

PART 5 - IDENTIFICATION OF ENVIRONMENTAL EFFECTS

There has been extensive evaluation of predicted environmental impacts related to the clean up operation. Additionally, mitigation measures have been introduced for both those impacts that are both general and site specific in nature.

The following table summarizes those impacts that have been identified for the DND DEW Line sites and mitigative actions outlined in the Environmental Screening Report for the Cleanup of the DEW Line sites in the Nunavut Settlement Area.

Description	Significance	Monitoring/Mitigation Requirements
Impacts of Landfill Development and Closure		
Potential risks to soils, surface water, terrestrial and aquatic habitat from development and closure of landfills	Potentially significant	● design of landfill development and closure to prevent leachate ● landfills to be contoured to match existing drainage patterns
Impacts of Demolition/Regrading Activities		
Potential risk to existing habitat from demolition and regrading activities	Potentially significant in previously unimpacted areas	● demolition areas to be recontoured to match existing drainage patterns ● regrading to be limited to specified areas
Impacts of Removal and Transport of Hazardous Materials/Fuel/Contaminated Soil		
Potential risks to soils, surface water, terrestrial and aquatic habitat and species and human safety from accidental events such as fuel or hazardous materials spills	Potentially significant in the worst case (i.e. large spill volume)	● development of a contingency plan outlining procedures to follow in the event of an accidental spill ● training and education of employees in emergency procedures ● storage of fuel in dyked tanks ● proper fuel handling techniques, particularly when refuelling equipment
Hazards to human health and safety during clean up, especially during asbestos abatement and facility demolition where PCB paint is present.	Significant due to contaminated nature of material on site	● proper procedures for handling hazardous materials ● removal of hazardous materials from site

Impacts of General Clean Up Activities			
● compliance and monitoring requirements for engineering performance are detailed in contract specifications	Improvement of overall environmental conditions	Elimination of potential hazards and sources of contaminants through remediation of existing landfills, removal of physical debris, discontinued use of sewage outfalls, and removal of contaminated soil	Disruption of heritage sites due to new development, regrading, and/or activities of contractors' personnel
			Potentially significant (prior to mitigation) at sites with high potential for archaeological resources
			● report and record any features of potential interest, ensure areas are clearly marked ● avoidance of controlled excavation of features ● monitor excavations for additional features ● all personnel to be discouraged from visiting archaeological and other heritage sites
			Potentially significant in excavations in ice rich ground
			● avoid patterned ground and ice rich areas when siting new facilities or borrow sources ● if possible, backfill excavations as soon as practical ● replace vegetation cover or topsoil as soon as possible after excavation ● exploit existing borrow sources to minimize disturbed areas ● monitor for evidence of soil erosion, subsidence, or development of thermokarst
			Degradation of permafrost due to clean up operations
			Potentially significant (prior to mitigation) on sites where wildlife is noted
			● minimize activity in sensitive areas ● scheduling of work activities to avoid nesting, calving, or migration periods ● education of employees to prevent on site personnel from harassing wildlife
			Effect of contractors activities (e.g. noise or disturbance) and/or personnel on terrestrial wildlife species
			Effect of contractors activities (e.g. noise or disturbance) on marine wildlife species
			Potentially significant (prior to mitigation) on sites where marine wildlife is known to occupy off shore waters
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Effect of clean up operations and contractor's activities on terrestrial habitat, vegetation	Potentially significant, at sites where vegetation covers a major portion of the site, for example in the Low Arctic Ecoclimatic Region	● siting of clean up camps or new development (landfills) to be on disturbed ground, wherever possible ● vehicle and equipment traffic is to be combined to existing access roads
Effect of clean up activities on appearance of site	Improvement. Surface debris will be collected and disturbed areas regraded	● none required (Note: some sites may have more extensive clean up)
Other Environmental Impacts		
Use of local services and northern residents during implementation of clean up plans	Positive impact on northern socio-economic development	● tender documents for DEW Line Clean Up contracts will include clauses requiring Contractors to maximize employment and business opportunities in the North
Disruption of heritage sites due to new development, regrading, and/or activities of contractors' personnel	Potentially significant (prior to mitigation) at sites with high potential for archaeological resources	● report and record any features of potential interest, ensure areas are clearly marked ● avoidance of controlled excavation of features ● monitor excavations for additional features ● all personnel to be discouraged from visiting archaeological and other heritage sites
Effect of cleanup operations on local resource use	Potentially significant (prior to mitigation) at sites near year round communities or seasonal camps	● consultation with local communities to minimize conflicts ● scheduling of activities to avoid hunting and fishing activities

