6.8.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on aquatic animals occurs if a population or portion thereof is affected in such a way as to cause a decline or change in abundance or distribution of the population over one or more generations. Natural recruitment may not re-establish the population to its original level. A significant effect on aquatic habitat may alter the valued habitat, physically, chemically or biologically, in quality or extent, to such a degree that there is a decline in the diversity of the habitat. This effect would be reflected by a decline in abundance and/or change in distribution of the benthic community within the area, beyond which natural recruitment would not return that population to its former level within several generations.

Residual Environmental Effects Summary

Table 6-14 summarizes the residual environmental effects of the project activities on aquatic animals and habitat. The implementation of the mitigative measures proposed to protect the aquatic animals and habitat will result in the residual effects being not significant or, in the case of the removal of existing hazardous materials, positive.

Table 6-14: Residual Environmental Effects Summary Matrix: Aquatic Animals and Habitat

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Landfill Closure	P		
Landfill Development	NS		
Site Re-grading / Borrow Source Development	NS		
Contaminated Soil Disposal / Hazardous Materials Removal	P		
Removal and Transport of Hazardous Material, Fuel and Contaminated Soil	NS		
Contractor Support	NS		
Removal of Fuel Drums from the Watershed	NS		
Culvert Installation	NS		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.8.2.5 Summary of Environmental Effects on Aquatic Animals and Habitat

Effects of the Project on aquatic animals and habitat are associated with the potential deposition of eroded material from borrow excavations and water quality affects from landfill leachates and fuel and chemical spills. The implementation of mitigation measures such as berms, silt fences and/or silt booms will prevent deleterious substances from entering the aquatic environment. Spill prevention and contingency plans will mitigate the effects of accidental spills. The effect of the remediation of FOX-C on aquatic animals and habitat is assessed as not significant or as positive.

6.9 Health and Safety

6.9.1 Existing Environment

SENES Consultants Limited (2003) conducted a human health screening-level risk assessment for the FOX-C site. The assessment, conducted using conservative assumptions that lead to an overestimation of potential exposure, found that although contaminants are present in the soil, none of the contaminants of concern exceed the hazard quotient value (for non-carcinogenic effects) or risk level (for carcinogenic effects) designated for acceptable exposure limits at the site. Physical hazards identified at the site included the presence of asbestos in the piping and tiles of the buildings, the physical topography of the site, scattered debris, and hazards associated with use of the current dumps on site.

Jacques Whitford performed a human health and ecological risk assessment (HHERA) of the FOX-C site in 2004 (Jacques Whitford 2005b). The primary objective of this study was to evaluate whether known concentrations of chemicals in surface soil and water at the site would present a significant risk to human or ecological health based on future use of the property in its current condition and after remediation. The results of the HHERA were:

- Surface soil maximums of the identified chemicals are not anticipated to produce adverse effects in human receptors under the exposure scenarios included in the risk assessment; and
- Surface soil exposure point concentrations (EPCs) of the identified chemicals are not anticipated to produce adverse effects in ecological receptors under the exposure scenarios included in the risk assessment.

The HHERA also concluded that the remediation of the site will result in lower contaminant concentrations.

6.9.2 Health and Safety Impact Assessment

6.9.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on health and safety is the FOX-C Intermediate DEW Line Site vicinity (immediate area) and the living quarters of the workers performing the site investigations and remediation. The temporal boundary is the remediation field-work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of the health and safety assessment are the lack of site-specific information and limited time frame associated with the environmental screening.

6.9.2.2 Identification of Issues, Interactions and Potential Effects

The exposure of potentially hazardous materials during remediation of the landfills, the collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities, the general handling of hazardous materials, and travel around the site have the potential to impact health and the safety of workers. However, as concluded in the HHERA, exposure to the existing contaminants is not expected to cause adverse effects in humans. It can be concluded that exposure to contaminants during remediation will not have adverse effects either.

Ultimately, the removal of contaminated soil and other hazardous materials from the environment reduces the risk of exposure to people. Table 6-15 is an environmental assessment matrix for the Health and Safety VEC.

