Appendix 5

Approvals

Alberta
ENVIRONMENT

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
S.A. 1992, c.E-13.3, as amended.

APPROVAL NO. 1581-01-00

APPLICATION NO. 001-1581

EFFECTIVE DATE: ..... August , 1999

EXPIRY DATE: ..... July 31, 2009

APPROVAL HOLDER ..... Murphy Oil Company Ltd.
P.O. Box 2721
Calgary, Alberta
T2P 3Y3

Pursuant to Division 2, of Part 2, of the Environmental Protection and Enhancement Act, S.A. 1992, c.E-13.3, as amended, approval is granted to the approval holder subject to the attached terms and conditions for the following activity:

Construction, Operation and Reclamation of the Lindbergh enhanced recovery in-situ heavy oil processing plant.

Designated Director under the Act ……

Date Signed …… August , 1999

TERMS AND CONDITIONS ATTACHED TO APPROVAL

PART 1: DEFINITIONS

SECTION 1.1: DEFINITIONS

1.1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval.

1.1.2 In all PARTS of this approval:

(a) "Act" means the *Environmental Protection and Enhancement Act*, S.A. 1992, c.E-13.3, as amended;

(b) "affected lands" means lands which have received substances released from the plant;

(c) "air contaminant" means any solid, liquid or gas or combination of any of them in the atmosphere resulting directly or indirectly from the activities of man;

(d) "annulus gas" means gas from the annulus of the oil and gas well casing;

(e) "application" means the written submissions to the Director in respect of application number 001-1581 and any subsequent applications for amendments of approval number 1581-01-00;

(f) "chemical" means any substance that is added or used as part of the treatment process;

(g) "day" means any sampling period of 24 consecutive hours unless otherwise specified;

(h) "decommissioning" means the dismantling and decontamination of a plant undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;

(i) “decontamination" means the treatment or removal of substances from the plant and affected lands;

(j) "Director" means the Director responsible for this approval unless otherwise specified;

(k) "dismantling" means the removal of buildings, structures, process and pollution control and abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the plant;

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(l) "disturbed land" means any land disturbed by the approval holder in any manner in association with the activity which is the subject of this approval;

(m) "effluent stream" means any substance in a gaseous medium released by or from a plant;

(n) "fugitive emissions" means air contaminant emissions to the atmosphere other than ozone depleting substances, originating from a plant source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;

(o) "grab sample" means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(p) "grade" means the rise or fall of the land surface over a specified distance, measured in the same units;

(q) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the plant;

(r) "industrial runoff" means precipitation that falls on or traverses the plant developed area;

(s) "industrial runoff control system" means the parts of the plant that collects, stores or treats industrial runoff from the plant;

(t) "land reclamation" means the stabilization, contouring, maintenance, conditioning, and reconstruction of the surface of the land to a state that permanently returns the plant to a land use capability equivalent to its predisturbed state;

(u) “month" means calendar month;

(v) "net or lower heating value" means the quantity of heat evolved on complete combustion where the combustion products remain as vapour at 15°C;

(w) "plant" means

(i) the field production facilities on the lands known and described as Sections 11, 12, 13 and 14, Township 58, Range 5, West of the 4th Meridian

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(ii) the central processing facilities on the lands known and described as Legal Subdivision 6, Section 13, Township 58, Range 5, West of the 4th Meridian,

(iii) all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines and other installations, located on the lands described above,

that is being or has been used or held for or in connection with the Lindbergh enhanced recovery in-situ heavy oil processing plant;

(x) "plant developed area" means the areas of the plant used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material;

(y) "produced gas" means all gas associated with the production and treatment of oil or bitumen including, but not limited to, gas liberated at storage tanks, heaters, treaters, produced water facilities;

(z) "regulations" means the regulations issued pursuant to the Act, as amended;

(aa) "representative grab sample" means a sample consisting of equal volume portions of water collected from at least four sites between 0.20-0.30 metres below the water surface within a pond;

(bb) "tank" means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support, and without precluding the generality of the foregoing, may include substances such as wood, concrete, steel, and plastic;

(cc) "topsoil" means the undisturbed soil profile made up of the following, when present:

(i) all organic horizons as defined in the *Canadian System of Soil Classification*, 3rd edition, 1998; and

(ii) A horizons as defined in *Canadian System of Soil Classification*, 3rd edition, 1998, and rated as good or fair as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, 1987, Table 10, page 30; and

(iii) B horizons only when directed to do so in writing by a Conservation and Reclamation Inspector.

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(dd) "volume estimate" means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

(ee) "week" means any consecutive 7-day period; and

(ff) "year" means calendar year, unless otherwise specified.

PART 2: GENERAL

SECTION 2.1: GENERAL

2.1.1 The approval holder shall immediately report by telephone any contravention of the terms and conditions of this approval to the Environmental Service Response Centre at 1-780-422-4505.

2.1.2 The approval holder shall submit an application for renewal of this approval to the Director a minimum of six months prior to the approval expiry date or otherwise as specified in writing by the Director.

2.1.3 Any conflict between the application or any document and the terms and conditions of this approval shall be resolved in favour of the approval.

2.1.4 The terms and conditions of this approval do not affect any rights or obligations created under any other approval issued by Alberta Environment.

2.1.5 The mention of trade names, commercial products or named technologies in this approval does not constitute an endorsement or recommendation by Her Majesty the Queen in Right of Alberta, her employees, agents and the Director for general use.

2.1.6 The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

2.1.7 The approval holder shall notify the Director in writing within 30 days of all changes in the corporate status of the approval holder.

2.1.8 If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

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2.1.9 All abbreviations used in this approval follow those given in *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation, as amended, or as otherwise specified in the approval.

2.1.10 The approval holder shall notify the Director in writing within 30 days of operations ceasing permanently.

2.1.11 Environmental Protection and Enhancement Act Approval No. 92-AL-256, 92-WL-174 and OS-3-83 are cancelled.

SECTION 2.2: RECORD KEEPING

2.2.1 The approval holder shall record and retain all the following information for a minimum of ten years:

(a) the names and addresses of all persons who discover any contravention of the Act, the regulations or this approval;

(b) the names and addresses of all persons who take any remedial action arising from the contravention of the Act, the regulations or this approval; and

(c) a detailed description of the remedial measures taken in respect of a contravention of the Act, the regulations or this approval.

2.2.2 The approval holder shall record and retain all the following information in respect of any sampling conducted or analyses performed for a minimum of ten years, or otherwise as specified in writing by the Director:

(a) the place, date and time of sampling;

(b) the dates the analyses were performed;

(c) the analytical techniques, methods or procedures used in the analyses;

(d) the names of the persons who collected and analyzed each sample; and

(e) the results of the analyses.

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SECTION 2.3: ANALYTICAL REQUIREMENTS

2.3.1 Collection, analysis of samples and reporting shall be conducted in accordance with the following or otherwise as specified in writing by the Director:

(a) for air monitoring:

(i) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environmental Protection, as amended;

(ii) the *Air Monitoring Directive*, Alberta Environmental Protection, as amended;

(b) for industrial wastewater, industrial runoff, groundwater, waterworks and domestic wastewater parameters:

(i) the *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water Works Association, and the Water Environment Federation, as amended;

(c) for soil samples:

(i) the *Manual on Soil Sampling and Methods of Analysis*, Lewis Publishers, 1993, as amended; and

(ii) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846; September 1986,as amended.

2.3.2 The preservation, storage, and handling of all samples collected at the sampling locations identified in this approval shall be in such a manner that the validity of the samples is not compromised. The analysis of samples shall be in a laboratory with documented quality assurance and quality control programs, including participation in interlaboratory studies.

PART 3: CONSTRUCTION

SECTION 3.1: LAND CONSERVATION

3.1.1 The approval holder shall salvage all topsoil from land to be disturbed land.

3.1.2 The approval holder shall stockpile salvaged topsoil and the stockpiles shall be constructed as follows:

(a) salvaged topsoil shall be stockpiled separately from the other materials;

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(b) stockpile foundations must be stable;

(c) stockpiles shall be stabilized to control water and wind erosion;

(d) stockpiles shall be accessible and retrievable; and

(e) stockpiles shall be revegetated and controlled for weeds.

3.1.3 The approval holder shall immediately suspend topsoil salvage when:

(a) wet or frozen field conditions will result in the degradation of topsoil quality, unless otherwise authorized in writing by a Conservation and Reclamation Inspector, or

(b) high wind velocities, any other field conditions or operations will result in the degradation of topsoil quality or loss of topsoil, unless otherwise authorized in writing by a Conservation and Reclamation Inspector, or

(c) directed to do so in writing by a Conservation and Reclamation Inspector.

3.1.4 The approval holder shall only recommence topsoil salvage when suspended under 3.1.3 if:

(a) field conditions in 3.1.3 no longer exist, or

(b) direction for a change in topsoil salvage procedures is received in writing from a Conservation and Reclamation Inspector.

3.1.5 The approval holder shall ensure that drainage control measures are in place to minimize erosion and sedimentation on disturbed land.

3.1.6 The approval holder shall stabilize ditches and trenches that discharge to natural watercourses and waterbodies, in order to minimize erosion and sediment input.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: AIR

OPERATIONS

4.1.1 The approval holder shall not emit any effluent streams to the atmosphere except as provided in this approval.

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4.1.2 The approval holder shall only emit effluent streams to the atmosphere from the following sources:

(a) the two 14.6 MW steam generator exhaust stacks;

(b) the two 261 kW glycol heater exhaust stacks;

(c) the two central processing facility flare stacks;

(d) the space ventilation exhaust stacks; and

(e) the space heater exhaust vents.

4.1.3 Annulus gas and produced gas shall be collected and burned as fuel, incinerated or flared.

4.1.4 The approval holder shall ensure the combustion of all combustible gases released to the central processing facility flare stacks.

4.1.5 All plant pressure and safety valves in sour gas service shall be connected to the flare system.

4.1.6 The approval holder shall equip and operate the central processing facility flare stacks with:

(a) a wind guard,

(b) a continuously burning pilot light, and

(c) an electric (or equivalent) igniter.

4.1.7 The approval holder shall operate and maintain the following stacks according to the height requirements as prescribed in TABLE 4.1-A.

TABLE 4.1-A: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (METERS)
Central processing facility flare stack	15.2
Central processing facility flare stack	12.2
The 14.6 MW steam generator exhaust stack	17.5
The 14.6 MW steam generator exhaust stack	14.0
The two 261 kW glycol heater exhaust stacks	7.4

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4.1.8 Except as provided for by the Director in writing, the approval holder shall not emit fugitive emissions or an air contaminant from any source not specified in 4.1.2 that causes or may cause any of the following:

(a) the impairment, degradation or alteration of the quality of natural resources; or

(b) material discomfort, harm or adversely affect the well being or health of a person; or

(c) harm to property or to plant or animal life.

LIMITS

4.1.9 Releases of air contaminants shall not exceed the limits specified in TABLE 4.1-B.

TABLE 4.1-B: LIMITS

SOURCE	AIR CONTAMINANT	LIMIT
Steam generator exhaust stacks and central processing facility flare stacks	Sulphur Dioxide	0.23 tonnes per day

4.1.10 The net or lower heating value of the combined gas stream released to the central facility flare stacks shall be maintained, at a minimum, at 9 MJ/m^3 when adjusted for 101.325 kPa and 15°C by adding residue gas to the sour gas.

MONITORING AND REPORTING

4.1.11 The approval holder shall monitor as required in TABLE 4.1-C and TABLE 4.1-D.

4.1.12 The approval holder shall report to the Director as required in TABLE 4.1-C and TABLE 4.1-D.

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TABLE 4.1-C: SOURCE MONITORING AND REPORTING

EFFLUENT STREAM/ EMISSION SOURCE	MONITORING			REPORTING	
	PARAMETER	METHOD	FREQUENCY	MONTHLY (On or before the end of the month following the month in which the information was collected)	ANNUALLY (on or before March 15th of the year following the year in which the information was collected)
Acid gas and residue or fuel gas to the central facility flare stacks	Volumetric flow rates	Measured or Estimated	Continuously	No	No
Central facility flare stacks	Sulphur dioxide	Calculated		Yes, tonnes per day	Yes, tonnes per year
Steam generators	Sulphur dioxide	Calculated		Yes, tonnes per day	Yes, tonnes per year
Produced gas	Hydrogen sulphide	Gas Analysis	Monthly	Yes	No
	Lower Heating Value	Gas Analysis	Monthly	Yes	No

TABLE 4.1-D: AMBIENT MONITORING AND REPORTING

NUMBER OF MONITORING SITES	METHOD OF MONITORING	PARAMETER TO BE ANALYZED OR MEASURED	FREQUENCY	MONTHLY (on or before the end of the month following the month in which the information was collected)	Annually (On or before March 15th of the year following the year in which the information was collected)
Four	static exposure monitoring station as per Air Monitoring Directive	total sulphation levels and hydrogen sulphide levels	Continuously	Yes	Yes

4.1.13 In addition to the monthly reporting requirements in TABLE 4.1-C and TABLE 4.1-D, the monthly air emission summary report shall contain remarks on the performance of the air pollution control equipment including an interpretation of significant variations in equipment performance.

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4.1.14 In addition to the annual reporting requirements in TABLE 4.1-C and TABLE 4.1-D, the annual air emission summary and evaluation report shall contain information related to the plant operation, the performance of air pollution control equipment and air contaminant emissions.

SECTION 4.2: INDUSTRIAL WASTEWATER

OPERATIONS

4.2.1 The approval holder shall not release any substances from the plant to the surrounding watershed, groundwater or soil, except as authorized under this approval.

4.2.2 All industrial wastewater and process liquids contained in above ground and below ground storage tanks, shall be contained in accordance with the *Alberta Energy and Utilities Board (EUB) Guide G-55 Storage Requirements for the Upstream Petroleum Industry*, as amended.

4.2.3 Industrial wastewater shall only be disposed of as follows:

(a) Alberta Energy and Utilities Board (EUB) approved disposal well;

(b) Alberta Energy and Utilities Board (EUB) approved Waste Processing and Disposal Facility; or

(c) As otherwise authorized in writing by the Director.

LIMITS

4.2.4 Releases from the Industrial Runoff Control System shall not exceed the limits specified in TABLE 4.2-A.

TABLE 4.2-A: INDUSTRIAL RUNOFF LIMITS

PARAMETER	PARAMETER OR CONCENTRATION LIMITS
Discharge Volume	--
pH	6.0 - 9.5 units
Oil and Grease	No visible sheen
Chloride	500 mg/l

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4.2.5 Any release of industrial runoff shall be done in a manner which will not cause flooding or erosion.

MONITORING AND REPORTING

4.2.6 Representative grab samples of water within the Industrial Runoff Control System shall be obtained and analyzed for the parameters listed in TABLE 4.2-B prior to release.

4.2.7 The approval holder shall monitor the release of industrial runoff from the Industrial Runoff Control System as required in TABLE 4.2-B throughout the release period.

4.2.8 The approval holder shall report as required in TABLE 4.2-B.

TABLE 4.2-B MONITORING AND REPORTING

MONITORING						REPORTING	
PARAMETER, TEST, EVENT, STUDY PROPOSAL OR REPORTING REQUIREMENT	**PRIOR TO RELEASE**		**DURING RELEASE**			**ANNUALLY**	**TO**
INDUSTRIAL RUNOFF							
Discharge volume (in cubic metres)	-	-	Once/day	Volume estimate	A	Industrial Wastewater and Runoff Report (On or before February 14th of the year following the year in which the information was collected)	Director
pH	Once	Representative grab	Once/day	Grab	A		
Oil and Grease	Once	Representative grab	Once/day	Grab	A		
Chloride in mg/l	Once	Representative grab	Once/week	Grab	A		
A = Discharge point of industrial runoff holding pond							

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4.2.9 In addition to the annual reporting requirements in TABLE 4.2-B, the annual industrial wastewater and runoff report shall include the following information:

(a) a current contact for the plant;

(b) a summary and evaluation of management and disposal of the following for the previous year:

(i) industrial wastewater;

(ii) industrial runoff';

(iii) domestic wastewater;

(c) an overview of the operation of the plant; and

(d) any other information required by the Director.

