FINAL REPORT
ON

ECOLOGICAL RISK EVALUATION FOR RADIO ISLAND FORMER MILITARY SITE

LEVEL 1 CUSTODIAL INPUT SECTION

Prepared for:

Department of Indian Affairs and Northern Development

Prepared by:

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STEP 1 SUMMARY SITE DESCRIPTION: WORKSHEET

Section A) Contact Information

Contact Name:	
Signature:	
Date of Completion:	
Position:	
Address/Phone No.:	

Site Visited?	Yes / No

Section B) Site Information

Site No.:	
Site Name:	**Radio Island**
Province/Territory:	**Nunavut Territory**
Custodial Department:	**Department of Indian Affairs and Northern Development**
Site Location (latitude and longitude):	**(61° 18' N, 64° 52' W) located at the tip of Resolution Island, 340 km southeast of Iqaluit**

Provide a brief description of the site:
The station, originally known as Resolution Island, was set up in 1929 by the Canadian Department of Transport, and operated year round as a navigational aid and weather station until October 1961 when the station was moved to Cape Warwick. The site is accessible by sea at Acadia Cove (summer months) and air only by helicopter. The island is approximately 1.0 km long and 0.5 km wide and consists of two intact structures and the remains of four other structures and a light beacon tower. The island consists of tilted bedrock, knolls and shallow gullies forming a series of ledges. Soil is restricted to isolated pockets in these gullies and valleys and is virtually nonexistent in other areas. Vegetation is limited to the valleys and low-lying areas. Marine mammals such as walrus, seal, whale (the island is along the migration routes of whales) and polar bears are common to the region. Hazardous and non-hazardous debris was scattered across the site.

Describe the current land use: (e.g. Ag/Res/Com/Ind)	**Abandoned Industrial Site**
Describe the future or potential land use:	**Natural Habitat**

FCSSAP (Federal Contaminated Site Accelerated Action Plan) NCS Scoring:

Provide the Total FCSSAP National Classification System Score for the Site:	
Provide the Total Score for Category III Receptors: Section B Environment:	/16
Score for Category III B1: Known Adverse Impact:	/16
Score for Category III B2: Potential fore Impact:	/16
Score for Category III B3: Special Considerations:	/5

Section C) Studies completed and Outcomes

List the reports or resources pertaining to the property used in the Ecological Risk Assessment (ERA) evaluation:

Report Title	Date
Public Works and Government Services Canada (PWGSC) 2002. *Remedial Action Plan Former Navigational Aid and Weather Station Radio Island, Nunavut.*	**MARCH 2002**
Environmental Services Group (ESG) (Royal Military College) 1997. *An Environmental Assessment of Radio Island, NWT.*	**MARCH 1997**
Qikiqtaaluk Corporation, Legault Desjardins Simon Consultants Inc., Cantox Environmental Inc. and Gartner Lee Ltd. 1998. *Risk Assessment for 7 Abandoned Military Stations in Eastern Arctic Volume 1*. November.	**NOVEMBER 1998**

Has a screening level ERA been completed at the site? If yes, complete: **YES**

Study Title	Study Outcomes
Qikiqtaaluk Corporation and Legault Desjardins Simon Consultants Inc., *Risk Assessment for 7 Abandoned Military Stations in Eastern Arctic*	**Potential unacceptable ecological risks associated with concentrations of lead, being widespread at elevated levels in soil across the site.**

Has a Tier 2/3 ERA; Preliminary or Detailed Quantitative Risk Assessment been completed at the site? If yes, provide a list:

Study Title	Study Outcomes

Has the Study been peer-reviewed? Yes/No; Comments: _____

Is the site under specific regulatory obligations? If yes provide a list:

_____

_____

Section D) High Risk Sites Statement

D1) Adverse Impact

If the response to question 1 or 2 or 3 is yes, automatically rate the site as high risk:

1) Is the site contamination known to have caused significant adverse impact or physical stress on the environment or highly valued species? **NO**
2) Could the imminent failure of a physical structure at this site have the potential to result in significant adverse effects? **NO**
3) Has an ecological risk assessment reported a risk or potential adverse impact to ecological receptors? **YES**

Significant adverse impacts would be defined as those which affect the population of a species or portion thereof in such a way as to cause a decline or change in abundance or distribution of the population over one or more generations; the impact may be localized; natural recruitment may not re-establish the population to its original level.

An insignificant impact is one that affects the population of a species in a localized area for a short period of time in a manner similar to natural variation, and would have no measureable effect on the integrity of the population as a whole.

Rating a site as high risk provides an additional qualitative indicator for Departments reviewing the site to consider when providing a final score for the site.