Table 6-15: Environmental Effects Assessment Matrix: Health and Safety

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
General Clean Up Activities	The excavation of potentially hazardous materials from the landfills, the collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities and the general handling of hazardous materials has the potential to impact health and the safety of workers (A).	• Transportation of any hazardous materials will be in accordance with Transportation of Dangerous Goods Regulations. • A comprehensive health and safety plan will be developed and implemented. • Workers will be required to wear and use appropriate personal protective equipment. • Workers will be trained in the use of personal protective equipment and proper handling procedures for hazardous materials.	1	N/A	1/1	R	N/A
Contaminated Soil Disposal/Hazardous Materials Removal	The removal of contaminated soil and other hazardous materials from the environment reduces the risk of exposure to people. (P)	• N/A					

KEY:

Magnitude:

1 = Low: No more than a few individuals are affected with minor, short-term health problems.

2 = Medium: A small portion of the local community are affected with minor, short-term health problems.

3 = High: An individual is affected with a chronic health problem or a large portion of the local community is affected with minor, short-term health problems.

Geographic Extent:

N/A

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 months
4 = 37-72 months
5 = >72 months

Frequency:

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

Reversibility:

R = Reversible
I = Irreversible

Ecological/Socio-cultural and Economic Context:

1 = Relatively pristine area or area not adversely affected by human activity.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.9.2.3 Mitigation

The transportation of any hazardous materials will be in accordance with the Transportation of Dangerous Goods Regulations. A comprehensive health and safety plan will be developed and

implemented with requirements for workers to wear and use appropriate personal protective equipment. Workers will also be trained in the use of personal protective equipment and proper handling procedures for hazardous materials.

6.9.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on health and safety occurs if an individual is injured on site and requires medical evacuation, or is killed, or develops a chronic health problem as a result of working on the Project.

Residual Environmental Effects Summary

Table 6-16 summarizes the residual environmental effects of the project activities on health and safety.

Table 6-16: Residual Environmental Effects Summary Matrix: Health and Safety

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
General Clean Up Activities	NS		
Contaminated Soil Disposal/Hazardous Materials Removal	P		

KEY:

Residual Environmental Effects Rating:

S =Significant Adverse Environmental Effect
NS =Not Significant Adverse Environmental Effect
P =Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.9.2.5 Summary of Environmental Effects on Health and Safety

The collection and disposal of potentially hazardous debris, the removal of hazardous materials from facilities and the general handling of hazardous materials has the potential to affect the health and the safety of workers. To help mitigate this risk, the transportation of any hazardous materials will be in accordance with Transportation of Dangerous Goods Regulations. Additionally, a comprehensive health and safety plant will be developed and implemented, which will require workers to wear and use appropriate personal protective equipment. Workers will also be trained in the use of personal protective equipment and proper handling procedures for hazardous materials. The effects of the remediation activities on health and safety are assessed as not significant. Ultimately, the removal of contaminated soil and other hazardous materials from the site reduces the risk of exposure to humans.

6.10 Archaeological and Heritage Resources

6.10.1 Existing Environment

The Department of Culture, Language, Elders and Youth of the Government of Nunavut was contacted for information on the archaeological and heritage resources of the FOX-C DEW Line site. They responded that there are no recorded archaeological sites within a 15-km radius of the site (J. Ross pers. comm. 2005). The recent history of the site is as a DEW Line facility.

6.10.2 Archaeological and Heritage Resources Impact Assessment

6.10.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on archaeology and heritage resources is the facility and access route footprint. The temporal boundary is the remediation field-work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA for review by NIRB and other federal departments through the normal CEAA process. Technical boundaries of archaeological and heritage resources assessment are the lack of site-specific information and limited time frame associated with the environmental screening.

6.10.2.2 Identification of Issues, Interactions and Potential Effects

The presence and movement of people around the site has the potential to disturb unrecorded archaeological resources that may be present. Remediation activities also have the potential to expose new sites. Table 6-17 is an environmental assessment matrix for the archaeology and heritage resources VEC.

Table 6-17: Environmental Effects Assessment Matrix: Archaeology and Heritage Resources

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
General Clean Up Activities	Excavation activities at the site have the potential to unearth new artefacts (P).	• N/A					
	The presence and movement of people around the site has the potential to disturb previously unrecorded archaeological and heritage resources (A).	• The Nunavut Department of Culture, Language, Elders and Youth will be contacted if new artefacts or a site are discovered and work will be stopped until the site can be assessed and permission to proceed is obtained from the Department.	1	2	1/1	I	N/A

KEY:

Magnitude:

1 = Low: *e.g.,* loss of a minor proportion of data at site, local or regional level; after low impact, interpretative capacity of the remains is virtually intact, limited only by loss of minor items and/or features.