SECTION 4.3: WASTE MANAGEMENT

Not used at this time.

SECTION 4.4: DOMESTIC WASTEWATER

OPERATIONS

4.4.1 All domestic wastewater shall be directed to:

(a) A holding tank with subsequent disposal to an approved domestic wastewater treatment facility; or

(b) a septic tank and field system.

4.4.2 Sludge produced by the domestic wastewater collection and treatment system shall be disposed of at an approved domestic wastewater treatment facility.

SECTION 4.5:WATERWORKS

Not used at this time.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

SECTION 4.6: GROUNDWATER

4.6.1 The approval holder shall collect and analyze a representative groundwater sample from each of the groundwater monitor wells at the plant for the parameters specified and according to the schedule prescribed in TABLE 4.6-A unless otherwise authorized in writing by the Director.

TABLE 4.6-A GROUNDWATER MONITORING PROGRAM

GROUNDWATER MONITOR WELL	PARAMETER(S)	FREQUENCY
All wells	TDS, TOC, TKN, EC, pH, Chloride, Sulphate, Iron	Annually

4.6.2 The samples extracted from the groundwater monitor wells shall be collected using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.

4.6.3 All groundwater monitor wells shall be:

(a) protected from damage; and

(b) locked except when being sampled, unless otherwise authorized in writing by the Director.

4.6.4 If a representative groundwater sample cannot be collected because the groundwater monitor well is damaged or is no longer capable of producing a representative groundwater sample:

(a) the groundwater monitor well shall be cleaned, repaired or replaced; and

(b) a representative groundwater sample shall be collected and analyzed prior to the next scheduled sampling event; unless otherwise authorized in writing by the Director.

4.6.5 In addition to the sampling information recorded in 2.2.2, the approval holder shall record the following sampling information for all groundwater samples collected:

(a) a description of purging and sampling procedures;

(b) the static elevations, above sea level, of fluid phases in the groundwater monitor well prior to purging;

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(c) the temperature of each sample at the time of sampling;

(d) the pH of each sample at the time of sampling; and

(e) the specific conductance of each sample at the time of sampling.

4.6.6 The approval holder shall compile an Annual Groundwater Monitoring Program Summary Report which shall include the following information:

(a) a legal description of the plant and a map illustrating the plant boundaries;

(b) a topographic map of the plant;

(c) a description of the industrial activity and processes;

(d) a map showing the location of surface and groundwater users within a five kilometre radius of the plant;

(e) a general hydrogeological characterization of the region within a five kilometre radius of the plant;

(f) a detailed hydrogeological characterization of the plant;

(g) a geological cross-section(s) of the plant;

(h) a map of surface drainage patterns located within the plant;

(i) a map of groundwater monitor well locations and a description of the existing groundwater monitoring program for the plant;

(j) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;

(k) analytical data recorded as required in 4.6.1 and 4.6.5;

(l) a summary of fluid elevations recorded as required in 4.6.5(b) and an interpretation of changes in fluid elevations;

(m) an interpretation of groundwater flow patterns;

(n) an interpretation of the analytical results including the following:

(i) diagrams indicating the location of any contamination identified;

(ii) probable sources of contamination; and

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(iii) the extent of contamination identified;

(o) a summary and interpretation of the data collected since the groundwater monitoring program began including:

(i) control charts which indicate trends in contaminant concentrations; and

(ii) the migration of contaminants;

(p) a description of the following:

(i) contaminated groundwater remediation techniques employed;

(ii) source elimination measures employed;

(iii) risk assessment studies undertaken; and

(iv) risk management studies undertaken;

(q) a sampling schedule for the following year;

(r) recommendations, as follows:

(i) for changes to the groundwater monitoring program to make it more effective; and

(ii) for remediation, risk assessment or risk management of contamination identified.

4.6.7 The approval holder shall submit two copies of the Annual Groundwater Monitoring Summary Report to the Director on or before April 14 of the year following the year in which the information on which the report is based was collected.

SECTION 4.7: SOIL

MONITORING

4.7.1 The approval holder shall develop and document proposals for the Soil Monitoring Program in accordance with the *Soil Monitoring Directive*, Chemicals Assessment and Management Division, May 1996, as amended.

4.7.2 The approval holder shall submit the Soil Monitoring Program proposals to the Director for authorization in writing according to the following schedule:

(a) for the first soil monitoring proposal, no later than February 1, 2002; and

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(b) for the second soil monitoring proposal, no later than February 1, 2007.

4.7.3 If the Soil Monitoring Program proposals are found deficient by the Director, the approval holder shall correct all the deficiencies as outlined by the Director within 120 days of the deficiency letter.

4.7.4 The approval holder shall implement the Soil Monitoring Program proposals as authorized in writing by the Director.

4.7.5 The approval holder shall implement QA/QC provisions in accordance with the *CCME Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites, Volume I*, Report CCME EPC-NCS62E, Winnipeg, Manitoba, December 1993, as amended.

STANDARDS

4.7.6 For sampling locations which meet the conditions in C.1 of the *Soil Monitoring Directive*, May 1996, as amended, the concentration of substances in soil shall be compared to values in the following:

(a) for a substance release on or after the effective date of the approval, the *Alberta Tier I Criteria for Contaminated Soil Assessment and Remediation*, March 1994, as amended, Chemicals Assessment and Management Division; and

(b) for a substance release prior to the effective date of the approval, the *Interim Canadian Environmental Quality Criteria for Contaminated Sites*, Report CCME EPC-CS34, Winnipeg, Manitoba, September, 1991, as amended.

4.7.7 For sampling locations which do not meet the conditions in C.1 of the *Soil Monitoring Directive*, May 1996, as amended, or if substances are present that are not listed in the standards referred to in 4.7.6(a) or 4.7.6(b), the concentrations of substances in soil shall be compared to values derived using methods in C.2 of the *Soil Monitoring Directive*.

REPORTING

4.7.8 The approval holder shall submit two copies of each Soil Monitoring Program report to the Director summarizing the data obtained from the soil monitoring referred to in 4.7.4 according to the following schedule:

(a) for the first soil monitoring report, no later than December 1, 2002; and,

(b) for the second soil monitoring report, no later than December 1, 2007, unless otherwise authorized by the Director.

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4.7.9 The Soil Monitoring Program reports shall be as prescribed in the reporting requirements of the *Soil Monitoring Directive*, May 1996, as amended.

SOIL MANAGEMENT PROGRAM

4.7.10 If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than the applicable concentrations in 4.7.6 or 4.7.7, the approval holder shall develop and document a Soil Management Program proposal in accordance with the *Guideline for Monitoring and Management of Soil Contamination Under EPEA Approvals*, Chemicals Assessment and Management Division, May 1996, as amended, or as otherwise authorized in writing by the Director.

4.7.11 If required pursuant to 4.7.10, the approval holder shall submit a Soil Management Program proposal to the Director within six months after the date that the Soil Monitoring Report referred to in 4.7.8 is due.

4.7.12 The Soil Management Program proposal shall include, at a minimum:

(a) steps to be taken to control sources of contamination; and

(b) remediation objectives for substances identified by soil monitoring as exceeding the applicable maximum standards in 4.7.6 or 4.7.7; and

(c) proposed steps for management of soil contamination; and

(d) a schedule for implementing the Soil Management Program.

4.7.13 If the Soil Management Program proposal is found deficient by the Director, the approval holder shall correct all the deficiencies as outlined by the Director by the date specified in the deficiency letter.

4.7.14 The approval holder shall implement the Soil Management Program as authorized in writing by the Director.

4.7.15 If the approval holder must implement a Soil Management Program pursuant to 4.7.14, the approval holder shall submit a written Soil Management Program report to the Director on or before March 31 of each year, unless otherwise authorized in writing by the Director.

4.7.16 The Soil Management Program report shall contain, at a minimum, all the following information:

(a) a summary of actions taken under the Soil Management Program during the previous year;

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(b) a description and interpretation of results obtained, including any soil testing, from the Soil Management Program; and

(c) events planned for the current year including any deviations from the program authorized in writing by the Director.

PART 5: RECLAMATION

SECTION 5.1: GENERAL

5.1.1 Within six months of the plant ceasing operation, except for repairs and maintenance, the approval holder shall apply for an amendment to this approval to reclaim the plant by submitting a Decommissioning and Land Reclamation plan to the Director.

SECTION 5.2: DECOMMISSIONING

Not used at this time.

SECTION 5.3: LAND RECLAMATION

5.3.1 The approval holder shall reclaim land through appropriate conservation and reclamation methods to construct land having characteristics (soils, topography and drainage) that results in a return of land capability equivalent to that existing prior to disturbance.

5.3.2 The approval holder shall develop and submit a plan for the Land Reclamation phase to the Director which shall include, at a minimum, all of the following:

(a) the final use of the reclaimed area and how equivalent land capability will be achieved;

(b) removal of infrastructure;

(c) restoration of drainage;

(d) soil replacement;

(e) erosion control;

(f) revegetation and conditioning of the plant including:

(i) species list, seed source and quality, seeding rates and methods;

(ii) fertilization rates and methods;

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(iii) wildlife habitat plans where applicable; and

(g) reclamation sequence and schedule.

5.3.3 The approval holder shall implement the Land Reclamation plan as authorized in writing by the Director.

CONTOURING AND MATERIAL PLACEMENT

5.3.4 The approval holder shall contour disturbed land such that the reclaimed landforms approximate the natural landforms in the areas adjacent to the plant or as agreed in writing by the Conservation and Reclamation Inspector.

5.3.5 The approval holder shall ensure that reclaimed slopes shall be no steeper than 3:1.

5.3.6 The approval holder shall immediately suspend topsoil replacement when:

(a) wet or frozen field conditions will result in the degradation of topsoil quality; unless otherwise authorized in writing by a Conservation and Reclamation Inspector, or

(b) high wind velocities, any other field conditions or operations will result in the degradation of topsoil quality or loss of topsoil; unless otherwise authorized in writing by a Conservation and Reclamation Inspector, or

(c) directed to do so in writing by a Conservation and Reclamation Inspector.

REPORTING

5.3.7 In addition to reporting pursuant to 2.1.1, the approval holder shall immediately contact a Conservation and Reclamation Inspector when a land surface disturbance that is not approved is required.

5.3.8 The approval holder shall prepare an Annual Report that includes:

(a) a statement summarizing compliance with the requirements of this approval;

(b) a discussion about any non-compliance events or inconsistencies reported under 5.3.8(a);

(c) conservation and reclamation activities; and

(d) any information requested by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

5.3.9 The Annual Report for the preceding year shall be submitted to the Director by March 31 of each year.

DATED August , 1999

Designated Director under the Act

Alberta
ENVIRONMENT

CONSENT TO TRANSFER APPROVAL 1581-01-00

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT

WHEREAS the Director has issued Approval Number 1581-01-00 (the "Approval") to Murphy Oil Company Ltd., to undertake the activity described in the Approval.

AND WHEREAS Murphy Oil Company Ltd., pursuant to section 75 of the Environmental Protection and Enhancement Act of Alberta, has requested the Director to consent to the transfer of the Approval to Pengrowth Corporation.

NOW THEREFORE pursuant to section 11 of the Approvals Procedure Regulation, I, the Designated Director under the Act consent to the transfer of the Approval from Murphy Oil Company Ltd. to Pengrowth Corporation.

IN CONSIDERATION of the Designated Director consenting to the transfer of the Approval from Murphy Oil Company Ltd. to Pengrowth Corporation, Pengrowth Corporation covenants and agrees with the Designated Director to comply with and to be bound by all the terms of the Approval as if the Approval had been issued by the Director to Pengrowth Corporation.

Murphy Oil Company Ltd.	Witness (if not under corporate seal)
Pengrowth Corporation	Witness (if not under corporate seal)

Designated Director under the Act

September 8, 2004
Date

Alberta Environment

Environmental Management
Northern Region

111 Twin Atria Building
4999 – 98 Avenue
Edmonton, Alberta
Canada T6B 2X3

Telephone: (780) 427-7617
Fax: (780) 427-7824

File: 1581-01-00

July 31, 2009

Mr. Dean Soucy
Senior Environmental Coordinator
Pengrowth Corporation
2100, 222 Third Avenue SW
Calgary, AB T2P 0B4

Dear Mr. Soucy:

Re: Pengrowth Corporation
Lindbergh Enhanced Recovery In-Situ Heavy Oil Processing Plant
Extension of Expiry Date of *Environmental Protection and Enhancement Act* (EPEA) Approval No. 1581-01-00, as amended

In accordance with Section 69 of the *Environmental Protection and Enhancement Act* (EPEA), the expiry date of the above-noted approval is hereby extended from July 31, 2009 to July 30, 2010.

By way of this letter, Pengrowth Corporation is to follow the terms and conditions of the above-noted approval until July 30, 2010, or until a new EPEA approval is issued, whichever occurs first.

If you have any questions regarding this extension, please contact Rhonda Lee Curran, Industrial Approvals Engineer, at (780) 644-5339.

Sincerely,

Patrick Marriott, P. Eng.
Acting Regional Approvals Manager
Northern Region
(Designated Director under the Act)

cc: Rhonda Lee Curran – AENV
Ken Deagle – AENV
Elaine Lawrence – AENV

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Government of Alberta ■
Environment

AMENDING APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO.: 1581-01-03

APPLICATION NO.: 006-1581

EFFECTIVE DATE: July 30, 2010

EXPIRY DATE: July 29, 2011

APPROVAL HOLDER: Pengrowth Corporation

Pursuant to Division 2, of Part 2, of the *Environmental Protection and Enhancement Act*, R.S.A.2000, c.E-12, as amended, the expiry date of Approval No. 1581-01-00 for the Lindbergh enhanced recovery in-situ heavy oil processing plant is extended to July 29, 2011:

Designated Director under the Act .....

Date Signed July 30, 2010

Alberta ■

Government of Alberta
Environment

Finance and Administration
Regulatory Approvals Centre
9th Floor, Oxbridge Place
9820 – 106 Street
Edmonton, Alberta T5K 2J6
Canada
Telephone: (780) 427-6311
Fax: (780) 422-0154
www.environment.alberta.ca

August 5, 2011

Steve De Maio
Vice President, In Situ Oil Development & Operations
Pengrowth Energy Corporation
2100-222 3 AVE SW
CALGARY AB T2P 0B2

Dear Mr. De Maio:

Re: Lindbergh Pilot SAGD Project
Application No. 004-1581

Your application for a renewal of an existing approval under the Environmental Protection and Enhancement Act (EPEA) has been reviewed and enclosed is Approval No. 1581-02-00.

It is your responsibility to obtain any approvals, permits or licences that are required from other agencies.

The Act may provide the approval holder a right of appeal against any term or condition contained in the approval to the Alberta Environmental Appeals Board. You should note that there are strict time lines for filing an appeal dependent on the type of appeal. If you choose to appeal, please contact the office of the Registrar of Appeals, Environmental Appeals Board of Alberta, 3rd Floor, 10011 - 109 Street, Edmonton, Alberta, T5J 3S8, telephone (780) 427-6207.

If you have any questions, please contact me at (780) 427-9541.