D2) Impact Summary

List impacted habitats/receptors:
Potential impacts on terrestrial vegetation, terrestrial animals, marine mammals and fish
List chemicals of concern:
Metals, PCBs, Pesticides, PHC, VOCs and PAHs
List exposure pathways:
drinking water, soil intake, food intake

Section E) Data Requirements Checklist

1. Are data requirements provided as per Step 2, the "**Data Requirements Checklist Form"**? **Yes**

Section F) Level 1 Risk Evaluation

1. Complete the Level 1 Worksheets (Step 3) and indicate final Custodial Department input worksheets score: **74**

Comments

Step 2 Data Requirements Checklist

Information Review	Yes/No	Comments
Has a description of the site historical activities been completed?	**Yes**	
Have chemicals of concern at the site been identified?	**Yes**	
Were the approximate size of site and quantity of contaminants provided?	**Yes**	**Estimated 1100 m^3 of soils contaminated with metals and 400 m^3 of soils contaminated with PHC**
Are the site assessment data collected representative of the site contamination?	**Yes**	
Are the QA/QC (quality assurance / quality control) data acceptable?	**Yes**	**QA/QC assessment was documented in the reference**
Have the chemicals of concern been analyzed for in all potentially impacted media (*i.e.,* groundwater, surface soil, surface sediments, surface water, liquid phase product) or exposure pathways?	**Groundwater: No** **Surface soil: Yes** **Sediment : No** **Surface Water : Yes**	**No groundwater sample collected** **Analyzed for metals, PCBs, PAHs, PHC & pesticides** **No sediment sample collected** **Analyzed for metals and PCBs**
Has the extent of contamination been delineated (*i.e.,* horizontal and vertical contamination) in all significantly impacted media?	**Yes**	
Have background concentrations been evaluated and identified for chemicals of concern?	**Yes**	**Background concentrations were only evaluated for selected metals and PCBs in soil and water.**

Information Review	Yes/No	Comments
Were the following items defined on a regional and local basis: a) Surface drainage pattern? b) Surficial and bedrock geology? c) Groundwater flow regimes, gradients, and velocities? d) Aquifer types? e) Groundwater and surface water use in the local area? f) Grain size analyses (if proposing fine-grained soil criteria)?	**a) Yes** **b) Yes** **c) No** **d) No** **e) No** **f) No**	
Were the ecological uses of adjacent water resources evaluated and identified?	**Yes**	
Were potential habitats identified, evaluated and defined: a) On-site? b) Off-site?	**On-Site: Yes** **Off-Site: Yes**	
Is the data set for chemicals of concern appropriate and well founded, considering the attributes of the habitats?	**Yes**	**Well founded based on past use of site, not the attributes of the habitats.**

Notes: Appendix A provides more information on the site.

- **Reference documents**

1. Public Works and Government Services Canada (PWGSC) 2002. *Remedial Action Plan Former Navigational Aid and Weather Station Radio Island, Nunavut.*
2. Environmental Services Group (ESG) (Royal Military College) 1997. *An Environmental Assessment of Radio Island, NWT.*
3. Qikiqtaaluk Corporation, Legault Desjardins Simon Consultants Inc., Cantox Environmental Inc. and Gartner Lee Ltd. 1998. *Risk Assessment for 7 Abandoned Military Stations in Eastern Arctic Volume 1*. November.

- **Reference documents not attached to submission**

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Worksheet 1 Ecological Habitat Screen

Ecological Habitat Screen **Determine the absence or presence of the following habitat within 1 km of the contaminated site:**			
	YES (Score 5)	**POSSIBLE (Score 2)**	**NO (Score 0)**
Category 1: Freshwater or Marine habitats such as wetlands, marshes, swamps, tidal flats, beaches, rivers, oceans, lakes or streams. **(Habitats identified are underlined)**	✔		
Category 2: Forested habitats and/or Grass land habitats			✔
Category 3: Provincial/National Parks, ecological reserve; area of high biodiversity; sensitive arctic environments	✔		
Category 4: Habitat supporting rare, threatened, endangered or significant (local / regional) species	✔		
Category 5: Sensitive habitat for wildlife or migratory species (including breeding or spawning areas)	✔		
Score: Please total score. A score of 20 points is the maximum total for this worksheet. If the total is greater than 20, please score 20 for this worksheet.	**SUM = 20** **SCORE = 20**		
If the answer is No (Score 0) for all the above habitats, then no potential habitat at risk is identified and no further evaluation is required.			

