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## IMPERIA WORKING PAPER

# Mining ESIA case studies and ESIA guidelines

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REPORT





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## 1.0 INTRODUCTION

### 1.1 IMPERIA project

*Improving environmental assessment by adopting good practices and tools of multi-criteria decision analysis IMPERIA* is a LIFE+ project aiming to recognise and develop new tools and practises for Environmental Impact Assessment (EIA) and Strategic Environment Assessment (SEA), particularly in Finland. In the IMPERIA project, good practises and methods are reviewed using documents of EIA and SEA cases in Finland and other countries, handbooks and guidelines published for conducting EIA and SEA, scientific articles, interviews with major environment consultants and EIA authorities in Finland, and a questionnaire administered to chosen EIA/SEA consultants in EU countries. New MCDA and internet-based tools are developed for EIA and SEA and applied in three pilot projects. Practises, tools and guidelines are developed with special focus on applicability of these in practise, increasing public interest to EIA and SEA, and enhancing the effectiveness and usefulness of the processes.

Main objectives of the project are

- Developing new tools and practices for
  - support of systematic and transparent EIA and SEA processes
  - assessment of impact significance
  - comparison of alternative options
  - stakeholder participation
  - web-based participation
- Producing guidelines and recommendations (“good practices”) for
  - stakeholder analysis and participation
  - impact significance assessment and cumulative impact assessment
  - combined use of cost-benefit analysis (CBA) and multi-criteria decision analysis (MCDA)
- Arranging training courses and educational material related to EIA methodology and participation

(From Imperia web page <http://imperia.jyu.fi>)

### 1.2 Assignment

Golder Associates Oy has been assigned with the work of providing case studies of ESIA (Environmental and Social Impact Assessment) performed for Mining projects outside of the EU. The goal of the assignment was to look at examples globally and possibly identify good practices, tools and/or methodologies related to, in particular:

- Determination of impact significance
- Comparison of project alternatives
- Consideration of the issues presented and feedback provided by stakeholders, and / or reporting thereof
- Transparent reporting of the choices and decisions made during the impact assessment process



This Working Paper contains the results of the first phase of the assignment, the initial review. In this Working Paper the selected case studies are summarised on the evaluation table template provided for Golder by the IMPERIA team. **This paper does not represent original research or study and is intended mainly for internal use in the IMPERIA project. Much of the information contained in the summaries is directly copied from the source documents.** The summaries have been prepared by environmental expert Helena Railo and project manager EIA and impact assessment Janna Riikonen, who also is the project manager for the project.

Furthermore the assignment includes collection of information on EIA guidelines outside of the EU. A number of different guidelines available freely on the internet, in the English language, are listed in Chapter 3.0 below. The guidelines collected are intended to represent a sample of various information materials available and do not necessarily represent best practice. As per the assignment, the guidelines have not been reviewed or evaluated.

The initial summary results presented herein are intended to be further discussed in a follow up report. This Working Paper does not include discussion beyond some initial notes included in the table below.

## 2.0 CASE STUDIES: ESIA REPORTS ON MINING CASES

This Chapter presents the findings of the case study review. The review is presented in tabular form, on a table template provided by the IMPERIA team. The material includes summaries of the texts of the report as well as direct quotations. References to the location of the material in the ESIA documents are provided.

The case studies were chosen firstly so that they include interesting methodology pertinent to the focus areas of the review (presented above) and where such methodologies differ between cases. Secondly cases conforming to various reporting standards were included. Many of the major mining ESIA's of recent years have been undertaken in the developing countries, however an example from a high-income OECD country was also included. The case studies selected for review are the following:

### Case 1: Tenke Fungurume Oxide Project ESIA

- Country: Democratic Republic of Congo (DRC)
- Project proponent: Freeport-McMoRan
- Main ESIA consultant: SRK Consulting (South Africa) Pty
- ESIA standards: Equator Principles, IFC Performance Standards (2006), DRC Mining Convention and DRC Mining Law, corporate policies

### Case 2: New Liberty Gold Mine (NLGM) EIA

- Country: Liberia
- Project proponent: by Bea Mountain Mining Company, a wholly owned subsidiary of Aureus Mining Incorporated
- Main EIA consultant: Golder Associates Ghana Limited
- ESIA standards: IFC Performance Standards (2006), Liberian environmental legislation, Liberian Environmental Protection Agency: "Environmental Impact Assessment Procedural Guidelines" (2006).



**Case 3: Gahcho Kué diamond mine EIS**

- Country: North-Western Territories (NWT), Canada
- Jurisdiction: Mackenzie valley environmental impact review board (MVEIRB)
- Project Proponent. De Beers
- Lead EIS consultant (EA and EIS preparation phase): Golder Associates Ltd of Canada
- ESIA standards: *Terms of Reference for the Gahcho Kué Environmental Impact Statement* were provided by the Gahcho Kué Panel, a body appointed by the MVEIRB. Canadian and NWT environmental legislation, particularly *Mackenzie Valley Resource Management Act*.

Case 1: Tenke Fungurume Oxide Project ESIA	
Theme	<p><a href="http://www.fcx.com/operations/tenke/TFM-OP_ESIA_2013_eng.pdf">http://www.fcx.com/operations/tenke/TFM-OP_ESIA_2013_eng.pdf</a></p> <p>Freeport-McMoRan mining project in the Democratic Republic of Congo</p> <p>Note: For each section referred to, page numbers are indicated both as marked on the report and as page numbers of the PDF document to make it easier to locate the section in the PDF file.</p>
Impact assessment / risk assessment	
What were the criteria used?	<ul style="list-style-type: none"> <li>• SOILS AND LAND CAPABILITY</li> <li>• AIR QUALITY</li> <li>• NOISE</li> <li>• BLASTING AND VIBRATIONS</li> <li>• SURFACE WATER RESOURCES</li> <li>• GROUNDWATER RESOURCES</li> <li>• FLORA, FAUNA, FISH AND AQUATIC HABITAT</li> <li>• BIODIVERSITY</li> <li>• SOCIO-ECONOMIC ASPECTS</li> <li>• TRAFFIC AND TRANSPORTATION</li> <li>• ARCHAEOLOGY AND CULTURAL HERITAGE</li> </ul> <p>Further detail of aspects included, and mitigation measures considered, in each discipline is provided in the table starting from Page xv.</p>
Any specific method used in cumulative impact assessment?	<p>Page 8-86: (PDF:418): Narrative description of cumulative impact assessment, no maps provided</p> <ul style="list-style-type: none"> <li>• References to previous ESIA reports (the first two phase of the TFM project)</li> <li>• Narrative description provided for physical, biological and social disciplines cumulative effects separately and contains descriptions for several criteria each</li> <li>• Notably there are no cumulative impact maps showing even the cumulative impact resulting from the mining in the three target areas covered by the TFM-OP EIA</li> </ul>
Any specific method used in risk assessment?	<p>None identified. Very brief description of “Safety measures” in respect of workers and the nearby communities is included in Section 9.10 from page 9-54 (PDF: 495).</p>



**Case 1: Tenke Fungurume Oxide Project ESIA**

<p>Are there examples of good practices, what (tables, figures, text)?</p>	<p>The impacts were systematically identified already at the beginning of the process Stakeholder engagement plan provided and updated, appendix to Final ESIA report Stakeholder issues and concerns had influence on how the assessment was undertaken and what impacts were assessed (see below)</p>
<p>How uncertainty has been taken into account? Any specific method used to assess the importance of uncertainty?</p>	<p>Page 8-4 (PDF: 343): In Table 8-1 there is a description of uncertainties (a list of potential sources of uncertainty). However, it is not explained how uncertainty is measured in the Impact Ratings Tables. The tables simply include a verbal level confidence (high, medium or low) but the text does not provide justification on why each particular confidence level is derived.</p>
<p>Other, what?</p>	

**Impact significance assessment**

<p>What were the criteria used?</p>	<p>From Page 8-4 (PDF:343):          The basic elements used in the evaluation of impact significance are described in Table 8-1:</p> <ul style="list-style-type: none"> <li>• Consequence</li> <li>• Probability</li> <li>• Effectiveness of the management measures as well as</li> <li>• Uncertainty / Confidence (the latter is included separately and not used when deriving the impact significance score.</li> </ul> <p><b>Consequence</b> is described in terms of (Table 8-2)</p> <ul style="list-style-type: none"> <li>• Type (Biophysical, social or economic)</li> <li>• Nature (Direct or indirect, cumulative etc.)</li> <li>• Status (Positive / Negative)</li> <li>• Phase of project (Pre-construction, construction, operation, decommissioning, post-closure)</li> <li>• Timing (Immediate, delayed)</li> <li>• <b>Magnitude</b> <ul style="list-style-type: none"> <li>○ Sensitivity of the receiving environment / receptors (High, medium or low sensitivity; Low capacity to accommodate the change (impact) / tolerant to the proposed change)</li> <li>○ Severity / intensity (Gravity / seriousness of the impact; Intensity / influence / power / strength)</li> <li>○ Level of stakeholder concern (High, medium or low levels of concern; All or some stakeholders are concerned about the change)</li> </ul> </li> <li>• Spatial extent or population affected (Area / volume covered, distribution, population; Site / Local, regional, national, international)</li> <li>• Duration and reversibility (Short / long term; Intermittent / continuous; Reversible / irreversibility; Temporary, permanent)</li> </ul> <p>The impact significance rating system is presented in Table 8-3 (page 8-6, PDF: 345) which includes a two tier rating system. First a <b>Consequence Rating</b> is defined in terms of Magnitude, Spatial Scale and Duration by definitions and a matrix given in the</p>
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Case 1: Tenke Fungurume Oxide Project ESIA

table. The **Significance Rating** is then determined as based on the Consequence Rating and the probability of exposure (Definite / Possible / Unlikely). For the significance rating a confidence level (low, moderate, high) is then determined. There are no guidelines as to how the confidence level is derived.

