

**SECTION 3.0 – SCOPE OF ENVIRONMENTAL IMPACT ASSESSMENT  
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### 3.0 SCOPE OF ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of this Environmental Impact Assessment (EIA) is to identify, evaluate and report the environmental and socio-economic effects of the proposed Expansion Project. This process includes identification of mitigative measures that will be used to reduce or eliminate potential adverse effects, where appropriate.

The scope of the EIA was set out in the Terms of Reference ([Volume 3, Appendix A](#)) for the project. The terms require the EIA to address the following:

- provide information on the environmental resources and resource uses that could be affected by the construction, operation and reclamation of the project. Provide a sufficient base for the prediction of positive and negative impacts and the extent to which negative impacts may be mitigated by planning, project design, construction techniques, operational practices and reclamation techniques. Discuss how the EIA report ensures that the same level of information is provided for all phases of the project;
- quantify and assess impact significance where possible, taking into consideration spatial, temporal and cumulative aspects. Discuss the sources of information used in the assessment. Information sources will include literature and previous baseline reports and environmental studies, operating experience from current oil sands operations, industry study groups, traditional knowledge and government sources. Identify any limitations or deficiencies that the information may place on the analysis or conclusions in the EIA report. Discuss how these limitations or deficiencies will be addressed within the current EIA report;
- describe the stakeholder consultation process (including, but not limited to, the public, Aboriginal people, industry and regulatory representatives). Where required, undertake studies and investigations to obtain additional information for establishing a sound baseline in the Study Area(s). From a broad-based examination of all ecosystem components including previous environmental baseline work, describe and rationalize the selection of key components and indicators examined; and
- for each environmental parameter:
  - ❑ describe baseline conditions (includes existing and approved facilities and activities). Comment on whether the available data are sufficient to assess impacts and mitigation measures. Identify environmental disturbance from previous activities that have now become part of baseline conditions,
  - ❑ describe the nature and significance of the environmental effects and impacts associated with the development activities. Discuss the impacts of both the baseline case and the application case (includes baseline conditions and project),
  - ❑ present plans to minimize, mitigate or eliminate negative effects and impacts and discuss the key elements of such plans,
  - ❑ identify residual impacts and comment on their significance,

- ❑ present a plan to identify possible effects and impacts, monitor environmental impacts and manage environmental changes to demonstrate the project is operating in an environmentally-sound manner,
- ❑ present a plan that addresses the adverse impacts associated with the project that may require joint resolution by government, industry and the community,
- ❑ describe how this plan will be implemented and how it will incorporate the participation of government, industry and the community, and
- ❑ summarize the mitigation measures, which KNOC is committed to implement in the project.

Assessment of cumulative effects will be an integral component of the EIA report. A cumulative environmental effects assessment of the project was based on the AE and ERCB (1998). This included a comprehensive summary of all proposed monitoring, research and other strategies or plans to minimize, mitigate and manage any potential adverse effects.

This assessment follows the AENV 2 December 2009 release of the Final Terms of Reference for the project.

### **3.1 Approach**

The impact assessment was undertaken using a methodological approach consistent with guidelines set out by the Alberta Energy Resources and Conservation Board (ERCB) and the Alberta *Environmental Protection and Enhancement Act* regarding the preparation of environmental and socio-economic impact assessments in Alberta. The approach followed is summarized below.

#### **Scoping**

- Identify environmental and socio-economic issues.
- Establish spatial and temporal study area boundaries.
- Describe existing environmental and socio-economic conditions.

#### **Analysis**

- Determine interactions between project activities and identified issues.
- Evaluate potential environmental and socio-economic effects.
- Develop necessary mitigation strategies.

#### **Determine Final Impact Rating**

- Identify residual project impacts and cumulative effects.
- Determine the magnitude of residual project impacts and cumulative effects.

#### **Reporting**

- Document impact assessment and conclusions.