Yours truly,

Elaine Lawrence

for Valerie Collins
Application & Security Coordinator

Enclosure

cc: Rhonda Lee Curran, Northern Region - Edmonton

Government of Alberta
Environment

APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO.: 1581-02-00

APPLICATION NO.: 004-1581

EFFECTIVE DATE: July 29, 2011

EXPIRY DATE: June 30, 2021

APPROVAL HOLDER: Pengrowth Energy Corporation

ACTIVITY: **Construction, operation and reclamation of the**

Lindbergh enhanced recovery in-situ oil sands or heavy oil processing plant

is subject to the attached terms and conditions.

Designated Director under the Act: [signature]

Date Signed: July 29, 2011

Alberta

TERMS AND CONDITIONS ATTACHED TO APPROVAL

DEFINITIONS

1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval and Schedule I.

GENERAL

2.1 If construction of the SAGD pilot project has not commenced by July 1, 2012, the approval holder shall apply for an amendment to this approval, unless otherwise authorized in writing by the Director.

2.2 The following stacks shall be equipped with sampling facilities:

(a) the two 18.3 MW steam generator (OTSG 1 and OTSG 2) exhaust stacks; and

(b) the two 3.44 MW glycol boiler exhaust stacks.

2.3 The sampling facilities required by condition 2.2 shall, at a minimum, be:

(a) installed;

(b) operated; and

(c) maintained

to comply with:

(i) the *Alberta Stack Sampling Code,* Alberta Environment, 1995, as amended, and

(ii) the *Air Monitoring Directive,* Alberta Environment, 1989, as amended.

2.4 The approval holder shall:

(a) construct;

(b) operate;

(c) maintain; and

(d) reclaim;

the plant in accordance with this approval.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

2.5 The approval holder shall comply with the terms and conditions contained in Schedules I to XI, attached hereto and forming part of this approval.

2.6 Environmental Protection *and Enhancement Act* Approval No. 1581-01-00 is cancelled.

AIR EMISSIONS

3.1 The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.

3.2 The approval holder shall control fugitive emissions and any source not specified in Schedule IV in accordance with condition 3.3, unless otherwise authorized in writing by the Director.

3.3 With respect to fugitive emissions and any air emission source not specified in Schedule IV, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:

(a) impairment, degradation or alteration of the quality of natural resources;

(b) material discomfort, harm or adverse effect to the well being or health of a person; or

(c) harm to property or to the vegetative or animal life.

3.4 Releases of the following substances to the atmosphere shall not exceed the limits specified in TABLE 3.1.

TABLE 3.1: AIR EMISSION LIMITS

EMISSION SOURCE	SUBSTANCE	LIMIT
Plant	Sulphur Dioxide	0.083 tonnes per day
Each of the 18.3 MW steam generators (OTSG 1 and OTSG 2)	Oxides of nitrogen (expressed as NO_2)	1.71 kilograms per hour
Each of the 3.44 MW glycol boilers	Oxides of nitrogen (expressed as NO_2)	0.32 kilograms per hour

3.5 The approval holder shall not operate the process equipment unless and until the associated pollution abatement equipment is operating.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.6 The approval holder shall monitor:

(a) the air emission sources as specified in TABLE 3.2; and

(b) in accordance with the *Air Monitoring Directive*, Alberta Environment, 1989, as amended.

3.7 The approval holder shall report to the Director:

(a) the results of the air emission source monitoring as required in TABLE 3.2; and

(b) in accordance with the *Air Monitoring Directive*, Alberta Environment, 1989, as amended.

TABLE 3.2: AIR EMISSION SOURCE MONITORING AND REPORTING

EMISSION SOURCE	PARAMETER	METHOD OF MONITORING	FREQUENCY	REPORTING FREQUENCY	
				MONTHLY	ANNUALLY
Produced gas and residue or fuel gas to the high pressure (HP) flare stack, the two steam generators, and the two glycol boilers	Volumetric flow rates	Measured or Estimated	Continuously	No	No
High pressure (HP) flare stack and the two steam generator exhaust stacks	Sulphur dioxide	Calculated	Daily	Yes, tonnes per day	Yes, tonnes per year
Produced gas at the central processing facility	Hydrogen sulphide	Gas Analysis	Monthly	Yes	No
	Total hydrocarbons				
	Lower heating value				
Each of the 18.3 MW steam generators	Oxides of nitrogen (expressed as NO_2)	Manual Stack survey	Once within six months of commissioning the SAGD pilot project	Yes	Yes, summary
Each of the 3.44 MW glycol boilers	Oxides of nitrogen (expressed as NO_2)	Manual Stack survey	Once within six months of commissioning the SAGD pilot project	Yes	Yes, summary

3.8 The approval holder shall notify the Director in writing a minimum of two weeks prior to any manual stack survey that is required to be conducted by this approval.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.9 In addition to the annual reporting requirement in TABLE 3.2, the annual Air Emission Summary and Evaluation Report shall include, at a minimum, all of the following information:

(a) information related to the plant operation;

(b) the performance of air pollution control equipment;

(c) any trends in the emissions data; and

(d) any other information as required in writing by the Director.

3.10 The approval holder shall operate or cause to be operated the LICA Air Quality Monitoring Program Network.

3.11 The approval holder shall submit or cause to be submitted monthly reports, with respect to the monitoring done in 3.10, to the Director within 45 days from the end of each measured month.

3.12 The approval holder shall immediately apply to the Director to amend the ambient air monitoring and reporting requirements upon the occurrence of any of the following events:

(a) the approval holder ceasing to actively participate in the LICA Air Quality Monitoring Program;

(b) the LICA Air Quality Monitoring Program, as accepted by the Director, ceasing to operate; or

(c) the LICA Air Quality Monitoring Program amending its air monitoring program without acceptance from the Director.

WATER

4.1 The approval holder shall not release any substances from the plant to the surrounding watershed except as authorized by this approval.

PARTICIPATION IN REGIONAL INITIATIVES

5.1 The approval holder shall participate in the following regional monitoring programs and initiatives:

(a) Lakeland Industry and Community Association (LICA); and

(b) Alberta Biodiversity Monitoring Institute (ABMI).

TERMS AND CONDITIONS ATTACHED TO APPROVAL

DECOMMISSIONING AND RECLAMATION

6.1 The approval holder shall submit a:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

to the Director by November 30, 2011 to reclaim the abandoned CSS operations, unless otherwise authorized in writing by the Director.

6.2 The Decommissioning Plan referred to in condition 6.1 shall be prepared in accordance with condition 7 of Schedule IX.

6.3 If the Decommissioning Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

6.4 The approval holder shall implement the Decommissioning Plan as authorized in writing by the Director.

6.5 The approval holder shall only implement changes to the Decommissioning Plan authorized in condition 6.4 as authorized in writing by the Director.

6.6 The Land Reclamation Plan referred to in condition 6.1 shall be prepared in accordance with condition 9 of Schedule IX.

6.7 If the Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

6.8 The approval holder shall implement the Land Reclamation Plan as authorized in writing by the Director.

6.9 The approval holder shall only implement changes to the Land Reclamation Plan authorized in condition 6.8 as authorized in writing by the Director.

6.10 The approval holder shall submit an Annual Decommissioning and Land Reclamation Report to the Director on or before March 31 of each year after decommissioning has begun until reclamation is complete.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

6.11 The Annual Decommissioning and Land Reclamation Report shall include, at a minimum, all of the following:

(a) a summary of decommissioning and land reclamation activities conducted during the reporting period;

(b) a status of decommissioning;

(c) decommissioning and reclamation activities planned for the following report period;

(d) a summary and interpretation of monitoring data collected for the reporting period;

(e) interpretation of monitoring data collected historically; and

(f) any other information as required in writing by the Director.

DATED July 29, 2011

DESIGNATED DIRECTOR UNDER THE ACT

SCHEDULE I
DEFINITIONS

1. In all parts of this approval:

(a) "Act" means the *Environmental Protection and Enhancement Act*, R.S.A. 2000, c.E-12, as amended;

(b) "abandoned CSS operations" means the disturbed land and infrastructure associated with the previous cyclic steam stimulation operation (previously operated by Murphy Oil Company Inc.) as identified in Figure 2 of the Conservation and Reclamation Plan Report Lindbergh SAGD Pilot Project (dated 10 April 2008) submitted as part of the application, that is not being used or held for or in connection with the SAGD pilot project;

(c) "affected lands" means land which have received substances released from the plant;

(d) "air effluent stream" means any substance in a gaseous medium released by or from a plant;

(e) "annulus gas" means gas from the annulus of the oil and gas well casing;

(f) "application" means the written submissions from the approval holder to the Director in respect of application number 004-1581 and any subsequent applications where amendments are issued for this approval;

(g) "central processing facility" means those buildings, structures, pollution abatement equipment, process and storage facilities and land used in and for the processing of bitumen or heavy oil at the plant;

(h) "commencing operation" means to start up the plant, process unit or equipment for the first time with the introduction of feed material, electrical or thermal energy and the simultaneous production of products for which the plant, process unit or equipment was designed excluding predetermined period of commissioning or testing;

(i) "continuous monitoring" means sampling or flow measurement through equipment that creates an uninterrupted output of the analysis or flow measurement;

(j) "day", when referring to sampling, means any sampling period of 24 consecutive hours, unless otherwise specified;

(k) "decommissioning" means the dismantling and decontamination of a plant undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;

SCHEDULE I
DEFINITIONS

(l) "decontamination" means the treatment or removal of substances from the plant and affected lands;

(m) "Director" means an employee of the Government of Alberta designated as a Director under the Act;

(n) "dismantling" means the removal of buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the plant;

(o) "disturbed land" means any land disturbed by the approval holder in any manner in association with the activity which is subject of this approval;

(p) "estimate" means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

(q) "fugitive emissions" means emissions of substances to the atmosphere other than ozone depleting substances, originating from a plant source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;

(r) "grab" when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(s) "grade" means the rise or fall of land surface over a specified distance, measured in the same units;

(t) "industrial runoff" means precipitation that falls on or traverses the plant developed area;

(u) "industrial runoff control system" means the parts of the plant that collect, store or treat industrial runoff from the plant;

(v) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the plant;

(w) "industrial wastewater control system" means the parts of the plant that collect, store or treat industrial wastewater;

SCHEDULE I
DEFINITIONS

(x) "ISO/IEC 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;

(y) "land reclamation" means the stabilization, contouring, maintenance, conditioning, reconstruction, and revegetation of the surface of the land to a state that permanently returns the plant to a land capability equivalent to its predisturbed state;

(z) "LICA Air Quality Monitoring Program Network" means the air monitoring network established and operated by the Lakeland Industry and Community Association (LICA), as accepted in writing by the Director;

(aa) "manual stack survey" means a survey conducted in accordance with the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;

(bb) "monitoring system" means all equipment used for sampling, conditioning, analysing or recording data in respect of any parameter listed or referred to in this approval including equipment used for continuous monitoring;

(cc) "month" means calendar month;

(dd) "net or lower heating value" means the quantity of heat evolved on complete combustion where the combustion products remain as vapour at 15°C;

(ee) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, railways, pipelines, camps, well pads, borrow pits, abandoned CSS operation and other installations, and includes the land, located on Section 13, Township 58, Range 5, West of the 4th Meridian, that is being or has been used or held for or in connection with the Lindbergh enhanced recovery in-situ oil sands or heavy oil processing plant;

(ff) "plant developed area" means the areas of the plant used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material;

(gg) "produced gas" means all gas associated with the production and treatment of oil or bitumen including, but not limited to, gas liberated at storage tanks, heaters, treaters, produced water facilities;

(hh) "QA/QC" means quality assurance and quality control;

SCHEDULE I
DEFINITIONS

(ii) "reclaimed soil" means soil created by the selective placement of suitable topsoil and subsoil on recontoured areas;

(jj) "recontoured areas" means disturbed land that has been decommissioned, contoured and decompacted;

(kk) "regulations" means the regulations enacted pursuant to the Act, as amended;

(ll) "representative grab" when referring to a sample, means a sample consisting of equal volume portions of water collected from at least four sites between 0.20-0.30 metres below the water surface within a pond;

(mm) "SAGD pilot project" means the disturbed land and associated infrastructure within the plant that is being or has been used or held for or in connection with the SAGD operations;

(nn) "self-sustaining" means the degree at which a reclaimed ecosystem can maintain itself without requiring external support or human intervention;

(oo) "soil" means mineral or organic earthen materials that can, have, or are being altered by weathering, biological processes, or human activity;

(pp) "storm water retention pond" means the industrial runoff control system pond as described in the application and identified in Figure 14-1 of the Project Update and Supplemental Information Responses (dated December 2010) submitted as part of the application;

(qq) "surface runoff pond" means the industrial runoff control system pond as described in the application and identified in Figure 14-1 of the Project Update and Supplemental Information Responses (dated December 2010) submitted as part of the application;

(rr) "tank" means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support including wood, concrete, steel, and plastic;

(ss) "topsoil" means the uppermost layer of soil and consists of:

(i) all organic horizons (L, F, H and O) as defined in *The Canadian System of Soil Classification* (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended,

SCHEDULE I
DEFINITIONS

(ii) A-horizons as defined in *The Canadian System of Soil Classification* (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998, as amended, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, and

(iii) the replaced topsoil layer in a reclaimed soil;

(tt) "volume estimate" means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

(uu) "weeds" means vegetation defined as controlled, nuisance or noxious by the *Weed Control Act*, 2008, as amended;

(vv) "week" means any consecutive 7-day period, unless otherwise specified; and

(ww) "year" means calendar year, unless otherwise specified.

SCHEDULE II
GENERAL CONDITIONS

1. The approval holder shall immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.

2. The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to condition 1 of Schedule II.

3. The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

4. The approval holder shall immediately notify the Director in writing if any of the following events occur:

   (a) the approval holder is served with a petition into bankruptcy;

   (b) the approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal;

   (c) a receiver or receiver-manager is appointed;

   (d) an application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation; or

   (e) any of the assets which are the subject matter of this approval are seized for any reason.

5. If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and using procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

6. The approval holder shall submit all monthly reports required by this approval to be compiled or submitted to the Director on or before the end of the month following the month in which the information was collected, unless otherwise specified in this approval.

7. The approval holder shall submit all annual reports required by this approval to be compiled or submitted to the Director on or before March 31 of the year following the year in which the information was collected, unless otherwise specified in this approval.

SCHEDULE III
ANALYTICAL REQUIREMENTS

1. The approval holder shall:

   (a) record; and

   (b) retain;

   all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of ten years:

   (i) the place, date and time of sampling,

   (ii) the dates the analyses were performed,

   (iii) the analytical techniques, methods or procedures used in the analyses,

   (iv) the names of the persons who collected and analysed each sample, and

   (v) the results of the analyses;

   unless otherwise authorized in writing by the Director.

2. With respect to any sample required to be taken pursuant to this approval, the approval holder shall ensure that:

   (a) collection;

   (b) preservation;

   (c) storage;

   (d) handling; and

   (e) analysis;

   shall be conducted in accordance with the following, unless otherwise authorized in writing by the Director:

   (i) for air:

   (A) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended,

   (B) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environment, 1993, as amended, and

SCHEDULE III
ANALYTICAL REQUIREMENTS

(C) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended;

(ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater parameters:

(A) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 1998, as amended;

(iii) for soil:

(A) the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended, and

(B) the *Soil Quality* Criteria *Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended;

(iv) for waste:

(A) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, 1986, as amended,

(B) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Alberta, 1996, AECV96-M1, as amended,

(C) the *Toxicity Characteristic Leaching Procedure (TCLP)*, USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended, or

(D) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 1998, as amended.

3. The approval holder shall analyse all samples that are required to be obtained by this approval in a laboratory accredited pursuant to ISO/IEC 17025, as amended, for the specific parameter(s) to be analysed, unless otherwise authorized in writing by the Director.

4. The term sample as used in condition 3 of Schedule III does not include samples directed to continuous monitoring equipment, unless specifically required in writing by the Director.