Table 8-3: Method for rating the significance of impacts

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE		
<i>Use these definitions to define the consequence in Part B</i>		
Impact characteristics	Definition	Criteria
<b>MAGNITUDE</b>	Major	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor+	Minor improvement; change not measurable; or threshold never exceeded
	Moderate+	Moderate improvement; within or better than the threshold; or no observed reaction
	Major+	Substantial improvement; within or better than the threshold; or favorable publicity
<b>SPATIAL SCALE</b>	Site or local	Site specific or confined to the project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
<b>DURATION</b>	Short term	Less than 3 years
	Medium term	3 to 15 years
	Long term	>15 years



Case 1: Tenke Fungurume Oxide Project ESIA

PART B: DETERMINING CONSEQUENCE RATING					
<i>Rate consequence based on definition of magnitude, spatial extent and duration</i>					
		SPATIAL SCALE/ POPULATION			
		Site or Local	Regional	National	
MAGNITUDE					
Minor	DURATION	Long term	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	DURATION	Long term	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	DURATION	Long term	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High
PART C: DETERMINING SIGNIFICANCE RATING					
<i>Rate significance based on consequence and probability</i>					
		CONSEQUENCE			
		Low	Medium	High	
PROBABILITY (of exposure to impacts)	Definite	Medium	Medium	High	
	Possible	Low	Medium	High	
	Unlikely	Low	Low	Medium	
PART D: CONFIDENCE LEVEL					
High		Medium		Low	

Notes: + denotes a positive impact.

In the impact assessment chapters (Chapters 8.4 – 8.6. from page 8-8, PDF: 347) the significance ratings are presented in tabular form for each of the impacts considered. Example of the table for Impact SLC1:L *Placement of infrastructure that will be removed or rehabilitated at closure, resulting in a loss of soil resource, potential change in soil characteristic, a change in land capability and a change in land use during the construction and operations periods* (page 8-9):



Case 1: Tenke Fungurume Oxide Project ESIA

**Impact ratings**

**Construction and operation**

	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+/-	Confidence
Before management	Moderate	Long-term (>15yrs)	Site/Local	High	Definite	HIGH	-	Medium
Management measures: Refer to the Environmental and Social Action Plan in Table 9-1.								
After management	Minor	Long-term (>15yrs)	Site/Local	Low	Definite	MEDIUM	-	Medium

**Closure**

	Magnitude	Duration	Scale	Consequence	Probability	SIGNIFICANCE	+/-	Confidence
Before management	Moderate	Long-term (>15yrs)	Site/Local	High	Definite	MEDIUM	-	Medium
Management measures: Refer to the Environmental and Social Action Plan in Table 9-1.								
After management	Minor	Long-term (>15yrs)	Site/Local	Medium	Definite	LOW	-	Medium

In the impact ratings tables there are ratings (low/medium/high), but at the end of the report, there is no summary of most significant impacts. Chapter 8.3.4. (page 8-8 / PDF: 347) mentions that the impacts presented in the report are the most salient ones:

*“This chapter summarizes the most salient impacts associated with the project that require intervention and management. While specialists identified and rated impacts themselves, the impacts presented in this chapter are a synthesis, rationalization and integration of the impacts and management measures identified by specialists. The general findings are mostly similar, but the impact descriptions, ratings and descriptions do differ in some instances.*

*It is important to note that the resulting significance rating of the impact is not the only criterion used to identify where the priorities for management lie. In some cases the ‘after management’ and ‘before management’ significance ratings are the same but the individual criteria making up significance, do vary. Management measures are therefore determined based on good international practice and on the ratings of the individual criteria.”*

Further examples of the impact ratings tables for each impact can be found throughout Chapters 8.4-8.6. For example Surface water page 8-22 (PDF: 361), Social conflict and vulnerable groups page 8-75 (PDF: 407).

Has a total score of significance been calculated, how?

Consequence Ratings and Significance Ratings are calculated for each impact separately but these are not combined to form an overall significance level.

Are there examples of good practices, what (tables, figures, text)?

Page 9-8 (PDF: 449): Table 9-1: Environmental and Social Action Plan, presents a summary of action plans that will be implemented to monitor and, if necessary, mitigate impacts during the construction and operation phases of the combined TFM project and the proposed TFM-OP.



<b>Case 1: Tenke Fungurume Oxide Project ESIA</b>	
	The Significance Rating for each impact is defined before and after management and both impacts are reported (Chapters 8.4. – 8.6.). The management measures (i.e. actions to be taken so that the “after management” significance score will be realised instead of the “before management” impact) are listed in the Table 9-1. Reporting both gives a good idea of the effect of the management measures. However if the significance ratings and the management measures would be summarised together somehow the benefit would be even greater.
Other, what?	Unfortunately the Significance ratings are not summarized (e.g. collected into a single summary table), which makes it hard to form an opinion of the overall significance of the impacts.
<b>Development and comparison of alternatives</b>	
What kind of alternatives were analysed?	Page 3-63 (PDF: 143): Various technically and financially feasible alternatives were investigated as part of the ESIA process. However, the different alternatives are not described or compared in the Final ESIA report. References to previous ESIA reports (the first two phase of the TFM project)
How alternatives were compared, was there any systematic approach?	No alternatives
Are there examples of good practices, what (tables, figures, text)?	No alternatives
Other, what?	-
<b>Stakeholder involvement / Public participation</b>	
Has their opinions and values (and how they affect the desirability of alternatives) described clearly, how?	Issues and Responses Report provided and updated, appendix to Final ESIA report (PDF: 739) Issues raised during scoping listed in non-technical summary Tables 11-3 (from p. 11-8, PDF: 566) and 11-4 (from p. 11-17, PDF: 575) summarize issues and concerns raised and the response of the ESIA team for both the scoping and the impact assessment phases. The issues covered include also concerns over transparency and impartiality of the ESIA consultant. The tables however contain no reference as to where in the ESIA report the issue is (potentially) covered in more detail, adding such reference would be useful (compare with Table 9-1) .
Are there examples of good practices, what (tables, figures, text)?	<ul style="list-style-type: none"> <li>• Extensive engagement during Scoping phase (ten focus group meetings)</li> <li>• Feedback sought from all stakeholders via asking for feedback on the full Draft ESIA report (14 focus group and community meetings with a total of over 1000 individuals in attendance)</li> <li>• The EIA consultant will continue to expand the stakeholder database through</li> </ul>



Case 1: Tenke Fungurume Oxide Project ESIA	
	<p>networking and referral. Information will continue to be disseminated and comments accepted throughout the consultation process. The consultant will maintain a database of all stakeholders consulted, comments received (both written and verbal), and these will be included in report submissions.</p> <ul style="list-style-type: none"> <li>• Issues and Responses Report (Appendix H, page PDF: 739) prepared and included as an appendix and summarized in the Draft ESIA report</li> <li>• The updated Stakeholder Engagement Plan is appended to the Final ESIA report (Appendix A, page PDF: 592)</li> </ul> <p>The appendixes mentioned above are included in the PDF-document accessible by the link provided at the heading row.</p>
Other, what?	<p>On page 11-16 (PDF: 574) after the issues raised during scoping table there is a statement that all the issues have been dealt with in the ESIA. However as the table 11-3 lacks references to actual ESIA report sections this is hard to verify quickly.</p>

Case 2: New Liberty Gold Mine (NLGM) EIA	
<b>Theme</b>	<p><a href="http://www.golder.com/af/en/modules.php?name=Pages&amp;sp_id=1493#/ts=1379879280251">http://www.golder.com/af/en/modules.php?name=Pages&amp;sp_id=1493#/ts=1379879280251</a></p> <p>A gold mine project located in Liberia, owned by Bea Mountain Mining Company, a wholly owned subsidiary of Aureus Mining Incorporated.</p> <p>Note: For each section referred to, page numbers are indicated both as marked on the report and as page numbers of the PDF document to make it easier to locate the section in the PDF file.</p>
Impact assessment / risk assessment	
What were the criteria used?	<ul style="list-style-type: none"> <li>• Soils</li> <li>• Surface water</li> <li>• Groundwater</li> <li>• Air quality</li> <li>• Noise</li> <li>• Terrestrial ecology</li> <li>• Aquatic ecology</li> <li>• Socio-economic</li> <li>• Cultural heritage</li> <li>• Visual aesthetics</li> </ul> <p>The impacts were assessed separately for construction + operational phase and decommissioning and closure phase. Furthermore the Resettlement Action Plan is presented together with the Socio-economic impact assessment for the project.</p> <p>Tables 42 from page 116 (PDF: 148) and 43 p. 131 (PDF: 163) list the aspects for Environmental and the Tables 44 p. 140 (PDF: 172) and 45 p. 148 (PDF: 180) for Social impact assessment for more detail along with the significance of each aspect.</p>



<b>Case 2: New Liberty Gold Mine (NLGM) EIA</b>	
Any specific method used in cumulative impact assessment?	<p>The project is located in a rural area with no other mining or industrial activities taking place in the greater area. Thus, cumulative impacts will for the most part be low or insignificant at the current time.</p> <p>Table 46 on page 152 (PDF: 184), provides statements on the predicted cumulative impacts associated with the proposed project. Some cumulative impacts related for example to terrestrial and aquatic ecology were identified. The table in itself looks like a good way to summarise the cumulative impacts at least in a similar case where there are only limited cumulative impacts predicted.</p>
Any specific method used in risk assessment?	Page 170, chapter 5.4: Narrative description of geochemistry risk assessment; no overarching risk assessment included. A very brief description of the emergency response plan is included in Chapter 15 (p. 266 / PDF: 298).
Are there examples of good practices, what (tables, figures, text)?	Chapter 7.2. from page 153 (PDF: 185) summarizes residual impacts, which are defined as those impacts that still remain significant after management measures. The chapter (mainly consisting of table 47) works as a good summary of these residual impacts. The table contains verbal descriptions, combination of these descriptions with the significance calculations summarized in tables 42-45 could be even more illustrative.
How uncertainty has been taken into account? Any specific method used to assess the importance of uncertainty?	<p>No specific methods identified</p> <p>Appendixes A and I contain statements of study limitations but there is no evaluation of uncertainty / confidence level.</p>
Other, what?	<p>Separate reports for each impact type are included with the ESIA summary report:</p> <ul style="list-style-type: none"> <li>Section A: Soil and Land Use Assessment Report</li> <li>Section B: Surface Water Assessment Report</li> <li>Section C: Groundwater Assessment Report</li> <li>Section D: Geochemical Risk Assessment Report</li> <li>Section E: Air Quality Assessment Report</li> <li>Section F: Noise Assessment Report</li> <li>Section G: Terrestrial Ecology Assessment Report</li> <li>Section H: Aquatic Ecology Assessment Report</li> <li>Section I: Social Impact Assessment Report</li> <li>Section J: Cultural Heritage Assessment Report</li> <li>Section K: Visual Assessment Report</li> <li>Section L: Closure Objectives and Costing Report</li> </ul> <p>The appended reports are accessible via the link provided at the top of this table.</p>



Case 2: New Liberty Gold Mine (NLGM) EIA

Impact significance assessment

What were the criteria used?