Worksheet 2 Chemical Identification

Worksheet 2A Chemical Identification – Data Only: No Scoring

Source Matrix	Chemical Testing Performed (Yes or No)	Chemical Category	Circle Yes or No	Comments
Surface Water	**Yes**	Metals	(Y) N	**Only copper was detected in one of the three water samples. Concentrations of other metals were all below method detection limit.**
	No	PAHs	Y N	
	No	PHC	Y N	
	No	VOCs	Y N	
	No	Pesticides	Y N	
	Yes	PCBs	(Y) N	
	No	Soluble inorganics	Y N	
	No	Others	Y N	
Surface Sediment	**No**	Metals	Y N	**No data collected.**
	No	PAHs	Y N	
	No	PHC	Y N	
	No	VOCs	Y N	
	No	Pesticides	Y N	
	No	PCBs	Y N	
	No	Soluble inorganics	Y N	
	No	Others	Y N	
Surface Soil	**Yes**	Metals	(Y) N	
	Yes	PAHs	(Y) N	
	Yes	PHC	(Y) N	
	Yes	VOCs	(Y) N	
	Yes	Pesticides	(Y) N	
	Yes	PCBs	(Y) N	
	No	Soluble inorganics	Y N	
	No	Others	Y N	
Groundwater	**No**	Metals	Y N	**No data collected.**
	No	PAHs	Y N	
	No	PHC	Y N	
	No	VOCs	Y N	
	No	Pesticides	Y N	
	No	PCBs	Y N	
	No	Soluble inorganics	Y N	
	No	Others	Y N	

Worksheet 2B – Chemical Screen – for Chemicals without Environmental Quality Criteria

Source Matrix	Chemical Category (list) and Chemical Parameters (list)	Is concentration >2 x mean background/reference location Yes/No	Score (Please score 0.5 for each Yes - Score each parameter in each category listed)
Surface Water	**PCBs**	**No**	**0**
Sediment	**None**		
Surface Soil	**PAHs- Fluoranthene** **- Chrysene** **Pesticides - DDE** **- o,p'-DDD** **- p,p'-DDD** **- Dieldrin**	**Background Concentration not Available and Assumed to be 0**	**0.5** **0.5** **0.5** **0.5** **0.5** **0.5**
Groundwater	**Not Measured**		
Score: Please total score. A score of 5 points is the maximum total for this worksheet. If the total is greater than 5, please score 5 for this worksheet.	**SUM = 3.0** **SCORE = 3.0**		

Note: Environmental Data Summaries are provided in Appendix B.

Worksheet 2C Chemical Hazard Screen – Exceeding Environmental Quality Criteria and Degree of Exceedance

Source Matrix	Chemical Category and Parameter (please list)	Evaluation Criteria	Score (Please score each parameter in each category listed – See scoring guide below)
Surface Water	**Metals – Copper**	CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life	**1**
Sediment	**None**	CCME Canadian Sediment Quality Guidelines for the Protection of Aquatic Life	
Surface Soil	**Metals – Antimony** **– Arsenic** **– Barium** **– Beryllium** **– Boron** **– Cadmium** **– Chromium** **– Cobalt** **– Copper** **– Lead** **– Mercury** **– Molybdenum** **– Nickel** **– Selenium** **– Silver** **– Tin** **– Vanadium** **– Zinc** **PCBs** **PHC- F1 Fraction** **- F2 Fraction** **- F3 Fraction** **- F4 Fraction** **VOCs - Toluene**	CCME Canadian Soil Quality Guidelines for the Protection of Environmental Health - SQGe **(Ecological component was used if available, otherwise, the generic CCME soil quality guidelines for residential/parkland were used)**. **For PHCs: Canada Wide Standards for Petroleum Hydrocarbons in Soil – Ecological Soil Contact from CCME 2001 – residential land use.**	**5** **1** **1** **0** **2** **5** **0** **1** **5** **5** **1** **1** **5** **2** **1** **5** **0** **5** **0** **0** **5** **5** **2** **0**

Source Matrix	Chemical Category and Parameter (please list)	Evaluation Criteria	Score (Please score each parameter in each category listed – See scoring guide below)
	- Xylenes **PAHs - Phenanthrene** **- Pyrene** **- Benzo(a)anthracene** **Pesticides – Hexachlorobenzene** **- p,p' DDT**		**0** **0** **0** **0** **0** **0**
Groundwater	**Not Measured**	CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life X 10 (account for dilution of groundwater discharging to surface water)	
Score: Please total score. A score of 20 points is the maximum total for this worksheet. If total is greater than 20, please score 20 for this worksheet. Scoring Guide: Score 1 if exceedance is > 1 to 5 fold over guideline. Score 2 if exceedance is > 5 to 10 fold over guideline. Score 5 if exceedance is > 10 fold over guideline.			**SUM = 57** **SCORE = 20**