SCHEDULE III
ANALYTICAL REQUIREMENTS

5. The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under condition 3 of Schedule III.

SCHEDULE IV
AIR EMISSIONS

1. The approval holder shall only release air effluent streams to the atmosphere from the following sources:

   (a) two 18.3 MW steam generator (OTSG 1 and OTSG 2) exhaust stacks;

   (b) two 3.44 MW glycol boiler exhaust stacks;

   (c) one high pressure (HP) flare stack;

   (d) one back-up generator set (genset) exhaust stack; and

   (e) any other source authorized in writing by the Director.

2. The approval holder shall construct and maintain the following stacks according to the height requirements specified in TABLE 1 of Schedule IV.

TABLE 1: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (meters)
The two 18.3 MW steam generator (OTSG 1 and OTSG 2) exhaust stacks	14.0
The two 3.44 MW glycol boiler exhaust stacks	7.4
The high pressure (HP) flare stack	12.2

3. The net or lower heating value of the combined gas stream released to the central processing facility flare stack shall be maintained, at a minimum, at 12 MJ/m3 when adjusted for 101.325 kPa and 15°C by adding residue gas to the flare gas.

4. Annulus gas and produced gas shall be collected and burned as fuel, incinerated or flared.

5. The approval holder shall ensure that all oil production tanks are connected to the vapour recovery system.

6. All aboveground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks*, Canadian Council of Ministers of the Environment, PN 1180, 1995, as amended.

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

1. The approval holder shall manage:

   (a) industrial wastewater; and

   (b) industrial runoff;

   as described in the application, unless otherwise authorized in writing by the Director or specified by this approval.

2. The approval holder shall not dispose of industrial runoff unless otherwise authorized in writing by the Director.

3. The approval holder shall only dispose of industrial wastewater as follows:

   (a) to the central processing facility water recycle treatment unit;

   (b) to an Alberta Energy Resources Conservation Board approved disposal well; or

   (c) to an Alberta Energy Resources Conservation Board approved Waste Processing and Disposal Facility;

   unless otherwise authorized in writing by the Director.

4. The approval holder shall direct all industrial runoff from the plant developed area to the central processing facility water recycle treatment units or the industrial runoff control system, specifically the surface runoff pond at the central processing facility.

5. The approval holder shall only release industrial runoff from the following at the central processing facility:

   (a) the surface runoff pond; or

   (b) the storm water retention pond.

LIMITS

7. Releases from the industrial wastewater control system and the industrial runoff control system shall not exceed the limits for the parameters specified in TABLE 1 of Schedule V.

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

TABLE 1 – INDUSTRIAL WASTEWATER/RUNOFF CONTROL SYSTEMS LIMITS

PARAMETER	LIMITS
Discharge Volume	--
pH	6.0 – 9.5 units
Oil and Grease	No visible sheen
Chloride	500 mg/L

MONITORING AND REPORTING

8. The approval holder shall monitor the industrial wastewater and industrial runoff control systems as specified in TABLE 2 of Schedule V.

9. The approval holder shall report to the Director the results of the industrial wastewater and industrial runoff control systems monitoring as required in TABLE 2 of Schedule V, unless otherwise authorized in writing by the Director.

TABLE 2 – INDUSTRIAL WASTEWATER/RUNOFF CONTROL SYSTEMS MONITORING AND REPORTING

MONITORING						REPORTING FREQUENCY
PARAMETER	PRIOR TO RELEASE		DURING RELEASE			ANNUALLY
	FREQUENCY	SAMPLE TYPE	FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION	
Discharge volume (in cubic meters)	-	-	Once/day	Volume estimate	A	Yes
pH	Once	Representative grab	Once/day	Grab	A	
Oil and Grease	Once	Representative grab	Once/day	Grab	A	
Chloride in mg/L	Once	Representative grab	Once/day	Grab	A	
A = Discharge point of industrial runoff control system (surface runoff pond or storm water retention pond, whichever is being released)						

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

10. In addition to the annual reporting in TABLE 2 of Schedule V, the annual Industrial Wastewater and Industrial Runoff Report shall include, at a minimum, all of the following information:

    (a) an assessment of the performance of:

        (i) the industrial wastewater control system,

        (ii) the industrial runoff control system, and

        (iii) pollution abatement equipment;

    (b) an overview of the operation of the plant;

    (c) a summary and evaluation of management and disposal of industrial wastewater for the previous year; and

    (d) a summary and evaluation of management and disposal of industrial runoff for the previous year.

RAW WATER USAGE AND INDUSTRIAL WASTEWATER MINIMIZATION STUDY

11. The approval holder shall submit a proposal for a Raw Water Usage and Industrial Wastewater Minimization Study to the Director by December 31, 2014, unless otherwise authorized in writing by the Director.

12. The Raw Water Usage and Industrial Wastewater Minimization Study shall include, at a minimum, all of the following information:

    (a) a full Characterization Survey and water balance for industrial wastewater and industrial runoff from the plant; and

    (b) methods by which raw water use and industrial wastewater may be reduced or eliminated through reduction, reuse, recycling, treatment, or introduction of new technology to reduce the release of pollutants to the environment; and

    (c) a timeline for conducting the study and submitting a report to the Director.

13. The approval holder shall implement the Raw Water Usage and Industrial Wastewater Minimization Study submitted in accordance with condition 11 of Schedule V as authorized in writing by the Director.

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

14. Within 12 months following receipt of authorization from the Director as specified in condition 13 of Schedule V, the approval holder shall submit a Raw Water Usage and Industrial Wastewater Minimization Study Report on the implementation of the findings, including recommended implementation plans and timelines.

15. If the Raw Water Usage and Industrial Wastewater Minimization Study Report is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the deadline specified in writing by the Director.

16. The approval holder shall implement the Raw Water Usage and Industrial Wastewater Minimization Study Report recommendations as authorized in writing by the Director.

SCHEDULE VI
GROUNDWATER MONITORING

1. The approval holder shall develop an up-to-date Groundwater Monitoring Program Proposal which shall include, at a minimum, all of the following:

   (a) a conceptual development of the regional and local groundwater monitoring network;

   (b) a description of the regional hydrogeology;

   (c) a hydrogeologic description and interpretation of the plant;

   (d) a map of groundwater flow patterns;

   (e) a map and description of surface water drainage patterns for the plant;

   (f) a lithologic description and maps, including cross-sections, of the surficial and the upper bedrock geologic materials at the plant;

   (g) maps showing depth to water table, patterns of groundwater movement and hydraulic gradients at the plant;

   (h) the hydraulic conductivity of all surficial and bedrock materials at the plant;

   (i) a map showing the location of existing and additional proposed groundwater monitoring wells at the plant;

   (j) lithologs of all boreholes drilled at the plant;

   (k) construction details of existing groundwater monitoring wells;

   (l) a rationale for proposed groundwater monitoring well locations and proposed completion depths of those wells;

   (m) a description of groundwater monitoring well development protocols;

   (n) a list of parameters to be monitored and the monitoring frequency for each groundwater monitoring well or group of groundwater monitoring wells at the plant;

   (o) details of a plan to gather information on existing groundwater quality at the plant prior to commencing operations;

   (p) a description of the groundwater sampling and analytical QA/QC procedures;

SCHEDULE VI
GROUNDWATER MONITORING

(q) details of a groundwater response plan specifying actions to be taken should contaminants be identified through the Groundwater Monitoring Program or in the event of a well casing failure; and

(r) a proposal to:

(i) monitor and report any anomalous increases in water level at monitoring wells as soon as they are discovered,

(ii) address the potential that the approval holder's operations may have on liberating or introducing arsenic into groundwater, and

(iii) address the existing groundwater contamination at the plant and affected lands identified by previous groundwater monitoring, electromagnetic survey and soil sampling programs.

2. The approval holder shall submit the Groundwater Monitoring Program Proposal to the Director on or before September 30, 2011, unless otherwise authorized in writing by the Director.

3. If the Groundwater Monitoring Program Proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

4. The approval holder shall implement the Groundwater Monitoring Program as authorized in writing by the Director.

5. Effective until the updated Groundwater Monitoring Program in condition 4 of Schedule VI is authorized in writing by the Director, the approval holder shall collect and analyse groundwater monitoring wells at the plant for the parameters specified and according to the schedule prescribed in Table 1 of Schedule VI, unless otherwise authorized in writing by the Director.

6. The approval holder shall collect the samples extracted from the groundwater monitoring wells using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.

7. In addition to the sampling information recorded in condition 2 of Schedule III, the approval holder shall record the following sampling information for all groundwater samples collected:

(a) a description of purging and sampling procedures;

SCHEDULE VI
GROUNDWATER MONITORING

(b) the static elevations, above sea level, and depth below ground surface, of fluid phases in the groundwater monitoring well prior to purging;

(c) the temperature of each sample at the time of sampling;

(d) the pH of each sample at the time of sampling; and

(e) the specific conductance of each sample at the time of sampling.

TABLE 1: GROUNDWATER MONITORING PROGRAM

GROUNDWATER MONITORING WELL	PARAMETERS	FREQUENCY
All existing wells	Major cations and anions Nitrate (NO_3) Total Alkalinity Total Dissolved Solids (TDS) Total Organic Carbon (TOC) Total Kjeldahl Nitrogen (TKN)	Annually
All new wells (installed after January 1, 2010)	Same parameters as existing wells (above) and metals, including: Iron (Fe) Manganese (Mn) Arsenic (As) Boron (B) Mercury (Hg) Lead (Pb) Antimony (Sb) Strontium (Sr)	Annually
All wells with potential impact from dissolved organic chemicals	Oxidation-Reduction Potential Dissolved Oxygen Benzene Toluene Ethylbenzene Total Xylenes Petroleum Hydrocarbons F1 Petroleum Hydrocarbons F2 Total Phenols	Annually

SCHEDULE VI
GROUNDWATER MONITORING

8. The approval holder shall:

   (a) protect from damage; and

   (b) keep locked except when being sampled;

   all groundwater monitoring wells, unless otherwise authorized in writing by the Director.

9. If a representative groundwater sample cannot be collected because the groundwater monitoring well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:

   (a) clean, repair or replace the groundwater monitoring well; and

   (b) collect and analyse a representative groundwater sample prior to the next scheduled sampling event;

   unless otherwise authorized in writing by the Director.

10. When installing new groundwater monitoring wells deeper than 20 m below ground surface, the approval holder shall conduct the following:

   (a) resistivity (or conductivity) and spontaneous potential (or gamma) downhole logging;

   (b) coring of sediments for selected wells; and

   (c) hydraulic conductivity testing;

   unless otherwise authorized in writing by the Director.

11. The approval holder shall conduct at least five groundwater sampling events to establish baseline conditions for:

   (a) new facilities;

   (b) expansion areas which were not covered in prior sampling events; and

   (c) previously non-assessed relevant, non-saline hydrostratigraphic units at existing facilities;

   unless otherwise authorized in writing by the Director.

SCHEDULE VI
GROUNDWATER MONITORING

12. The approval holder shall conduct the sampling events referred in condition 7 of Schedule VI at intervals of no less than one month and must demonstrate stable groundwater conditions.

13. The approval holder shall carry out remediation of groundwater in accordance with the following:

    (a) *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2009, as amended; and

    (b) *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2009, as amended.

14. The approval holder shall compile an annual Groundwater Monitoring Program Summary Report which shall include, at a minimum, all of the following:

    (a) a completed *Record of Site Condition Form*, Alberta Environment, 2009, as amended;

    (b) a legal description of the plant and a map illustrating the plant boundaries;

    (c) a topographic map of the plant;

    (d) a description of the industrial activity and processes;

    (e) a map showing the location of all surface and groundwater users, and, a listing describing surface water and water well use details, within at least a five kilometre radius of the plant;

    (f) a general hydrogeological characterization of the region within a five kilometre radius of the plant;

    (g) a detailed hydrogeological characterization of the plant, including an interpretation of groundwater flow patterns;

    (h) a cross-section(s) showing depth to potentiometric surface, vertical hydraulic gradients, and patterns of groundwater movement at the plant;

    (i) borehole logs and completion details for groundwater monitoring wells;

    (j) a map showing locations of all known buried channel thalwegs and non-saline aquifers within at least five kilometres of the plant;

SCHEDULE VI
GROUNDWATER MONITORING

(k) a map of surface drainage within the plant and surrounding area to include nearby waterbodies;

(l) a map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the plant;

(m) a summary of any changes to the groundwater monitoring program made since the last groundwater monitoring report;

(n) analytical data recorded as required in conditions 4 , 5 and 7 of Schedule VI;

(o) a summary of fluid elevations recorded as required in condition 7 (b) of Schedule VI and an interpretation of changes in fluid elevations;

(p) an interpretation of QA/QC program results;

(q) an interpretation of results from condition 10 of Schedule VI;

(r) an interpretation of all the data in this report, including the following:

  (i) diagrams indicating the location and delineated extents of any contamination,

  (ii) a description of probable sources of contamination, and

  (iii) a site map showing the location and type of current and historical potential sources of groundwater contamination;

(s) a summary and interpretation of the data collected since the Groundwater Monitoring Program began including:

  (i) control charts which indicate trends in concentrations of parameters, and

  (ii) the migration of contaminants;

(t) a description of the following:

  (i) contaminated groundwater remediation techniques employed,

  (ii) source elimination measures employed,

  (iii) risk assessment studies undertaken, and

  (iv) risk management studies undertaken;

SCHEDULE VI
GROUNDWATER MONITORING

(u) a proposed sampling schedule for the following year(s); and

(v) recommendations for changes to the Groundwater Monitoring Program to make it more effective.

15. The approval holder shall submit the annual Groundwater Monitoring Program Summary Report to the Director, unless otherwise authorized in writing by the Director.

SCHEDULE VII
SOILS MONITORING

1. In addition to any other requirements specified in this approval, the approval holder shall conduct all of the following activities related to soil monitoring and soil management required by this approval in accordance with the *Soil Monitoring Directive,* Alberta Environment, 2009, as amended:

   (a) designing and developing proposals for the Soil Monitoring Program;

   (b) designing and developing proposals for the Soil Management Program;

   (c) all other actions, including sampling, analysing, and reporting, associated with the Soil Monitoring Program; and

   (d) all other actions, including sampling, analysing and reporting, associated with the Soil Management Program.

MONITORING AND REPORTING

2. The approval holder shall submit the Soil Monitoring Program proposal to the Director according to the following schedule:

   (a) for the first soil monitoring event on or before January 31, 2014; and

   (b) for the second soil monitoring event on or before January 31, 2019; or

   unless otherwise authorized in writing by the Director.

3. If any Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

4. Subject to condition 3 of Schedule VII, the approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.

5. If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by condition 2 of Schedule VII, the approval holder shall implement the Soil Monitoring Program:

   (a) in accordance with the program as set out in the proposal submitted by the approval holder; and

   (b) within 270 days after the applicable date required by condition 2 of Schedule VII.

SCHEDULE VII
SOILS MONITORING

6. The approval holder shall submit to the Director each Soil Monitoring Program Report obtained from the soil monitoring referred to in conditions 4 and 5 of Schedule VII according to the following schedule:

   (a) for the first Soil Monitoring Program Report on or before January 31, 2015; and

   (b) for the second Soil Monitoring Program Report on or before January 31, 2020; or

   unless otherwise authorized in writing by the Director.

7. If any Soil Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SOIL MANAGEMENT PROGRAM

8. If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than any of the applicable concentrations set out in the standards in the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended, the approval holder shall develop a Soil Management Program Proposal.