Methodology of significance determination is described in chapter 5.1. from page 114 (PDF: 146) as follows.

The impact significance is a product of impact severity and occurrence as follows:

- **Direction of an impact** may be positive, neutral or negative with respect to the particular impact (e.g., a habitat gain for a key species would be classed as positive, whereas a habitat loss would be considered negative).
- **Magnitude** is a measure of the degree of change in a measurement or analysis (e.g., the area of pasture, or the concentration of a metal in water compared to the water quality guideline value for the metal), and is classified as none/negligible, low, moderate or high. The categorization of the impact magnitude may be based on a set of criteria (e.g. health risk levels, ecological concepts and/or professional judgment) pertinent to each of the discipline areas and key questions analyzed. The specialist study must attempt to quantify the magnitude and outline the rationale used. Appropriate, widely-recognized standards are used as a measure of the level of impact.
- **Duration** refers to the length of time over which an environmental impact may occur: i.e. transient (less than 1 year), short-term (0 to 5 years), medium term (5 to 15 years), long-term (greater than 15 years with impact ceasing after closure of the project) or permanent.
- **Scale/Geographic extent** refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international.
- **Probability of occurrence** is a description of the probability of the impact actually occurring as either improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40 % to 60 % chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definitely occur).

**Impact significance** is then rated by the specialists using the scoring system shown in the box below.



Case 2: New Liberty Gold Mine (NLGM) EIA

Magnitude	Duration	Scale	Probability
10 Very high/ don't know	5 Permanent/ Irreversible	5 International	5 Definite/don't know
8 High	4 Long-term ( <i>impact ceases after closure of activity</i> )	4 National	4 Highly probable
6 Moderate	3 Medium-term (5 to 15 years)	3 Regional	3 Medium probability
4 Low	2 Short-term (0 to 5 years)	2 Local	2 Low probability
2 Minor	1 Transient	1 Site only	1 Improbable
1 None			0 None

Maximum SP is 100 points  
 SP>75 High environmental significance  
 SP 30 to 75 Moderate environmental significance  
 SP<30 Low environmental significance

Figure 37: Scoring System for the Assessment of Significance

After ranking these factors for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

**SP (significance points) = (magnitude + duration + scale) x probability**

The maximum value is 100 significance points (SP). The potential environmental impacts were then rated as of **High** (SP >75), **Moderate** (SP 30 – 75) or **Low** (SP <30) significance, both with and without mitigation measures on the following basis:

- **SP > 75 Indicates high environmental significance**
  - Where it would influence the decision regardless of any possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.
- **SP 30 – 75 Indicates moderate environmental significance**
  - Where it could have an influence on the decision unless it is mitigated. An impact or benefit which is sufficiently important to require management. Of moderate significance - could influence the decisions about the project if left unmanaged.
- **SP < 30 Indicates low environmental significance**
  - Where it will not have an influence on the decision. Impacts with little real effect and which should not have an influence on or require modification of the project design or alternative mitigation.
- **+ Positive impact**
  - An impact that is likely to result in positive consequences / effects.

The potential impacts associated with the project, are first summarised in the tables 42 and 43 for Environmental (Construction and operation / Decommission and closure phases separately) and tables 44 and 45 for Socio-Economic impacts and then described in the text. The summary tables show the constituents for significance



Case 2: New Liberty Gold Mine (NLGM) EIA

scores (Magnitude, Duration, Scale and Probability for each aspect) separately for the before mitigation and after mitigation situations. An excerpt from Table 42 (page 117 / PDF: 149) is reproduced below:

Potential Environmental Impact (Proposed NLGM Project)	ENVIRONMENTAL SIGNIFICANCE											
	Before mitigation						After mitigation					
	M	D	S	P	Total	SP	M	D	S	P	Total	SP
<b>3. Groundwater</b>												
Inflows of significant volumes of water into the pre-production mine workings	9	2	2	5	65	M	5	2	2	5	45	M
Lowering of the groundwater table	5	2	2	5	45	M	5	2	2	5	45	M
Contamination of surrounding aquifers	1	2	2	0	0	L	1	2	2	0	0	L
Contamination of contact / mine water	10	5	3	5	90	H	8	3	2	5	65	M
Lowering and impact of the groundwater table as a result of the TSF	6	3	2	5	55	M	6	3	2	5	55	M
Contamination of underlying aquifers from TSF	10	5	3	5	90	H	7	3	2	4	48	M
Impact on the groundwater table from WRD – enhanced artificial recharge	6	2	2	4	40	M	7	3	2	4	48	M
Contamination of underlying aquifers from WRD	10	5	3	5	90	H	6	3	2	4	44	M
<b>4. Air Quality</b>												
Potential impacts of dust releases from preparatory earthworks including soil stripping and earth excavations	6	2	2	4	40	M	6	2	2	3	30	M
Potential Impacts of dust releases during construction/ building activities	6	2	2	4	40	M	6	2	2	3	30	M
Potential impacts of dust releases from any stockpiled materials (including soil, overburden and storage materials)	6	2	2	4	40	M	6	2	2	3	30	M
Potential impacts of dust releases from erosion following area clearing (stripping of vegetation)	6	2	2	4	40	M	6	2	2	3	30	M
Potential impacts of dust releases from haul												

The text following the tables gives some more detail and states verbally the impacts significance (high, moderate, low) in the after mitigation situation. Further details are available in the appended assessment reports for each impact type.

Has a total score of significance been calculated, how?	The significance ratings for each aspect are summarized in tables 42-45 but no total score is calculated.
Are there examples of good practices, what (tables, figures, text)?	Tables 42, 43, 44 and 45 summarise the potential impacts that are related to the proposed project, and provides a significance rating for each impact before and after mitigation.
Other, what?	



**Case 2: New Liberty Gold Mine (NLGM) EIA**

**Development and comparison of alternatives**

What kind of alternatives were analysed?	Alternatives analysed are described in section 10 (from page 246 / PDF: 278). The section explains verbally what sort of decision have been made (e.g. choice of mining method between open pit and underground mining) and briefly gives some rationales for the choices made. The full impact assessment is reported only for the selected option, in some of the impact chapters brief reference is made to choices between alternatives.
How alternatives were compared, was there any systematic approach?	<ul style="list-style-type: none"> <li>• The semi qualitative comparison of the TSF (tailing storage facility) sites is presented in Table 54, page 248 / PDF: 280. The table contains only certain factors that were used in making the choice, not an assessment of impacts for the options.</li> <li>• The qualitative comparison of the alignment options of Marvoe Creek is provided in Table 55, page 249 / PDF: 281</li> <li>• Furthermore the criteria for the selection of the resettlement village location were listed but no alternative options were described.</li> <li>• The other alternatives considered were mentioned in the text but not compared</li> <li>• The main reasons why an alternative was chosen, were described</li> </ul>
Are there examples of good practices, what (tables, figures, text)?	No alternatives
Other, what?	-

**Stakeholder involvement / Public participation**

Has their opinions and values (and how they affect the desirability of alternatives) described clearly, how?	<p>Interested and Affected Parties were identified through a systematic process. The stakeholder data is managed in the stakeholder database and a wide spectrum of society is represented, both from within the project area and outside.</p> <p>During the public consultation process for the EIA, the Project was announced during September 2010 through the distribution of a Background Information Document (BID) and letters of invitation to stakeholders to participate. People were informed of the opportunity to comment through announcements on local radio and through community and focus group meetings. Approximately 250 individuals and organisations participated in the community and focus group meetings. Written comments were also received. All comments, concerns and suggestions received from stakeholders are recorded in a Comment and Response Report (Appendix F).</p> <p>The BID and comment form are also appended in the ESIA report.</p> <p>Once the government authorities have reviewed the EIS, a public meeting will be called. During the meeting, comments and issues will be recorded so that a Comment and Response Report for the impact assessment phase can be developed and relayed to stakeholders.</p>
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<b>Case 2: New Liberty Gold Mine (NLGM) EIA</b>	
Are there examples of good practices, what (tables, figures, text)?	<p>Comment and Response Report (Appendix F / PDF: 351) summarising all comments, issues and suggestions raised along with responses.</p> <p>The Background Information Document is a short leaflet (A4 page folded into three) designed to help the stakeholders get an idea of what the project is all about to be able to make a decision to contribute (or not). The BID is included as Appendix G (PDF: 375)</p>
Other, what?	<p>Local residents were trained to perform social impact assessment fieldwork (survey questionnaire, facilitate and translate in community meetings, qualitative research of local households)</p> <p>The experience and qualifications of the EIA team are presented in Appendix C which includes summary resumes of key team members. This could be helpful for the stakeholders when evaluating reliability of the presented impact assessment.</p>

<b>Case 3: Gahcho Kué diamond mine EIS</b>	
<b>Theme</b>	<p><a href="http://reviewboard.ca/registry/project_detail.php?project_id=37&amp;doc_stage=5">http://reviewboard.ca/registry/project_detail.php?project_id=37&amp;doc_stage=5</a></p> <p>De Beers' diamond project in the Mackenzie Valley, North-Western Territories, Canada.</p> <p>The project would entail mining of three kimberlite pipes for diamonds and the dewatering (and subsequent refilling) of considerable parts of Kennady Lake as the ore largely lies below the lake bottom.</p>
<b>Impact assessment / risk assessment</b>	
What were the criteria used?	<p>Method and approach are described in Section 6 <a href="http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_6_Assessment_Approach_and_Methods_1294329668.PDF">http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_6_Assessment_Approach_and_Methods_1294329668.PDF</a></p> <p>The impacts of the project are described in terms of <i>key lines of inquiry</i> and <i>subjects of note</i>. These have been determined in a consultative process at the Terms of Reference phase (see below on Stakeholder engagement). The EIS structure is built around these key lines of inquiry (KLOI) and subjects of note (SON) so that each KLOI and SON is reported as a standalone assessment with as little cross-referencing as possible. A similar structure and organisation of the EIS is in use in some of the newer EIS undertaken in the North-West Territories, as opposed to the typical structure where issues are organized into biophysical and socio-economic components, and then analysed and assessed effects in separate sections of the EA report (e.g., sections on water quality, hydrology, soils, noise, wildlife, heritage resources, and traditional land use). This discipline-based format is also commonly used in many other jurisdictions. Linkages and cross-referencing among component sections are common with this type of report structure. The new EIS approach evolved from the issue scoping process for the Project conducted by the Mackenzie Valley</p>



### Case 3: Gahcho Kué diamond mine EIS

Environmental Impact Review Board (MVEIRB), which included technical workshops in Yellowknife and community workshops.

