaks;

If a spill occurs from the wall of a tank and cannot be stopped, transfer the product from the leaking tank to another container in order to reduce

the amount spilled. Use secondary containment (drum or pail) to catch the product and prevent further impact where possible.

STEP 3 – Stop the Spread

Determine the direction and speed the spill is moving. Determine what is causing the spill to move (wind, gravity, water flow, etc.).

Determine what will be affected by the spill (environment, property).

Determine where the spill can be contained with available staff and equipment. Take all necessary steps to prevent the spill from contaminating any waterbodies.

Contain the spill as close to the source as possible, by obstructing drains and culverts, erecting barriers along ditches and creating temporary berms (of snow, soil or other appropriate materials). Place absorbent booms and pads to help prevent further contamination.

STEP 4 – Secure the Area

Limit access to the immediate area by establishing a buffer zone (i.e. erect construction fencing or use caution tape) and expand the restricted zone if spill grows;

Prepare a contingency plan in case the spill continues to grow beyond the current response capacity.

STEP 5 – Report the Spill

Notify the Site Supervisor / Project Manager with a status update.

The Site Supervisor will notify other internal personnel, as appropriate.

The Site Supervisor will fill out a Spill Report Form and forward it to the 24-Hour Spill Report Line (fax to 867-873-6924) and call the Spill Report Line (867-920-8130) to confirm the details.

The Project Manager and/or Public Relations Representative will notify other external agencies and the public of any major incidents, as appropriate.

STEP 6 - Spill Clean Up and Disposal

Place additional absorbent booms and pads, as appropriate.

Prior to initiating site clean up (removing soil, pumping contaminated water, etc.), the Site Supervisor and the Environmental Coordinator must approve disposal procedures, for larger scale spills (>100L) the appropriate regulatory bodies and the Project Manager must also approve the disposal procedures.

Upon completion of cleanup, the Site Supervisor will fill out a Spill Update Form and forward to the Project Manager, the NWT Spill Report Line, the Project's Environmental Coordinator and others, as appropriate.

2.4 POST-INCIDENT PROCEDURES

STEP 7 - Debriefing

An internal review will evaluate of the spill cause, effects, and response.

Where possible, appropriate actions will be taken and procedures modified, to avoid similar incidents in the future.

STEP 8 - Closure of the Spill Incident File

The Environmental Coordinator will follow up with the appropriate regulatory bodies to ensure that a satisfactory clean up and/or remediation of affected areas has been completed.

The internal spill file will include all key documentation relevant to the incident.

2.5 DIFFICULT RESPONSE SITUATIONS

2.5.1 Non-Liquid Spills in Rain

If the spilt material is granular (i.e. a powder) or a solid (i.e. ANFO pellets), cover the spill area with a tarp, until it can be cleaned up safely. If wetted, surround the tarp area with booms and/or use other measures to prevent runoff from the contaminated area.

2.5.2 Spill into a Waterbody

Follow the initial response procedures and contain the spill using booms designed for this purpose. This may require the use of hip-waders and/or boats.

As soon as practical, the Environmental Monitors and/or the Environmental Coordinator will initiate downstream monitoring.

2.5.3 Spills on Snow

For small spills, the spilled contaminant-snow mixture can be collected using a shovel and stored in a water-tight drum until proper disposal can be arranged.

For more extensive spills, respond by:

Constructing a trench or ditch to intercept or contain the contaminants on the snow, where feasible;

Compact the snow around the outside perimeter of the spill area;

Construct a dike or dam out of snow, either with shovels or with heavy equipment, where available;

Locate the low point of the spill area and clear channels in the snow, directing the contaminant away from waterways, to allow non-absorbed material to flow to the low point, and;

Transport contaminated material to approved disposal site. Equipment used will depend on the magnitude and the location of the spill.

2.5.4 Spills on Ice

Spills on ice are handled in a similar manner to those on snow. Ice presents the added danger of immediate access to water. Should the contaminant seep or flow through cracks or breaks in the ice, despite all precautions, additional assistance should be sought immediately.

Construct a compacted snow berm around the edge of the spill area.

Even if the spill is contained on top of the ice, quickly develop a contingency plan in the event that seepage through the ice is discovered.

Although hard ice may prevent contaminants from entering the waters below, all contaminated snow and ice, as well as objects embedded in the ice (gravel, frozen absorbent pads) must be scraped from the ice surface and disposed of in an appropriate manner.

2.6 OTHER SAFETY CONSIDERATIONS

Although the Project-wide Health and Safety Policies still apply, several issues warrant specific mention.

2.6.1 Control Access

In the event of a hazardous materials spill, an immediate assessment will be made to ensure that the site is safe and secure. Spills may attract curious onlookers, and the site must be controlled in such a way as to ensure that they are kept well outside any hazardous-area. Only those directly involved in the containment, control, or cleanup of the spill should be permitted in the general vicinity of the spilled material.

2.6.2 Fires

Two fully-charged 20lb, ABC class fire extinguishers will be kept at all fuel and hazardous materials storage locations and will be on hand during any spill response activities. An air horn will also be on hand to alert personnel in the immediate vicinity.

2.6.3 Slippery Surfaces

Once a spill is contained, all persons involved in response activities must wear oil-resistant, steel-toed, rubber safety boots with textured bottoms.

2.6.4 Personal Protective Equipment (PPE) Requirements

Selection of outer PPE will be based on the potential for whole body contact with the product. A potential for repeated contact will require splash gear (top/bottoms). Clothing will be kept fully zippered when handling spilled product. Supervising personnel may authorize the removal of suit tops if there is no potential for upper body contact.

In situations with high body-contact potential, personnel will seal glove/sleeve and boot/pant leg interfaces with tape.

In situations with limited skin contact potential, personnel may wear disposable clean-guard garments or equivalent. Where potential exposure is minimal (for inspectors, monitors, etc.), personnel are only required to wear standard PPE for the worksite.

All personnel on shore-cleaning operations will wear safety glasses.

Personnel handling contaminated materials will wear outer chemical resistant gloves. Glove/sleeve interfaces will be taped whenever handling heavily contaminated, wet materials.

2.6.5 Buddy System

When possible, a buddy system will be instituted for working in the impacted area. Personnel will be required to work within sight of their assigned partner (buddy) at all times.

2.7 SPILL RESPONSE TRAINING

Environmental training on material management, spill response and emergency procedures, and other environmental protection measures will be provided to personnel prior to commencement of construction activities, and periodically during routine safety meetings. Recertification training will be provided as required.

