BRITISH COLUMBIA | Ministry of Environment

Land Remediation Section
PO Box 9342 Stn Prov Govt
Victoria B.C. V8W 9M1
Telephone: (250) 387-4441
Fax: (250) 387-8897

DETAILED ECOLOGICAL RISK ASSESSSMENT CHECKLIST

Submission of this checklist is required by Protocol 20, "Detailed Ecological Risk Assessment Checklist" under the *Environmental Management Act.*

Part 1. Land, owner and risk assessor information

Section I Land Description				
Site ID Number (if known)				
PID		or	PIN	
Legal Description				
Latitude	Degrees	Minutes	Seconds	
Longitude	Degrees	Minutes	Seconds	
Site Civic Address	Street			
	City			Postal Code

Section II Property Owner and/or Operator (if applicable)				
Name				
Address	Street			
	City			Province/State
	Country			Postal/Zip Code
Phone		Fax	E-Mail	

Section III Risk Assessor(s)
Name(s)
Organization(s)
Address:
Street
City, Province/State
Country, Postal/Zip Code
Phone
Fax
E-Mail

Part 2. Detailed Ecological Risk Assessment Checklist

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
Subsection 1.0 General Requirements			
1.1 Does the DERA identify who the major participants are in the risk assessment and state their qualifications?	Mandatory		
1.2 Does the DERA describe how the method(s) of assessment and the findings of any previous investigation(s) were used to design and carry out the current assessment?	Mandatory		
1.3 Does the DERA describe the extent to which any previous assessment(s) were/were not relied upon?	Mandatory		
1.4 If ministry preapprovals apply to the DERA, has all required preapproval documentation been provided with the risk assessment?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
1.5 Does the report make it clear what conditions are required (if any) for the instrument being applied for (e.g., Schedule B conditions for a Certificate of Compliance)?	Mandatory		
1.6 Has field data relevant to the ecological risk assessment been provided?	Mandatory		
1.7 Has laboratory data relevant to the ecological risk assessment been provided?	Mandatory		

Subsection 2.0 Problem Formulation			
2.1 Have the objectives of the ecological risk assessment been documented[1]?	Mandatory		
2.2 Were assessment and measurement endpoints for operative exposure pathways warranting further assessment defined[1]?	Mandatory		
2.3 Were assessment and measurement endpoints linked to the risk assessment objectives[1]?	Mandatory		
2.4 Were all current and reasonable potential future land, water and sediment uses identified in the problem formulation and considered in screening for chemical exceedances?	Mandatory		
2.5 Were assumptions associated with current and future land use documented and rationale provided (e.g., development scenario)?	Mandatory		
2.6 Were potential contaminants of concern identified?	Mandatory		
2.7 Was a conceptual model included?	Mandatory		
2.8 Were all relevant exposure pathways (direct and indirect) identified and considered?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
2.9 If the site was previously assessed using screening level risk assessment (SLRA) and if exposure pathways excluded under the SLRA were not considered in the DERA; were the assumptions upon which the pathways were excluded in the SLRA confirmed in the DERA[2]?	Mandatory		
2.10 If statistics were used in the DERA, was a rationale provided for the statistical methods used?	Mandatory		
2.11 Was a rationale provided for any exclusion of contaminants that exceed applicable standards, criteria, or guidelines[3]?	Mandatory		
2.12 Did a qualified biologist visit and assess the site?	Mandatory		
2.13 Were receptors of potential concern identified based on commonly accepted risk assessment practice, including consideration of: ecological relevance, social importance, exposure potential and contaminant sensitivity[4]?	Mandatory		
2.14 Was the site assessed for likely use by red and blue listed species?	Mandatory		
2.15 Were contaminant-pathway-receptor combinations that warranted further assessment clearly identified?	Mandatory		
2.16 If contaminant-pathway-receptor combinations were excluded from further assessment, was a rationale for the exclusion provided?	Mandatory		
2.17 If bioassays were used, was detailed rationale provided for the selection of the toxicity tests used, (e.g., consideration of: sensitivity of the organism to the potential contaminants of concern; potential confounding factors; taxonomic diversity, etc.)?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
2.18 If the assessment of risk was based on several lines of evidence, was the approach used to evaluate individual lines of evidence and to integrate findings across lines of evidence documented[5]?	Mandatory		
2.19 Were future contaminant concentrations and potential contaminant degradation products considered?	Optional		