## **3.2 Spatial and Temporal Boundaries**

### **3.2.1 Spatial Boundaries**

#### **3.2.1.1 Project Area**

The project area is that portion of the lease area within which the project activities will or are likely to cause direct surface disturbances. These activities include the surface well pads, well pad access roads and surface pipeline and utility corridors.

#### **3.2.1.2 Local Study Area**

The Local Study Area (LSA) includes the project facilities in the project area, as well as an additional area within which effects of direct surface disturbances reasonably may be expected to occur. For each component in the EIA, the boundaries of the LSA vary according to the geographic extent of the resources.

#### **3.2.1.3 Regional Study Area**

The Regional Study Area (RSA) is larger than the LSA. The RSA incorporates the LSA into a larger geographical area where potential regional effects may occur. See each component section for maps of the regional study areas.

### **3.2.2 Temporal Boundaries**

#### **3.2.2.1 Construction**

Construction of the project is scheduled to begin with salvage of forest resources in 2013. Construction of the first three well pads and associated injection and production well pairs and related infrastructure will be completed. Bitumen production will begin in 2015 and will increase to the design capacity of 3 180 m<sup>3</sup>/d (20 000 b/d).

Construction activities will continue on the project area through to completion of the 27 production well pads. Ongoing construction will include well pad construction, roads and pipelines. Progressive construction over the life of the project is required to maintain a steady state of production at design capacity, however, progressive reclamation will occur concurrently.

#### **3.2.2.2 Operations**

Commissioning of production wells will be the start of the operations in 2015. Operations will continue for a period of approximately 25 years.

#### **3.2.2.3 Reclamation**

To maintain production capacity, additional well pads will be added to the project. Once all well pairs within a well pad are depleted, the well pad will be reclaimed. Reclamation processes will begin approximately 8 to 10 years after project start-up and continue progressively through the balance of the project.

Reclamation of the well pads will be accompanied by reclamation of associated infrastructure, such as facilities, pipelines, roads and access corridors. As the project nears the end of its life cycle, substantial reclamation already will have been completed and the final well pads and associated infrastructure and the CPF will remain for reclamation.

Although the project will proceed with overlapping construction, operation and reclamation activities at any given time, the impact assessment addresses the project from the perspective that the construction and operations phase infrastructure is in place at the time of assessment. This methodology provides for the maximum disturbance impact scenario and provides the assurance that actual impacts will be less than those predicted.

### **3.3 Public Consultation and Issue Identification**

Potential impacts arising from the development of the project were identified by KNOC and stakeholders. Stakeholders include local citizens, communities in the oil sands area, Aboriginal communities, regulators, other industrial operators and proponents in the region and other interested stakeholders. KNOC's public consultation program is described in [Volume 1, Section 4.0](#). Public consultation will continue through to the conclusion of the operations and reclamation phases of the project.

### **3.4 Identification and Evaluation of Impacts**

Impact assessments are based upon measured, estimated or reasonably expected changes in some attributes of a selected receptor. These key indicator resources (KIRs) or valued ecosystem components (VECs) are considered to be representatives of the larger environment, with the assumption that if little to no impact to the receptor is identified, the broader environment will not be impacted. The identification of KIRs and VECs is dependent upon scientific understanding of the perspective ecological components and their interactions in the overall environment within which the project will be developed. Work activity is guided both by issues identified during the course of impact assessment and in response to terms of reference approved for the project.

For each identified receptor, an assessment of the potential impact is made using the attributes of direction, geographic extent, magnitude, duration, reversibility and confidence in the relationships between cause and effect. An overall impact assessment rating for each receptor is derived based upon the individual attributes.

A residual project impact is defined as an effect that cannot be fully reversed. Thus, the quantification and description of a residual project impact, by definition, includes consideration of available mitigation procedures and opportunities. Impacts discussed in this EIA include those occurring due to the maximum disturbance scenario (e.g., all project components developed and operating at one time) and those impacts remaining after reclamation activities have been completed (i.e., the residual project impacts).