2.8 SPILL AND EMERGENCY RESPONSE EQUIPMENT

Spill and emergency response equipment will be maintained at all locations where fuel and hazardous materials are stored and handled. Spill kits will be present when activities of moderate or high risk of spillage occur adjacent to a watercourse. The spill kits will include, at a minimum:

1 Spill Kit Storage Container (Overpack Drum, Steel Drum or Locker),

4 tyvek splash suits with goggles or face shields,

4 pairs of chemical master gloves,

10 large plastic bags with ties for temporary use,

2 oil only booms (5” x 10’),

50 oil only absorbent pads (16” x 20”),

5 sorbent socks,

10 sorbent pads,

2 large tarps,

1 roll duct tape,

1 utility knife,

1 field notebook and pencil,

1 rake,

1 pick axe,

2 aluminium scoop shovels (for removing contaminated snow),

2 spades (for digging trenches),

1 instruction binder (documenting Spill Kit Contents) and a containing a copy of this plan (laminated or printed on water resistant paper), and

1 tube of purpose-specific industrial putty (to temporarily plug minor leaks).

Once a spill is under control and the cleanup is underway, extra fully-intact spill kits will be moved to the site of the spill, and the used spill kits will be removed from the site, inspected and restocked, as appropriate. Contaminated items will be cleaned or discarded in an appropriate manner.

Where appropriate, other response equipment will be made available for spill response. This may include pumps / hoses / skimmers, granulized absorbents (i.e. Graboil, Oilsorb) chest-waders and boats (for placing booms in a lake).

Upon completion of detailed construction planning insert locations and numbers of all spills kits associated with Project activities.

2.8.1 Spill Kit Storage Container

The brightly colored spill kit storage container can be used to contain small volumes of contaminated soils or liquids. Overpack drums are ideal, as they can be fitted over a standard 205L drum (which may be leaking) and sealed. Steel savage drums have a re-sealable lid and are typically 205L in volume. Spill kits can be stored both indoors and outdoors.

If all spill kit items cannot fit within a single container (shovels, rakes, etc), a separate clearly marked and highly visible secondary container (such as a big yellow duffle bag) will be stored near the primary spill kits (Figure 2-1, Figure 2-2).

Figure 2-1: Typical Spill Kits

Figure 2-2: Examples of Spill Kits at the Existing Taltson Facility

2.8.2 Personnel Protective Equipment

Each spill kit contains rubber work gloves, safety goggles or face shields, and protective tyvek coveralls.

2.8.3 Absorbents

Two types of sorbent materials in three different forms (booms, pads and socks) will be available for spill response.

Universal (Hydrophilic) Sorbents pick up most liquids including fuel, oil, glycol, and water. They are used for general spill cleanup on dry land and will sink if placed on water, as they adsorb the water. For this reason universal sorbents are not to be used for any spills on water.

Hydrocarbon (Oil Only) Sorbents only pick up hydrocarbons, such as fuel or lube oil. These sorbents float, as they do not pick up water (hydrophobic), and are to be used for any hydrocarbon spill on water.

Hydrophobic Sorbent Booms (which float) are placed around the spill perimeter to provide containment when a spill occurs on water. Typically composed of 5 or 8 inch diameter plastic net tube filled with sorbent material, these booms prevent the spill from spreading and/or moving downstream to contaminate other areas (Figure 2-3). Booms can be clipped together for extra length. The ends should be clipped together so that they overlap, leaving no space at the joint. This ensures that no spilled product leaks out past the boom, and the boom effectively contains and adsorbs the spilled product (Figure 2-4).

Sorbent Socks are similar to booms in construction; however, they do not clip together. They are generally used for small scale, localized spills.

Sorbent Pads are individual sheets (typically 16” x 20”) used on drips or leaks.

Sorbent Rolls are continuous strips of sorbent pads; they have perforated lines so that the material can be torn to the length desired.

Higher quality sorbents will wick up, contain, and retain spilled product much faster and more effectively than low quality sorbent, due to a finer weave of material. Low quality sorbent pads are used to clean up minor drips, while higher quality sorbents, found in the spill kits, are used for larger spills.

All heavy equipment and vehicles will be equipped with universal sorbent pads for day-to-day use and the cleanup of minor spills. For all high risk areas (i.e. fuel storage areas), where a large or significant spill might occur, spill kits will be available for containment and cleanup. Extra spill kits will also be available, so that they can be brought to specific work areas on a temporary basis, as required by the potential task-specific risks.

Figure 2-3: Sorbent Booms

Figure 2-4: Boom Deployment

2.8.4 Printed Disposal Bags and Permanent Marker

Large plastic bags (pre-printed as "hazardous") are used to collect and transport contaminated absorbent pads, booms and socks. Ties are used to seal the bags prior to transport; at the same time the spill ID number and current date should also be marked on the bag.

2.8.5 Document Binder

The document binder provides information regarding spill kit equipment (documenting Spill Kit Contents), copies of relevant Material Safety Data Sheets, and contains a copy of this plan (laminated or printed on water resistant paper).

2.8.6 Field Notebook and Pencil

It is essential that details surrounding the incident are recorded as soon as practical. This information can then be relayed accurately to the Site Supervisor, the Spill Report Line and others, as appropriate. The names of personnel discovering a spill and involved in the initial clean up should also be recorded so that follow-up interviews can be arranged at a later date. The notebook should be weather-proof.

2.8.7 Hand Tools

Hand tools assist during the response and when implementing containment measures. The spades (2) can be used to quickly dig a trench so that a spill is contained. The scoop shovels (2) can be used to quickly remove contaminated snow or sand. The rake (1) is useful for recovering used sorbent materials and collecting contaminated surface debris. The pick axe is useful for moving logs, slash material or rocks, when constructing improvised containment measures.

2.8.8 Large Tarps

The large tarps can be used to line trenches and prevent spills from seeping underground and to protect dry spills (spills of powders or solids) from rain.

2.9 SPILL MANAGEMENT AND RESPONSE DUTIES

Any **employee or subcontractor** discovering an incident will immediately implement Steps 1 to 4 from Section 2.1 (above) when safe to do so. Once Step 4 is completed, or if these steps cannot be completed safely, the individual will immediately notify their supervisor and/or the Site Supervisor. The urgency will depend on the nature of the incident.

For larger spills, the **Site Supervisor** will immediately take charge of the personnel and the incident scene, obtain all relevant information (e.g. MSDS's), assess the situation, and take further actions to remedy or alleviate the situation. The Site Supervisor will also be responsible for developing the overall plan of action (with input from the Environmental Coordinator and On-site Environmental Monitors) for containment and clean up, ensure that the assigned responsibilities are carried out and that coordination exists between team members.

When the magnitude of the incident warrants, the **Project Manager** (or his/her designate) will also work with the Site Supervisor to manage the incident. The Project Manager will be responsible for contacting the NWT Spill Report Line within 12 hours of detection (867-920-8130). This is to ensure all necessary information is gathered, to assist in obtaining any additional resources not immediately available, and liaise with regulatory agencies.

2.10 SPILL REPORTING

Reportable quantities of spills are outlined in Table 2-1 below, in accordance with Environment Canada regulations.