9. If a Soil Management Program Proposal is required pursuant to condition 8 of Schedule VII, the approval holder shall submit a Soil Management Program Proposal to the Director according to the following schedule:

   (a) for Soil Management Program Proposal that is triggered by the findings from the first soil monitoring event on or before the date in condition 6 (a) of Schedule VII;

   (b) for Soil Management Program Proposal that is triggered by the findings from a second soil monitoring event on or before the date in condition 6 (b) of Schedule VII; or

   (c) for any other soil monitoring event not specified in this approval within six months of completion of the soil monitoring event.

10. If any Soil Management Program Proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

11. The approval holder shall implement the Soil Management Program as authorized in writing by the Director.

SCHEDULE VII
SOILS MONITORING

12. If the approval holder is required to implement a Soil Management Program pursuant to condition 11 of Schedule VII, the approval holder shall submit a written Soil Management Program Report to the Director on or before March 31 of each year following the year in which the information was collected.

13. If any Soil Management Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified by the Director by the date specified in writing by the Director.

SCHEDULE VIII
WILDLIFE MONITORING

1. The approval holder shall monitor the long-term cumulative effects on biodiversity and wildlife in the region, in cooperation with other oil sands developers, and coordinated with efforts undertaken with the Alberta Biodiversity Monitoring Institute, unless authorized in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

CONSTRUCTION

1. The approval holder shall:

   (a) salvage; and

   (b) conserve;

   all topsoil for land reclamation.

2. The approval holder shall:

   (a) conserve; and

   (b) stockpile;

   all salvaged topsoil separately from other materials.

3. The topsoil stockpiles referred to in condition 2 of Schedule IX shall be:

   (a) on stable foundations;

   (b) accessible and retrievable;

   (c) contoured to allow for vegetation and stabilization;

   (d) identified with a permanent signpost as of December 31, 2011; and

   (e) controlled for weeds.

4. The approval holder shall take all steps necessary to prevent wind and water erosion of all stockpiles including, but not limited to, all of the following:

   (a) establishing a vegetative cover; and

   (b) any other steps authorized in writing by an Inspector.

5. The approval holder shall immediately suspend salvage of topsoil if directed to do so in writing by an Inspector, or when:

   (a) wet or frozen conditions;

   (b) high wind velocities; or

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

(c) any other field condition or operation;

will result in mixing, loss or degradation of the topsoil.

6. The approval holder shall recommence salvage of topsoil only when the field conditions in condition 5 of Schedule IX no longer exist or if directed to do so in writing by an Inspector.

7. The approval holder shall implement drainage control measures to minimize erosion and sedimentation.

DECOMMISSIONING

8. The approval holder shall apply for an amendment to this approval by submitting a:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

to the Director.

9. The approval holder shall submit the:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

referred to in condition 8 of Schedule IX within six months of the plant as a whole ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

10. The approval holder shall submit the:

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

referred to in condition 8 of Schedule IX within six months of the plant as a whole ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

Decommissioning Plan

11. The Decommissioning Plan referred to in condition 8 of Schedule IX shall include, at a minimum, all of the following:

    (a) a plan for dismantling the plant;

    (b) a comprehensive study to determine the nature, degree and extent of contamination at the plant and affected lands;

    (c) a plan to manage all wastes at the plant;

    (d) evaluation of remediation technologies proposed to be used at the plant and affected lands;

    (e) a plan for decontamination of the plant and affected lands in accordance with the following:

        (i) for soil or groundwater, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2010, as amended,

        (ii) for soil or groundwater, *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2010, as amended,

        (iii) for drinking water, *Canadian Environmental Quality Guidelines*, CCME PN1299, 1999, as amended, and

        (iv) for surface water, *Surface Water Quality Guidelines for Use in Alberta*, Alberta Environment, 1999, as amended;

    (f) confirmatory testing to indicate compliance with the remediation objectives;

    (g) a plan for maintaining and operating contaminant monitoring systems;

    (h) a schedule for activities (a) through (g) above; and

    (i) any other information as required in writing by the Director.

12. If the Decommissioning Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

Land Reclamation Plan

13. The Land Reclamation Plan referred to in condition 8 of Schedule IX shall include, at a minimum, all of the following:

    (a) the final use of the reclaimed area and how equivalent land capability will be achieved;

    (b) removal of infrastructure, including watercourse crossings;

    (c) a plan for the reclamation of all roads including removal of culverts and other structures;

    (d) re-establishment of drainage and how it will be integrated with adjacent land;

    (e) a description of reclaimed topography and how the reclaimed landforms will approximate the natural landforms adjacent to the plant;

    (f) soil replacement;

    (g) erosion control;

    (h) revegetation and conditioning of the plant including:

        (i) species list, seed source and quality, seeding rates and methods,

        (ii) fertilization rates and methods,

        (iii) a vegetation management plan, and

        (iv) wildlife habitat plans where applicable;

    (i) a comprehensive Reclamation Monitoring Program to assess soils, vegetation and wildlife on reclaimed areas;

    (j) reclamation sequence and schedule; and

    (k) any other information as required in writing by the Director.

14. If the Land Reclamation Plan is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

RECLAMATION

15. The approval holder shall ensure that the reclaimed slopes are no steeper than 3:1, unless otherwise authorized in writing by the Director.

16. The approval holder shall cap any unsuitable material, as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, where unsuitability is not related to contamination, with 1.0 metre of soil material having a good, fair or poor rating, as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, prior topsoil replacement.

17. The approval holder shall replace all salvaged topsoil on recontoured areas of the plant.

18. The approval holder shall immediately suspend replacement of topsoil if directed to do so in writing by an Inspector, or when:

    (a) wet or frozen conditions;

    (b) high wind velocities; or

    (c) any other field condition or operation

    will result in mixing, loss or degradation of topsoil.

19. The approval holder shall recommence replacement of topsoil only when the field conditions in condition 17 of Schedule IX no longer exist or if directed to do so in writing by an Inspector.

20. The approval holder shall maintain a weed control program until new vegetation is established and is self-sustaining.

SCHEDULE X
DOMESTIC WASTEWATER

1. The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.

2. The approval holder shall direct all domestic wastewater to the domestic wastewater system.

3. The approval holder shall operate a domestic wastewater system which shall include the following:

   (a) a septic tank and field system; or

   (b) a wastewater holding tank(s) with subsequent disposal to a wastewater treatment plant holding a current Approval or Registration under the Act to accept such waste

   unless otherwise authorized in writing by the Director.

4. The approval holder shall only dispose of sludge from the domestic wastewater system to a wastewater treatment plant holding a current Approval or Registration under the Act to accept such waste.

5. The approval holder shall construct a domestic wastewater treatment system that:

   (a) releases treated domestic wastewater to an area beyond the plant boundary, or

   (b) treats 25 cubic meters, or more, of domestic wastewater per day in a domestic wastewater treatment plant

   only if authorized by an amendment to this approval.

SCHEDULE XI
WETLANDS

Not used at this time.

Alberta Environment and Sustainable Resource Development

AMENDING APPROVAL

PROVINCE OF ALBERTA

ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT
R.S.A. 2000, c.E-12, as amended.

APPROVAL NO.: 1581-02-01

APPLICATION NO.: 007-1581

EFFECTIVE DATE: May 23, 2013

EXPIRY DATE: June 30, 2021

APPROVAL HOLDER: Pengrowth Energy Corporation

Pursuant to Division 2, of Part 2, of the *Environmental Protection and Enhancement Act*, R.S.A.2000, c.E-12, as amended, the approval for the following activity:

Lindbergh enhanced recovery in-situ oil sands or heavy oil processing plant

is amended as per the attached terms and conditions, and Schedules I to XI.

Designated Director under the Act Amit Baneja

Date Signed May 23, 2013

TERMS AND CONDITIONS ATTACHED TO APPROVAL

Environmental Protection and Enhancement Act Approval No. 1581-02-00 is hereby amended as follows:

1. All attached terms and conditions, and Schedules I to XI are deleted and the following is substituted:

DEFINITIONS

1.1 All definitions from the Act and the regulations apply except where expressly defined in this approval and Schedule I.

GENERAL

2.1 The approval holder shall:

(a) construct;

(b) operate;

(c) maintain; and

(d) reclaim;

the plant in accordance with this approval.

2.2 The approval holder shall comply with the terms and conditions, and Schedules I to XI, attached hereto and forming part of this approval.

2.3 The approval holder shall construct the Lindbergh enhanced recovery in-situ oil sands or heavy oil processing plant as described in the application, unless otherwise authorized in writing by the Director.

2.4 The approval holder shall notify the Director in writing at least 14 days before commencing operations of the Lindbergh SAGD Project.

AIR EMISSIONS

3.1 The approval holder shall not release any air effluent streams to the atmosphere except as authorized by this approval.

3.2 The approval holder shall control fugitive emissions and any air emission source not specified in condition 1 of Schedule IV in accordance with condition 3.3, unless otherwise authorized in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.3 With respect to fugitive emissions and any air emission source not specified in condition 1 of Schedule IV, the approval holder shall not release a substance or cause to be released a substance that causes or may cause any of the following:

(a) impairment, degradation or alteration of the quality of natural resources;

(b) material discomfort, harm or adverse effect to the well being or health of a person; or

(c) harm to property or to the vegetative or animal life.

3.4 Releases of the following substances to the atmosphere shall not exceed the limits specified in TABLE 3.1.

TABLE 3.1: AIR EMISSION LIMITS

AIR EMISSION SOURCE	SUBSTANCE	LIMIT
Plant	Sulphur Dioxide	1.0 tonnes per day
Each of the two 18.3 MW steam generators at the SAGD pilot project site	Oxides of nitrogen (expressed as NO_2)	1.71 kilograms per hour
Each of the two 3.44 MW glycol boilers at the SAGD pilot project site	Oxides of nitrogen (expressed as NO_2)	0.32 kilograms per hour
Each of the two 116.5 MW HP steam boilers at the main plant site	Oxides of nitrogen (expressed as NO_2)	16.8 kilograms per hour
The 4.9 MW utility boiler at the main plant site	Oxides of nitrogen (expressed as NO_2)	0.46 kilograms per hour
Each of the two 7.5 MW Cogeneration Units at the main plant site	Oxides of nitrogen (expressed as NO_2)	7.34 kilograms per hour

3.5 The approval holder shall not operate the process equipment unless and until the associated pollution abatement equipment is operating.

3.6 The approval holder shall monitor the air emission sources as specified in TABLE 3.2, unless otherwise authorized in writing by the Director.

3.7 The approval holder shall report to the Director the results of the air emission source monitoring as required in TABLE 3.2, unless otherwise authorized in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

TABLE 3.2: AIR EMISSION SOURCE MONITORING AND REPORTING

AIR EFFLUENT STREAM/ AIR EMISSION SOURCE	MONITORING			REPORTING	
	PARAMETER	METHOD OF MONITORING	FREQUENCY	MONTHLY	ANNUALLY
Produced gas and residue or fuel gas to the flare stacks, steam generators and glycol heaters	Volumetric flow rates	Measured or Estimated	Continuously	No	No
Produced gas at the central processing facility	Hydrogen sulphide	Gas Analysis	Monthly	Yes	No
	Total hydrocarbons				
	Lower heating value				
Each of the flare stacks, steam generators and glycol heaters	Sulphur dioxide	Calculated	Daily	Yes, tonnes per day	Yes, tonnes per year
Each of the two 18.3 MW steam generators and the two 3.44 MW glycol boilers at the SAGD pilot project site	Oxides of nitrogen (expressed as NO_2)	Manual Stack Survey	Once within six months of commissioning	Yes	Yes
Each of the two116.5 MW HP steam boilers, the 4.9 MW utility boiler and the two 7.5 MW Cogeneration Units at the main plant site	Oxides of nitrogen (expressed as NO_2)	Manual Stack Survey	Once within six months of commissioning	Yes	Yes
Any of the two 116.5 MW HP steam boilers at the main plant site	Oxides of nitrogen (expressed as NO_2)	Manual Stack Survey	Once per year on a rotating basis	Yes	Yes
	Oxides of nitrogen (expressed as NO_2), flow rate and temperature	CEM, as per CEMS Code	Continuously	Yes	Yes
Each of the two 7.5 MW Cogeneration Units at the main plant site	Oxides of nitrogen (expressed as NO_2)	Manual Stack Survey	Once per year	Yes	Yes

3.8 The approval holder shall notify the Director in writing a minimum of two weeks prior to any manual stack survey that is required to be conducted by this approval.

3.9 The approval holder shall submit the monthly CEMS Code data required in condition 3.6 electronically to the Alberta Environment File Transfer Protocol (FTP) site, which is used for the electronic submission of continuous emissions monitoring information.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

3.10 The approval holder shall operate, or cause to be operated, the LICA Air Quality Monitoring Program Network for the monitoring of ambient air quality, in a manner satisfactory to the Director.

3.11 The approval holder shall submit, or cause to be submitted, to the Director, an annual report which provides, at a minimum, all of the following information:

(a) an overview of the monitoring undertaken in 3.10;

(b) a description of any exceedance of the Alberta Ambient Air Quality Objectives that may have occurred due to the plant's operations, including potential cause of the exceedance; and

(c) any other information as required in writing by the Director;

on or before April 30 each year following the year in which the information was collected.

3.12 The approval holder shall immediately apply to the Director to amend the ambient air monitoring and reporting requirements upon the occurrence of any of the following events:

(a) LICA ceasing to operate; or

(b) the approval holder ceasing to actively participate in LICA;

unless otherwise authorized in writing by the Director.

3.13 In addition to the annual reporting requirement in TABLE 3.2, the annual Air Emission Report shall include, at a minimum, all of the following information:

(a) information related to the plant operation;

(b) the performance of air pollution control equipment;

(c) any trends in the emissions data;

(d) information on any upgrades or modifications to the air pollution control and monitoring equipment;

(e) a summary of contraventions reported pursuant to condition 1 of Schedule II; and

(f) any other information as required in writing by the Director.

TERMS AND CONDITIONS ATTACHED TO APPROVAL

WATER

4.1 The approval holder shall not release any substances from the plant to the surrounding watershed except as authorized by this approval.

PARTICIPATION IN REGIONAL INITIATIVES

5.1 The approval holder shall participate in the following regional monitoring programs and initiatives:

(a) Lakeland Industry and Community Association (LICA).

DECOMMISSIONING AND RECLAMATION – ABANDONED CSS OPERATIONS

6.1 The approval holder shall implement the

(a) Decommissioning Plan; and

(b) Land Reclamation Plan

for the abandoned CSS operations described in *Pengrowth Lindbergh Enhanced Recovery In-Situ Oil Sands Processing Plant Decommissioning & Land Reclamation Plan Pursuant to Approval 1581-02-00*, dated November 2011, as authorized in writing by the Director on October 18, 2012, unless otherwise authorized in writing by the Director.

6.2 The approval holder shall submit an Annual Decommissioning and Land Reclamation Report to the Director on or before March 31 of each year after decommissioning has begun until reclamation is complete.

6.3 The Annual Decommissioning and Land Reclamation Report shall include, at a minimum, all of the following:

(a) a summary of decommissioning and land reclamation activities conducted during the reporting period;

(b) a status of decommissioning;

(c) decommissioning and reclamation activities planned for the following reporting period;

(d) a summary and interpretation of monitoring data collected for the reporting period;

(e) interpretation of monitoring data collected historically; and

TERMS AND CONDITIONS ATTACHED TO APPROVAL

(f) any other information as required in writing by the Director.