Relevant impact types and disciplines are thus dealt with for each KLOI and/or SON. Thus, within each KLOI and SON, several assessment criteria are used. Where the same issue is relevant for several KLOIs or SONs, detailed summaries of analysis described elsewhere in the report is provided. Furthermore a number of *remaining issues* have to be analysed to such an extent as to ensure whether significant impacts are likely to arise. A KLOI or SON may include a number of environmental components that were not combined in previous assessments (e.g., one KLOI includes a combination of biophysical and socio-economic effects). A SON may also consist of a topic not usually isolated in previous assessments.

The **Key Lines of Inquiry** (KLOIs) are the following:

Biophysical

- Caribou
- Water Quality and Fish in Kennady Lake
- Downstream water effects
- Long-term biophysical effects and closure issues

Socio-economic

- Long-term social, economic and cultural effects
- Family and community cohesion
- Social disparity

The **Subjects of Note** are the following:

Biophysical

- Impacts on Great Slave Lake
- Alternative energy sources
- Air quality
- Mine rock and processed kimberlite storage
- Permafrost, groundwater and hydrogeology
- Vegetation
- Traffic and road issues
- Waste management and wildlife
- Carnivore mortality
- Other ungulates
- Species at risk and birds
- Climate change impacts

Socio-economic

- Employment, training and economic development
- Impacts on tourism and wilderness character
- Demands on infrastructure
- Culture, heritage and archaeology
- Proposed National Park

For the KLOIs and SONs, **valued components** are identified. Valued components represent physical, biological, cultural, social, and economic properties that society considers to be important. Valued components were selected to focus the EIS on the



Case 3: Gahcho Kué diamond mine EIS

key issues that were raised through the concerns of communities, individuals, government, and other stakeholders. For each valued component **assessment endpoints** and **measurement endpoints** are then defined. Valued component assessment endpoints are general statements about what is being protected for future human generations (i.e., assessment endpoints incorporate sustainability). For example, protection of water quality, persistence of wildlife populations, and continued opportunities for traditional use of these resources may be assessment endpoints for surface water, wildlife, and traditional use. Identification of assessment endpoints for VCs in the EIS was determined primarily from the outcome of the community, public, and regulatory engagement process. Measurement endpoints are defined as quantifiable (i.e., measurable) expressions of changes to assessment endpoints.

See example:

**Table 6.3-1 Example of Valued Component, Assessment and Measurement Endpoints Associated with the Key Line of Inquiry for Caribou**

Key Line of Inquiry	Valued Component	Assessment Endpoints	Measurement Endpoints
Caribou	Caribou	<ul style="list-style-type: none"> <li>• Persistence of Caribou Populations</li> <li>• Continued Opportunity for Traditional and Non-traditional Land Use of Caribou</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat quantity and fragmentation</li> <li>• Habitat quality</li> <li>• Movement and behavior</li> <li>• Survival and reproduction</li> <li>• Access to caribou</li> <li>• Availability of caribou</li> <li>• Human health</li> </ul>

For the valued components, a **pathway analysis** is then performed. Relevant pathways can be described as:

Project activity => Change in environment => Effect on a valued component

Pathway analysis is a screening step that categorises all possible pathways into primary pathways, secondary or minor pathways, and no linkage findings. For the primary pathways identified a further **effects analysis** is then undertaken. Depending on the spatial and temporal scales involved, cumulative effects with other projects may also be needed.

Following the effects analysis, a summary of residual effects is provided for each KLOI and SON. Results from the effects analyses were used to describe the magnitude, duration, and geographic (spatial) extent of the predicted residual changes to valued components.

Through this process the issues that need to be analysed and assessed for each key line of inquiry and subject of note are defined. These are described in each Section 7-12 of the EIS.

For example for the KLOI Water quality and Fish in Kennady Lake (Section 8, [http://reviewboard.ca/upload/project\\_document/EIR0607-001\\_EIS\\_Section\\_8\\_Water\\_Quality\\_and\\_Fish\\_in\\_Kennady\\_Lake\\_1294330874.PDF](http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_8_Water_Quality_and_Fish_in_Kennady_Lake_1294330874.PDF)) the Valued Components (VCs) are defined to **Water quality** and **Fish**.

The key biophysical components that influence Water Quality in the project area are:



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- permafrost;
- groundwater quality and quantity (i.e., groundwater and hydrogeology);
- water levels and flow patterns (i.e., hydrology);
- water chemistry; and
- sediment quality.

For the valued component (VC) represented by fish includes individual fish species, because interactions between each Project activity and the unique habitat requirements and life history characteristics of fish can be fully assessed only at the species level. For the fish species found in the project area, an analysis (see Section 8.5.2.2.3 from page 8-181 and Table 8.5-1) was performed and three of the eight species present were determined to be VCs.

Fish habitat is not a VC for this assessment, because it is the fish that are ultimately valued by people rather than the habitat that supports them. Fish habitat is represented by the streams and lakes within the Kennady Lake watershed for this key line of inquiry. While these streams and lakes undoubtedly have value to people, it is their ability to support fish that is most important. Fish habitat is a key biophysical component that contributes to fish species selected as VCs. As such, changes to fish habitat is a measurement endpoint that is used to determine Project-related effects to fish species.

**Table 8.5-2 Aquatic-based Assessment Endpoints and Measurement Endpoints for Valued Components Identified for Water Quality and Fish in Kennady Lake**

Valued Components	Key Biophysical Components	Assessment Endpoints	Measurement Endpoints
Water Quality Fish (lake trout, Arctic grayling and northern pike)	<ul style="list-style-type: none"> <li>• Permafrost</li> <li>• Hydrogeology and Groundwater</li> <li>• Surface Water Quantity</li> <li>• Sediment Quality</li> <li>• Aquatic Health</li> <li>• Fish Habitat</li> </ul>	<ul style="list-style-type: none"> <li>• Suitability of Water Quality to Support a Viable Aquatic Ecosystem</li> <li>• Abundance and Persistence of Desired Population(s) of Lake Trout</li> <li>• Abundance and Persistence of Desired Population(s) of Northern Pike</li> <li>• Abundance and Persistence of Desired Population(s) of Arctic Grayling</li> </ul>	<ul style="list-style-type: none"> <li>• permafrost depth and distribution, location and size of taliks near waterbodies and watercourses</li> <li>• groundwater level and flow rate, groundwater quantity and quality</li> <li>• surface topography, drainage boundaries, an waterbodies (e.g., streams, lakes, and drainages), stream flow rates, and spatial and temporal distribution of surface water, shoreline and channel morphology</li> <li>• physical characteristics of water (e.g., pH, conductivity, turbidity), concentrations of major ions, nutrients, total and dissolved metals and trace organic compounds in water</li> <li>• physical and chemical properties of sediment</li> <li>• physical aquatic habitat characteristics, habitat quantity and quality</li> <li>• plankton community structure and composition</li> <li>• benthic invertebrate community structure and composition</li> <li>• fish habitat availability and use</li> <li>• fish numbers, movement and behaviour, fish survival and reproduction, fish reproductive condition and health</li> <li>• access to fish and wildlife</li> <li>• human health</li> </ul>

Table 8.6-1 from page 8-197 contains the pathway analysis for the KLOI Water quality and Fish in Kennady Lake for construction and operations phase. Of the 35 potential pathways identified, 9 were considered primary and effects analysis was performed. A justification of why the pathway was considered no linkage or secondary is provided for the remaining 26 potential pathways. Similarly for closure phase 29 potential pathways were analysed (Table 8.6-4, p 8-231) and 16 of these were defined primary.



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	<p>It should be noted that the KLOIs and SONs are project specific and have to be defined on a case to case basis. They have been developed through an extensive consultation process.</p>
<p>Any specific method used in cumulative impact assessment?</p>	<p>Cumulative impacts are assessed in Section 13 (<a href="http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_13_Cumulative_Effects_1294330838.PDF">http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_13_Cumulative_Effects_1294330838.PDF</a>)</p> <p>The <i>Terms of Reference for the Gahcho Kué Environmental Impact Statement</i> require that each key line of inquiry and subject of note be a stand-alone assessment, and must address cumulative effects from past, present, and reasonably foreseeable future developments. The Terms of Reference also require a stand-alone assessment of the cumulative effects from the proposed development. The cumulative effects section must provide sufficient information to allow (..) to evaluate the significance of the proposed development’s cumulative effects, without having to refer to other sections extensively (Gahcho Kué Panel 2007). Section 13 outlines, in general, the overall approach to the cumulative impact assessment and significance determination that was used in the key lines of inquiry and subjects of note. Details that are specific to each key line of inquiry and subject of note are provided in their respective sections and sub-sections.</p> <p>The cumulative impacts assessment in the Gahcho Kué EIS is broadly defined. It considers both human induced and natural developments. The EIS defines Cumulative effects as follows:</p> <p style="padding-left: 40px;"><i>“Cumulative effects are those effects that result from a combination of the Project with other past, present, and reasonably foreseeable future developments. They may be biophysical, socio-cultural or economic in nature. Cumulative effects represent the sum of all natural and human induced influences on the physical, biological, social, cultural, and economic components of the environment through time and across space. Some changes may be human-related, such as increasing mineral development or implementing new policy, and some changes may be associated with natural phenomena such as extreme rainfall events, and periodic harsh and mild winters. It is the goal of the cumulative effects assessment to estimate the contribution of these types of effects, in addition to Project effects, to the amount of change in the valued components of the biophysical, socio-economic, and cultural environments.”</i></p> <p>A cumulative effects assessment follows the following steps:</p> <ul style="list-style-type: none"> <li>• identify the valued components (VCs) for the proposed project,</li> <li>• determine what other past, present, and reasonably foreseeable future developments could affect the VCs,</li> <li>• predict the effects of the proposed project in combination with these other developments, and</li> <li>• identify ways to manage the combined effects.</li> </ul>