2 = Medium: *e.g.,* a proportion of the data at the site, local or regional level is lost but a significant proportion remains unimpaired; after medium impact, the interpretative capacity of the remains is hindered by loss of basic data about cultural descriptions and lifestyles.

3 = High: *e.g.,* a significant proportion of data at the site, local or regional level is lost; interpretative capacity of the remains following impact is minimal.

Geographic Extent:

1 = <1 km²
2 = 1-10 km²
3 = 11-100 km²
4 = 101-1000 km²
5 = 1001-10,000 km²
6 = >10,000 km²

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 months
4 = 37-72 months
5 = >72 months

Frequency:

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

Reversibility:

R = Reversible
I = Irreversible

Ecological/Socio-cultural and Economic Context:

1 = Relatively pristine area or area not adversely affected by human activity.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.10.2.3 Mitigation

No archaeological sites have been identified in the study area. If, during the course of the remediation program, archaeological resources are discovered, the Nunavut Department of Culture, Language, Elders and Youth will be contacted and work will be stopped at that location until an assessment of the find is made and permission to proceed is obtained from the Department.

6.10.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on archaeology and heritage resources would involve the destruction or disturbance of all or part of an archaeological, historic or palaeontological site considered to be of local, regional territorial, national, or international value. This effect, if not controlled through mitigative investigation and documentation would result in the permanent loss of part of the non-renewable heritage resource base.

Residual Environmental Effects Summary

Table 6-18 summarizes the residual environmental effects of the project activities on archaeology and heritage resources. Residual effects are assessed as not significant or as positive for the remediation activities.

Table 6-18: Residual Environmental Effects Summary Matrix: Archaeology and Heritage Resources

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
General Clean Up Activities	NS/P		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.10.2.5 Summary of Environmental Effects on Archaeology and Heritage Resources

The presence and movement of people around the site has the potential to disturb the archaeological and heritage resources that may be present. In the event that a new resource is discovered, the Nunavut Department of Culture, Language, Elders and Youth will be contacted. The effects of the Project on archaeology and heritage resources are assessed as not significant or as positive.

6.11 Land Use

6.11.1 Existing Environment

The FOX-C Intermediate DEW Line Site facilities have been in place since 1957. The site was used as an intermediate DEW line site until 1963. Assessments were completed for the site in 1985 and 1994. A hunting and fishing camp was located at the mouth of the river that leads from the freshwater lake. All that remains of the camp is wood and metal debris. It is unknown when the camp was occupied and

for how long it was used. Residents of Clyde River indicated in a community meeting held for the purposes of announcing this Project in May 2004 that the site is part of a traditional hunting area.

6.11.2 Land Use Impact Assessment

6.11.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on land use is the Ekalugad Fjord and adjacent land areas. The temporal boundary is the remediation field-work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on land use.

6.11.2.2 Identification of Issues, Interactions and Potential Effects

Remediation activities have the potential to disturb traditional land use such as hunting and fishing activities that potentially occur during the summer months. Table 6-19 is an environmental assessment matrix for the land use VEC.

Table 6-19: Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
General Clean Up Activities	Clean up activities may disturb traditional land use such as hunting and fishing activities that occur during the summer months (A).	• The local hunter and trapper organization will be notified of the scheduling of clean-up activities.	1	2	3/1	R	N/A

Table 6-19: Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
	Clean up of the site will improve wildlife habitat and provide easier access for hunters and trappers (P).	• NA					

KEY:

Magnitude:

1 = Low: *e.g.*, a few land or water use activities precluded.

2 = Medium: *e.g.*, a moderate number of land or water uses precluded.

3 = High: *e.g.*, a large number of land or water uses precluded.

Geographic Extent:

1 = <1 km²
2 = 1-10 km²
3 = 11-100 km²
4 = 101-1000 km²
5 = 1001-10,000 km²
6 = >10,000 km²

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 months
4 = 37-72 months
5 = >72 months

Frequency:

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

Reversibility:

R = Reversible
I = Irreversible

Ecological/Socio-cultural and Economic Context:

1 = Relatively pristine area or area not adversely affected by human activity.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.11.2.3 Mitigation

In order to minimize impacts to traditional land use such as hunting and trapping activities, local hunter and trapper organizations will be identified and notified of the scheduling of remediation activities.