6.4 If the Annual Decommissioning and Land Reclamation Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

DATED May 23, 2013

Amit Banerjee

DESIGNATED DIRECTOR UNDER THE ACT

SCHEDULE I
DEFINITIONS

1. In all parts of this approval:

(a) "Act" means the Environmental Protection and Enhancement Act, R.S.A. 2000, c.E-12, as amended;

(b) "abandoned CSS operations" means the disturbed land and infrastructure associated with the previous cyclic steam stimulation operation (previously operated by Murphy Oil Company Inc.) as identified in Figure 2 of the Conservation and Reclamation Plan Report Lindbergh SAGD Pilot Project (dated 10 April 2008) submitted as part of the application 004-1581, that is not being used or held for or in connection with the SAGD pilot project;

(c) "affected lands" means land which have received substances released from the plant;

(d) "air effluent stream" means any substance in a gaseous medium released by or from a plant;

(e) "annulus gas" means gas from the annulus of the oil and gas well casing;

(f) "application" means the written submissions from the approval holder to the Director in respect of application number 007-1581 and any subsequent applications where amendments are issued for this approval;

(g) "CEMS Code" means the *Continuous Emission Monitoring System (CEMS) Code, Alberta Environmental Protection, Pub. No. Ref: 107*, 1998, as amended;

(h) "central processing facility" means those buildings, structures, pollution abatement equipment, process and storage facilities and land used in and for the processing of bitumen or heavy oil, at the main plant site in the SW ¼ of Section 25 in Township 58, Range 5 West of the 4th Meridian and at the SAGD pilot project site in Section 13, Twp 58, Rge 5, west of the 4th Meridian.

(i) "commencing construction" means the act of removing vegetation and salvaging topsoil and/or subsoil;

(j) "commencing operations" means to start up the plant, process unit or equipment for the first time with the introduction of feed material, electrical or thermal energy and the simultaneous production of products for which the plant, process unit or equipment was designed excluding predetermined period of commissioning or testing;

SCHEDULE I
DEFINITIONS

(k) “continuous monitoring” means sampling or flow measurement through equipment that creates an uninterrupted output of the analysis or flow measurement;

(l) “day”, when referring to sampling, means any sampling period of 24 consecutive hours;

(m) “decommissioning” means the dismantling and decontamination of a plant undertaken subsequent to the termination or abandonment of any activity or any part of any activity regulated under the Act;

(n) “decontamination” means the treatment or removal of substances from the plant and affected lands;

(o) “deep organic soil” means soil with surface organic horizons, as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended, that are greater than 40 cm in depth;

(p) “Director” means an employee of the Government of Alberta designated as a Director under the Act;

(q) “dismantling” means the removal of buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, railways, roadways, pipelines and any other installations that are being or have been used or held for or in connection with the plant;

(r) “disturbed land” means any land disturbed by the approval holder in any manner in association with the activity which is subject of this approval;

(s) “domestic wastewater” means wastewater that is the composite of liquid and water-carried wastes associated with the use of water for drinking, cooking, cleaning, washing, hygiene, sanitation or other domestic purposes, together with any infiltration and inflow wastewater, that is released into a wastewater collection system;

(t) “domestic wastewater system” means the parts of the plant that collect, store or treat domestic wastewater;

(u) “estimate” means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

SCHEDULE I
DEFINITIONS

(v) "fugitive emissions" means emissions of substances to the atmosphere other than ozone depleting substances, originating from a plant source other than a flue, vent, or stack but does not include sources which may occur due to breaks or ruptures in process equipment;

(w) "grab" when referring to a sample, means an individual sample collected in less than 30 minutes and which is representative of the substance sampled;

(x) "grade" means the rise or fall of land surface over a specified distance, measured in the same units;

(y) "industrial runoff" means precipitation that falls on or traverses the plant developed area;

(z) "industrial runoff control system" means the parts of the plant that collect, store or treat industrial runoff from the plant;

(aa) "industrial wastewater" means the composite of liquid wastes and water-carried wastes, any portion of which results from any industrial process carried on at the plant;

(bb) "industrial wastewater control system" means the parts of the plant that collect, store or treat industrial wastewater;

(cc) "ISO/IEC 17025" means the international standard, developed and published by International Organization for Standardization (ISO), specifying management and technical requirements for laboratories;

(dd) "land reclamation" means the stabilization, contouring, maintenance, conditioning, reconstruction, and revegetation of the surface of the land to a state that permanently returns the plant to a land capability equivalent to its predisturbed state;

(ee) "LICA Air Quality Monitoring Program Network" means the air monitoring network established and operated by the Lakeland Industry and Community Association (LICA), as accepted in writing by the Director;

(ff) "manual stack survey" means a survey conducted in accordance with the *Alberta Stack Sampling Code, Alberta Environment*, 1995, as amended;

(gg) "mineral soil" means a soil consisting of soil horizons that contain 17% or less organic C by weight as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended;

SCHEDULE I
DEFINITIONS

(hh) "monitoring system" means all equipment used for sampling, conditioning, analyzing or recording data in respect of any parameter listed or referred to in this approval including equipment used for continuous monitoring;

(ii) "month" means calendar month;

(jj) "net or lower heating value" means the quantity of heat evolved on complete combustion where the combustion products remain as vapour at 15°C;

(kk) "pad materials" means all geotextile and fill materials used to construct plant facilities;

(ll) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, disposal wells, pipelines, camps, borrow pits and other installations, and includes the land, located on Section 13, 23, 24, 25, Township 58, Range 5, West of the 4th Meridian, as described in the application, that is being or has been used or held for or in connection with the Lindbergh enhanced recovery in-situ oil sands or heavy oil processing plant;

(mm) "plant developed area" means the areas of the plant used for the storage, treatment, processing, transport, or handling of raw material, intermediate product, by-product, finished product, process chemicals, or waste material;

(nn) "produced gas" means all gas associated with the production and treatment of oil or bitumen including, but not limited to, gas liberated at storage tanks, heaters, treaters, produced water facilities;

(oo) "QA/QC" means quality assurance and quality control;

(pp) "reclaimed soil" means soils that have had one or more of their natural horizons removed and replaced;

(qq) "recontoured areas" means disturbed land that has been decommissioned, contoured and decompacted;

(rr) "regulations" means the regulations enacted pursuant to the Act, as amended;

(ss) "representative grab" means a sample consisting of equal volume portions of water collected from at least four sites between 0.20-0.30 metres below the water surface within a pond;

SCHEDULE I
DEFINITIONS

(tt) "SAGD pilot project" means the disturbed land and associated infrastructure within the plant that is being or has been used or held for or in connection with the SAGD operations at the pilot plant site in Section 13, Twp 58, Rge 5, west of the 4th Meridian;

(uu) “self-sustaining” means the degree at which a reclaimed ecosystem can maintain itself without requiring external support or human intervention;

(vv) “shallow organic soil” means soil with surface organic horizons, as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended, that are less than 40 cm in depth;

(ww) “soil” means mineral or organic earthen materials that can, have, or are being altered by weathering, biological processes or human activity;

(xx) “subsoil” means the layer of soil directly below the topsoil layer and consists of:

(i) B-horizons as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, 1987*, as amended, or

(ii) the replaced subsurface layer in a reclaimed soil, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, 1987*, as amended;

(yy) “tank” means a stationary device, designed to contain an accumulation of a substance, which is constructed primarily of non-earthen materials that provide structural support including wood, concrete, steel, and plastic;

(zz) “topsoil” means the uppermost layer of soil and consists of one or more of the following, when present:

(i) all organic horizons (L, F, H and O) as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended,

(ii) A-horizons as defined in *The Canadian System of Soil Classification (Third Edition), Agriculture and Agri-Food Canada, Publication 1646, 1998*, as amended, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, 1987*, as amended, or

SCHEDULE I
DEFINITIONS

(iii) the replaced surface layer in a reclaimed soil, and rated as good, fair or poor as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, 1987*, as amended;

(aaa) “volume estimate” means a technical evaluation based on the sources contributing to the release, including, but not limited to, pump capabilities, water meters, and batch release volumes;

(bbb) “weeds” means vegetation defined as noxious or prohibited noxious by the *Weed Control Act, 2011*, as amended;

(ccc) “week” means any consecutive 7-day period;

(ddd) “wetland” means land that is saturated long enough to promote formation of water altered soils, growth of water tolerant vegetation and various kinds of biological activity that are adapted to wet environments; and

(eee) “year” means calendar year.

SCHEDULE II
GENERAL CONDITIONS

1. The approval holder shall immediately report to the Director by telephone any contravention of the terms and conditions of this approval at 1-780-422-4505.

2. The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to condition 1 of Schedule II.

3. The terms and conditions of this approval are severable. If any term or condition of this approval or the application of any term or condition is held invalid, the application of such term or condition to other circumstances and the remainder of this approval shall not be affected thereby.

4. The approval holder shall immediately notify the Director in writing if any of the following events occur:

   (a) the approval holder is served with a petition into bankruptcy;

   (b) the approval holder files an assignment in bankruptcy or Notice of Intent to make a proposal;

   (c) a receiver or receiver-manager is appointed;

   (d) an application for protection from creditors is filed for the benefit of the approval holder under any creditor protection legislation; or

   (e) any of the assets which are the subject matter of this approval are seized for any reason.

5. If the approval holder monitors for any substances or parameters which are the subject of operational limits as set out in this approval more frequently than is required and uses procedures authorized in this approval, then the approval holder shall provide the results of such monitoring as an addendum to the reports required by this approval.

6. The approval holder shall submit all monthly reports required by this approval to be compiled or submitted to the Director on or before the end of the month following the month in which the information was collected, unless otherwise authorized in writing by the Director or specified in this approval.

7. The approval holder shall submit all annual reports required by this approval to be compiled or submitted to the Director on or before March 31 of the year following the year in which the information was collected, unless otherwise authorized in writing by the Director or specified in this approval.

SCHEDULE III
ANALYTICAL REQUIREMENTS

1. The approval holder shall:

   (a) record; and

   (b) retain

   all the following information in respect of any sampling conducted or analyses performed in accordance with this approval for a minimum of ten years, unless otherwise authorized in writing by the Director:

   (i) the place, date and time of sampling,

   (ii) the dates the analyses were performed,

   (iii) the analytical techniques, methods or procedures used in the analyses,

   (iv) the names of the persons who collected and analyzed each sample, and

   (v) the results of the analyses.

2. With respect to any sample required to be taken pursuant to this approval, the approval holder shall ensure that:

   (a) collection;

   (b) preservation;

   (c) storage;

   (d) handling; and

   (e) analysis

   shall be conducted in accordance with the following, unless otherwise authorized in writing by the Director:

   (i) for air:

   (A) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended,

   (B) the *Methods Manual for Chemical Analysis of Atmospheric Pollutants*, Alberta Environment, 1993, as amended,

SCHEDULE III
ANALYTICAL REQUIREMENTS

(C) the *Air Monitoring Directive*, Alberta Environment, 1989, as amended, and

(D) the CEMS Code;

(ii) for industrial wastewater, industrial runoff, groundwater and domestic wastewater parameters:

(A) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 2010, as amended;

(iii) for soil:

(A) the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended,

(B) the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, and

(C) the *Directive for Monitoring the Impact of Sulphur Dust on Soils*, Alberta Environment and Water, December 2011, as amended;

(iv) for waste:

(A) the *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, USEPA, SW-846, September 1986, as amended,

(B) the *Methods Manual for Chemical Analysis of Water and Wastes*, Alberta Environmental Centre, Alberta, 1996, AECV96-M1, as amended,

(C) the *Toxicity Characteristic Leaching Procedure (TCLP)*, USEPA Regulation 40 CFR261, Appendix II, Method No. 1311, as amended, or

(D) the *Standard Methods for the Examination of Water and Wastewater*, published jointly by the American Public Health Association, American Water Works Association, and the Water Environment Federation, 2010, as amended.

3. In addition to other requirements in this approval the approval holder shall:

(a) monitor; and

SCHEDULE III
ANALYTICAL REQUIREMENTS

(b) report

the information required by:

(i) condition 3.6,

(ii) condition 3.7,

(iii) condition 3.10, and

(iv) condition 3.11.

4. The information required in 3, shall at a minimum, comply with:

(a) the *Alberta Stack Sampling Code*, Alberta Environment, 1995, as amended;

(b) the *Continuous Emissions Monitoring Systems (CEMS) Code*, Alberta Environmental Protection Environmental Service, 1998, as amended;

(c) the *Air Monitoring Directive – AMD 1989*, Environment Protection Services, Standards and Approvals Division, June 26, 1989, as amended; and

(d) the *Electronic Reporting of Continuous Emissions Monitoring (CEMS) Information User Manual*, Alberta Environment, 2003, as amended.

5. The approval holder shall analyse all samples that are required to be obtained by this approval in a laboratory accredited pursuant to ISO/IEC 17025, as amended, for the specific parameter(s) to be analyzed, unless otherwise authorized in writing by the Director.

6. The term sample as used in condition 5 of Schedule III does not include samples directed to continuous monitoring equipment, unless specifically required in writing by the Director.

7. The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under condition 5 of Schedule III.

SCHEDULE IV
AIR EMISSIONS

1. The approval holder shall only release air effluent streams to the atmosphere from the following air emission sources:

   (a) the two 18.3 MW steam generators exhaust stacks;

   (b) the two 116.5 MW steam boilers exhaust stacks;

   (c) the two 3.44 MW glycol boiler exhaust stacks;

   (d) the 4.9 MW utility boiler exhaust stack;

   (e) the four natural gas fired emergency generators exhaust stacks;

   (f) the two high pressure (HP) flare stacks;

   (g) the Low pressure (LP) flare stack (truck loading);

   (h) the two 7.5 MW cogeneration units exhaust stacks; and

   (i) any other source authorized in writing by the Director.

2. The approval holder shall construct and maintain the following stacks according to the height requirements specified in TABLE 1 of Schedule IV, unless otherwise authorized in writing by the Director.

TABLE 1: STACK HEIGHTS

STACK	MINIMUM HEIGHT ABOVE GRADE (meters)
The two 18.3 MW steam generators exhaust stacks at the SAGD pilot project site	14.0
The two 3.44 MW glycol boilers exhaust stacks at the SAGD pilot project site	7.4
The high pressure (HP) flare stack at the SAGD pilot project site	12.2
The two 116.5 MW steam boilers exhaust stacks at the main plant site	36
The 4.9 MW utility boiler exhaust stack at the main plant site	10
The two 7.5 MW cogeneration units exhaust stacks at the main plant site	25
The high pressure (HP) flare stack at the main plant site	40
The low pressure (LP) flare stack (Truck loading)	12.2

SCHEDULE IV
AIR EMISSIONS

3. The net or lower heating value of the combined gas stream released to the central processing facility flare stack shall be maintained, at a minimum, at 12 MJ/m^3 when adjusted for 101.325 kPa and 15°C by adding residue gas to the flare gas.

4. Annulus gas and produced gas shall be collected and burned as fuel, incinerated or flared.

5. The approval holder shall ensure that all oil production tanks are connected to the vapour recovery system.

6. All aboveground storage tanks containing liquid hydrocarbons or organic compounds shall conform to the *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks*, Canadian Council of Ministers of the Environment, PN 1180, 1995, as amended.

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

1. The approval holder shall manage:

   (a) industrial wastewater; and

   (b) industrial runoff;

   as described in the application, unless otherwise authorized in writing by the Director.

2. The approval holder shall direct industrial wastewater, produced water and boiler blowdown as follows:

   (a) to the central processing facility water recycle treatment unit;

   (b) to an Energy Resources Conservation Board approved disposal well; or

   (c) to an Energy Resources Conservation Board approved Waste Processing and Disposal Facility;

   unless otherwise authorized in writing by the Director.

3. The approval holder shall direct all industrial runoff from the plant developed area to the central processing facility water recycle treatment units or the industrial runoff control system, specifically the industrial runoff pond at the central processing facility.

4. The approval holder shall only release industrial runoff from the industrial runoff control system at the central processing facility.

LIMITS

5. Releases from the industrial runoff control system shall not exceed the limits for the parameters specified in TABLE 1 of Schedule V.