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	<p>Section 13.2. introduces the approach to cumulative impact assessment and discusses</p> <ul style="list-style-type: none"> <li>• Spatial boundaries               <ul style="list-style-type: none"> <li>○ Local, regional and beyond regional; mostly regional scale used in considered for cumulative impacts, however in certain cases (e.g. widely ranging animals such as caribou, wolves, grizzly bears) the beyond regional scale is utilised</li> </ul> </li> <li>• Temporal boundaries               <ul style="list-style-type: none"> <li>○ In terms of project phases (construction / operations / closure) and of the predicted duration of effects from the Project on a Valued Component (which may extend beyond closure).</li> <li>○ Note is made to consider changes independent of the Project which are always ongoing in the environment; Return or recovery to pre-Project conditions may not be possible or even desirable.</li> </ul> </li> <li>• Assessment cases               <ul style="list-style-type: none"> <li>○ Baseline case (including all previous and existing developments, including any approved projects);</li> <li>○ Application case (Baseline case + Gahcho Kué project);</li> <li>○ Future case (Application case + reasonably foreseeable projects)</li> </ul> </li> </ul>
Any specific method used in risk assessment?	-
Are there examples of good practices, what (tables, figures, text)?	<p>The presentation in tabular form of the pathway analysis and the effects derived for the valid pathways help in following the analysis (see e.g. table 8.6-1 on page 8-197 on pathways and 8.6-3 on page 8-230 on the resulting effects. These are again summarized for each component in the effects analysis chapters, for example in table 8.7-1 (p 8-249) as related to water quantity. Although some of the information is thus repeated in a text that is already massive, this significantly helps the reader to follow through the analysis.</p> <p>A glossary of terms is provided with each section, making it easier for the reader to concentrate on only the sections of interest.</p>
How uncertainty has been taken into account? Any specific method used to assess the importance of uncertainty?	<p>General approach to uncertainty is presented in Section 6.8.</p> <p>For each Key Line of Inquiry (KLOI) and Subject of Note (SON) (see above, a discussion of uncertainty is provided as) as most assessments of impacts embody some degree of uncertainty. The purpose of the uncertainty sections of the EIS is to identify the key sources of uncertainty and discuss how uncertainty is addressed to increase the level of confidence that effects will not be worse than predicted. Confidence in effects analyses can be related to many elements, including e.g. adequacy of baseline data, model inputs, understanding of Project-related impacts on complex ecosystems and knowledge of the effectiveness of the environmental design feature for reducing or removing impacts.</p> <p>Uncertainty in these elements can result in uncertainty in the prediction of environmental significance. Where possible, a strong attempt is made to reduce uncertainty in the EIS to increase the level of confidence in impact predictions, as shown in the following examples:</p>



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	<ul style="list-style-type: none"> <li>• using the results from several models and analyses to help reduce bias and increase precision in predictions;</li> <li>• using data from effects monitoring programs at existing mines and the literature as inputs for models rather than strictly hypothetical or theoretical values; and</li> <li>• implementing a conservative approach when information is limited so that impacts are typically overestimated.</li> </ul> <p>Where appropriate, uncertainty may also be addressed by additional mitigation, which would be implemented as required.</p>
Other, what?	<p>The entire structure of the EIS is based on comprehensive assessments of key lines of inquiry and subjects of note which are then analysed for valued components, pathways and effects is an interesting approach rather different from the Finnish EIA practice. As the key lines of inquiry and subjects of note are developed for each project based on an extensive stakeholder project, the approach appears to be much more complex and time consuming than the typical discipline based approach.</p> <p>However the approach could well be worth consideration in certain cases where high level stakeholder concern may threaten the entire project. In such cases it is absolutely necessary to make sure the impact assessment addresses all of the issues of most importance to the stakeholders and in a way that is understandable and acceptable to the stakeholders. It should be noted that also expert bodies are involved in the process, which ensures inclusion of subjects outside the interest of the local communities too (such as protection of such species that are of no particular interest to the local people). Possibly a mixed approach could also be considered where the typical discipline based approach is mostly used but certain focus issues would be considered in the form similar to the Key Line of Inquiry approach used in the Gahcho Kué case. This could be particularly useful if an aspect of the socio-ecological system in question would have both biophysical and socio-economic components.</p> <p>In the Gahcho Kué case each of the KLOI Sections is a sizable report in itself. For example Section 8 on KLOI Water Quality and Fish in Kennady Lake has 573 pages which includes methodology and approach, description of the environment and of the project relevant to the KLOI (each KLOI was required to be assessed in a stand-alone comprehensive assessment with minimal cross-referencing as required by the Terms of Reference document) and descriptions of the assessment including pathway and effects assessment and then the residual impacts with their environmental significance and a discussion of the uncertainty related to this KLOI.</p> <p>Where there is overlap between this key line of inquiry and another key line of inquiry or subject of note, information will be provided in both locations. The most comprehensive analysis with greatest detail will be provided once in the most appropriate location, but summaries will be provided in all other key lines of inquiry and subjects of note as required by the final Terms of Reference. For example, downstream effects will be addressed in detail in the Key Line of Inquiry: Downstream Water Effects. However, a similar requirement for downstream effects is included in the Terms of Reference for the Kennady Lake key line of inquiry. This will be addressed by a summary and a reference to the location of the in-depth analysis.</p>



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Impact significance assessment

What were the criteria used?

General approach to significance of impacts is described in Section 6.7 (see Section 6 at [http://reviewboard.ca/upload/project\\_document/EIR0607-001\\_EIS\\_Section\\_6\\_Assessment\\_Approach\\_and\\_Methods\\_1294329668.PDF](http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_6_Assessment_Approach_and_Methods_1294329668.PDF))

In the Gahcho Kué EIS, the analysis often called assessment of significance in other ESIA's is divided into several parts. First the effects identified as being caused by the project (via the pathway analysis and effects analysis as described above) will undergo **residual impact classification**. **Environmental significance is then determined** for the classified impacts.

**Residual impact classification**

In the EIS, the term "effect" used in the effects analyses and residual effects summary is regarded as an "impact" in the residual impact classification. An effect represents an unclassified change in a valued component VC (see above). The term "impact" is only used during the classification process. Therefore, in the residual impact classification, all residual effects are discussed and classified in terms of impacts to VCs. The impact classification and determination of significance is performed only for residual effects, i.e. after the environmental design features and mitigation has been taken into account. Effects that can be prevented or rendered negligible by incorporation of such features or mitigation measures are not included (for example an effluent flow for which an efficient treatment facility is added, is not included, provided that after treatment the water can be considered cleaned and has no or only negligible effect on receiving watercourse).

The purpose of the residual impacts classification is to describe the residual effects from the Project on the VCs using a scale of common words (rather than numbers and units). The classification of impacts is based on the following criteria specified in the Terms of Reference:

- direction;
- magnitude;
- geographic extent;
- duration;
- reversibility;
- frequency;
- likelihood; and
- ecological context.

These criteria are defined and explained in Section 6.7.2. which includes generic definitions, with more specific details on the scale of each criteria provided in the sections for each Key Line of Inquiry (KLOI) and Subject of Note (SON). The definitions for these scales are ecologically or logically based on the characteristics of the VC in question and the associated assessment endpoint, although the use of professional judgment is inevitable in some cases.

The classification of residual impacts on primary pathways provides the foundation for determining environmental significance from the Project on assessment endpoints.



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Magnitude, geographic extent, and duration are the principal criteria used to predict significance. Other criteria, such as frequency, ecological context, and likelihood are used as modifiers (where applicable) in the determination of significance.

Frequency may or may not modify duration, depending on the magnitude of the impact. Because the EIS assesses impacts to key VCs of concern, the ecological context is high, by definition. However, ecological context may be used to modify the environmental significance if the societal value is associated with traditional land use.

Likelihood will also act as a modifier that can influence environmental significance. Environmental impact assessment considers impacts that are likely or highly likely to occur; however, within the definition of likelihood there can be a range of probabilities that impacts will occur. In special circumstances, the environmental significance may be lowered if an impact is considered to have a very low likelihood of occurring, and increased for impacts with a very high likelihood of occurring. Furthermore, Section 6.7.3 provides further discussion as to residual impact classification and resilience.

The impacts are described using a scale of common words (as opposed to numbers or units) such as “moderate”, “likely” or “regional”. The definition of what constitutes e.g. a “regional” geographic extent for each Valued Component (in each KLOI or SON) is separately presented for each context.

In some of the sections, the methodology description mentions that the residual impact classification criteria are combined to classify “environmental consequence” which is then evaluated to determine finally the environmental significance. However the consequence classification is omitted in several of the sections and these present only the impact classification for the classification criteria (see above) and proceed directly to an evaluation of significance. Thus, for many of the sections, the classification result consists of seven verbal “grades” for each assessment endpoint. For example in KLOI Caribou (Section 7) the effects pathway “*Winter road footprint causes habitat fragmentation, which changes behaviour and movement, and reduces carrying capacity*” is classified to be Negative (in Direction), Low (in Magnitude), Regional, Medium-Term in Duration, Periodic (winter season only), Reversible and Likely but no overall classification for environmental consequence is given (Table 7.7-2 on page 7-163).

Classification of socio-economic residual effects and determination of significance generally follows the methods used for biophysical VCs; however, there are some differences in the selection and definitions of impact criteria. For socio-economic VCs, direction, magnitude, geographic extent, and duration are the criteria used to classify impacts and evaluate the significance of changes to assessment endpoints. The assessment of significance considers the scale of these criteria (e.g., low magnitude, regional geographic extent, and long-term duration) and professional opinion, which is based on the context of the communities involved, and the informed value and judgements of interested and affected organizations and specialists. The level of significance also assesses the efficacy of the proposed environmental design features (i.e., policies, practices, and investments) and benefit enhancement programs to limit negative impacts and foster positive impacts on the continued persistence of long-term sustainable social, cultural, and economic features of the environment.