The definition of the attributes used in the assessment is described below. Some specific definitions and certain attributes that pertain to a specific component are included in that component.

### **3.4.1 Direction of the Impact**

The direction of impact may be described as positive (beneficial), negative (detrimental) or neutral.

- Positive:* Measured or estimated impact represents a real or potential increase in abundance, quality or other attribute of the receptor.
- Negative:* Measured or estimated impact represents a real or potential decrease in abundance, quality or other attribute of the receptor.
- Neutral:* No measurable or estimated effect on the receptor. A “neutral” direction indicates that there is no impact to quantify; therefore no quantitative assessment (extent, magnitude, duration, etc.) is possible. The confidence (based upon an understanding of cause and effect relationship(s) and the quality and quantity of available data) in the assessment is discussed.

### **3.4.2 Geographic Extent of the Impact**

Impacts may be confined to small areas or may occur over a large geographic extent. Generally, impacts may be local or regional:

- Local:* Measured or estimated impact occurs only within the boundaries of the LSA.
- Regional:* Measured or estimated impact occurs beyond the boundaries of the LSA and mainly within the boundaries of the RSA.

### **3.4.3 Magnitude of the Impact**

Three levels of magnitude of the impact have been selected:

- Low:* Measured or estimated impact represents a 1% or less change in the receptor (quality, quantity or other attribute) from baseline conditions.
- Moderate:* Measured or estimated impact represents a 1% to 10% change in the receptor (quality, quantity or other attribute) from baseline conditions.
- High:* Measured or estimated impact represents a 10% or greater change in the receptor (quality, quantity or other attribute) from baseline conditions.

By this definition, a magnitude rating of low (<1% change in the receptor) is applied even when a small impact is predicted. While a rating of “negligible” could have been included in this system, there is often little distinction between a negligible rating and a rating of less than 1% impact (i.e., low). Within the limits and precision of impact assessment methodology, negligible and low ratings can be considered to be synonymous.

A 10% cut-off for the definition of a high magnitude impact was selected since it has been used in other recent EIA for oil sands projects and because of stakeholder concerns that use of a higher cut-off may result in the downgrading of impacts.

#### **3.4.4 Duration of the Impact**

Some impacts may persist for short periods of time, while others may be permanent. The following designations for duration of impact are used:

- Short-term:* Measured or estimated impact persists for no longer than five years.
- Mid-term:* Measured or estimated impact persists to the end of the operational life of the project.
- Long-term:* Measured or estimated impact is measurable for more than two years beyond the end of the operation life of the project.

#### **3.4.5 Reversibility**

Reversibility is the capability of the environment to return to a capacity or condition equivalent to the baseline after the impact ceases. Reversibility rating is either yes or no. The recovery time is described by the duration attribute.

#### **3.4.6 Confidence**

All estimations or judgments of direction, geographic extent, magnitude, duration and reversibility of an impact are made on the basis of available data and information. While every attempt is made to collect and interpret data and information, there remain instances where the understanding of the data remains weak and even where the quantity of data may be insufficient. To account for this in the impact assessment, an expression of confidence is made for each impact assessment:

- Poor:* No clear understanding of cause and effect because of lack of relevant information base and/or limited opportunity for rigorous data collection.
- Moderate:* Moderate understanding of cause and effect from existing knowledge base, but potential for site and time-specific variability and/or moderate site-specific data available, but limited predictive ability due to variability over time and/or space.
- High:* High understanding of cause and effect from existing knowledge base and/or high site-specific data available and limited potential for site and/or time-specific variability.

The confidence attribute and ranking is based upon the amount and adequacy of data, as well as an understanding of the relationship(s) between the potential cause(s) of the residual project impact(s).

### **3.4.7 Final Impact Rating**

In all attributes there are both objective and subjective considerations. Objective considerations include quantitative comparisons between predicted residual project impacts and established quantitative limits such as ambient air objectives and water quality guidelines, regional environmental objectives and forestry harvest quotas. Subjective considerations, or professional judgments, are required when impacts cannot be predicted quantitatively due to limited data availability or when there are no quantitative benchmarks against which to compare predicted quantitative impacts.

