4 PROJECT INTERACTIONS WITH THE ENVIRONMENT

Interactions between key Expansion Project activities and the environment were ranked according to the potential for an activity to interact with valued environmental components (VECs) of the biophysical or human environment (see Table 4-1). Ranking of interactions between key Expansion Project activities and the environment was not completed for VECs including Noise, Visual Aesthetics, Socio-Economics and Traditional Ecological Knowledge and Land Use as it was not relevant to their assessment method. Ranking is as follows:

0 = No interaction.

1 = Interaction occurs; however, based on past experience and professional judgment the interaction would not result in a significant environmental effect, even without mitigation; or interaction would not be significant due to application of codified environmental protection practices that are known to effectively mitigate the predicted environmental effects.

2 = Interaction could result in an environmental effect of concern even with mitigation; the potential environmental effects are considered further in environmental assessment. A precautionary approach has been taken, whereby interactions with a meaningful degree of uncertainty are assigned a rank of 2, ensuring that a detailed environmental effects assessment will be conducted.

The operation of the Proposed Facilities will follow standard procedures that are in place for the existing facilities at the Demonstration Project. Those activities with the greatest potential to cause an environmental effect of concern, even with mitigation, relate to surface disturbance during construction and atmospheric emissions during operation.

Individual sections of the EIA (Sections 5 – 20) assess the potential interactions of the Expansion Project on various environmental components.

Table 4-1 Interactions of the Expansion Project with the Environment

Project Activities/Physical Works	Project Description Reference for Activity (Vol. 1)	Air Quality	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation	Wildlife	Biodiversity and Fragmentation	Land and Resource Use	Historical Resources	Human and Ecological Health
Construction and Commissioning													
Site clearing	15.4, 15.5	1	1	2	2	2	2	2	2	2	2	1	1
Worker's camp construction	1.2.3, 9.2	1	0	2	2	1	2	2	2	2	0	1	1
Access roads construction	10.2, 11.1	1	0	2	2	1	2	2	2	2	2	1	1
Utility corridor construction (natural gas, electricity)	10.3	1	0	2	2	1	2	2	2	2	0	1	1
Construction of product shipping facilities	11.5	1	0	2	2	0	2	2	2	2	0	1	1
Construction drainage/run-off control (main processing area, wellpads)	12.0	0	1	2	2	2	1	1	2	2	0	0	0
Withdrawal of groundwater for potable supply or plant processing	12.5, 12.9	0	2	2	2	1	1	1	0	1	0	0	0
Peat and topsoil removal	15.6	1	1	2	2	2	2	2	2	2	2	1	1
Main processing area construction	9.2	1	1	2	2	1	2	2	2	2	2	1	1
Wellpads and above ground pipe racks construction	10.1, 10.3	1	1	2	2	1	2	2	2	2	0	1	1
Drilling of SAGD wells	4.2, 8.2	1	2	0	2	0	1	0	2	1	0	1	1
Workers' camp operation during construction	9.2, 12.9, 13.5	1	1	0	1	0	0	0	2	2	0	0	1
Waste management	13.5	0	1	0	2	0	1	1	1	0	1	0	0
Vehicular traffic – transportation of construction workers to site	11.2	1	0	0	1	0	0	1	2	1	0	0	1
Vehicular traffic – transportation of production modules and construction equipment	11.2	1	0	0	1	0	0	1	2	1	0	0	1

Table 4-1 Interactions of the Expansion Project with the Environment (cont'd)

Project Activities/Physical Works	Project Description Reference for Activity (Vol.1)	Air Quality	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation	Wildlife	Biodiversity and Fragmentation	Land and Resource Use	Historical Resources	Human and Ecological Health
Construction and Commissioning (cont'd)													
Vehicular traffic – ongoing engineering, resources and environmental assessments	11.2	1	0	0	1	0	0	1	2	1	0	0	1
Ongoing geotechnical and geological/reserves testing	6	0	0	2	0	0	1	2	2	1	0	1	0
Operations													
Extraction of groundwater for potable or plant processing	12.5, 12.9	0	2	2	2	0	0	1	0	1	0	0	0
Operation of central processing facility	9.0	2	2	2	0	1	1	2	2	1	0	0	2
Operation of steam chambers	7.0	0	2	0	2	0		0	0	0	0	1	0
Maintenance and repairs	17.0	1	0	0	0	0	1	0	2	0	0	0	1
Vehicular traffic – transportation of workers to processing facilities	11.2	1	0	0	1	0	1	1	2	1	0	0	1
Waste management	13.0, 9.19	1	1	0	1	0	1	1	1	0	1	0	1
Site runoff, stormwater storage and treatment in sediment ponds, and water discharge from sediment ponds	9.2, 9.17	0	1	2	2	2	1	1	2	1	0	0	1
Bitumen storage	9.8	2	1	0	1	0	1	1	0	0	0	0	2
Diluent storage and management	9.8	2	1	0	1	0	1	1	0	0	0	0	2
Procurement of materials, supplies and services	1.2.6	0	0	0	0	0	0	0	0	0	0	0	0
Ground heave	11.3	1	2	2	2	0	2	1	0	1	1	1	1