For the KLOI Water quality and Fish in Kennady Lake (Section 8, [http://reviewboard.ca/upload/project\\_document/EIR0607-](http://reviewboard.ca/upload/project_document/EIR0607-)



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[001\\_EIS\\_Section\\_8\\_Water\\_Quality\\_and\\_Fish\\_in\\_Kennady\\_Lake\\_1294330874.PDF](#)  
the more detailed definitions of the classification criteria are laid out in Table 8.14-1 on page 8-488 for direction, geographic extent, duration, reversibility, frequency, likelihood and ecological context. The scales for magnitude are defined in Table 8.14-2 on page 8-489, because the definition of what should be considered low, moderate or high magnitude varies between the VCs and have to be defined separately for each. For example the definitions for geographic extent for this KLOI are defined as follows (Table 8.14-1):

*Geographic Extent*

Local:

projected impact is confined to watersheds upstream of the outlet of Lake 410; small scale direct and indirect impacts from the Project (e.g., footprint, dust deposition, dewatering)

Regional:

projected impact extends beyond Lake 410 to the inlet to Aylmer Lake; the predicted maximum spatial extent of combined direct and indirect impacts from the Project that exceed local scale effects

Beyond Regional:

projected impact extends into Aylmer Lake and beyond; cumulative local and regional impacts from the Project and other developments extend beyond the regional scale

The context-dependent definitions for all the classification criteria are similarly defined for all criteria in each of the KLOIs and SONs separately.

The classification of residual impacts on the valued components (VC's) defined for the KLOI Water quality and Fish in Kennady Lake is summarised in Table 8.14-5 on page 8-494 with description and short justification given in the text of Section 8.14. The classification is performed (in this KLOI) for two time periods: from initiation of the project to 100 years later; and beyond 100 years. For different KLOIs and SONs, various temporal contexts may be used. In the KLOIs and SONs sampled as part of this case study, the classification was performed either for one timeframe only or for the same two timeframes of "first 100 years" and "beyond 100 years".

**Environmental significance**

The significance of the Project's impacts will ultimately be determined by the Gahcho Kué Panel. The panel is an independent body consisting of seven members that is responsible for assessing the potential impacts of the proposed Project and appointed by the Mackenzie Valley Environmental Impact Review Board (the authority responsible for the environmental impact review process). In the Mackenzie Valley Environmental Impact Review Board (MVEIRB 2006) reference bulletin on interpretation of key terminology, the term "significant" means an impact that is, in the view of the MVEIRB, important to its decision. To determine significance, the MVEIRB (2006) "will use its own values and principles of good EIA. It will use its combined experience and knowledge". Presumably the determination of significance will be made in a similar manner by the Gahcho Kué Panel.

However as per the Terms of Reference for the EIS, the project proponent must provide their own view on the significance of the impacts and for this end environmental significance is determined in the EIS.

The definition of significance is largely based on the residual impact classification



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process (see above). The process differs slightly between the biophysical and the socio-economic issues. The general approach to significance is provided in Section 6.7.4 (from page 6-25) and more specific definitions related to each context are described for each KLOI and SON in their related sections.

*Environmental significance is used to identify predicted impacts that have sufficient magnitude, duration, and geographic extent to cause fundamental changes to a Valued Component. Significance is determined by the risk to the persistence and function of populations (i.e., population level effects) within aquatic and terrestrial ecosystems, or the socio-economic system. It is difficult to provide generalized definitions for environmental significance that are universally applicable to each VC assessment endpoint. Consequently, specific definitions are provided for each assessment endpoint in each KLOI or SON.*

Some of the key factors considered in the determination of environmental significance include:

- Results from the residual impact classification of primary pathways are used to evaluate the significance of impacts from the Project on the assessment endpoint of VCs.
- Magnitude, geographic extent, and duration (which includes reversibility) of the impact are the principal criteria, with frequency and likelihood as modifiers.
- Professional judgment, experienced opinion, and ecological principles, such as resilience, are used to predict the duration and associated reversibility of impacts.

Section 8.14.4. contains determination of environmental significance for the KLOI Water quality and Fish in Kennady Lake. The evaluation of significance for this key line of inquiry considers the entire set of primary pathways that influence a particular assessment endpoint, but does not assign significance to each pathway. The relative contribution of each pathway is used to determine the significance of the Project on assessment endpoints, which represents a weight of evidence approach. For example, a pathway with a high magnitude, large geographic extent, and long-term duration would be given more weight in determining significance than pathways with smaller scale effects. The relative impact from each pathway is discussed; however, pathways that are predicted to have the greatest influences on changes to assessment endpoints would be assumed to contribute to most to the determination of environmental significance.

The assessment endpoints for which significance is determined are for this KLOI

- suitability of water quality to support a viable aquatic ecosystem;
- persistence and abundance of desired population(s) of Arctic grayling;
- persistence and abundance of desired population(s) of lake trout; and
- persistence and abundance of desired population(s) of northern pike.

The impacts on the fifth assessment endpoint, “suitability of water and fish for human and wildlife consumption”, are primarily covered in other KLOIS and SONs and only summarized in Section 8.

Environmental significance is used here to identify projected impacts that have sufficient magnitude, duration, and/or geographic extent that they could lead to fundamental changes to the VCs. For example, significance is determined by the risk to the persistence of fish populations within the aquatic ecosystem.

The following definitions are used for assessing the significance of effects on the protection of surface water quality for aquatic and terrestrial ecosystems, and human



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	<p>use are as follows.</p> <p><b>Not significant</b> – impacts are measureable at the local scale, and may be strong enough to be detectable at the regional scale.</p> <p><b>Significant</b> – impacts are measurable at the regional scale and are irreversible. A number of high magnitude and irreversible effects (i.e., pathways) at the regional scale would be significant.</p> <p>The following definitions are used for assessing the significance of impacts on the persistence of VC fish populations, and the associated continued opportunity for traditional and non-traditional use of these VCs.</p> <p><b>Not significant</b> – impacts are measurable at the individual level, and strong enough to be detectable at the population level, but are not likely to decrease resilience and increase the risk to population persistence.</p> <p><b>Significant</b> – impacts are measurable at the population level and likely to decrease resilience and increase the risk to population persistence. A high magnitude and irreversible impact at the population level would be significant.</p> <p>Considered over the classification timeframes of “first 100 years from project onset” and “beyond 100 years”, the impacts of the project on any of the four assessment endpoints (suitable water quality and the three fish species) were <b>not considered to be environmentally significant</b>. Short justification is presented in Section 8.14.4. All of the fish species are expected to persist in the area outside the Project footprint and be able to become re-established Lake Kennady after the lake is refilled, although possibly after a considerable length of time.</p> <p>As part of this case study the following biophysical KLOIs and SONs were sampled considering the environmental significance assessment: Caribou (Section 7, p. 7-170), Species at risk and Birds (Section 11.12, p. 11.12-153), Air quality (Section 11.4, p. 11.4-73). Within the sampled assessment, no residual biophysical impacts were considered to be environmentally significant.</p> <p>Section 18 contains all three socio-economic KLOIs and five SONs. A summary of the valued components and associated residual effects is presented in Table 12.8-1 on page 12-309. On this summary, one residual effect was considered significant (positive effect on VC Government Revenues).</p> <p>The Gahcho Kué Panel has issued their Report on the Environmental Impact Review on 9 July 2013 (<a href="http://reviewboard.ca/upload/project_document/EIR0607-001_Gahcho_Kue_Diamond_Mine_Project_Report_of_EIR.PDF">http://reviewboard.ca/upload/project_document/EIR0607-001_Gahcho_Kue_Diamond_Mine_Project_Report_of_EIR.PDF</a>) which contains the Panel’s view on the significance of the impacts. The criteria by which the Panel considers the significance are the same as described above.</p>
<p>Has a total score of significance been calculated, how?</p>	<p>No total score of significance has been presented for the entire project. The overall structure of the EIS is formed around Key Lines of Inquiry (KLOI) and Subjects of Note (SON). Within each KLOI and SON the environmental significance is assessed for all related Valued Components or their measurement endpoints.</p>
<p>Are there examples of good practices, what (tables, figures, text)?</p>	<p>The step by step determination of the pathways, effects, residual effects, impact classification and significance is thoroughly reported. However the final step of determining significance as based on the verbal classification of residual impacts is not always very clear or intuitive. However this may be partially due to the reviewer’s experience which has concentrated in regimes where the threshold of significance is lower than applied in this case.</p>



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<p>Other, what?</p>	<p>Based on the sampling of several sections done as part of this case study, practically all residual impacts were assessed to be not environmentally significant and thus the overall finding on significance (if such were given) would be expected to result in the statement that the impacts are not environmentally significant. This indicates that the “significance threshold” for all KLOIs and SONs has been fairly high.</p> <p>It should be noted that the environmental significance of project impacts was, at least in many of the cases, not performed for the situation where the Project is on-going. The timeframes for residual impact classification and significance assessment were defined as the first 100 years from project onset and beyond 100 years. Thus as it was forecasted that e.g. the fish species of note would be able to re-establish in the Kennady Lake in the decades following refilling, and thus the fish would persist regionally. Therefore the impact on these fish species was deemed to be not significant. In many other EIAs the threshold of what shall be considered “significant” is often lower.</p>
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**Development and comparison of alternatives**