6.11.2.4 Residual Environmental Effects

Definition of Significance

A significant environmental effect of the project activities on land use occurs if traditional land use activities are not permitted to occur.

Residual Environmental Effects Summary

Table 6-20 summarizes the residual environmental effects of the project activities on land use. The effect of remediation activities are assessed as being not significant or as being positive.

Table 6-20: Residual Environmental Effects Summary Matrix: Land Use			
Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
General Clean Up Activities	NS/P		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.11.2.5 Summary of Environmental Effects on Land Use

Clean up activities may disturb traditional land use such as hunting and fishing activities that occur during the summer months. In order to minimize these effects, local hunter and trapper organizations will be notified of the scheduling of remediation activities. The effects of the Project on land use are assessed as not significant or as positive.

6.12 Aesthetics

6.12.1 Existing Environment

The FOX-C Intermediate DEW Line site is located on arctic tundra. The facilities interrupt a natural arctic landscape view with one of a former military operation.

6.12.2 Aesthetic Impact Assessment

6.12.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on aesthetics is the FOX-C Intermediate DEW Line Site facility. The temporal boundary is the remediation field-work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on aesthetics.

6.12.2.2 Identification of Issues, Interactions and Potential Effects

Ultimately, the clean up activities will improve the aesthetics of the site by removing unsightly debris and restoring the site to a more natural state. However, remediation activities themselves are not expected to have any interaction with the aesthetics of the area. Table 6-21 is an environmental assessment matrix for the aesthetics VEC.

Table 6-21: Environmental Effects Assessment Matrix: Aesthetics

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
General Clean Up Activities	The clean up will improve the aesthetics of the site by removing unsightly debris and restoring the site to a more natural state (P).	N/A					

KEY:

Magnitude:

1 = Low: Little change to the visual landscape.

2 = Medium: Some viewscapes are partially obscured or degraded.

3 = High: Most viewscapes are obscured or degraded.

Geographic Extent:

1 = <1 km²
2 = 1-10 km²
3 = 11-100 km²
4 = 101-1000 km²
5 = 1001-10,000 km²
6 = >10,000 km²

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 months
4 = 37-72 months
5 = >72 months

Frequency:

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

Reversibility:

R = Reversible
I = Irreversible

Ecological/Socio-cultural and Economic Context:

1 = Relatively pristine area or area not adversely affected by human activity.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.12.2.3 Mitigation

No mitigation is required since there are no project-aesthetic interactions identified.

6.12.2.4 Residual Environmental Effects

Definition of Significance

A definition of significance for residual effects on aesthetics is not required since no interactions have been identified.

Residual Environmental Effects Summary

Table 6-22 summarizes the residual environmental effects of the project activities on aesthetics.

Table 6-22: Residual Environmental Effects Summary Matrix: Aesthetics

Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
General Clean Up Activities	P		

KEY:

Residual Environmental Effects Rating:	Probability of Occurrence: based on professional judgement:	Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:
S =N/A	1 = Low	1 = low level of confidence
NS =N/A	2 = Medium	2 = medium level of confidence
P =Positive Environmental Effect	3 = High	3 = high level of confidence
	n/a = effect not predicted to be significant	n/a = effect not predicted to be significant

6.12.2.5 Summary of Environmental Effects on Land Use

The remediation activities are not expected to interact with the aesthetic environment.

6.13 Socio-Economics

6.13.1 Existing Environment

FOX-C, located on the central Baffin Island, is in the Qikiqtaaluk region of Nunavut. The closest communities include Clyde River (195 km north) and Qikiqtarjuaq (235 km southeast). Population of the communities, according to the 2001 census was 785 in Clyde River and 519 in Qikiqtarjuaq. The economy of the region is based on hunting and fishing and on the tourist industry.

6.13.2 Socio-Economic Impact Assessment

6.13.2.1 Study Area Boundaries

The spatial boundary for the assessment of the effects of project activities on socio-economics is Nunavut, as labour and equipment may be required from Iqaluit, Clyde River and/or Qikiqtarjuaq. The temporal boundary is the remediation field-work period as well as the additional monitoring period following completion of the project.