Worksheet 2D Non-Chemical - Physical Impact Screen

Site Conditions	Non–Chemical Stressor (please list)	Physical Impact to Environment (please specify)	Degree of Hazard / Impact (low[1] or high[2])	Score: low = 1 high = 5
All remaining buildings to be demolished, except for Main House, which will act as an emergency shelter and the beacon tower, which is still operational. Non-hazardous material scattered across the site – cables, scrap metal, barrels, wood and building demolition material.	**Debris and dilapidated structures on-site**	**Possible hazard to wildlife**	**Low**	**1**
Score: Please total score. A score of 5 points is the maximum for this worksheet. If total is greater than 5, please score 5 for this worksheet.	**SUM = 1** **SCORE = 1**			

Worksheet 2E Scale of Impact

Habitat	Score (Range 25)
Terrestrial Contaminated Area Score 0 if no chemical impact Score 2 if <10 hectares Score 5 if >10 to 25 hectares Score 10 is >25 hectares	**2** **(The island is about 50 hectares in area. Assumed soil is present in only 10% of the area)**
Aquatic Contaminated Area Score 0 if no chemical impact Score 2 if <1 hectare **OR** <50 metres downstream in a flowing watercourse Score 5 if >1 to 5 hectares **OR** >50 - <100 metres downstream Score 10 if >5 hectares **OR** > 100 metres downstream	**2**
Physical Impact on Terrestrial Area Score 0 if no physical impact Score 1 if <10 hectares Score 2 if >10 to 25 hectares Score 5 is >25 hectares	**1**
Physical Impact to Aquatic Area Score 0 if no physical impact Score 1 if <1 hectare **OR** <50 metres downstream in a flowing watercourse Score 2 if >1 to 5 hectares **OR** >50 - <100 metres downstream Score 5 if >5 hectares **OR** > 100 metres downstream	**0**
Score: Please total score. A score of 25 points is the maximum for this worksheet. If total is greater than 25, please score 25 for this worksheet.	**SUM = 5** **SCORE = 5**

Area of Contamination definition:

- the area or volume of contaminated media (soil, sediment, groundwater and surface water) that exceeds appropriate environmental quality criteria (including modified generic; risk-based site specific criteria and site specific toxicity testing).

Physical Impact definition:

- A non-chemical impact originating from a site that affects the quality of the environment or poses a potential or existing ecological risk (*e.g.*, a slope that is failing; a structure that could fail).

Worksheet 3 Operable Pathway and Exposure Assessment – for Chemicals Scoring in Worksheets 2B and 2C

Chemical Category and Parameter (Please list – Examples Provided Below)	Surface Water Exposure Pathway		Sediment Exposure Pathway		Soil & Direct Surface Contact Exposure Pathway		Groundwater Exposure Pathway		Other Exposure Pathway[1] - provide specifics		Additive Score
	Pathway	Exposure	Pathway	Exposure	Pathway	Exposure	Pathway	Exposure	Pathway	Exposure	Totals
Metals – Antimony – Arsenic – Barium – Boron – Cadmium – Cobalt – Lead – Mercury – Molybdenum – Nickel – Selenium – Silver – Tin – Zinc	1	High Low	1	High Low	**1**	High Low	1	High Low	1	High Low	**(1.5 × 14) 21**
	0.5		0.5		0.5		0.5		**0.5**		
	0		0		0		0		0		
Metals - Copper	**1**	High Low	1	High Low	**1**	High Low	1	High Low	1	High Low	**2.5**
	0.5		0.5		0.5		0.5		**0.5**		
	0		0		0		0		0		
PHC- F2 Fraction - F3 Fraction - F4 Fraction	1	High Low	1	High Low	**1**	High Low	1	High Low	1	High Low	**1.5**
	0.5		0.5		0.5		0.5		**0.5**		
	0		0		0		0		**0**		
PAHs	1	High Low	1	High Low	**1**	High Low	1	High Low	1	High Low	**1.5**
	0.5		0.5		0.5		0.5		**0.5**		
	0		0		0		0		**0**		
Pesticides	1	High Low	1	High Low	**1**	High Low	1	High Low	1	High Low	**1.5**
	0.5		0.5		0.5		0.5		**0.5**		
	0		0		0		0		0		

Score: Please total score. A score of 25 points is the maximum for this worksheet. If total is greater than 25, please score 25. Scoring Guide: Score 1: Confirmed or measured open or operable pathway to receptor that results in an exposure Score 0.5: Possible or Potential pathway to receptor Score 0: No open or operable pathway If the exposure pathway is open for any number of chemicals within a given chemical category (Scores 1), please indicate whether the potential for exposure from this pathway is high or low, for an ecological receptor group (e.g. aquatic life; soil invertebrates, etc).	**SUM = 28** **SCORE = 25**

[1] Other exposure pathway: this may include upper trophic level consumption pathways (i.e., mink eating contaminated fish from a lake or stream, or eagles eating contaminated small mammals of fish from a site, etc.), or other small exposure pathways, such as inhalation of air/dust from a contaminated site.