<p>What kind of alternatives were analysed?</p>	<p>Section 2 (<a href="http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_2_Project_Alternatives_1294329640.PDF">http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_2_Project_Alternatives_1294329640.PDF</a>) describes the development of project alternatives in its 49 pages. The section describes the planning and decisions made from 2000 through to the submission of the environmental impact statement in 2010. The section presents also alternatives that were investigated and dismissed early as a result of technical and/or economic unfeasibility.</p> <p>As per the Terms of Reference, both alternatives to the Project (i.e., functionally different ways to meet the Project need and achieve the Project purpose), and individual development components and activities of the Project (i.e., alternative means) are discussed, including</p> <p>Alternatives to the project:</p> <ul style="list-style-type: none"> <li>• Change in the timing of the Project to a later date;</li> <li>• Cancellation of the Project; and</li> <li>• Full accounting of potential opportunity costs in consideration of possible effects on:             <ul style="list-style-type: none"> <li>○ eco-tourism;</li> <li>○ outfitting activities; and</li> <li>○ traditional harvesting.</li> </ul> </li> </ul> <p>Alternative means of carrying out the project, related to</p> <ul style="list-style-type: none"> <li>• Mining Methods;             <ul style="list-style-type: none"> <li>○ Open pit / Underground</li> <li>○ Mining sequence (order in which the kimberlite pipes are mined)</li> <li>○ Extraction rates</li> </ul> </li> <li>• Water Management;             <ul style="list-style-type: none"> <li>○ Dewatering of the Kennady lake: which areas to dewater (5 combinations)</li> <li>○ Discharge of water from Kennady lake: 3 alternative outlets</li> <li>○ Refilling: natural inflow by restoring natural drainage, or natural + augmented inflow by pumping</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>• Management of Mine Rock and Processed Kimberlite (PK);             <ul style="list-style-type: none"> <li>○ Four options for disposal structures</li> </ul> </li> <li>• Employee Work Schedule; and             <ul style="list-style-type: none"> <li>○ Two weeks on, two weeks off / Four days on, three days off / Daily</li> </ul> </li> <li>• Transportation of Workers and Material.             <ul style="list-style-type: none"> <li>○ Alternative transport methods (rejected)</li> <li>○ Alignment alternatives (3 routes) for the winter road</li> </ul> </li> </ul> <p>Each of these topics is discussed and rationale for the chosen option is briefly presented.</p> <p>The environmental considerations that influenced the project design are introduced in Section 2.4.</p> <p>Furthermore a discussion of alternative energy sources and energy conservation methods is covered in Section 11.3.</p>
<p>How alternatives were compared, was there any systematic approach?</p>	<p>There is no overall comparison of main project alternatives. For each of the factors considered, a brief discussion of the factors affecting the choice is included in Section 2. The Chosen Option is introduced with short description of the rationale for the choice. Mostly the rationale is given in qualitative terms but some quantitative data are given, related mostly to feasibility of each considered option.</p>
<p>Are there examples of good practices, what (tables, figures, text)?</p>	
<p>Other, what?</p>	<p>Section 2.2.3 Full accounting of Future Opportunity Costs appears interesting. The Section, along with a more detailed analysis in Section 12. considers:</p> <p><i>“Specific issues relating to the impact on eco-tourism, outfitting, and traditional harvesting activities; most specifically, the opportunity costs of proceeding with the Project in lieu of potential eco-tourism, outfitting, and traditional harvesting activities. A full accounting of potential opportunity costs to communities and governments associated with the development is provided in greater detail in Section 12.</i></p> <p><i>Opportunity cost is the consideration of making another choice and trying to predict a future based upon that choice. In the case of the Project, this is equivalent to addressing the alternative economic development opportunities that will not proceed if the Project goes ahead. The expected value of the Project, if it proceeds, includes substantial local employment opportunities within the mine, supporting services and businesses, as well as many millions of dollars of labour income, local business profits, and tax revenue.”</i></p> <p>This consideration is presented rather briefly in Section 2, however the underlying idea and the more detailed consideration in Chapter 12 appears interesting.</p>

**Stakeholder involvement / Public participation**

<p>Has their opinions and values (and how they affect the desirability of</p>	<p>The entire EIS is based upon Terms of Reference (ToR) which have been developed by an independent Panel. The scoping phase, including a number of scoping workshops, was undertaken by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) which is the authority responsible for the Environmental Impact</p>
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alternatives) described clearly, how?

Review. The regulatory process is described in Section 1 – Introduction ([http://reviewboard.ca/upload/project\\_document/EIR0607-001\\_EIS\\_Section\\_1\\_Introduction\\_1294329672.PDF](http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_1_Introduction_1294329672.PDF)) in 1.4.1. from page 1-28.

The MVEIRB conducted five scoping workshops (a three-day technical scoping workshop and four community workshops) The workshop participants identified and classified environmental and social issues related to the proposed Project and were then asked to rank and prioritize these issues. Based on the scoping process the MVEIRB concluded (see Report on Gahcho Kué Environmental Assessment, [http://reviewboard.ca/upload/project\\_document/EA0506-008\\_Report\\_of\\_Environmental\\_Assessment\\_1305582356.pdf](http://reviewboard.ca/upload/project_document/EA0506-008_Report_of_Environmental_Assessment_1305582356.pdf)) that the proposed Project would likely cause significant public concern and ordered a detailed Environmental Impact Review to be conducted in summer 2006. This initial scoping phase (initiation of the environmental assessment to decision that EIR be required) took about half a year.

For the purposes of the EIR, the MVEIRB appointed the Gahcho Kué Panel in May 2007. The Gahcho Kué Panel is an independent body consisting of seven members that is responsible for assessing the potential impacts of the proposed Project. The Gahcho Kué Panel issued a work plan for the EIR, and the proposed Terms of Reference for the EIS was circulated for De Beers and other participants to provide comment in July 2007.

The Terms of Reference for the EIS was released on October 5, 2007 ([http://reviewboard.ca/upload/project\\_document/EIR0607-001\\_Gahcho%20Kue%20final%20EISTerms%20of%20Reference\\_1191623578.pdf](http://reviewboard.ca/upload/project_document/EIR0607-001_Gahcho%20Kue%20final%20EISTerms%20of%20Reference_1191623578.pdf)).

The Terms of Reference contain the **Key Lines of Inquiry (KLOI)** and the **Subjects of Note (SON)** that have been assessed in the EIS as with the requirement that these KLOIs and SONs have to be reported comprehensively. Thus the entire EIS forms a response to the issues and concerns raised during the scoping phase, which has been undertaken by the authority and subsequently by the Panel appointed by the authority, and not by the project proponent. The scoping phase, including the Environmental Assessment where it was decided that full EIR is needed, and the preparation of the ToR for the EIS by the Panel, was a major process on its own lasting 22 months.

The stakeholders involved in the scoping phase include a number of authorities and other official bodies, First Nations and other Aboriginal groups etc. so the issues have been identified by a wide representation of the different stakeholders to the project.

The project proponent has then undertaken to prepare the Environmental Impact Statement EIS according to the Terms of Reference. After the submission of the EIS the Panel has conducted a conformity check of the EIS to determine whether the ToR have been met and issued a deficiency statement

([http://reviewboard.ca/upload/project\\_document/EIR0607-001\\_Deficiency\\_Statement\\_1300421433.PDF](http://reviewboard.ca/upload/project_document/EIR0607-001_Deficiency_Statement_1300421433.PDF)) identifying the ToR items that still have to be addressed. Mostly the EIS has met the ToR but certain supplementary information was still required. The project proponent has then supplied this further information. The Panel has then gone through a technical review process of the EIS where analysis sessions and hearings have been undertaken.

The Panel has prepared a Report and made a recommendation to the Minister of Aboriginal Affairs and Northern Development Canada on whether the proposed development should be approved and, if so, under what conditions (with or without mitigation or remedial measures or a follow up program) or whether the proposed



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	<p>development should be rejected. The Minister will then distribute the Gahcho Kué Panel’s report to every responsible minister for consideration. The Panel has recommended on 9 July 2013 that the Project should proceed to the regulatory phase of approvals (permitting etc.). The Panel has reached the conclusion that the Project as described in the EIS would be likely to cause some significant adverse environmental impacts, particularly on the caribou. However the Panel’s the Report lays out further mitigation measures which, if implemented, can in the Panel’s view ensure no significant impacts are caused. The positive recommendation is dependent on the environmental management measures and mitigation presented in the EIS as well as the further mitigation in the Panel’s Report will be incorporated into the Project design and implementation.</p> <p>In addition to the regulatory review process led by the MVEIRB and the Gahcho Kué Panel, the project proponent has undertaken stakeholder engagement prior to the Environmental Impact Review and during EIS preparation and will carry on as the project advances. The Stakeholder involvement process carried out by the project proponent and approach to communities is presented in Section 4 – Community, Regulatory and Public Engagement (<a href="http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_4_Community_Regulatory_and_Public_Engagement_129433203_8.PDF">http://reviewboard.ca/upload/project_document/EIR0607-001_EIS_Section_4_Community_Regulatory_and_Public_Engagement_129433203_8.PDF</a>) The activities have included public information campaigns, community meetings, meetings with authorities and governmental agencies, consultation of the leaders and Elders of the Aboriginal communities, site visits arranged to the Project site (by helicopter) etc. Information about the process is presented in Section 4.3. from page 4-6. An issue management tracking system was used to collect all engagement information and comments in one searchable, online database.</p> <p>Also the attempts made to engage communities that for some reason chose not to participate in the community engagement process are documented in the EIS, along with a commitment by the project proponent to establish engagement if opportunity becomes available. Some of the Aboriginal groups have been reluctant to participate in the process and the community engagement activities related to the project. This may be because of historical issues, previous issues with mining companies, land rights disputes or other reasons for mistrust.</p> <p>Plans for the forthcoming engagement (from 2011 onwards) are briefly introduced in the EIS. Information on the subsequent review process of the EIS, carried out by the Gahcho Kué Panel, is available at the MVEIRB website.</p>
<p>Are there examples of good practices, what (tables, figures, text)?</p>	<p>The assessment procedure is reported in a very comprehensive way with the pathway analysis, effects analysis, residual effects summary, residual impact classification and significance assessment explained step by step. Also issues which are omitted from further analysis (such as pathways found not to be primary) are included in the description and justification is provided for why this is considered not to require further assessment. Also the criteria used in the impact classification and determination of significance are explained. Suitable criteria that are logically based on the issue at hand are used. In other words, any pre-determined scales, possibly not suitable for the issue, are not forced on classification of everything. This approach makes it possible for the interested reader to follow through the reasoning. Such following is facilitated by the use of summary tables partially repeating previous phases of the assessment so that the reader does not need to refer back in the text all the time. However this also results in a very massive report that is unlikely to ever be read throughout by</p>