Table 2-1 – Immediately Reportable Quantities

TDG Class	Substance	Immediately Reportable Quantities for NWT/NU 24-Hour Spill Reports
1 2.3 2.4 6.2 7 None	Explosives Compressed gas (toxic) Compressed gas (corrosive) Infectious substances Radioactive Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.1 3.2 3.3	Flammable liquid	≥ 100 L
4.1 4.2 4.3	Flammable solid Spontaneously combustible solids Water reactant	≥ 25 kg
5.1 9.1	Oxidizing substances Miscellaneous products or substances excluding PCB mixtures	≥ 50 L or 50 kg
5.2 9.2	Organic peroxides Environmentally hazardous	≥ 1 L or 1 kg
6.1 8 9.3	Poisonous substances Corrosive substances Dangerous wastes	≥ 5 L or 5 kg
9.1	PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg
None	Other contaminants, e.g., crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater, etc.)	≥ 100 L or 100 kg
None	Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more
3.1-3.3 None	Flammable liquid Vehicular fluid	≥ 20 L When released on a frozen waterbody used as a working surface

The reporting procedures are as follows:

Fill out a Spill Report Form as completely as possible.

Fax or phone in the Spill Report as soon as practical (but within 12 hours) to the 24-Hour Spill Report Line:

Fax: (867) 873-6924

Phone: (867) 920-8130

NOTE: Collect telephone calls can be made by informing the Operator that you wish to report a spill. RCMP communications may be used if other means are not available.

Fax Spill Report Form to the Environmental Coordinator and other appropriate parties.

2.10.1 INTERNAL REPORTING

Following the initial spill response, the initial response will be to advise the Site Supervisor (if not already informed) of the spill and status of containment. The Site Supervisor will brief the Environmental Coordinator of all spills and the Project Manager of significant spills. The Spill Report Form will be faxed to the Environmental Coordinator so that the record can be added to the Site-Specific Environmental File.

Cleanup and Disposal efforts will commence following communications between the Site Supervisor, the Project Manager, and the Environmental Coordinator. Once the spill has been contained and cleanup efforts are complete, a Spill Update Form will be filled out and forwarded to the Environmental Coordinator.

2.11 CALLS THAT MUST BE MADE

When a spill of any size is discovered, notify the:

Site Supervisor (via radio using site-specific frequency)

The Site Supervisor is then responsible for notifying the:

Environmental Coordinator

Project Manager (for larger spills)

24-Hr Spill Report Line (867-920-8130 phone, 867-873-6924 fax).

If the Site Supervisor cannot be reached immediately, contact the Environmental Coordinator.

If spill response requires assistance or is an emergency, the Project Manager must call the appropriate people. Table 2-2 will be completed as personnel are assigned. Table 2-3 presents the current regional agencies that are to be contacted.

Table 2-2: Internal Emergency Response Communication List

Location	Position	Name(s)	Contact Info
Off-Site	Project Manager	To be determined.	To be determined.
	Environmental Coordinator		
	Assistant Environmental Coordinator		
	Coordinator		
Southern Sector	Twin Gorges Site Supervisor		
	South Nonacho Lake Site Supervisor		
	North Nonacho Lake Site Supervisor		
Northern Sector	Barge A Site Supervisor		
	Barge B Site Supervisor		
	Barge C Site Supervisor		
	Barge D Site Supervisor		
	Diavik Substation Site Supervisor		
This table will be updated and expanded as appropriate, once positions, names and contact information are determined through discussions with the construction contractor(s).			

Table 2-3: Regional Agencies (in case of emergency only)

Contact	Phone (867)
Department of Fisheries and Oceans (DFO)	669-4900
Emergency Measures Organization (EMO)	873-7554
Environment and Natural Resources (ENR)	873-7654
Environment Canada (EC)	669-4730
Environment Canada 24 Hour Pager System	920-5131
Indian and Northern Affairs Canada (INAC)	669-2764
Public Works - Fort Smith Region	872-5526
Public Works - Yellowknife Region	873-1517
Mackenzie Valley Land and Water Board	669-0506
This table will be updated and expanded as appropriate.	

3 CONTAINMENT

Step 4 of the Initial Response is to "Stop the Spread". This section provides detailed instructions and best practices for containing spills from spreading.

Spill containment may be categorized into land-based containment, water-based containment, and containment under ice.

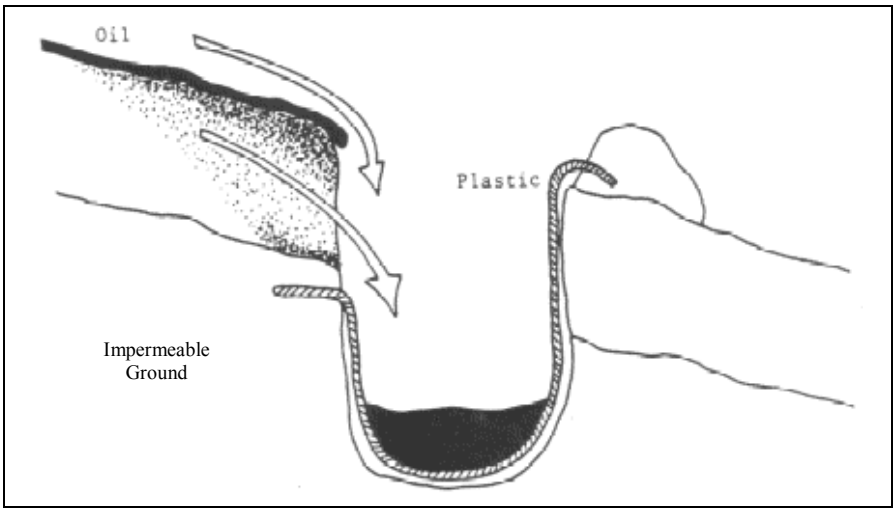
3.1 LAND-BASED CONTAINMENT

3.1.1 Trenches

Trenches may only be practical under summer conditions. The trench must be dug to groundwater, bedrock, or impermeable ground. If water is present in the excavated trenches, it should be assumed that groundwater contamination may result and eventually be discharged into surface waters.

An impermeable (water-resistant) liner should be placed on the bottom and sides of the trench. Shallow trenches placed down slope of the spill will be effective in trapping contaminants traveling both on the surface and below the surface (Figure 3-1). Sorbent pads, socks, and booms should be placed in the trench to collect spilled product. Materials and equipment that may be used for trench construction include backhoes, loaders, shovels, picks, and waterproof liners.

Figure 3-1: Trench Design

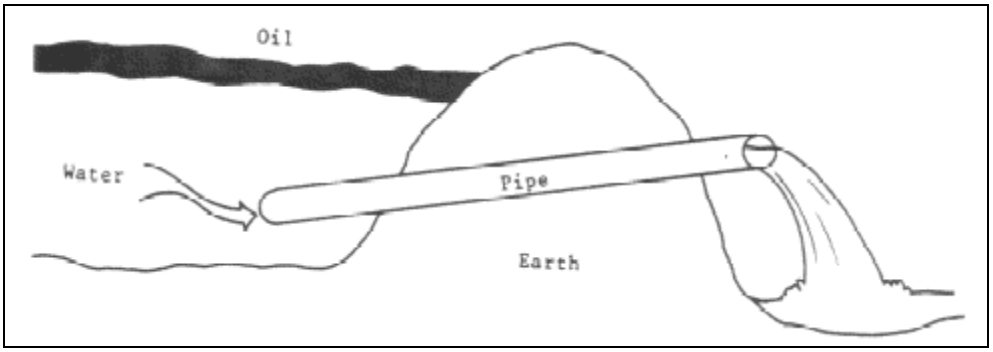


3.1.2 Dams

Dams constructed across ditches can be used to contain a spill and stop its flow. A dam may be built with earth, wood, sandbags, and/or snow. The dam should be lined with plastic sheeting to make it impermeable to the spilled product. In freezing conditions water may be sprayed on a dam to form ice, thereby making the dam impermeable. Care should be taken to ensure that a dam is large enough to contain the entire spill; insufficient capacity may result in overtopping failure.