Note: Individual pesticides and PAHs that do not have a corresponding CCME Guideline were grouped together as Pesticides (All) or PAHs (All), respectively.

Worksheet 4 – Risk Summary Score

Category	Score
Ecological Habitats – Apply Score from Worksheet 1	**20**
Chemical/Physical Hazards - Apply total of scores from Worksheet 2B 3/5 2C 20/20 2D 1/5	**24**
Scale of Impact – Apply score from Worksheet 2E	**5**
Operable Pathways and Exposure Assessment - Apply score from Worksheet 3	**25**
Total Score	**74**

APPENDIX A

SITE CHARACTERIZATION AND PHYSICAL HAZARDS

SITE CHARACTERIZATION AND PHYSICAL HAZARDS

This section provides a brief description of the Radio Island former military site and its physical characteristics.

RADIO ISLAND SITE DESCRIPTION

The Radio Island site is located at the tip of Resolution Island (which is at the southeastern tip of Baffin Island in Nunavut), 340 km southeast of Iqaluit. Figure A.1 shows Radio Island's general location, and Figure A.2 shows the overall site plan, highlighting the areas of potential concern.

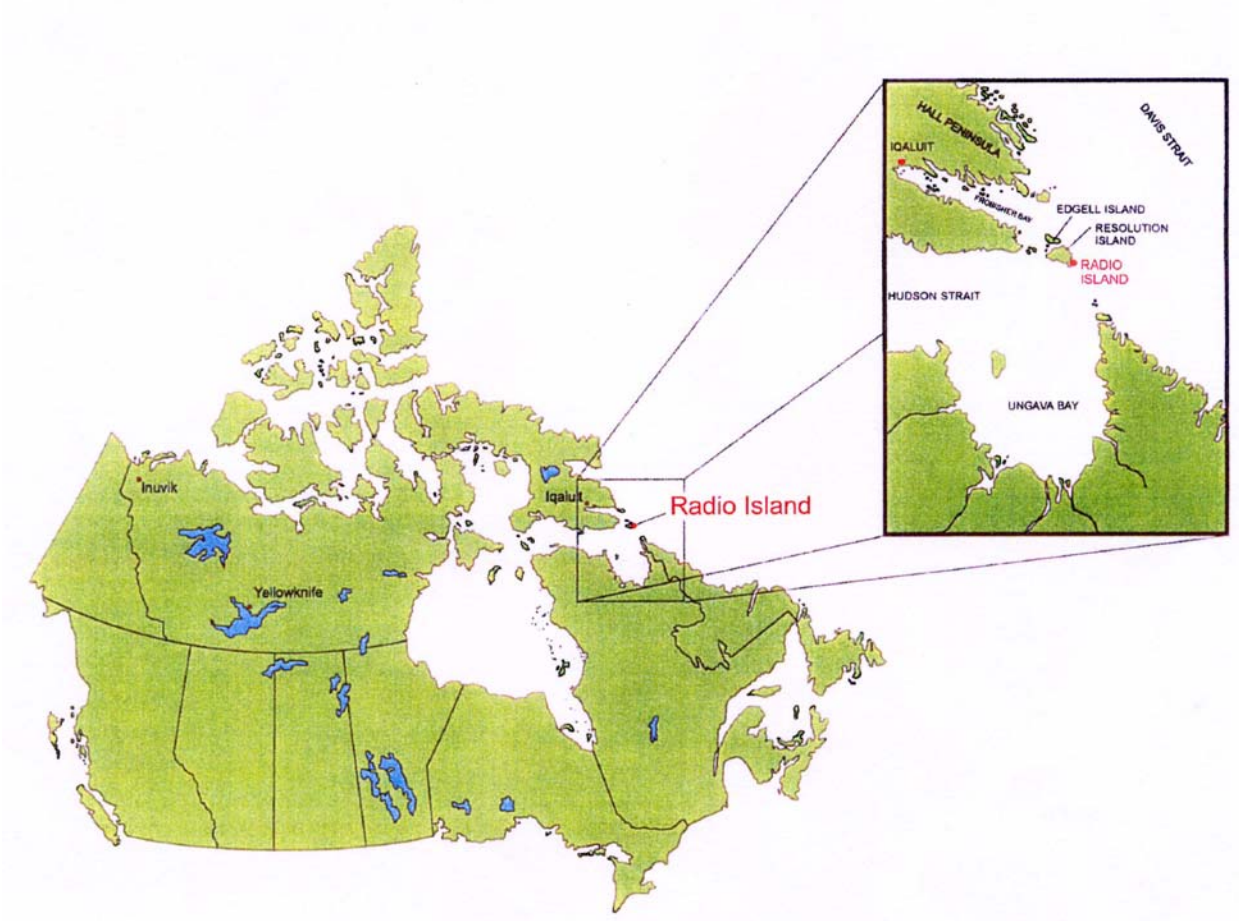
The station, originally known as Resolution Island, was set up in 1929 by the Canadian Department of Transport, and operated year round as a navigational aid and weather station until October 1961 when the station was moved to Cape Warwick.