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	<p>anyone but the most interested of readers.</p> <p>Non-technical and plain language summaries are provided for the general public in English, French and certain Aboriginal languages. The project proponent arranged Aboriginal languages terminology workshops for the interpreters and translators to facilitate the discussions.</p> <p>Ni Hadi Yati is a joint proposal from several Aboriginal organizations and the project proponent that was presented at the Public hearing during the final stages of this Environmental Impact Review (i.e. after the EIS was finished). Ni Hadi Yati proposes to provide a <i>forum for Aboriginal groups to increase their technical capacity to assist in the development and implementation of environmental monitoring and management plans for the Project</i>. Participating Aboriginal organizations and De Beers have agreed to negotiate a contract to initiate Ni Hadi Yati. The Ni Hadi Yati is described in the Panel’s Report of 9 July 2013.</p>
Other, what?	<p>Stakeholders and their concerns lie at the very heart of the entire Environmental Impact Review process. The structure and organization of the assessment is based on an extensive scoping phase undertaken together with a wide range of stakeholders. The legislation behind the regulatory process is aimed to address environmental impacts and <i>public concern</i>.</p> <p>On the other hand the process is nothing less than massive in terms of effort as well as time. The timeframe from decision to start the EA (the “lighter” assessment) to the recommendation and the Report of the Panel on the EIR was almost 8 years. It is possible a similar approach can be utilized within a more streamlined timeline but nevertheless the process is likely to be more time consuming than a more conventional approach where the stakeholders are only consulted.</p> <p>If some key stakeholders are reluctant to participate in such a process, problems and/or delays are likely to be caused.</p>

3.0 ESIA GUIDANCE AND GUIDELINES, GLOBAL EXAMPLES

This Chapter includes a listing of various EIA and ESIA guidelines and guidance documents available freely on the Internet in the English language and originating from outside of the EU. The guidelines provided by IFIs such as the World Bank are not included as these have been covered in a previous IMPERIA Working Paper. The guidelines listed here have been identified from websites of relevant authorities in Canada, Australia, US and South Africa (with examples of state/territory level guidelines), as well as certain organisations. Included are also an example of a corporate tool (Anglo American’s acclaimed SEAT toolbox) and a couple of other resources. All webpages have been accessed during September and October 2013

It should be noted that as per the assignment, the guidelines are just collected and listed to serve as examples of guidance available on the internet. They have been checked only so far as to ensure they include chapters relevant to at least one of the focus areas of this review, however *they were not evaluated or reviewed* further. Thus they do not necessarily represent best, or even good practice. Some of the guidelines listed here are very comprehensive while others may be rather basic. *The inclusion of a guideline on this list should not be interpreted as a recommendation or endorsement by Golder or the authors of this working paper*. For example, the inclusion of US state level guidance from California and Washington State is not meant as an indication that these would be somehow better guidelines than those of any other states.



### 3.1 Guidelines issued by authorities (national and state / territory)

#### Canada

**Federal** (Canadian Environmental Assessment Act 2012 (CEAA 2012))

Canadian Environmental Assessment Agency

Guidelines under the 2012 CEAA include *Assessing Cumulative Environmental Effects under CEAA 2012*

Several guidance documents available pertaining to the former Act, including e.g. Procedural Guides on impacts significance, cumulative effects etc., as well as guidance on public participation. Much of the guidance under the former Act has been prepared in the 1990's.

<http://www.ceaa-acee.gc.ca/default.asp?lang=en&n=F1F30EEF-1>

**British Columbia**, Can (BC Environmental Assessment Act, 2002)

BC Environmental Assessment Office, Guidelines

Guidelines of the BC EAO. Guidelines include the new (2013) GUIDELINE FOR THE SELECTION OF VALUED COMPONENTS AND ASSESSMENT OF POTENTIAL EFFECTS

*This Guideline provides guidance on the typical methodological steps in an environmental assessment, from issues scoping through the evaluation (including significance determination) of residual effects (i.e., those effects remaining after the implementation of all mitigation measures). It does not provide detailed methodological guidance for assessing cumulative effects or developing follow-up programs; users are encouraged to refer to other available guidance and consult with EAO regarding these steps.*

<http://www.eao.gov.bc.ca/guidance.html>

#### Australia

**Federal**

Environment Protection and Biodiversity Conservation Act 1999

Environment Assessment Manual – Implementing Chapter 4, EPBC Act

On the Federal level, and EIA, called Environment Assessment must be undertaken for federal projects or projects with potentially significant impact on eight matters determined to be of “national environmental significance”.

*This manual is intended for use by staff of the Department of Sustainability, Environment, Water, Population & Communities. It should not be relied upon by any other person. This manual does not represent legal or professional advice. The policies and procedures included in this manual are intended to serve as guidance only and should be applied in conjunction with the requirements of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations), which must always prevail.*

The manual contains links to Guidance Notes and other guidance.

<http://www.environment.gov.au/epbc/publications/pubs/environment-assessment-manual.pdf>

The Australian territories and states have their own EIA legislation, however many have not published official guidelines.



### USA

#### Federal

EPA United States Environmental Protection Agency  
<http://www.epa.gov/compliance/resources/policies/nepa/>

Guidance documents related to the NEPA process (Environmental assessment and Environmental Impact Statement); much of the guidance is from 1990's or 1980's even.

#### California

[http://ceres.ca.gov/ceqa/docs/2010\\_CEQA\\_Statutes\\_and\\_Guidelines.pdf](http://ceres.ca.gov/ceqa/docs/2010_CEQA_Statutes_and_Guidelines.pdf)

Guidelines on the CEQA (Californian Environmental Quality Act) is a sizable document containing requirements under the CEQA, including when to prepare an EIR (Environmental Impact Review). A heavy read, unfortunately.

#### Washington State

<http://www.ecy.wa.gov/programs/sea/sepa/handbk/hbch01.html> in particular Section 3  
Environmental Impact Statement Process  
<http://www.ecy.wa.gov/programs/sea/sepa/handbk/hbch03.html>

Handbook on the SEPA (State Environmental Policy Act) of Washington State.

*“The State Environmental Policy Act (SEPA) provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified”*

### South Africa

The Department of Environmental Affairs and Tourism (DEAT)

Guidelines on the Environmental Impact Assessment Regulations (National level)  
<http://www.environment.co.za/environmental-laws-and-legislation-in-south-africa/emi-impact-study-assessment-law.html>

In particular:

Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2006  
([http://www.environment.co.za/wp-content/uploads/2013/03/DEAT\\_EIA\\_Guideline3\\_General\\_EIA\\_Regulations\\_NEMA\\_Environmental\\_Impact\\_Assesments.pdf](http://www.environment.co.za/wp-content/uploads/2013/03/DEAT_EIA_Guideline3_General_EIA_Regulations_NEMA_Environmental_Impact_Assesments.pdf))

Guideline 5: Assessment of Alternatives and Impacts ([http://www.environment.co.za/wp-content/uploads/2013/03/DEAT\\_EIA\\_Guideline3\\_General\\_EIA\\_Regulations\\_NEMA\\_Environmental\\_Impact\\_Assesments.pdf](http://www.environment.co.za/wp-content/uploads/2013/03/DEAT_EIA_Guideline3_General_EIA_Regulations_NEMA_Environmental_Impact_Assesments.pdf))



### 3.2 Guidelines Published by Organizations

#### ICMM International Council on Mining & Metals

<http://www.icmm.com>

Guidelines developed by ICMM include guidelines on various subject areas related to impact assessment, such as good practice guidance on Health Impact Assessment, the ICMM Community Development Toolbox, Good practice guidance on Mining and Biodiversity as well as plenty of reports, position statements and materials from workshops and events arranged by the ICMM, related to e.g. climate change, various social development issues (human rights, indigenous peoples, distribution of benefit), resource economy and other subjects. No overall impact assessment guidelines.

**GRI Mining and Metals Sector Supplement** consists of sector-specific guidance incorporating the GRI G3 Guidelines - the world's most widely-used guidelines for reporting on economic, environmental and social performance. Issues such as indigenous rights, resettlement, closure planning, and materials stewardship are now covered in the Supplement. The Supplement was launched in 2010, jointly by GRI and the ICMM.

Concentrates on reporting of performance, not impact assessment but may contain interesting recommendations.

Link to a page where the supplement can be downloaded:

<http://www.icmm.com/page/36382/icmm-and-gri-launch-new-reporting-guidance>

#### PDAC – Prospectors and Developers Association of Canada

<http://www.pdac.ca/>

E3 Plus: A Framework for Responsible Exploration

The e3 Plus framework contains a number of toolkits related to Social Responsibility, Environmental Stewardship and Health&Safety. Note that the toolkits are aimed at the exploration phase.

#### ELAW Environmental Law Alliance Worldwide

Guidebook for Evaluating Mining Project EIAs

A Guidebook aimed at stakeholders such as grassroots advocates and communities to help them understand mining EIAs and be effective participants in the process

<http://www.elaw.org/mining-eia-guidebook>

### 3.3 Corporate Tools

#### Anglo American SEAT Socio-Economic Assessment Toolbox

Anglo American Group's corporate guidelines on a Socio-Economic assessment that is to be carried out regularly by all AA's operations. The toolbox contains tools for planning and performing a socio-economic assessment, management of the social performance of the operation, delivering socio-economic benefits, establishing of a social management plan and reporting of the results. Tools include e.g. Assessment of Issues and Impacts (3A) and Sharing Results of the SEAT Process with Stakeholders (7B). Tool 3A includes section 3A.4 Assessing the significance of issues and impacts.

<http://www.angloamerican.com/development/social/seat>



### 3.4 Other Resources

#### **GoldSET© software**

GoldSET© - Golder's sustainability decision support tool is software developed by Golder Associates. GoldSET allows simultaneous evaluation and transparent reporting of a project's sustainability – environmental, social and economic aspects, which can further be combined with technical comparisons – in an easy to use and illustrative manner.

<http://golder.goldset.com/portal/default.aspx>

#### **ELM EIA Law Matrix**

<https://www.elaw.org/node/5986>

An online resource by the ELAW Environmental Law Alliance Worldwide hosting summaries and comparison matrixes of EIA legislation around the world. Currently over 40 jurisdictions are included.



## Report Signature Page

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