For ditches with flowing water or for small streams, it may be necessary to allow water flow to continue while retaining the lighter-than-water liquids (i.e., hydrocarbons that float). This can be achieved by building water bypass dams (Figure 3-2): an earth dam is built stopping the flow of water and oil in the ditch; a pipe is then installed below the water level and passing through the dam. This allows the water to continue flowing while the dam retains the lighter-than-water products.

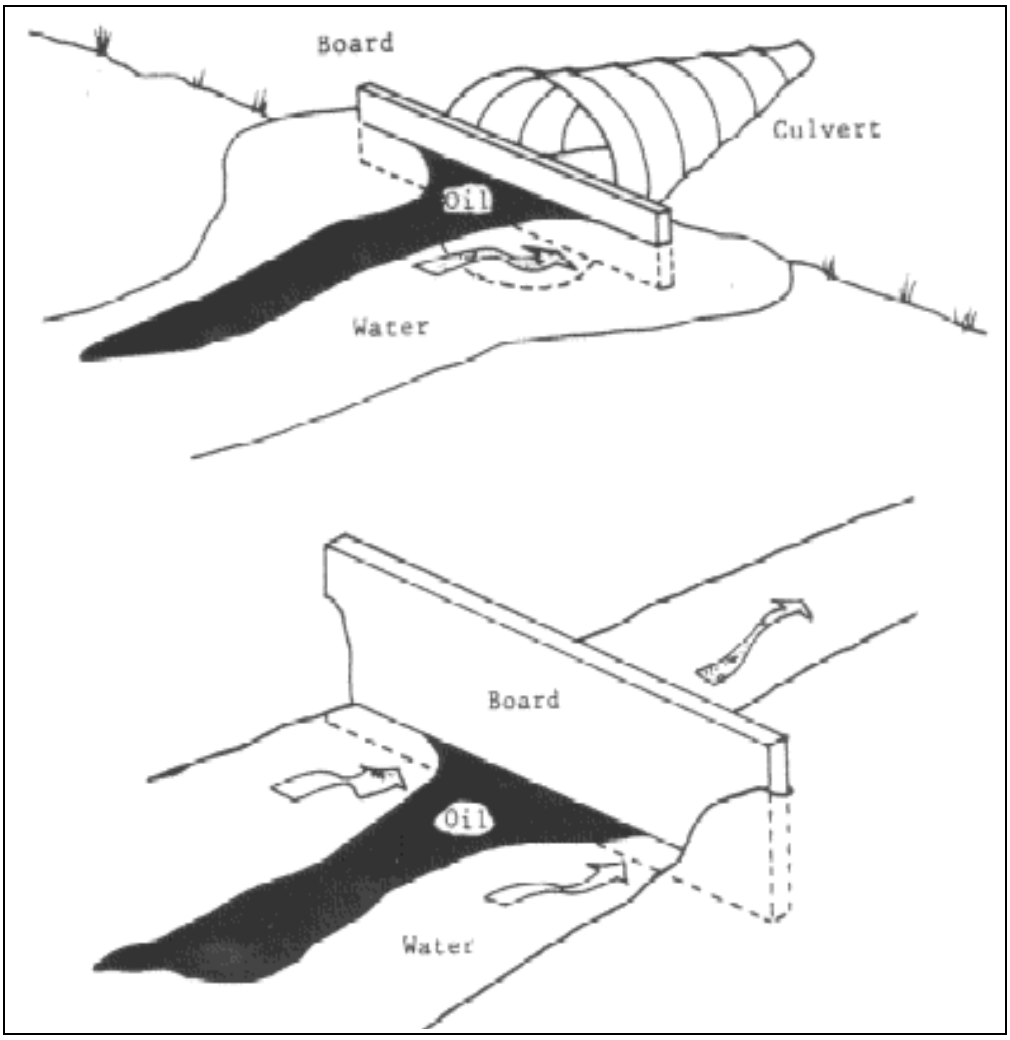
Figure 3-2: Water Bypass Dam



3.1.3 Weirs

Weirs may be used in ditches and at culvert entrances. Materials commonly used such as plywood, lumber, and sheet metal may be placed to completely or partially block culvert entrances. These barriers are effective on slow-moving streams. Water is allowed to flow under the weir, while floating product (i.e. hydrocarbons that were spilled) is retained on the surface of the water by the weir (Figure 3-3).

Figure 3-3: Weirs



3.2 WATER-BASED CONTAINMENT

Water-based containment measures generally include the use of barriers or booms. Unless the entire flow of contaminated water can be stopped by damming, water-based methods are limited to the containment and recovery of materials that can be separated from water.

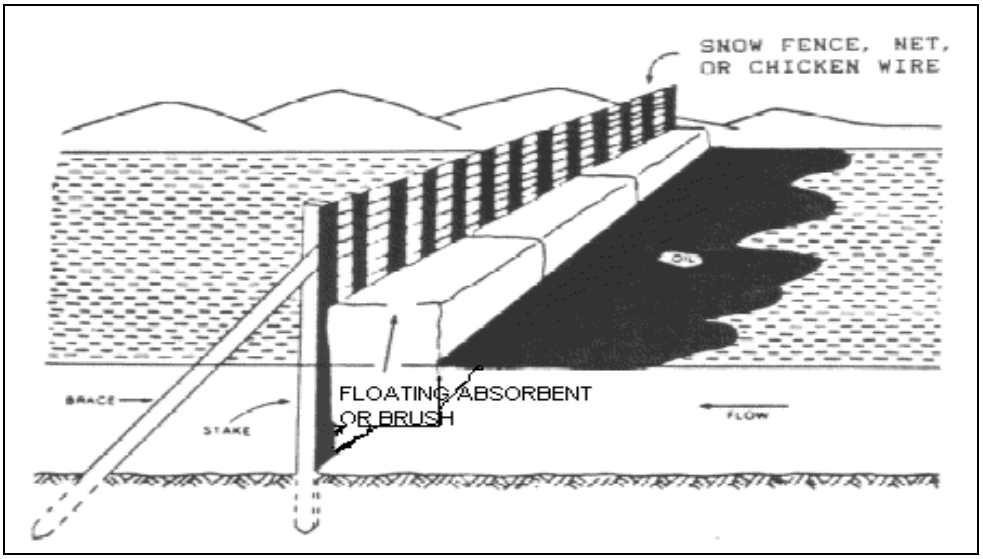
Certain materials such as gasoline and other volatile or flammable petroleum products have a high risk of fire or explosion. For these materials, containment and evaporation (without recovery) or burning may be the preferred approach. These decisions will be made by the Project Manager, in consultation with regulatory agencies.