The site is accessible by sea at Acadia Cove (summer months) and air only by helicopter. The island consists of tilted bedrock, knolls and gullies. Soil is restricted to the gullies and valleys, and surface drainage at the site flows along the gullies to the ocean. The site is relatively small, and consists of two standing buildings, the remains of three buildings, two helipads and a light beacon tower (currently operational). Vegetation is limited, and marine mammals, such as walrus, seal, whale and polar bears are common to the region.

Two environmental site assessments were conducted at this site. The first in 1996 by the Environmental Sciences Group (ESG) of the Royal Military College in Kingston, and the second in 2001 by Earth Tech Canada of Edmonton. The site was primarily powered by coal, reducing the amount of fuel and barrels required on-site. No covered landfill was identified, but hazardous and non-hazardous debris was scattered across the site. Numerous empty barrels were located throughout the site. No potential borrow source areas were identified.

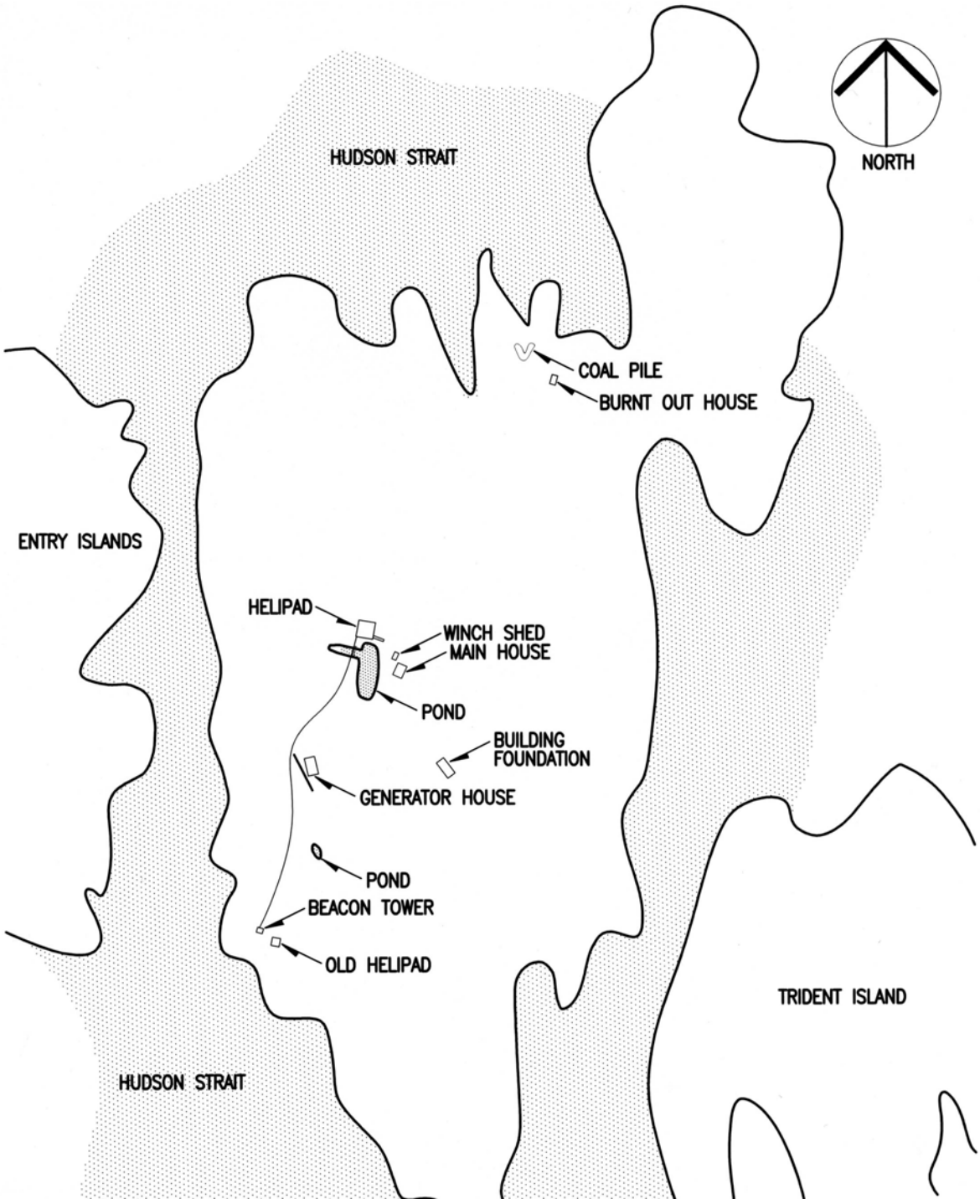
Table A.1 summarizes some of the main physical features of the site.