Table 4-1 Interactions of the Expansion Project with the Environment (cont'd)

Project Activities/Physical Works	Project Description Reference for Activity (Vol.1)	Air Quality	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation	Wildlife	Biodiversity and Fragmentation	Land and Resource Use	Historical Resources	Human and Ecological Health
Closure													
Reclamation and closure of central processing facilities	15.10,15.11	1	1	2	2	2	2	2	2	*	1	0	1
Reclamation and closure of wellpads, pipe racks and associated facilities	15.10.2, 15.10.3	1	1	2	2	2	2	2	2	*	1	0	1
Deactivation of temporary access roads	15.10.4	1	0	2	2	2	2	1	2	*	1	0	1
Construction and maintenance of any closure drainage systems	15.11.4	0	1	2	2	2	2	2	2	1	0	0	0
Waste management (storage, treatment and disposal	13.0	0	1	0	2	0	1	1	1	0	1	0	1
Maintenance and repairs	N/A	0	0	0	0	0	1	0	2	0	0	0	0
Accidents, Malfunctions and Unplanned Events													
Emergency flaring	Vol. 1: 14.3.2, Vol. 2: Appendices 5C and 5D	2	1	0	0	0	1	1	2	0	1	0	2
Pipe rack leak or explosion	12.10, 17.0	1	1	0	2	1	1	1	2	1	1	0	1
Traffic accidents	Vol. 2: 19.5	1	0	0	2	0	0	0	2	1	1	0	1
Failure of water intake pipeline	12.10	0	0	0	0	0	1	0	0	0	0	0	0
Petroleum products/chemical spills	9.2, 9.16, 10.1, 17.1	1	1	0	2	0	1	2	2	1	1	0	1
Flooding	9.2, 10.1, 15.9	0	0	2	1	1	1	2	2	0	1	1	0
Forest fires	17.3.5	1	0	0	1	1	1	2	2	1	2	1	1

Table 4-1 Interactions of the Expansion Project with the Environment (cont'd)

Project Activities/Physical Works	Project Description Reference for Activity (Vol.1)	Air Quality	Hydrogeology	Hydrology	Surface Water Quality	Fish and Fish Habitat	Terrain and Soils	Vegetation	Wildlife	Biodiversity and Fragmentation	Land and Resource Use	Historical Resources	Human and Ecological Health
Interaction of Other Projects and Activities													
Trapping and hunting	N/A								✓	✓			
Recreational activities	N/A			✓					✓	✓			
Forestry operations	N/A	✓		✓		✓		✓	✓	✓			
Operation of JACOS Demonstration Project	N/A	✓		✓	✓		✓	✓	✓	✓			✓
Expansion/traffic on Highway 63	N/A	✓		✓				✓	✓	✓			
Operation of other SAGD projects	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Operation of surface mining oil sands projects	N/A	✓		✓		✓				✓	✓		✓
Operation of aggregate projects	N/A	✓		✓		✓				✓	✓		✓
Operation of commercial camps	N/A	✓		✓					✓	✓	✓		✓

NOTES:

Project-Environment Interactions

0 = No interaction

1 = Interaction occurs; however, based on past experience and professional judgment the interaction would not result in a significant environmental effect, even without mitigation; or interaction would not be significant due to application of codified environmental protection practices that are known to effectively mitigate the predicted environmental effects

2 = Interaction could result in an environmental effect of concern even with mitigation; the potential environmental effects are considered further in environmental assessment

* - these potential interactions will likely to have a neutral to net positive effect.

Cumulative Effect Potential

Check mark for cumulative environmental effects indicates potential to interact with project environmental effects. Cumulative effects are ranked in the project Effects matrix