3.2.1 Construction Fence and Sorbent Barrier

Barriers created with construction fencing (orange plastic "snow fencing") and sorbent materials (i.e. spill pads, booms or even slash material) may be used in streams (less than 1 m deep) with soft beds into which stakes can be driven. A snow fence barrier is installed to span the width of the stream, anchored at both ends, and stakes are driven into the stream bottom at 1 to 2 m intervals along the fence. Commercial sorbents are placed on the upstream side of the fence and are held against it by the current. Sorbents will float against the upstream side of the barrier, but must be replaced before they become soaked with product and sink.

The barrier should be angled against the current for shore side collection. Multiple snow fence barriers can provide redundancy (backup protection) against potential losses from upstream barriers. Net or chicken wire barriers can also be constructed in the same way, and are more practical for stronger currents, as water can flow through them more easily (Figure 3-4).

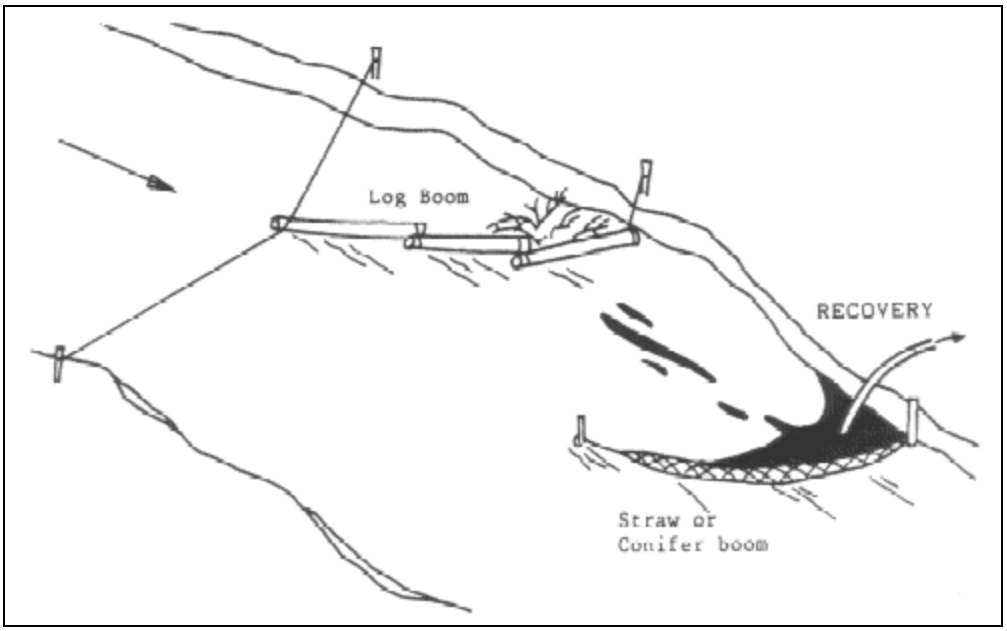
Figure 3-4: Snow Fence and Sorbent Barrier



3.2.2 Booms

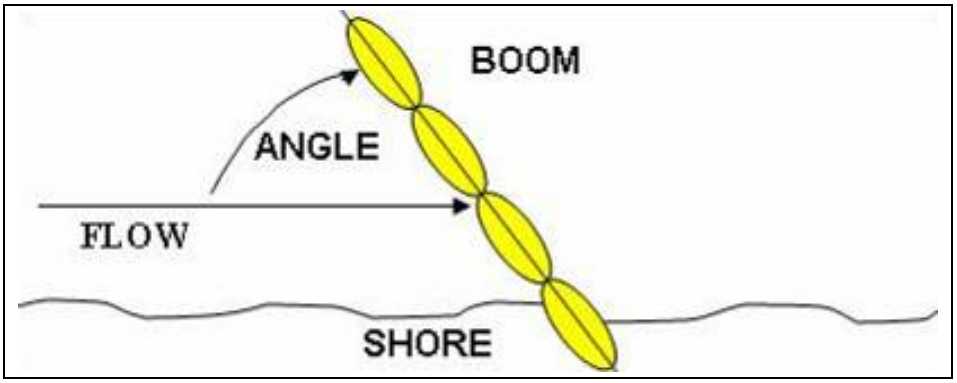
Booms are used to contain a spill of floating liquid or debris, to deflect or divert material to a defined area so that it may be recovered, and to protect sensitive areas from contamination. They may be installed using absorbent booms (from the spill kits); logs, straw or slash material (with netting) can also be used (Figure 3-5).

Figure 3-5: Boom Usage



Boom deployment is important, as the angle of the boom in relation to the speed of the water affects how well the spill may be contained. The faster the stream, the more angled the boom must be (Figure 3-6).

Figure 3-6: Boom Deployment



Several redundant booms arranged in parallel may be necessary to contain all of the product. These should be spaced to allow product, which may escape the first boom, to float to the surface and be contained by the next boom. In addition, the use of several booms permits one boom to be removed at a time for cleaning.

Booms may be either commercially made or homemade. Commercially made booms are designed to float and keep product from escaping under the boom (these are contained in the spill kits). Homemade booms may be constructed from logs, trees, lumber, inflated fire hose, or styrofoam. These may be used to deflect floating material to shore or to keep floating material within a contained area. Individual sections are connected together by rope, chain, or wire. A seal around the joints to prevent leakage can be made by wrapping with plastic sheets or burlap.

Wooden or other floating booms can be used to contain the spilled fluid itself or hold the sorbent materials containing the product. They can also be used upstream of sorbent booms to improve the efficiency and longevity of the sorbent material.