For each individual impact assessment, a final impact rating of low, moderate or high is stated. This is based upon the integration of quantitative analysis (where possible) and professional judgment that takes into account the various rankings for each attribute (direction, geographic extent, magnitude, duration, reversibility and confidence). This is applied to both the project specific impact and cumulative effects assessments.

## **3.5 Assessment Scenarios**

The project is assessed on the basis of three scenarios (baseline, application and planned development), which may vary from component to component, depending on the size of the study area.

### **3.5.1 Baseline**

The baseline scenario considers the existing environmental conditions in the study area, as well as existing and approved projects ([Table 3.5-1](#)).

Baseline disturbances in the terrestrial LSA are shown in [Figure 3.5-1](#).

### **3.5.2 Application**

The application scenario considers the project in addition to the baseline conditions. The project contribution is also documented alone.

### **3.5.3 Planned Development**

The planned development scenario describes the environmental conditions that would exist as a result of the interaction of the proposed project, other existing projects and other planned projects that can be reasonably expected to occur.

### **3.5.4 Cumulative Effects Assessment (CEA)**

Cumulative effects are impacts that result from the interaction of several projects or activities within a region. These impacts may occur as a result of simultaneous activities within the same geographic boundaries and/or activities that occur over time. Although the impacts associated with each individual activity may be acceptable, the combined effects may be deemed unacceptable (AE and ERCB 1998).

**Table 3.5-1: Projects Included in Each Assessment Scenario**

(Sourced from 'Oil Sands Projects', Strategy West Inc., February 2009 - Strathcona Upgraders have not been included)

Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
Upgraders	BA Energy (Value Creation) Heartland	Phase 1	Suspended	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
		Phase 3	Approved	TBD	Baseline
	Bluesky Refining	Phase 1	Announced	TBD	CEA
		Phase 2	Announced	TBD	CEA
		Phase 3	Announced	TBD	CEA
		Phase 4	Announced	TBD	CEA
	CNRL Horizon	Phase 1	Operating	2008	Baseline
		Phases 2 & 3	Approved	TBD	Baseline
		Phase 4	Announced	TBD	CEA
		Phase 5	Announced	TBD	CEA
	CNRL Primrose	Phase 1	Announced	TBD	CEA
		Phase 2	Announced	TBD	CEA
	Fort Hills (Petro-Canada) Sturgeon	Phase 1	Approved	TBD	Baseline
		Phases 2 & 3	Approved	TBD	Baseline
	Nexen Long Lake	Phase 1	Operating	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
		Phase 3	Announced	TBD	CEA
		Phase 4	Announced	TBD	CEA
		Phase 5	Announced	TBD	CEA
		Phase 6	Announced	TBD	CEA
	Northern Lights (Synenco) Sturgeon	Phase 1	Withdrawn	TBD	Not Included
		Phase 2	Withdrawn	TBD	Not Included
	Northwest Upgrading (Sturgeon)	Phase 1	Approved	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
		Phase 3	Approved	TBD	Baseline
	Suncor Base & Millennium	Base U1 & U2	Operating	1967	Baseline
Millennium Vacuum Unit		Operating	2005	Baseline	
Millennium Coker Unit		Operating	2008	Baseline	
Suncor Voyageur	Phase 1	Suspended	TBD	Baseline	
	Phase 2	Approved	TBD	Baseline	

Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
Upgraders (cont)	Syncrude Mildred Lake	Stages 1&2	Operating	1978	Baseline
		Stage 3 Expansion	Operating	2006	Baseline
		Stage 3 Debottleneck	Announced	TBD	CEA
		Stage 4 Expansion	Announced	TBD	CEA
	Value Creation Terre de Grace	Pilot	Application	TBD	CEA
		Phase 1	Announced	TBD	CEA
Phase 2		Announced	TBD	CEA	
Athabasca Mining	AOSP Shell Jackpine	Phase 1A	Construction	2010	Baseline
		Phase 1B	Approved	TBD	Baseline
		Phase 2	Application	TBD	CEA
	AOSP Shell Muskeg River	Existing	Operating	2002	Baseline
		Expansion/Debottleneck	Approved	TBD	Baseline
	AOSP Shell Pierre River	Phase 1	Application	TBD	CEA
		Phase 2	Application	TBD	CEA
	CNRL Horizon	Phase 1	Operating	2008	Baseline
		Phases 2 & 3	Approved	TBD	Baseline
		Phase 4	Announced	TBD	CEA
		Phase 5	Announced	TBD	CEA
	Fort Hills (Petro-Canada)	Phase 1	Approved	TBD	Baseline
		Debottleneck	Approved	TBD	Baseline
	Imperial Kearn Lake	Phase 1	Approved	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
		Phase 3	Approved	TBD	Baseline
	Northern Lights (Synenco/Total)	Phase 1	Application	TBD	CEA
		Phase 2	Application	TBD	CEA
	Suncor Millennium & North Steepbank	Millennium Mine	Operating	1967	Baseline
		Steepbank Debottleneck Phase 3	Operating	2007	Baseline
		Millennium Debottleneck	Operating	2008	Baseline
		North Steepbank Extension	Construction	2010	Baseline
	Suncor Voyageur South	Phase 1	Application	TBD	CEA
	Syncrude Mildred Lake & Aurora	Phases 1 & 2	Operating	1978	Baseline
		Phase 3 Expansion	Operating	2006	Baseline
		Phase 3 Debottleneck	Announced	TBD	CEA
		Phase 4 Expansion	Announced	TBD	CEA
	Total (Deer Creek) Joslyn	North Mine	Application	TBD	Baseline
		South Mine	Announced	TBD	CEA



Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
Athabasca Mining (cont)	UTS/Teck Cominco	Equinox	Disclosure	TBD	CEA
		Frontier 1	Disclosure	TBD	CEA
		Frontier 2	Disclosure	TBD	CEA
North Athabasca In-situ	Athabasca Oil Sands MacKay	Pilot	Application	TBD	CEA
	Chevron Canada Ells River	SAGD Project	Announced	TBD	CEA
	CNRL Birch Mountain	Phase 1	Announced	TBD	CEA
	EnCana Borealis	Phase 1	Application	TBD	CEA
		Phase 2	Announced	TBD	CEA
		Phase 3	Announced	TBD	CEA
	Husky Sunrise	Phase 1	Approved	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
		Phase 3	Approved	TBD	Baseline
		Phase 4	Approved	TBD	Baseline
	Petro-Canada Lewis	Phase 1	Disclosure	TBD	CEA
		Phase 2	Disclosure	TBD	CEA
	Petro-Canada MacKay River	Phase 1	Operating	2002	Baseline
		Phase 2	Approved	TBD	Baseline
	Southern Pacific MacKay	Phase 1	Announced	TBD	CEA
	Suncor Firebag	Phase 1	Operating	2004	Baseline
		Phase 2	Operating	2006	Baseline
		Cogeneration & Expansion	Operating	2007	Baseline
		Phase 3	Suspended	TBD	Baseline
		Phase 4	Application	TBD	CEA
		Phase 5	Application	TBD	CEA
		Phase 6	Application	TBD	CEA
		Stages 3-6 Debottleneck	Application	TBD	CEA
	Sunshine Oilsands Harper	CSS Pilot	Application	TBD	CEA
	Sunshine Oilsands Thickwood	Phase 1	Announced	TBD	CEA
		Phase 2	Announced	TBD	CEA
		Phase 3	Announced	TBD	CEA
	Sunshine Oilsands West Ells	Phase 1	Announced	TBD	CEA
Phase 2		Announced	TBD	CEA	
Phase 3		Announced	TBD	CEA	
Total (Deer Creek) Joslyn	Phase 1	Operating	2004	Baseline	
	Phase 2	Operating	2006	Baseline	
	Phase 3a	Withdrawn	TBD	CEA	
	Phase 3b	Disclosure	TBD	CEA	