PART 6 – CUMULATIVE ENVIRONMENTAL EFFECTS

For the purposes of the DEW Line Clean Up Project, cumulative effects have been defined as changes to the biophysical, social, cultural or economic environments caused by a project component in combination with any on-going, past or future activities. In undertaking environmental assessments, the project management office has included an evaluation of possible cumulative effects, including:

- Impacts over a larger (regional) area including the crossing of jurisdictional boundaries;
- Temporal boundaries beyond the time frame required to complete the clean up work;
- Interactions with Valued Ecosystem Components (both biophysical and socio-economic); and/or

- With other past, ongoing (i.e., operation of the North Warning System, mining activities, existing hamlet operations) or known future (i.e., construction related to the build up of the Nunavut government infrastructure) activities.

This evaluation also included an evaluation of levels of significance.

Cumulative effects arising from the DEW Line Clean Up Project can occur as interactions between project components (either from the same or more than one site) and/or between environmental components. Effects can occur in one of four ways:

- Physical or chemical transport mechanisms;
- “Nibbling loss” (i.e., gradual disturbance);
- Spatial or temporal crowding;

- Growth induction initiated by the project.

An analysis of cumulative environmental effects has been undertaken for this project. In doing so, four steps have been undertaken to date:

1. Scoping, including identifying issues of potential concern, VECs that could be affected and boundary setting;
2. Analysis of effects, including an evaluation of baseline data and possible effects on VECs. Methods could include the use of overlays to identify where the geographic and temporal extent of various projects’ effects may interact;
3. Identification of mitigation options and recommending measures to be undertaken; and

4. Evaluating significance of these effects, after mitigation actions have been applied.

As a result of this analysis, it can be concluded that, for the most part, both the clean up of each site and the individual components will not lead to significantly adverse cumulative impacts. As a result of initial overlay studies, the clean up of each site can be considered as a short term, distinct individual event that will not have any form of additive effect with past, existing or known future activities.

PART 7 – MITIGATION

Part 5 (above) identifies mitigation measures that are to implemented for this project.

PART 8 – ABANDONMENT AND DECOMMISSIONING PLAN

The contract documents for the DEW Line Clean Up Project will require that the contractor clean up and remediate the area in which their activities took place. Following the completion of clean up activities, all vehicles and equipment, remaining fuel, supplies, personnel, and the construction camp are to be removed from the site by the contractor. The construction specifications provide for a percentage of the payment for mobilisation/demobilisation to be withheld pending a satisfactory withdrawal from the site.

Demobilisation will coincide with the annual sealift. The contractor will be required to arrange for this sealift. All provisions of the Environmental Protection Plan (Annex E) will be strictly adhered to until the demobilisation is complete.

PART 9 – MONITORING AND MAINTENANCE PLANS

For the purposes of this project, monitoring is being conducted for two reasons:

Monitoring in relation to the environmental assessment

This monitoring involves a continual on-site review of impact predictions made during the environmental assessment process. The purpose of this monitoring is two fold:

- to confirm the accuracy of impact predictions made if, and when, they occur on-site and to ensure that mitigative action taken is appropriate; and

- to be able to identify impacts that occur on-site that may not have been identified during the assessment process but, none the less, require an appropriate mitigative response.

The results of on-site this assessment of will be reviewed on an annual basis as part of the project quality assurance program. Assessment areas and impact predictions requiring adjustment or re-evaluation are identified at this point and an action plan promulgated.

Monitoring in relation to environmental objectives

As part of the overall DEW Line Clean Up program, DND will undertake an extensive multiple year post clean up monitoring program at each site. This monitoring program is contained in the DND/NTI Agreement (Appendix H of Annex D). The purpose of this program will be to ensure that environmental objectives, particularly those related to landfill remediation, continue to be met. The results of this program will be provided to stakeholder organisations. In those cases where agreed to remediation standards are not being maintained, an engineering and/or other solution will be implemented to rectifying the situation.