TABLE 1: INDUSTRIAL RUNOFF CONTROL SYSTEMS LIMITS

PARAMETER	LIMITS
Discharge Volume	--
pH	$\geq$ 6.0 and $\leq$ 9.5 pH units
Oil and Grease	No visible sheen
Chloride	$\leq$ 500 mg/L

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

6. The approval holder shall not release any industrial runoff in a manner which will cause flooding or erosion.

MONITORING AND REPORTING

7. The approval holder shall monitor the industrial runoff control systems as specified in TABLE 2 of Schedule V, unless otherwise authorized in writing by the Director.

8. The approval holder shall report to the Director the results of the industrial runoff control system monitoring as required in TABLE 2 of Schedule V, unless otherwise authorized in writing by the Director.

TABLE 2: INDUSTRIAL RUNOFF CONTROL SYSTEM MONITORING AND REPORTING

MONITORING						REPORTING
PARAMETER	PRIOR TO RELEASE		DURING RELEASE			ANNUALLY
	FREQUENCY	SAMPLE TYPE	FREQUENCY	SAMPLE TYPE	SAMPLE LOCATION	
Discharge volume (in cubic meters)	-	-	Once/day	Volume estimate	A	Yes
pH	Once	Representative grab	Once/day	Grab	A	
Oil and Grease	Once	Representative grab	Once/day	Grab	A	
Chloride (in mg/L)	Once	Representative grab	Once/day	Grab	A	
A = Discharge point of industrial runoff control system (industrial runoff pond)						

9. In addition to the annual reporting in TABLE 2 of Schedule V, the annual Industrial Wastewater and Industrial Runoff Report shall include, at a minimum, all of the following information:

(a) an assessment of the performance of:

(i) the industrial wastewater control system,

(ii) the industrial runoff control system, and

SCHEDULE V
INDUSTRIAL WASTEWATER AND INDUSTRIAL RUNOFF

(iii) pollution abatement equipment;

(b) an overview of the operation of the plant;

(c) a summary and evaluation of management and disposal of industrial wastewater for the previous year;

(d) a summary and evaluation of management and disposal of industrial runoff for the previous year; and

(e) a summary and evaluation of management and disposal of domestic wastewater for the previous year, as per Schedule X.

SCHEDULE VI
GROUNDWATER

1. Effective until the updated Groundwater Monitoring Program required in condition 2 of Schedule VI is authorized in writing by the Director pursuant to condition 5 of Schedule VI, the approval holder shall implement the Groundwater Monitoring Program described in the Lindbergh Enhanced Recovery Heavy Oil Processing Plant 06-13-058-05-W4M Annual Groundwater Monitoring Plan, Millennium EMS Solutions, November 2011 and as authorized in writing by the Director on January 23, 2012, unless otherwise authorized in writing by the Director.

2. The approval holder shall submit an updated Groundwater Monitoring Program proposal to the Director on or before October 31, 2013, unless otherwise authorized in writing by the Director.

3. The updated Groundwater Monitoring Program proposal shall include, at a minimum, all the following:

   (a) a conceptual development of the regional and local groundwater monitoring network;

   (b) a description of the regional hydrogeology;

   (c) a hydrogeologic description and interpretation of the plant;

   (d) a map of groundwater flow patterns;

   (e) a map and description of surface water drainage patterns for the plant;

   (f) a lithologic description and maps, including cross-sections, of the surficial and the upper bedrock geologic materials at the plant;

   (g) a site map showing the location and type of current and historical potential sources of groundwater contamination;

   (h) a cross-section(s) showing depth to water table, patterns of groundwater movement and hydraulic gradients at the plant;

   (i) the hydraulic conductivity of all surficial and bedrock materials at the plant;

   (j) a map showing the location of existing and additional proposed groundwater monitor wells at the plant;

   (k) lithologs of all boreholes drilled at the plant;

   (l) construction and completion details of existing groundwater monitor wells;

SCHEDULE VI
GROUNDWATER

(m) a rationale for proposed groundwater monitor well locations and proposed completion depths of those wells;

(n) a description of groundwater monitoring well development protocols;

(o) a list of parameters to be monitored and the monitoring frequency for each groundwater monitor well or group of groundwater monitor wells at the plant;

(p) details of a plan to gather information on existing groundwater quality at the plant prior to commencing operations;

(q) a description of the groundwater sampling and analytical QA/QC procedures;

(r) details of a groundwater response plan specifying actions to be taken should contaminants be identified through the Groundwater Monitoring Program or in the event of a well casing failure;

(s) a proposal to:

(i) monitor and report any anomalous increases in water level at monitoring wells as soon as they are discovered,

(ii) address the potential that the approval holder's operations may have on liberating or introducing arsenic into groundwater, and

(iii) monitor groundwater levels and groundwater quality for the protection of all known buried channels within at least five kilometres of the plant;

(t) any other information relevant to groundwater quality at the plant; and

(u) any other information as required in writing by the Director.

4. If the updated Groundwater Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

5. The approval holder shall implement the updated Groundwater Monitoring Program as authorized in writing by the Director.

6. The approval holder shall collect the samples extracted from the groundwater monitor wells using scientifically acceptable purging, sampling and preservation procedures so that a representative groundwater sample is obtained.

SCHEDULE VI
GROUNDWATER

7. The approval holder shall:

   (a) protect from damage; and

   (b) keep locked except when being sampled

   all groundwater monitor wells, unless otherwise authorized in writing by the Director.

8. The approval holder shall conduct at least five groundwater sampling events to establish baseline conditions for:

   (a) new facilities;

   (b) expansion areas which were not covered in prior sampling events; and

   (c) previously non-assessed relevant, non-saline hydrostratigraphic units at existing facilities;

   unless otherwise authorized in writing by the Director.

9. The approval holder shall conduct the sampling events referred to in condition 8 of Schedule VI at intervals of no less than one month and must demonstrate stable groundwater conditions.

10. If a representative groundwater sample cannot be collected because the groundwater monitor well is damaged or is no longer capable of producing a representative groundwater sample, the approval holder shall:

    (a) clean, repair or replace the groundwater monitoring well; and

    (b) collect and analyse a representative groundwater sample prior to the next scheduled sampling event;

    unless otherwise authorized in writing by the Director.

11. In addition to the sampling information recorded in condition 2 of Schedule III, the approval holder shall record the following sampling information for all groundwater samples collected:

    (a) a description of purging and sampling procedures;

    (b) the static elevations, above sea level and depth below ground surface, of fluid phases in the groundwater monitoring well prior to purging;

SCHEDULE VI
GROUNDWATER

(c) the temperature of each sample at the time of sampling;

(d) the pH of each sample at the time of sampling; and

(e) the specific conductance of each sample at the time of sampling.

12. The approval holder shall carry out remediation of the groundwater in accordance with the following:

(a) *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, December 2010, as amended; and

(b) *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, December 2010, as amended.

13. The approval holder shall submit an annual Groundwater Monitoring Report to the Director.

14. The Groundwater Monitoring Report shall include, at a minimum, all of the following:

(a) a completed *Record of Site Condition Form*, Alberta Environment, 2009, as amended;

(b) a legal description of the plant and a map illustrating the plant boundaries;

(c) a topographic map of the plant;

(d) a description of the industrial activity and processes;

(e) a map showing the location of all surface and groundwater users, and, a listing describing surface water and water well use details, within at least a five kilometre radius of the plant;

(f) a general hydrogeological characterization of the region within a five kilometre radius of the plant;

(g) a detailed hydrogeological characterization of the plant, including an interpretation of groundwater flow patterns;

(h) a cross-section(s) showing depth to water table, patterns of groundwater movement and hydraulic gradients at the plant;

(i) borehole logs and completion details for groundwater monitoring wells;

SCHEDULE VI
GROUNDWATER

(j) a map showing locations of all known buried channels within at least five kilometres of the plant;

(k) a map of surface drainage within the plant and surrounding area including nearby water bodies;

(l) a map of groundwater monitoring well locations and a table summarizing the existing groundwater monitoring program for the plant;

(m) a summary of any changes to the Groundwater Monitoring Program made since the last groundwater monitoring report;

(n) analytical data recorded as required in conditions 5 and 10(b) of Schedule VI;

(o) a summary of fluid elevations recorded as required in condition 11(b) of Schedule VI and an interpretation of changes in fluid elevations;

(p) an interpretation of QA/QC program results;

(q) an interpretation of all the data in this report, including the following:

  (i) diagrams indicating the location and extent of any contamination,

  (ii) a description of probable sources of contamination, and

  (iii) a site map showing the location and type of current and historical potential sources of groundwater contamination;

(r) a summary and interpretation of the data collected since the Groundwater Monitoring Program began including:

  (i) control charts which indicate trends in concentrations of parameters, and

  (ii) the migration of contaminants;

(s) a description of the following:

  (i) contaminated groundwater remediation techniques employed,

  (ii) source elimination measures employed,

  (iii) risk assessment studies undertaken, and

  (iv) risk management studies undertaken;

SCHEDULE VI
GROUNDWATER

(t) a proposed sampling schedule for the following year;

(u) a description of any contaminant remediation, risk assessment or risk management action conducted at the plant;

(v) recommendations for changes to the Groundwater Monitoring Program to make it more effective; and

(w) any other information as required in writing by the Director.

15. If the Groundwater Monitoring Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

SCHEDULE VII
SOIL

1. In addition to any other requirements specified in this approval, the approval holder shall conduct all of the following activities related to soil monitoring and soil management required by this approval in accordance with the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended:

   (a) designing and developing proposals for the Soil Monitoring Program;

   (b) designing and developing proposals for the Soil Management Program;

   (c) all other actions, including sampling, analysing, and reporting, associated with the Soil Monitoring Program; and

   (d) all other actions, including sampling, analysing and reporting, associated with the Soil Management Program.

MONITORING AND REPORTING

2. The approval holder shall submit a Soil Monitoring Program proposal to the Director according to the following schedule:

   (a) for the first soil monitoring event, on or before January 31, 2016; and

   (b) for the second soil monitoring event, on or before January 31, 2020;

   unless otherwise authorized in writing by the Director.

3. If any Soil Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

4. The approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.

5. If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by condition 2 of Schedule VII, the approval holder shall implement the Soil Monitoring Program:

   (a) in accordance with the program as set out in the proposal submitted by the approval holder; and

   (b) within 270 days after the applicable date required by condition 2 of Schedule VII.

SCHEDULE VII
SOIL

6. The approval holder shall submit each Soil Monitoring Program Report obtained from the soil monitoring referred to in conditions 4 and 5 of Schedule VII to the Director according to the following schedule:

   (a) for the first Soil Monitoring Program Report, on or before January 31, 2017; and

   (b) for the second Soil Monitoring Program Report, on or before January 31, 2021;

   unless otherwise authorized in writing by the Director.

7. If any Soil Monitoring Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

SOIL MANAGEMENT PROGRAM

8. If the Soil Monitoring Program, or any other soil monitoring, reveals that there are substances present in the soil at concentrations greater than any of the applicable concentrations set out in the standards in the *Soil Monitoring Directive*, Alberta Environment, 2009, as amended, the approval holder shall develop a Soil Management Program proposal.

9. If a Soil Management Program proposal is required pursuant to condition 8 of Schedule VII, the approval holder shall submit a Soil Management Program proposal to the Director according to the following schedule:

   (a) for Soil Management Program proposal that is triggered by the findings from the first soil monitoring event, on or before the date in condition 6(a) of Schedule VII;

   (b) for Soil Management Program proposal that is triggered by the findings from a second soil monitoring event, on or before the date in condition 6(b) of Schedule VII; or

   (c) for any other soil monitoring event not specified in this approval, within six months of completion of the soil monitoring event.

10. If any Soil Management Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

11. The approval holder shall implement the Soil Management Program as authorized in writing by the Director.

SCHEDULE VII
SOIL

12. If the approval holder is required to implement a Soil Management Program pursuant to condition 11 of Schedule VII, the approval holder shall submit an annual Soil Management Program Report to the Director, unless otherwise authorized in writing by the Director.

13. If any Soil Management Program Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director, by the date specified in writing by the Director.

SCHEDULE VIII
WILDLIFE

Not used at this time.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

CONSTRUCTION

1. The approval holder shall ensure that woody debris removal allows for all topsoil to be:

   (a) conserved; and

   (b) stockpiled

   in accordance with this approval, unless otherwise authorized in writing by the Director.

2. The approval holder shall salvage topsoil for land reclamation as follows:

   (a) salvage all topsoil from:

      (i) mineral soils,

      (ii) shallow organic soils, and

      (iii) reclaimed soils;

   (b) from areas of deep organic soil where pad materials will be left in place during land reclamation:

      (i) salvage topsoil to a minimum depth of 40 cm, or

      (ii) submit to the Director, for written authorization, an alternate plan for obtaining topsoil prior to commencing construction; and

   (c) no topsoil salvage from areas of deep organic soil where pad materials will be removed during land reclamation;

   unless otherwise authorized in writing by the Director

3. The approval holder shall salvage subsoil from any central processing facility located on:

   (a) mineral soils;

   (b) shallow organic soils; and

   (c) reclaimed soils;

   unless otherwise authorized in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

4. Subject to condition 3 of Schedule IX, the approval holder shall salvage all subsoil:

   (a) separately from topsoil; and

   (b) to a maximum thickness of 30 cm;

   unless otherwise authorized in writing by the Director.

5. The approval holder shall:

   (a) conserve; and

   (b) stockpile

   all salvaged topsoil and subsoil separately from:

      (i) each other, or

      (ii) other materials.

6. The topsoil stockpiles referred to in condition 5 of Schedule IX shall be:

   (a) on undisturbed topsoil or on a material that will not cause the mixing, loss or degradation of the topsoil;

   (b) on stable foundations;

   (c) accessible and retrievable;

   (d) contoured to allow for vegetation and stabilization;

   (e) identified with a permanent signpost; and

   (f) controlled for weeds.

7. The subsoil stockpiles referred to in condition 5 of Schedule IX shall be:

   (a) on areas where the topsoil has been removed;

   (b) on stable foundations;

   (c) accessible and retrievable;

   (d) contoured to allow for vegetation and stabilization;

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

(e) identified with a permanent signpost; and

(f) controlled for weeds.

8. The approval holder shall take all steps necessary to prevent wind or water erosion of all stockpiles including, but not limited to, one or more of the following:

(a) establishing a vegetative cover;

(b) use of silt fences, tackifiers, mulches, tarps or other erosion control products; or

(c) any other steps authorized in writing by an Inspector.

9. The approval holder shall immediately suspend salvage of:

(a) topsoil; and

(b) subsoil

if directed to do so in writing by an Inspector, or when

(i) wet or frozen conditions,

(ii) high wind velocities, or

(iii) any other field condition or operation

will result in mixing, loss or degradation of the topsoil or subsoil.

10. The approval holder shall recommence salvage of:

(a) topsoil; and

(b) subsoil

only when the field conditions in condition 9 of Schedule IX no longer exist or if directed to do so in writing by an Inspector.

11. The approval holder shall implement drainage control measures to minimize erosion and sedimentation.

12. The approval holder shall submit a Disturbance and Stockpile Summary Report to the Director within six months of the plant commencing operations, unless otherwise authorized in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

13. The Disturbance and Stockpile Summary Report shall include, at a minimum, all of the following:

    (a) a summary of the location, dimensions and area (in hectares) of the final disturbance footprint;

    (b) final locations and dimensions of topsoil and subsoil stockpiles, including survey drawings;

    (c) a description of the source and characteristics of the materials included in the topsoil and subsoil stockpiles;

    (d) location and volume of topsoil and subsoil used for interim or permanent land reclamation;

    (e) final volumes of topsoil and subsoil stockpiles; and

    (f) any other information as required in writing by the Director.

14. If the Disturbance and Stockpile Summary Report is found deficient by the Director, the approval holder shall correct all deficiencies identified in writing by the Director by the date specified in writing by the Director.