3.3 CONTAINMENT UNDER ICE

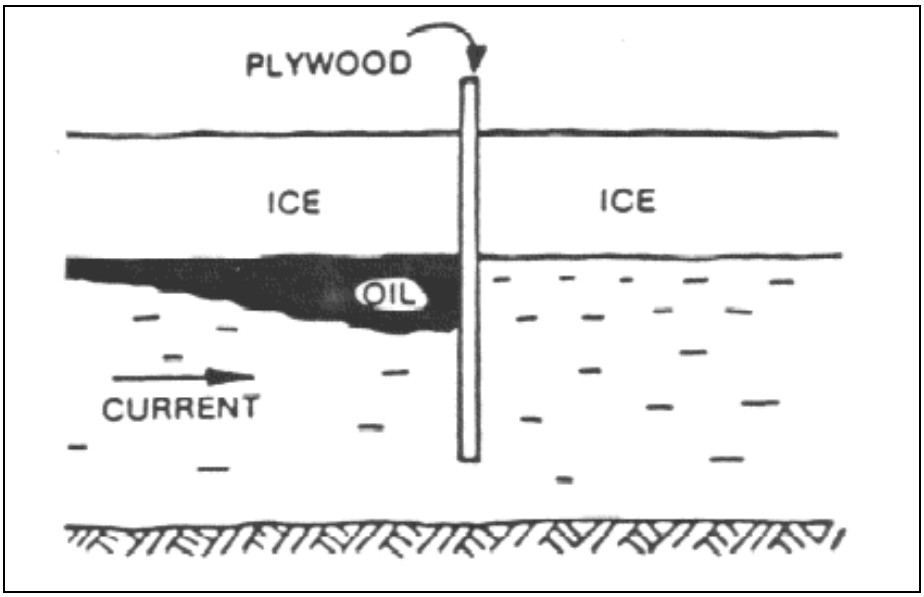
3.3.1 Ice Slotting

Ice slotting may be used in rivers or streams when current speeds are slow (i.e. less than 0.5 m/s). A trench is cut into the ice using a chain saw or trenching machine at an angle to the current, to deflect and concentrate product that passes through the area. Because of thick ice encountered during the winter, cutting and removal of ice blocks is often difficult. Loaders or backhoes may be needed to lift blocks out of the slot, or to push blocks down. Product that accumulates in the ice slot may be pumped out, adsorbed, or burned in place.

3.3.2 Vertical Barriers

Vertical barriers such as plywood may be used to deflect product under ice in deep, slow-moving waters (Figure 3-7). The ice must be strong enough to support the necessary personnel and equipment. Vertical barriers are put in place by cutting trenches in the ice at an angle to current flow, inserting the plywood barriers, and allowing them to freeze in place. The location of the spilled product may be monitored by drilling observation holes with an ice-auger.

Figure 3-7: Vertical Barriers



3.3.3 Barrel Containment

If liquid is leaking from a barrel and the leak cannot be plugged, and overpack drums are not on hand, the barrel can be rolled onto its side so that the leaking area is at the highest point, and will therefore slow the flow or eliminate the leak.

A leak may be plugged with wooden wedges wrapped with a cloth or heavy-duty tape, or by placing an inner tube around the barrel overtop of the leak. The inner tube can be tightened by twisting it with a rod or stick. All of these methods are to be used as temporary seals only. The liquid needs to be transferred into a new barrel or storage tank as soon as possible to prevent further contamination.

3.4 RECOVERY

Once the spill has been contained and the appropriate reports made, the initial response becomes a clean up effort.

Spill recovery methods generally include direct suction, mechanical removal, and the use of sorbent material. A water spray mist may be used to herd liquid contaminants to an area for collection, if the contaminant is not reactive with water.

3.4.1 Direct Suction Equipment and Techniques

Direct suction methods include the use of vacuum trucks, portable pumps, or shop vacuums. Vacuum cleaners or portable pumps can be used to directly recover materials from damaged containers or from thick slicks on water.

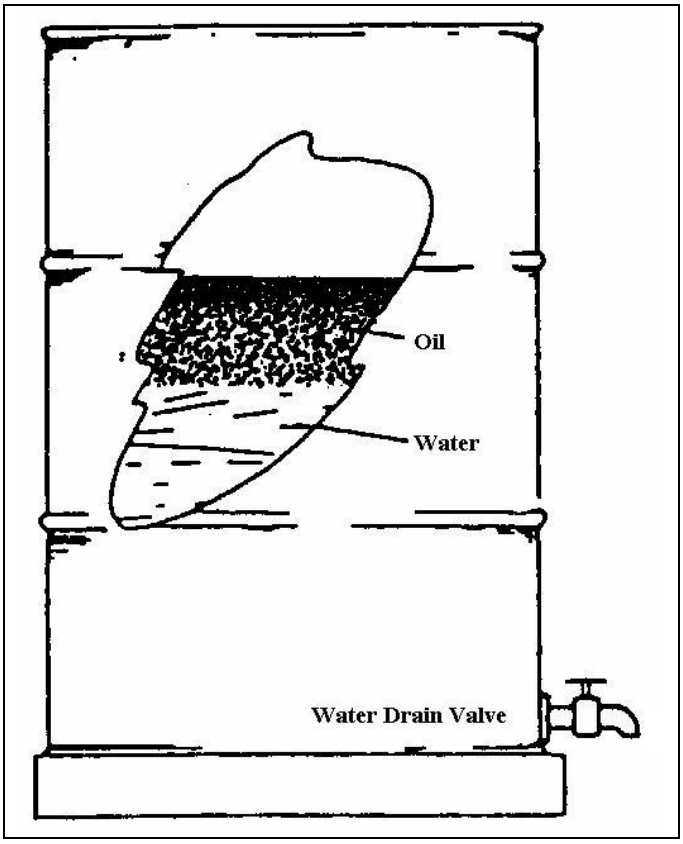
Shop vacuums are suitable for small spills if a power source is available. Commercial skimmers are available for attachment to vacuum sources. These

skimmers serve to skim floating product from the water surface while reducing the amount of water recovered. Suction screens may be required to prevent hose plugging by floating debris and to prevent pump damage.

Care should also be taken to prevent the uptake of water in order to minimize both the final volume of material that requires disposal and to prevent emulsification of oil and water. Once removed from the water body, however, water and oil can be separated using gravity separation. Valving on vacuum trucks can be used for water/oil separation, or a drum separator may be readily constructed using a 205-litre (45-gallon) drum and plumbing hardware (Figure 3-8).

CAUTION: All containers used for the recovery of flammable contaminants must be grounded due to the potential for static-electricity build-up and fire. It is important to remember that these devices may act as sources of ignition, and should not be used if there is a risk of explosion or fire.

Figure 3-8: Improvised Oil-Water Separator Drum



3.4.2 Manual and Mechanical Recovery

Manual recovery by use of hand tools (e.g. cans, buckets, shovels, rakes) is an effective means of recovering contaminant from small spills or from areas that are

inaccessible to larger equipment. This is often the only method available, and in some cases is preferred as it causes the least amount of damage to an area.

Mechanical recovery using heavy construction equipment can be used in some cases for recovery and loading of material for disposal. Caution must be used when operating such equipment around a spill site. In some instances, more damage can be caused from the operation of the equipment than from the spilled product. Escaping petroleum vapors may also be present and pose the danger of explosion and fire.

3.4.3 Sorbent Material

Sorbent materials are commonly used for final cleanup and recovery of small amounts of contaminants or to remove contaminants from places that are inaccessible to other means of recovery. They are effective in recovering thick layers of oil; however large volumes of sorbent are often required.

Snow and soil can be used as effective sorbent materials. Once mixed, the contaminants in snow or soil mixture can be shoveled or picked up using construction equipment and taken to a suitable treatment site.

3.5 STORAGE OF CONTAMINATED MATERIALS

Once recovered, the product and any contaminated materials must be stored until appropriate disposal can be arranged. Storage is required in situations when:

a suitable location for disposal cannot be immediately found;

climatic conditions do not permit disposal at the time of cleanup;

the selection of a disposal option requires further assessment; or when

transportation to a treatment / disposal facility is dependent on the availability of a suitable transport vehicle.