Subsection 3.0 Exposure Assessment			
3.1 Was each contaminant-pathway-receptor combination identified for further assessment evaluated?	Mandatory		
3.2 Was each applicable land use scenario (current and future) evaluated?	Mandatory		
3.3 Was supporting rationale provided for methods used to estimate exposure point contaminant concentration(s)?	Mandatory		
3.4 If a fate and transport model or other exposure model was used, were model equations provided and referenced?	Mandatory		
3.5 If an exposure model was used, were equations and the input data provided to support an independent quality assurance check for each exposure route in the risk assessment?	Mandatory		
3.6 Were all exposure model parameters defined and was rationale provided for all exposure model parameter values (with references where applicable)?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
3.7 If an exposure model was used, was uncertainty regarding both: (a) the structure of the exposure model and (b) the parameter values used in the exposure model, considered in any interpretation of the results of the exposure modelling?	Mandatory		
3.8 If an exposure model was used, were the model's results compared to, or calibrated to, empirical (i.e., measured data) to determine if the model adequately represents reality?	Optional		
3.9 For any models used, was a sensitivity analysis or a rationale for the absence of a sensitivity analysis provided?	Optional		
3.10 Were data quality objectives established for field parameters used in the risk assessment?	Optional		

Subsection 4.0 Effects Assessment			
4.1 If ecological surveys (e.g., plant, soil invertebrate, bird, fish, or benthic communities) were conducted, was the survey methodology used (including sampling locations and seasons) documented?	Mandatory		
4.2 If toxicity reference values (TRVs) were used, was a rationale for the selection and/or development of the TRVs provided?	Mandatory		
4.3 If TRVs were used, was the source of the TRVs referenced? If TRVs were developed *de novo*, was their derivation documented?	Mandatory		
4.4 If TRVs were used, was the toxicity endpoint associated with each TRV identified?	Mandatory		
4.5 Did the level of protection used in the DERA comply with the level specified in the ministry ecological risk assessment policy summary[6] for the applicable land use or media?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
4.6 If risks were evaluated relative to: a reference site(s) or reference condition(s), was rationale for the selection of the reference site(s) or reference condition(s) provided? Were confounding variables (e.g., soil: texture, pH, grain size, depth etc.) addressed and considered in the evaluation?	Mandatory		
4.7 If site-specific toxicity testing was conducted, did the test method(s) used meet the quality standards of Environment Canada[7], ASTM[8] or another recognized government agency?	Mandatory		
4.8 If site-specific toxicity tests were conducted, did the tests include samples from the most contaminated area of the site?	Mandatory		
4.9 Were potential toxicological interactions (e.g., synergistic or antagonistic effects) between potential contaminants of concern discussed?	Optional		
4.10 Were up to date toxicity profiles provided for each potential contaminant of concern?	Optional		

Subsection 5.0 Risk Characterization			
5.1 Was sufficient detail provided for equations used to calculate numeric risk estimates so that it is clear how the estimates were derived?	Mandatory		
5.2 Was preference given to the use of hazard quotients in expressing numeric risk estimates?	Mandatory		
5.3 If hazard quotients were calculated, were they documented for each complete contaminant-receptor-pathway combination (as identified in the Problem Formulation)?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
5.4 If hazard quotients were not calculated, was rationale provided for using a different approach (e.g., site observations or plotting exposure with dose-response data)?	Mandatory		
5.5 If an ecological hazard quotient exceeded unity, but the level of risk was considered acceptable, was a rationale provided?	Mandatory		
5.6 Were risks for all operative contaminant-receptor-pathways detailed in the problem formulation assessed and categorized as acceptable or unacceptable?	Mandatory		
5.7 Were the conclusions (i.e., risk characterization) consistent with the assessment endpoints?	Mandatory		
5.8 Does the risk assessment provide an explicit risk conclusion in regard to the significance of the ecological risk posed by the contamination at the site?	Mandatory		