The administrative boundaries for the assessment refer to the jurisdictions within which and for which the assessment is being prepared. In this case, the assessment is being prepared under CEAA for review by NIRB and other federal departments through the normal CEAA process. No technical boundaries have been recognized for the assessment of the project on socio-economics.

6.13.2.2 Identification of Issues, Interactions and Potential Effects

The Department of National Defence (DND) and Nunavut Tunngavik Incorporated (NTI) have signed a *DND/NTI Agreement for the Clean Up and Restoration of the DEW Line Sites within the Nunavut Settlement Area* outlining the economic provisions. The agreement includes a Minimum Inuit Content (MIC) for the clean up contract and requirements for training, specifically related to the clean up activities. Generally, the contracts for the clean up of DEW Line sites include clauses requiring the contractor to maximize Inuit Involvement. Inuit involvement in the remediation activities will include both employment and business (contracting) opportunities, and local purchases.

Table 6-23 is an environmental assessment matrix for the socio-economic VEC.

Table 6-23: Environmental Effects Assessment Matrix: Socio-Economics

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context
General Clean Up activities	Nunavut residents will have employment opportunities during the remediation work (P).	N/A					

Table 6-23: Environmental Effects Assessment Matrix: Socio-Economics

Project Activity	Potential Positive (P) or Adverse (A) Environmental Effect	Mitigation	Evaluation Criteria for Assessing Environmental Effects				
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-Cultural and Economic Context

KEY:

Magnitude:

1 = Low: *e.g.*, Few individuals affected.

2 = Medium: *e.g.*, A moderate number of individuals affected.

3 = High: *e.g.*, A large number of individuals affected.

Geographic Extent:

1 = <1 km²
2 = 1-10 km²
3 = 11-100 km²
4 = 101-1000 km²
5 = 1001-10,000 km²
6 = >10,000 km²

Duration:

1 = <1 month
2 = 1-7 months
3 = 8-36 months
4 = 37-72 months
5 = >72 months

Frequency:

1 = <11 events/year
2 = 11-50 events/year
3 = 51-100 events/year
4 = 101-200 events/year
5 = >200 events/year
6 = continuous

Reversibility:

R = Reversible
I = Irreversible

Ecological/Socio-cultural and Economic Context:

1 = Relatively pristine area or area not adversely affected by human activity.

2 = Evidence of adverse effects.

N/A = Not Applicable

6.13.2.3 Mitigation

During any remediation project, whenever possible, DIAND strives to support and enhance the development of healthy, sustainable communities by leveraging local skills and knowledge into their approach to addressing environmental issues associated with contaminated sites. By these means core competencies are maximized and deployed. Whenever possible, the project will also adopt solutions tailored to the northern environment and its inhabitants. This includes leveraging local knowledge and the incorporation of provisions accounting for the unique needs of northerners and the needs of the environment in which they live into the development and implementation of policies and procedures.

6.13.2.4 Residual Environmental Effects

Definition of Significance

A definition of significance for residual effects on socio-economics is not required since effects are positive.

Residual Environmental Effects Summary

Table 6-24 summarizes the residual environmental effects of the project activities on socio-economics.

Table 6-24: Residual Environmental Effects Summary Matrix: Socio-Economics			
Phase	Residual Adverse Environmental Effect Rating	Likelihood (of significant adverse environmental effects)	
		Probability of Occurrence	Scientific Uncertainty
Contractor Support	P		

KEY:

Residual Environmental Effects Rating:

S = Significant Adverse Environmental Effect
NS = Not Significant Adverse Environmental Effect
P = Positive Environmental Effect

Probability of Occurrence: based on professional judgement:

1 = Low
2 = Medium
3 = High
n/a = effect not predicted to be significant

Scientific Uncertainty: based on scientific information, and statistical analysis or professional judgement:

1 = low level of confidence
2 = medium level of confidence
3 = high level of confidence
n/a = effect not predicted to be significant

6.13.2.5 Summary of Environmental Effects on Socio-Economics

The contractor will be required to have a minimum Inuit content in the workforce for the remediation work. This will provide employment benefits, training and related economic benefits. The effects of the remediation of FOX-C on the socio-economics VEC are assessed as positive.