Storage options generally consist of pails, drums, tanks, berms, or pits. The specific type of storage needed is dependent on the volume of recovered material, the degree of contamination of the water and/or soil, the properties of the spilled product, and the duration of storage required. The storage containers will be clearly marked with the owner's name, and with information on the contents and spill incident (identifying number). Caution will be used when storing volatile organic compounds (e.g. gasoline)

3.5.1 Vehicle Storage

Vehicles suited for the storage of recovered contaminants are tank trucks, vacuum trucks, dump trucks, flat bed trucks, sled-mounted tanks, and transport trailers. Tank trucks may be used to separate floating contaminants and water by emptying the water from the bottom of the tank. Tank trucks typically hold up to 20 m3, while vacuum trucks typically hold around 16 m3.

Flat bed trucks and transport trailers are suitable for carrying tanks and drums braced on pallets.

3.5.2 Open-Topped Containers

Open-topped containers, such as storage bladders or "swimming pools", with capacities up to 20 m^3 may be quickly assembled on firm, level ground. They may be fed by several hoses at once and can store both liquids and solids. These should be used only for short-term storage when storing contaminants.

3.5.3 Tanks Drums

Empty tanks and drums may be used for temporary storage of recovered contaminants.

3.6 DISPOSAL

Appropriate disposal or destruction of recovered contaminants is needed to eliminate the risk of further environmental impacts from the recovered liquids and contaminated materials. No decision, except under emergency conditions, should be made until authorized by the Project Manager and Environmental Coordinator. The Site Supervisor should initiate such requests and a follow-up status report should be prepared to document the details of disposal.

3.6.1 Salvage and Recycle

Recovered diesel and lubricating oil may be reused directly as a low-grade heating fuel in waste oil furnaces and in incinerators.

3.6.2 Burning

Open burning of spilled contaminants should be avoided. Open burning is prohibited except in the case of an emergency. Only regulatory agencies (ENR, INAC, DFO) can authorize controlled or open burning of spilled products. This option will only be considered in extreme emergencies (i.e. when humans or environmental receptors are in danger of extensive contamination) and following consultations between the Project Manager and Environmental Coordinator.

3.7 FINAL CLEANUP AND RESTORATION

The final clean up and restoration activities require authorization from regulators and may be monitored by government inspectors. Before contaminated material is removed, regulatory agencies must be contacted regarding acceptable disposal sites.

3.7.1 Natural Assimilation (Biodegradation)

Hydrocarbons can be degraded naturally by microorganisms under proper temperature and nutrient conditions. Tilling the contaminated soil can increase exposure to soil organisms and oxygen, which helps to speed up natural biodegradation.

3.7.2 Replacement of Soil

In some cases, it is necessary to replace contaminated soil with clean soil. This can include organic material in the upper layer of soil.

Spills that take place on tundra receive special attention due to the presence of sensitive soils and plants. In some cases, replacing contaminated tundra may be more detrimental to the area than allowing the contamination to naturally degrade.

Hand shovels, front-end loaders, backhoes, and other heavy equipment may be used to excavate contaminated soil.

4 GENERAL POLICY ON PUBLIC RELATIONS

Employees should not make any statements to the media or to the public on behalf of the Dezé Energy Corporation. If questioned by the public or the media about a spill, refer them to the Site Supervisor.

Environmental incidents, such as spills, often attract local interest and media attention. It is the responsibility of the Project Manager and/or Project Public Relations Representative (to be determined by the scale of incident) to address the media and the public.

Respond fully to any request from regulatory authorities or emergency personnel that may help to control the spill and the extent if its damage. However, refer all other requests for information to the Site Supervisor. This may include questions from reporters, environmental agencies, or people and property owners affected by a spill. When probing questions are asked, it is important that the response is polite and professional; for example:

"I'm sorry; I don't have the authority to answer that question. Please contact the Site Supervisor.

Employees should avoid guessing at an answer or making promises that are out of their control, as this can cause future problems for both the employee and the Corporation. No speculation should be made with regard to who is at fault, why the spill occurred, spill volume, when cleanup will be completed, or any other issue. It is the responsibility of the Site Supervisor to keep the Project Manager and others informed so that media questions directed to the Corporation can be answered.

5 MATERIAL SPECIFIC RISKS

5.1 GASOLINE AND AVIATION FUEL

Gasoline may be stored on-site for use in light vehicles and equipment. Aviation fuel will be required for the use of helicopters and planes associated with the Project. The hazards associated with these fuels and possible additional incident response requirements are described below.

Gasoline and Aviation Fuel are:

Highly flammable;

Explosive when in vapour form;

Easily ignited by flame or spark;

Lighter than water (floats on water);

Toxic to humans by ingestion and by aspiration; and

Toxic to fish and other aquatic organisms.

In the event of a fire, the response will be:

Seek immediate assistance;

Use CO_2, dry chemical, foam, or water spray (fog);

Use jet streams to wash away burning gasoline;

Diversion of gasoline to an open area and let it burn off under control;

Use water to cool tank surfaces; and

Being aware of re-ignition if the fire is put out before all gasoline is consumed.

Gasoline or aviation fuel entering the ground can be recovered by digging sumps or trenches and pumping from below the water table. Under some circumstances (and with regulatory approval), contamination from these fuels may be eliminated through evaporation or incineration.

5.2 AMMONIUM NITRATE FUEL OIL (ANFO)

ANFO is in the form of small porous ammonium nitrate pellets coated with fuel oil. The pellets are transported (mainly) dry and are either ignited using ‘stick’ dynamite or mixed with fuel oil prior to being loaded into blast holes. ANFO is moderately toxic to aquatic organisms and if improperly stored, may explode under high pressures or temperatures.

Concerns associated with ammonium nitrate include the following:

Strong oxidizing agent, and highly reactive with other substances;

Moderately toxic to people;

Moderately toxic to fish and other aquatic organisms;

Soluble in water;

Supports combustion readily and may detonate, if heated under confinement or if subjected to strong shocks. It becomes more sensitive if mixed with or contaminated by organic matter (e.g. soils); and

When burned, produces toxic oxides of nitrogen.

Any response to an ANFO spill will be directed by the explosives contractor, to ensure the safety of all personnel. A more detailed material-specific response will be developed by the explosives contractor prior to construction.

In the event of an ANFO spill, all possible sources of ignition will be eliminated. Every attempt will be made to prevent the spill from coming in contact with water. In the event of a fire involving large quantities of ANFO, no attempt will be made to fight the fire and the area will be immediately evacuated. Fire involving small quantities of ANFO may be extinguished with water. Fires should be approached from the upwind side and only when wearing protective clothing and breathing apparatus.

ANFO will be recovered by being carefully shoveled into containers, to minimize the quantity of ammonium nitrate being dissolved. Sorbents, such as manufactured pads and booms, can be used to recover any fuel oil emanating from the spill. The recovered ANFO will be either reused (if not water-saturated) or disposed of by detonation or incineration under knowledgeable supervision.