Subsection 6.0 Uncertainty Assessment			
6.1 Were uncertainties (e.g., measurement uncertainty, random variations, conceptual uncertainty and ignorance) explicitly evaluated and stated, including their implications on risk conclusions?	Mandatory		
6.2 If a weight-of-evidence approach was used, was preference given to assigning quantifiable, *a priori* weightings to weighted aspects of the DERA?	Mandatory		
6.3 If a weight-of-evidence approach was used, were the weight-of-evidence conclusions determined in a manner consistent with the approach laid out in the problem formulation?	Mandatory		

Section IV Detailed Ecological Risk Assessment Checklist			
Column I	**Column II**	**Column III**	**Column IV**
DERA Checklist Element	**Response Requirement**	**Response (Yes or No)**	**Comments**
6.4 If a weight-of-evidence approach was used, were uncertainties associated with the use of the assigned weightings explicitly evaluated and stated, including their implications on risk conclusions?	Mandatory		

Footnotes

1. Ecological risk assessment objectives and assessment and measurement endpoints are described in Science Advisory Board for Contaminated Sites in British Columbia, Report on: Detailed Ecological Risk Assessment (DERA) in British Columbia Technical Guidance, September, 2008.
2. Where both SLRA and DRA are applied at a site, pathways screened using SLRA should be re-evaluated in the problem formulation stage of the DRA to confirm that the assumptions and conditions inherent in SLRA are satisfied at the site.
3. Province of British Columbia. *Environmental Management Act. BC Reg 375/96* Contaminated Sites Regulation Section 59 (2).
4. Guidance on selecting receptors of potential concern can be found in Science Advisory Board for Contaminated Sites in British Columbia, Report on: Detailed Ecological Risk Assessment (DERA) in British Columbia Technical Guidance, September, 2008.
5. Guidance on the use of weight-of-evidence evaluation under DERA can be found in Science Advisory Board for Contaminated Sites in British Columbia, Report on: Guidance for a Weight of Evidence Approach in Conducting Detailed Ecological Risk Assessments (DERA) in British Columbia, October, 2010.
6. Ministry of Environment, lands and Parks. Tier 1 Ecological Risk Assessment Policy Decision Summary. Victoria, British Columbia. 1999.
7. Environment Canada toxicity test protocols are available from the Environment Canada Biological Test Method Series website. Environment Canada. Ottawa, Ontario.
8. ASTM toxicity testing protocols can be purchased through the ASTM Committee E47 on Biological Effects and Environmental Fate website. American Society for Testing and Materials International. Technical Committee E47 on Biological Effects and Environmental Fate.

Part 3. Professional Statements and Signatures

Section V Professional Statements and Signatures – To be completed by the Risk Assessor or Risk Assessment Specialist

In accordance with Section 63 of the Contaminated Sites Regulation, I confirm that:

1) the detailed ecological risk assessment for which this checklist is submitted has been performed in accordance with Ministry of Environment approved methods, procedures, guidance and standards of professional practice;
2) the responses provided in this Detailed Ecological Risk Assessment Checklist are true and accurate based on current knowledge as of the date completed; and
3) I have demonstrable experience in conducting ecological risk assessments and in conducting investigations of the type used to prepare the detailed ecological risk assessment for which this checklist is submitted.

Print Name	Signature	Date completed (yy-mm-dd)

If multiple signatories add additional Part 3 forms as needed.

NOTE: All signatories to Part 3 are jointly and equally responsible for all risk assessment aspects of the Detailed Ecological Risk Assessment

Apply professional society stamp (if applicable)