6.14 Summary of Environmental Effects

Table 6-25 is an interaction matrix between the Project and several environmental parameters, showing the effects of the Project on the environment. The parameters listed are those required by the NIRB and those that were not identified as specific VECs in the preceding sections, were included as part of the VECs discussed.

TABLE 6-25:

NUNAVUT IMPACT REVIEW BOARD
ENVIRONMENTAL INTERACTION MATRIX
FOX-C (EKALUGAD FJORD) REMEDIATION

INTERACTION MATRIX		ENVIRONMENTAL COMPONENTS	PHYSICAL	climate/ weather	ground stability	noise	sediment quality	soil quality	air quality	water quality	hydrology/ limnology	permafrost	eskers and other unique landscapes	BIOLOGICAL	vegetation	wildlife including habitat	birds including habitat	freshwater Biota and Habitat	marine Biota and Habitat	protected areas	land use	archaeology & heritage resources	aesthetics	socio-economics
PROJECT ACTIVITIES																								
SITE PREPARATION	Mobilization to the site				M				M	M														P
	Camp construction				M							M			M	M	M				M			P
	Development of borrow sources						M	M	M	M		M			M	M	M				M	M		
	Construction of landfill				M		M	M	M	M		M			M	M	M							P
	Access road upgrades				M		M	M	M	M	M							M						P
REMEDIATION	Remediation of dumps						M	M	M	M					P	P					P		P	P
	Demolition of infrastructure																						P	P
	Segregation of demolition wastes							M		M					M									P
	Remediation of contaminated soil							P		P						P	P	P						P
	Collection of debris																							P
	Disposal of barrels																							P
	Landfarming of hydrocarbon-contaminated soils							P								P	P	P						P
	Physical restoration of disturbed areas														P	P	P				P		P	P
CLOSURE	Site closure and demobilization				M																		P	P

Notes: Please indicate in the matrix cells whether the interaction causes an impact and whether the impact is:

- ***P*** *Postitive*
- ***N*** *Negative and non-mitigatable*
- ***M*** *Negative and mitigatable*
- ***U*** *Unknown*

If no impact is expected then please leave the cell blank

6.15 Cumulative Effects

The effects of the remediation of the former FOX-C DEW Line site will be cumulative with the effects of other activities in the area. The purpose of the remediation program is to repair the environmental effects of the DEW Line site. The only other activities identified at the site are traditional land use activities. The remediation program will interact with traditional land use during the time on-site activities are occurring but this period is of short duration (September 2005, Winter 2005/2006, and July-October 2006 and 2007) and traditional land users (hunters and trappers) will be notified of the periods when the remediation crews will be on site. The remediation of the site will have a positive effect on the environment through the removal of hazardous materials and the restoration of the habitat to one that is similar to what was present before site construction. There is a potential negative cumulative effect of the remediation on the socio-economic VEC. Ongoing remediation of other DEW Line sites in the region (e.g., Cape Hooper and Cape Dyer) will put pressure on the available labour pool and may make it difficult for contractors to meet their minimum Inuit labour content for their work. Overall, however, the contribution of the effects of the remediation to the cumulative effects of the area are assessed as being positive or not significant.

6.16 Impact of the Environment on the Project

The implementation of a clean up project in an Arctic environment has unique logistical issues. Equipment and personnel must either be flown in or shipped in during the ice-free season. The potential exists for delays in the clean up associated with bad weather. These delays may include work stoppage on-site or delays in the transportation to and from the site of personnel and supplies. Conditions related to the Arctic climate, such as ice and frozen ground may also delay clean up activities. Ice may delay marine transport to and from the site. Clean up activities which are best completed at maximum thaw may be delayed depending on seasonal climate changes.

7.0 CONCLUSIONS

The remediation of the former FOX-C DEW Line site at Ekalugad Fjord involves the removal of hazardous waste, the burial of non-hazardous waste, and the removal of facilities. The remediation activities are part of DIAND's environmental management of the North. Remediation will be carried out following procedures that will protect the environment. For the more sensitive activities of removing fuel drums within the watershed and culvert installation, an environmental protection plan has been developed. Contingency plans have also been developed for the remediation activities. The effects of the remediation on the environment have been examined and assessed, as required under the *Canadian Environmental Assessment Act*. The effects of the project on the environment have been assessed as not significant or as positive.

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