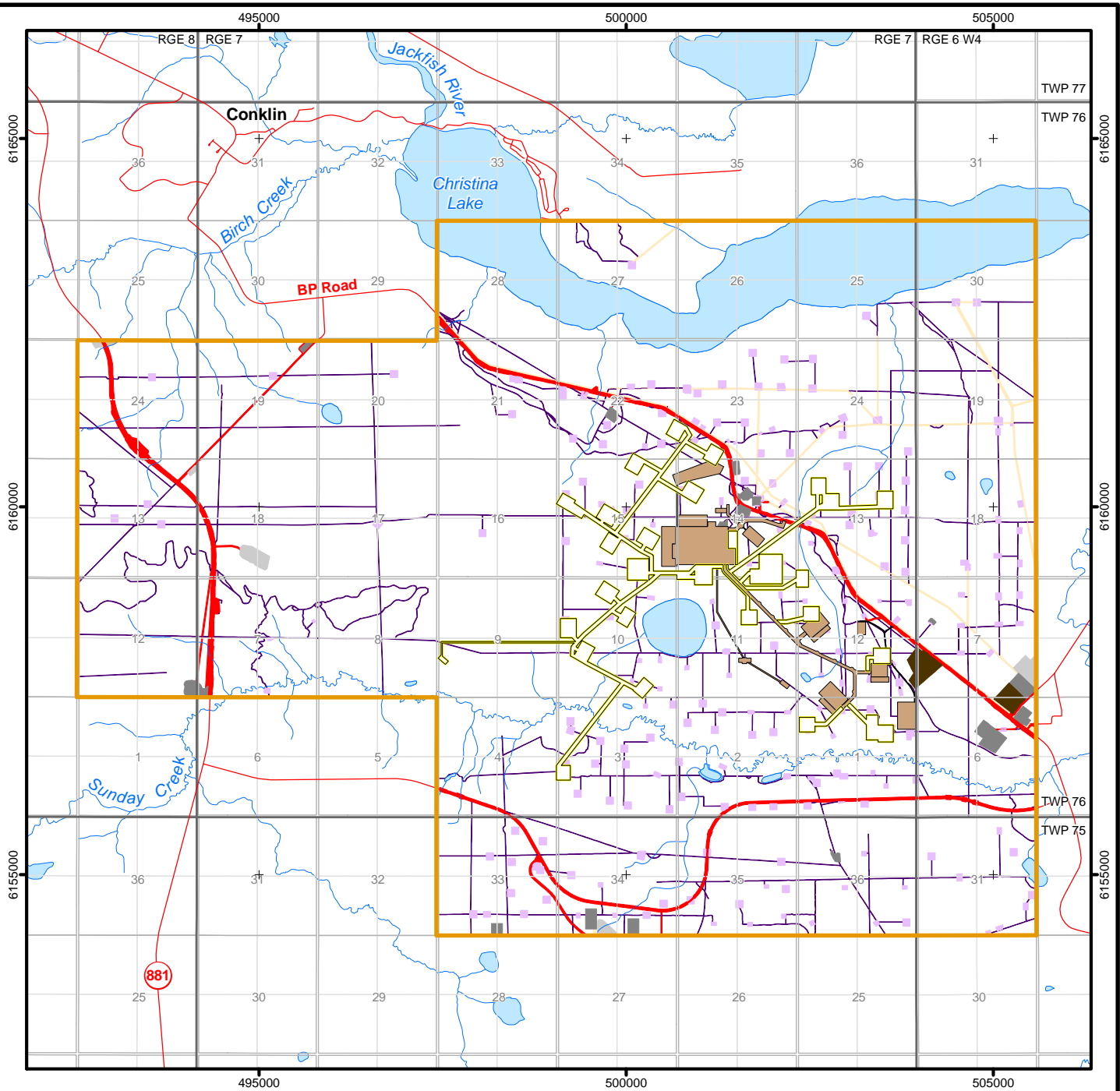
Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
North Athabasca In-situ (cont)	Value Creation Terre de Grace	Pilot	Application	TBD	CEA
		Phase 1	Announced	TBD	CEA
		Phase 2	Announced	TBD	CEA
South Athabasca In-situ	CNRL Gregoire	Phase 1	Announced	TBD	CEA
	CNRL Grouse	Phase 1	Announced	TBD	CEA
	CNRL Kirby	Phase 1	Application	TBD	Baseline
	CNRL Leismer	Phase 1	Announced	TBD	CEA
		Pod 1	Operating	2007	Baseline
	Connacher Great Divide	Pod 2 (Algar)	Suspended	TBD	Baseline
		Phase 1	Operating	2008	Baseline
	Devon Jackfish	Phase 2	Construction	2011	Baseline
		EnCana Christina Lake	Phase 1A	Operating	2002
	Phase 1B		Operating	2008	Baseline
	Phase 1C		Construction	2010	Baseline
	Phase 1D		Approved	TBD	Baseline
	Expansion 1		Announced	TBD	CEA
	Expansion 2		Announced	TBD	CEA
	Expansion 3		Announced	TBD	CEA
	Expansion 4		Announced	TBD	CEA
	EnCana Foster Creek	Expansion 5	Announced	TBD	CEA
		Phase 1A	Operating	2001	Baseline
		1B - Debottleneck	Operating	2003	Baseline
		1C - Stage 1	Operating	2005	Baseline
		1C - Stage 2	Operating	2007	Baseline
		Phase 1D	Construction	2009	Baseline
		Phase 1E	Construction	2009	Baseline
	Enerplus Kirby	Phase 1F	Application	TBD	CEA
		Phase 1	Application	TBD	CEA
	Husky McMullen	Phase 2	Announced	TBD	CEA
		Pilot	Application	TBD	CEA
	JACOS Hangingstone	Demonstration Project	Operating	2002	Baseline
		Expansion	Disclosure	TBD	CEA
	KNOC BlackGold	Initial	Application	TBD	CEA
		Expansion	Announced	TBD	CEA
	Laricina Germain	Pilot	Approved	TBD	Baseline
Phase 1		Announced	TBD	CEA	



Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
South Athabasca In-situ (cont)	Laricina Saleski	Pilot	Application	TBD	CEA
		Phase 1	Announced	TBD	CEA
	Nexen Long Lake	Phase 1	Operating	2007	Baseline
		Phase 2	Announced	TBD	CEA
		Phase 3	Announced	TBD	CEA
		Phase 4	Announced	TBD	CEA
	Nexen Long Lake South	Phase 1	Application	TBD	CEA
		Phase 2	Application	TBD	CEA
	MEG Christina Lake	Phase 1 Pilot	Operating	2007	Baseline
		Phase 2A	Construction	2009	Baseline
		Phase 2B	Application	TBD	CEA
		Phase 3A	Application	TBD	CEA
		Phase 3B	Application	TBD	CEA
	Patch Ells River	Phase 1	Announced	TBD	CEA
	Petrobank	May River Phase 1	Application	TBD	CEA
		Subsequent Phases	Disclosure	TBD	CEA
	Petro-Canada Chard	Phase 1	Announced	TBD	CEA
	Petro-Canada Meadow Creek	Phase 1	Approved	TBD	Baseline
		Phase 2	Approved	TBD	Baseline
	Serrano Blackrod (Pearl)	Pilot	Application	TBD	CEA
	ConocoPhillips Surmont	Phase 1	Operating	2006	Baseline
		Phase 2	Approved	TBD	Baseline
	StatoilHydro Kai Kos Dehseh	Leismer Demonstration	Construction	2009	Baseline
		Leismer Commercial	Application	TBD	CEA
		Leismer Expansion	Application	TBD	CEA
		Corner	Application	TBD	CEA
		Thornbury	Application	TBD	CEA
Corner Expansion		Application	TBD	CEA	
Hangingstone		Application	TBD	CEA	
Thornbury Expansion		Application	TBD	CEA	
Northwest Leismer		Application	TBD	CEA	
South Leismer		Application	TBD	CEA	