FIGURE A.1
RADIO ISLAND GENERAL LOCATION



Source: PWGSC (2002).

FIGURE A.2
RADIO ISLAND SITE MAP



Source: PWGSC (2002).

TABLE A.1
PHYSICAL FEATURES OF RADIO ISLAND SITE

Physical Parameter	Key Features	Characteristics	Description
Infrastructure		General Information	Includes two intact buildings (Main House, Winch Shed), the remains of three buildings (Generator House, burnt out house and a building foundation), two helipads, and a light beacon tower.
		Date of Construction	Early 1930s
		Type of Construction	Concrete foundations, steel frame columns and beams, wooden sill foundations
		Condition/Stability	All remaining buildings to be demolished, except for Main House, which will act as an emergency shelter; and the beacon tower, which is still operational
		Accessibility	Not specified that the buildings are locked.
Fuels, Chemicals, PCBs	**PCBs**	General Information	No PCB concentrations in soils exceeding guidelines identified.
	Hydrocarbons	Volume	400 m^3 of soils with concentrations of petroleum hydrocarbons.
	Asbestos	Type of Contaminant	Asbestos insulation and board
		Volume	Approx. 15 m^3 of lead acid batteries, lead paint and asbestos identified
	Metals	Volume	1,100 m^3 of metals contaminated soils.
Additional Physical Hazards		General Information	400 m^3 of non-hazardous debris identified (cables, scrap metal, barrels, wood, building demolition material); 15 m^3 of hazardous materials (lead acid batteries, lead paint, asbestos) Approximately 135 empty barrels; No potential borrow sources; Denning area for polar bears, frequently sited.

As seen in Table A.1, the main areas of concern for the Radio Island Site are:

- Soil contaminated with metals;
- Non-hazardous material scattered across the site – cables, scrap metal, barrels, wood, building demolition material;
- Hazardous materials identified around the site – lead acid batteries, lead paint, asbestos insulation and boards;
- Approximately 135 empty barrels identified around the site;
- Island is denning area for polar bears.

Asbestos Containing Materials (ACM) in various forms exist at several of the sites assessed in this study. In most jurisdictions, ACM is defined as any material containing more than one percent (1%) asbestos. Based on this definition, most asbestos containing material found at the abandoned mine sites and former military sites (e.g. insulated piping, asbestos board) would be classified as ACM. Accidental or intentional disturbances of ACM can result in fibre release and consequently pose a health hazard to individuals handling the material. This particular health hazard has not been considered in these SLRAs.