6 EXISTING TWIN GORGES FACILITY RESPONSE PLAN

The Taltson Hydro Facility (60º 23'N and 111º 21'W), also known as Twin Gorges (TG), is located on the Taltson River approximately 56 km northeast of the community of Fort Smith.

TG has year-round air access only, and can accommodate Hercules aircrafts.

6.1 FACILITY SITE SPECIFICS

6.1.1 Facility Layout

The site infrastructure consists of a hydroelectric plant and surge tower situated on the east side of the Taltson River, approximately 250m southwest of the Twin Gorge Dam (Figure 6-1). The head-gate house sits on the upstream side of the dam in the forebay. Two staff houses and a garage are located east of the plant. A 13,600 L above ground storage tank (AST) containing diesel fuel sits 60m north of the garage. Two storage sheds, used for equipment and waste storage, are located at the boneyard, approximately 1.6 km northeast of the plant.

The 800 m airstrip is located approximately 3km southeast of the plant, with a storage shed and steel-bermed fuel storage building at its western end. An emergency all-terrain vehicle is kept in the storage shed.

6.1.2 Sensitive Environmental Receptors

The Taltson River is immediately west of the Facility. The primary objective of any spill response is to stop spilled product from reaching the Taltson River.

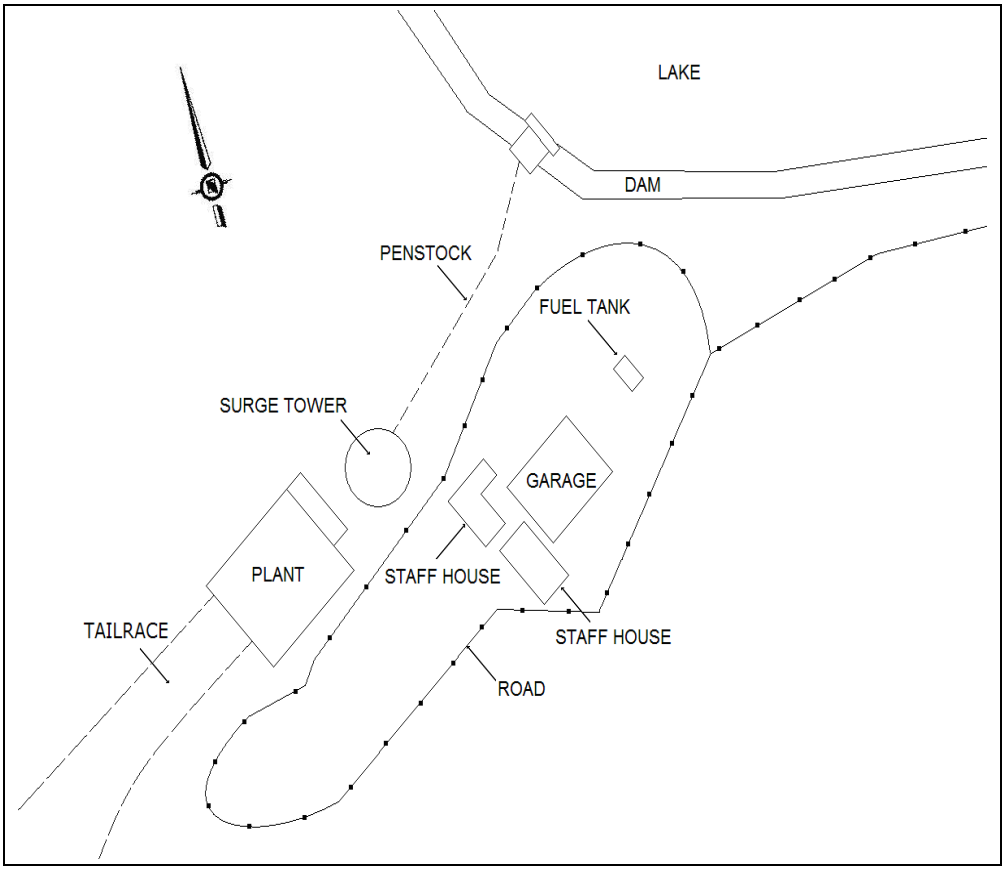
6.1.3 Spill Control

As drainage at the Facility is toward to the southwest, a spill at the Facility will flow southwest toward the Taltson River (see Figure 6-2).

As there are no existing ditches to stop the movement of the spilled product, trenching techniques should be used to prevent lateral migration through the soil towards the Taltson River. Pumps and sorbents should then be used to collect the product.

Where appropriate, ditches may be created prior to Project construction activities, to reduce the potential risks and facilitate the effective response to a major spill.

Figure 6-1: NTPC Plant Site Area – Taltson Hydro



Should product reach the water IMMEDIATELY do the following:

shut down the power plant,

install sorbent booms downstream of the tailrace, and

use sorbent pads and booms to collect product from the water's surface.

Figure 6-2: Taltson Hydro Facility

6.1.4 Onsite Hazardous Product Storage

Fuel used in vehicles is stored in the 13,600 L AST near the plant. Fuel used for mobile equipment and the standby generator is stored in 205 L drums inside the bermed fuel storage building at the airstrip. Lube oil is stored in 205 L drums inside the boneyard storage shed.

Most other fluids stored on-site are kept in small quantities and contained in 23L pails, 4L jugs, or inside of flammable storage cabinets, and include paints, solvents, and grease.

6.1.5 Transformers

Five un-bermed, transformers are located in the substation.

6.2 BULK PETROLEUM PRODUCT STORAGE

The Taltson Facility handles bulk volumes of diesel fuel for standby generation and mobile equipment. An average of 8,200L (40 drums) of diesel fuel are transported annually to the Facility by air. Fuel capacity for the Facility is 14,600L (Figure 6-3):

1 horizontal 13,600L double-walled AST, diesel fuel, located east of the plant

1 vertical 1,000L day tank, diesel fuel, located east of the plant

Figure 6-3: Facility Fuel Storage

6.3 PRODUCT KNOWLEDGE

The Workplace Hazardous Materials Information System (WHMIS) is Canada's hazardous materials communication standard. The key elements of the system are the cautionary labeling of containers of WHMIS Controlled Products, the provision of Material Safety Data Sheets (MSDS), and worker education programs.

All appropriate personnel will receive WHMIS training to ensure that they understand the properties of products being handled at the Project sites. The construction contractor will also ensure that MSDS for all products handled are maintained onsite and up-to-date.

6.4 SPILL KITS AND EQUIPMENT

The Facility has four spill kits: one plastic overpack kit located in the airstrip fuel storage shed, two plastic overpack kits in the garage, and a plastic overpack kit in the lube oil storage shed at the boneyard. These contain both universal and oil only sorbents.

6.5 HEAVY EQUIPMENT

Heavy equipment available at the Taltson Facility for emergency spill cleanup is listed below. Additional lists will be developed by the construction contractor for each work site.

Heavy Equipment Available	Location
Front End Loader	Onsite
Dump Truck (2)	Onsite

Grader	Onsite
Water Pump	Onsite