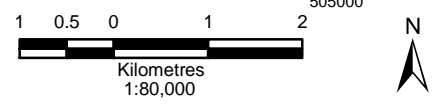


Type	Facility Name	Phase	Status	Start-up Date	EIA Classification (Baseline/CEA/Not Included)
Cold Lake In-situ	CNRL Primrose/Wolf Lake	Wolf Lake	Operating	1985	Baseline
		Primrose South	Operating	1985	Baseline
		Primrose North	Operating	2006	Baseline
		Primrose East	Operating	2008	Baseline
		Wolf Lake SAGD	Application	TBD	CEA
		Capacity Increase	Application	TBD	CEA
	Husky Caribou Lake	Demonstration Project	Approved	TBD	Baseline
	Husky Tucker	Phase 1	Operating	TBD	Baseline
	Imperial Cold Lake	Phases 1 to 10	Operating	1985	Baseline
		Phases 11 to 13	Operating	2003	Baseline
		Phases 14 to 16	Approved	TBD	Baseline
	Pengrowth Lindberg	Pilot	Application	TBD	CEA
	Shell Blackrock Orion (Hilda Lake)	Phase 1	Operating	2007	Baseline
		Phase 2	Approved	TBD	Baseline
Peace River In-situ	Andora Sawn Lake	Demonstration Project	Application	TBD	CEA
	North Peace Energy Red Earth	Pilot	Operating	TBD	Baseline
		Phase 1	Announced	TBD	CEA
		Phase 2	Announced	TBD	CEA
		Phase 3	Announced	TBD	CEA
	Penn West Seal	CSS Pilot	Application	TBD	CEA
	Shell Peace River	Cadotte Lake	Operating	TBD	Baseline
		Carmon Creek Phase 1	Withdrawn	TBD	Not Included
Carmon Creek Phase 2		Withdrawn	TBD	Not Included	



**Legend**

- Terrestrial LSA
  - BlackGold Expansion Project
  - Open Water
  - Watercourse
- Baseline Disturbance**
- BlackGold Initial Project
  - Borrow Pit
  - Camp
  - Cutblock
  - Industrial/Clearing
  - Wellsite
  - ROW
  - Road
  - 2D Seismic/Trail



Sources: Al-Pac, GeoBase®, KNOCC, Spatial Data Warehouse Ltd.

**Korea National Oil Corporation**

**BlackGold Expansion Project**

**Disturbances Used for Baseline and Application Cases**

DATE: December 2009		<b>Figure 3.5-1</b>	
PROJECT: CE03745/800		Fig03.05-01 Project Disturbance 09-12-14	
ANALYST: TM	QA/QC: KW DH DR	DRAWN BY: AMEC	
PROJECTION/DATUM: UTM Zone 12 NAD83		PREPARED BY: AMEC	

The CEA was completed for those environmental components where measurable incremental impacts of moderate or higher magnitude in the LSA were identified from the project or where these impacts could act cumulatively in the RSA with other land use pressures.

Projects included in each assessment case, including the CEA, are listed on [Table 3.5-1](#). Information used in the CEA for each of these facilities was obtained from publicly available documents (e.g., applications for regulatory approval, monitoring reports submitted to AENV) or from contacting the company directly.

### **3.6 Literature Cited**

Alberta Environment and Energy Conservation Board. 1998. Cumulative Effects Assessment in Environmental Impact Assessment Report Requires under Alberta *Environmental Protection and Enhancement Act*. Information Letter. Edmonton, Alberta.