APPENDIX B

SUMMARY OF MAXIMUM MEASURED ENVIRONMENTAL DATA

RADIO ISLAND MEASURED DATA

Prepared by: Mo-Ki Tai

Radio Island - Soil Concentrations (ppm) **Checked by: Mo-Ki Tai**

	Background		CCME	Measured	Score	
Contaminant	**Mean**	**2xMean**	**Guideline**	**Maximum**	**Background**	**CCME**
As	0.98	1.96	17	53	-	1
Cd	1.00	2.00	10	115	-	5
Co	12.70	25.40	50	188	-	1
Cr	45.80	91.60	64	63	-	0
Cu	24.06	48.12	63	1230	-	5
Ni	42.00	84.00	50	840	-	5
Pb	10.00	20.00	300	115000	-	5
Zn	42.00	84.00	200	19500	-	5
Mo		0.00	10	10.1	-	1
Se		0.00	1	9.7	-	2
Ag		0.00	20	40	-	1
Sb		0.00	20	254	-	5
Be		0.00	4	1.5	-	0
V		0.00	130	51.4	-	0
Ba		0.00	500	1120	-	1
Hg		0.00	12	31	-	1
Sn		0.00	50	1700	-	5
B		0.00	2	14	-	2
Th		0.00	1.4	1	-	-
Total PCBs	0.00794	0.01588	1.3	0.49	-	0
PAHs						
Naphthalene	0	0	0.6	0.02	-	-
Acenaphthylene	0	0		0.02	-	-
Acenaphthene	0	0		0.02	-	-
Fluorene	0	0		0.02	-	-
Phenanthrene	0	0	5	1.4	-	0
Anthracene	0	0		0.02	-	-
Fluoranthene	0	0		0.54	0.5	-
Pyrene	0	0	10	0.94	-	0
Benz(a)anthracene	0	0	1	0.18	-	0
Chrysene	0	0		1.1	0.5	-
Benzo(b)fluoranthene	0	0	1	0.02	-	-
Benzo(k)fluoranthene	0	0	1	0.02	-	-
Benzo(a)pyrene	0	0	0.7	0.02	-	-
Dibenz(ah)anthracene	0	0	1	0.02	-	-
Indeno(1,2,3-cd)pyrene	0	0	1	0.02	-	-
Benzo(ghi)perylene	0	0		0.02	-	-

RADIO ISLAND MEASURED DATA

Prepared by: Mo-Ki Tai
Checked by: Mo-Ki Tai

Radio Island - Soil Concentrations (ppm) - continued

	Background		CCME	Measured	Score	
Contaminant	**Mean**	**2xMean**	**Guideline**	**Maximum**	**Background**	**CCME**
Pesticides						
Hexachlorobenzene	0	0	2	0.00041	-	0
alpha BHC	0	0		0.00095	-	-
beta BHC	0	0		0.0024	-	-
gamma BHC	0	0		0.002	-	-
Heptachlor	0	0		0.0035	-	-
Aldrin	0	0		0.00091	-	-
Oxychlordane	0	0		0.0053	-	-
trans-Chlordane	0	0		0.00095	-	-
cis-Chlordane	0	0		0.00091	-	-
o,p' DDE	0	0		0.00027	-	-
p,p' DDE	0	0		0.0009	0.5	-
trans-Nonachlor	0	0		0.00087	-	-
cis-Nonachlor	0	0		0.00066	-	-
o,p' DDD	0	0		0.0014	0.5	-
p,p' DDD	0	0		0.0024	0.5	-
p,p' DDT	0	0	0.7	0.00098	-	0
Mirex	0	0		0.00076	-	-
Heptachlor Epoxide	0	0		0.00012	-	-
alpha-Endosulphan	0	0		0.00017	-	-
Dieldrin	0	0		0.00022	0.5	-
Endrin	0	0		0.00031	-	-
Methoxychlor	0	0		0.00079	-	-
TPHs						
F1	0	0	130	50	-	0
F2	0	0	450	29000	-	5
F3	0	0	400	30000	-	5
F4	0	0	2800	15000	-	2
VOCs						
Benzene	0	0	5	0.04	-	-
Toluene	0	0	1.4	0.15	-	0
Ethybenzene	0	0	1.2	0.1	-	-
Xylenes	0	0	1	0.69	-	0
SUM					**3**	**57**

CCME Soil Quality Guidelines based on ecological component where available.
Otherwise, generic residential/parkland guidelines were used.

RADIO ISLAND MEASURED DATA

Prepared by: Mo-Ki Tai

Checked by: Mo-Ki Tai

Radio Island - Surface Water Concentrations (ppm)

	Background		CCME	Measured	Score	
Contaminant	**Mean**	**2xMean**	**Guideline**	**Maximum**	**Background**	**CCME**
As	0.001	0.002	0.005	0.001	-	-
Cd	0.001	0.002	0.000017	0.001	-	-
Co	0.01	0.02		0.01	-	-
Cr	0.01	0.02		0.01	-	-
Cu	0.03	0.06	0.002	0.01	-	1
Ni	0.01	0.02	0.025	0.01	-	-
Pb	0.01	0.02	0.001	0.01	-	-
Zn	0.02	0.04	0.03	0.02	-	-
Total PCBs	0.00044	0.00088		0.00044	0	-
SUM					**0**	**1**

CCME Freshwater Guidelines for the Protection of Aquatic Life

Measured value is below method detection limit (MDL) and is assumed to be at the MDL. These values were not carried forward into the assessment.