DECOMMISSIONING

15. The approval holder shall apply for an amendment to this approval by submitting a:

    (a) Decommissioning Plan; and

    (b) Land Reclamation Plan

    to the Director.

16. The approval holder shall submit the:

    (a) Decommissioning Plan; and

    (b) Land Reclamation Plan

    referred to in condition 15 of Schedule IX within six months of:

        (i) the plant as a whole, or

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

(ii) any central processing facility,

ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

DECOMMISSIONING PLAN

17. The Decommissioning Plan referred to in condition 15 of Schedule IX shall include, at a minimum, all of the following:

(a) a plan for dismantling the plant;

(b) a comprehensive study to determine the nature, degree and extent of contamination at the plant and affected lands;

(c) a plan to manage all wastes at the plant;

(d) evaluation of remediation technologies proposed to be used at the plant and affected lands;

(e) a plan for decontamination of the plant and affected lands in accordance with the following:

(i) for soil or groundwater, *Alberta Tier 1 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2010, as amended,

(ii) for soil or groundwater, *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2010, as amended,

(iii) for drinking water, *Canadian Environmental Quality Guidelines*, CCME PN1299, 1999, as amended, and

(iv) for surface water, *Surface Water Quality Guidelines for Use in Alberta*, Alberta Environment, 1999, as amended;

(f) confirmatory testing to indicate compliance with the remediation objectives;

(g) a plan for maintaining and operating contaminant monitoring systems;

(h) a schedule for activities (a) through (g) above; and

(i) any other information as required in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

LAND RECLAMATION PLAN

18. The Land Reclamation Plan referred to in condition 15 of Schedule IX shall include, at a minimum, all of the following:

    (a) the final use of the reclaimed area and how equivalent land capability will be achieved;

    (b) removal of infrastructure, including watercourse crossings;

    (c) a plan for the reclamation of all roads including removal of culverts and other structures;

    (d) re-establishment of drainage and how it will be integrated with adjacent land;

    (e) a description of reclaimed topography and how the reclaimed landforms will approximate the natural landforms adjacent to the plant;

    (f) a soil replacement plan;

    (g) erosion control;

    (h) a revegetation plan that includes, at a minimum, all of the following:

        (i) species list, seed source and quality, seeding rates and methods,

        (ii) fertilization rates and methods,

        (iii) a vegetation management plan, and

        (iv) wildlife habitat plans where applicable;

    (i) a Reclamation Monitoring Program proposal to assess soils, vegetation and wildlife on reclaimed areas;

    (j) reclamation sequence and schedule; and

    (k) any other information as required in writing by the Director.

RECLAMATION

19. The approval holder shall ensure that the reclaimed slopes are no steeper than 3:1(Horizontal:Vertical), unless otherwise authorized in writing by the Director.

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

20. The approval holder shall cap any unsuitable material, as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, where unsuitability is not related to contamination, with 1.0 metre of soil material having a good, fair or poor rating, as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, 1987, as amended, prior to subsoil and topsoil replacement.

21. The approval holder shall replace all salvaged subsoil on recontoured areas:

    (a) where the subsoil was salvaged from; and

    (b) prior to topsoil replacement;

    unless otherwise authorized in writing by the Director.

22. The approval holder shall replace all topsoil that was salvaged or allocated under condition 2(b) of Schedule IX on all areas where pad materials will be left in place during land reclamation, unless otherwise authorized in writing by the Director.

23. Subject to condition 22 of Schedule IX, the approval holder shall replace all salvaged topsoil on all recontoured areas such that the average depth of the replaced topsoil in the reclaimed soil for each reclamation area shall be equivalent to or greater than 80% of the original topsoil depth, unless otherwise authorized in writing by the Director.

24. The approval holder shall immediately suspend replacement of:

    (a) topsoil; and

    (b) subsoil

    if directed to do so in writing by an Inspector, or when

        (i) wet or frozen conditions,

        (ii) high wind velocities, or

        (iii) any other field condition or operation

    will result in mixing, loss or degradation of topsoil or subsoil.

25. The approval holder shall recommence replacement of:

    (a) topsoil; and

SCHEDULE IX
CONSTRUCTION, DECOMMISSIONING AND RECLAMATION

(b) subsoil

only when the field conditions in condition 24 of Schedule IX no longer exist or if directed to do so in writing by an Inspector.

26. The approval holder shall maintain a weed control program until new vegetation is established and is self-sustaining.

SCHEDULE X
DOMESTIC WASTEWATER

1. The approval holder shall not release any substances from the domestic wastewater system to the surrounding watershed except as authorized by this approval.

2. The approval holder shall direct all domestic wastewater at the plant to a septic tank with subsequent disposal to a domestic wastewater treatment facility holding a current approval under the Act.

3. The approval holder shall only dispose of sludge produced by the domestic wastewater system at a domestic wastewater treatment facility holding a current approval under the Act.

SCHEDULE XI
WETLANDS AND WATER BODIES

Not used at this time

LINDBERGH THERMAL PROJECT

Alberta
ENVIRONMENT

LICENCE
to DIVERT AND USE WATER

Pursuant to the
WATER RESOURCES ACT

File No. 21658

Priority No. 1985-03-08-01

Purpose Industrial

Drainage Basin North Saskatchewan River

First Issued 1986 -10-20

Murphy Oil Company Ltd.
P.O. Box 2721
Calgary, Alberta
T2P 3Y3

HAVING COMPLIED with the applicable provisions of the Water Resources Act and the regulations thereunder and Interim Licence No. 13844 , a copy of which is attached hereto and incorporated herein,

IS HEREBY GRANTED LICENCE to divert and use the quantities of water prescribed in the Interim Licence in accordance with and subject to all other applicable provisions of that Act and the regulations thereunder, and the terms and conditions attached hereto and incorporated herein, at locations described in the Interim Licence,

BY MEANS AND THROUGH works and undertakings described in the Interim Licence.

1986 -10-20
Date

G. J. Fennell
Controller of Water Resources

0160e

WR 4 (Feb/89)

LINDBERGH THERMAL PROJECT

Alberta
ENVIRONMENT

UPDATED AND RE-ISSUED

INTERIM LICENCE

Pursuant to Section 18
THE WATER RESOURCES ACT

Issued to: Murphy Oil Company Ltd.
P.O. Box 2721
Calgary, Alberta
T2P 3Y3

No. 13844

File No. 21658

Priority No. 1985-03-08-01

This updated and re-issued Interim Licence particularizes the rights, privileges and obligations embodied in and associated with the original Interim Licence as numbered above, or with any other form of authorization or approval issued in connection with the project identified herein under any former applicable Act or regulation, and updates same to conform to and comply with the current Act, regulations and standards.

In particular this Interim Licence provides for the right to:

A. Construct, maintain and operate works as shown on current plans and reports filed, approved and identified in departmental records as:

See attached list of plans

B. Divert and use water as hereinafter specified and described subject to the terms and conditions attached hereto and incorporated herein:

PURPOSE: Industrial (injection)

SOURCE OF SUPPLY: North Saskatchewan River

POINT OF DIVERSION: NE 23-56-5-W4

GROSS DIVERSION: Up to 2,272 acre-feet annually consisting of:

1. Estimated Consumptive Use: 2,272 acre-feet
2. Estimated Losses: NIL
3. Estimated Return Flow: NIL

RATE OF DIVERSION: 1.8 cubic feet per second
(675 imperial gallons per minute)

Date first issued 1985 09 23

Date re-issued 1986-10-20

G. J. Fennell
Controller of Water Resources

0160e

Original—Department
Copy—Licensee
WR 2A (Aug/82)

LINDBERGH THERMAL PROJECT

File: 21658

TERMS AND CONDITIONS UPDATED AND RE-ISSUED INTERIM LICENCE NO. 13844

1. The Minister reserves the right to make any modifications to the water intake or intake site deemed necessary to provide for the diversion of water to serve multi-purpose projects from the North Saskatchewan River at this location in accordance with the Long Term Plan Cold Lake - Beaver River Water Management Study as adopted.

2. The licensee is responsible for the operation and maintenance of the works and for any damages that may result therefrom.

3. In the event that waste water, treated so that the licensee's water treatment facilities can be modified to accept it at reasonable cost, becomes available to the plant site the licensee shall switch his water supply to the waste water and use the intake herein authorized for standby or make-up purposes.

4. At any time after September 23, 1990 the allocation herein granted may be revised downward to the amount of water being used at that time or to the amount for which need has been established through submission of satisfactory plans to the Energy Resources Conservation Board for approval of production facilities.

5. The licensee may divert and use up to 94 acre-feet of water per annum from a lake locally known as Garnier Lake at SW 18-58-4-W4, as a source of alternate water supply, provided:

   (a) the diversion is in accordance with plan number 21658-6;

   (b) water level of Garnier Lake is above 592.2 metres (13 centimetres above the reference datum provided by the licensee);

   (c) the licensee advises the Controller of Water Resources or his designate at least 3 working days prior to the commencement of diversion (emergencies will be handled on an as required basis);

   (d) the maximum rate of diversion does not exceed 0.61 cubic feet per second (230 imperial gallons per minute); and

   (e) a water use return is filed with the Controller of Water Resources at the end of each month water is diverted showing:

      i) the periods and rates of diversion;

      ii) the daily quantities of water diverted;

      iii) a statement of reasons why water had to be diverted.

6. The licensee shall, in a manner acceptable to the Controller of Water Resources, monitor:

   (a) the periods and rates at which water is diverted from North Saskatchewan River; and

.../2
0160e

a.g.f. 1986-10-20

File: 21658

TERMS AND CONDITIONS UPDATED AND RE-ISSUED
INTERIM LICENCE NO. 13844 (Continued)

(b) the total volume of water used each day in the plant.

7. The licensee shall submit an annual water use return to the Controller of Water Resources, Alberta Environment on or before January 31st in each year for that calendar year showing:

(a) periods and rates of diversion;

(b) the total monthly quantity of water diverted;

(c) the total annual quantity of water diverted; and

(d) such other information as may be required from time to time.

8. The licensee, for any future phases of the Lindbergh Thermal Recovery Project, shall demonstrate to the satisfication of the Controller of Water Resources that the make-up water requirements, from the North Saskatchewan River, are being minimized through the use of produced water recycle technology and/or other water conservation techniques.

9. The rights and privileges hereby granted are subject to periodic review and to modification to ensure the most beneficial use of the water in the public interest and more particularly to ensure preservation of the rights of other water users.

10. The rights and privileges hereby granted can only be extended or modified with the approval of the Controller of Water Resources and are subject to cancellation or modification as provided in the Water Resources Act.

11. Following satisfactory completion of the works herein authorized this interim licence and its terms and conditions shall be attached to and become part of the licence to use water issued under the provisions of the Water Resources Act.

1986 - 10 - 20
Dated at Edmonton

for a. J. Fennell
Controller of Water Resources

File: 21658

LIST OF PLANS AND REPORTS - INTERIM LICENCE NO. 13844

W. R. NO.	DRAWING NO.	TITLE
21658-1	G-M-105 Rev. B	Lindbergh Area Map
21658-2	G-E-600 Rev. 1	Plot Plan
21658-3	G-G-600 Rev. 1	River Water Intake Pump Chamber Proposed Layout
21658-5	P-U-600 Rev. 1	Underground Piping River Water Intake Plan & Profile
21658-6		Water Intake Pump Building (alternate source of supply)

1986 -10-20
Dated at Edmonton

for A. J. Fennell
Controller of Water Resources

0160e

Alberta
ENVIRONMENT

LICENCE AMENDMENT

PURSUANT TO THE PROVISIONS OF THE *WATER ACT*

LICENCE No. 00029768-00-00

FILE No. 21658

PRIORITY No. 1985-03-08-001

AMENDMENT No. 00029768-00-01

Shaun Byrne
Pengrowth Corporation
2100, 222 Third Avenue SW
Calgary, AB T2P 0B4

The licence is amended as follows:

1. Change the licence holder from Murphy Oil Company Limited to Pengrowth Corporation.

2. Remove Condition 5 from the licence.

_____
Designated Director under the Act

_____
Dated (Y/M/D)

Government of Alberta ■
Environment

LICENCE AMENDMENT

PURSUANT TO THE PROVISIONS OF THE *WATER ACT*

LICENCE No. Dated 1986 10 20

FILE No. 21658

PRIORITY No. 1985-03-08-001

EFFECTIVE DATE 2010-09-30

AMENDMENT No. 00029768-00-02

Pengrowth Corporation

The licence is amended as follows:

1. Delete condition 7 and substitute with the following:

   7.0 The Licensee shall:

   (a) measure the periods and rates of diversion on a monthly basis;

   (b) measure the volume of water diverted on a monthly basis; and

   (c) provide any other information as may be required by the Director.

   7.1 The Licensee shall record and retain all of the following information for a minimum of 5 years after being collected:

   (a) the place, date and time of all monitoring and measuring; and

   (b) the results obtained pursuant to 7.0.

   7.2 The Licensee shall report to the Director the results of the measuring and monitoring required in 7.0 using the "Water Use Reporting System" and any other information required in writing by the Director.

   7.3 The Licensee shall submit the report required in 7.2 on or before the end of the month following the month in which the information is based upon was collected.

Amendment No. 00029768-00-02
File No. 21658

AMENDMENT

7.4 "Water Use Reporting System" means the secure internet website provided by Alberta Environment at http://www.environment.alberta.ca/1286.html for submitting measuring and monitoring results electronically to the Director.

7.5 The licensee shall comply with the terms and conditions of the "Water Use Reporting System User Consent".

Designated Director under the Act
Patrick Marriott, P. Eng.

2010/07/15
Dated (Y/M/D)

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from the Cold Lake Lower Grand Rapids Oil Sands Deposit in the Lindbergh Sector

APPROVAL NO. 6410

WHEREAS the Energy Resources Conservation Board, by Approval No. 1954, approved an experimental scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen; and

WHEREAS the Board, by Approval No. 4671, approved a commercial scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen; and

WHEREAS the Board is prepared to grant an application by Murphy Oil Company Ltd. to revise and consolidate Board Approvals No. 1954 and 4671; and

WHEREAS Approval No. 1954 has expired; and

WHEREAS the Board deems it desirable to issue a new approval, subject to the terms and conditions herein contained; and

WHEREAS the Minister of the Environment has given his approval, hereto attached, insofar as the application affects matters of the environment, and the Minister of Forestry, Lands and Wildlife has given his approval, hereto attached, insofar as the application affects land and resources that are the property of the Crown in right of Alberta; and

WHEREAS the Lieutenant Governor in Council, by Order in Council numbered O.C. 340/91 and dated 9 May 1991, has authorized the granting of the approval subject to certain conditions set out in the Order in Council.

THEREFORE, the Energy Resources Conservation Board, pursuant to the Oil Sands Conservation Act, being chapter 0-5.5 of the Statutes of Alberta, 1983, hereby orders as follows:

1. The scheme of Murphy Oil Company Ltd. (hereinafter called "the Operator") for the recovery of crude bitumen from the Cold Lake Lower Grand Rapids Oil Sands Deposit in Sections 11 to 14 inclusive of Township 58, Range 5, West of the 4th Meridian, as such scheme is described in

(a) Application No. 7242 dated 23 July 1973,

(b) Application No. 9739 dated 21 October 1976,

(c) Application No. 810852 dated 21 October 1981,

(d) Application No. 831077 dated 14 November 1983,

(e) Application No. 841338 dated 20 December 1984,

(f) Application No. 882186 dated 15 December 1988, and

(g) Application No. 901623 dated 30 October 1990,

is approved, subject to the Oil Sands Conservation Regulations and terms and conditions herein contained.

2. Data submitted pursuant to

(a) Application No. 7242 dated 23 July 1973,

(b) Application No. 9739 dated 21 October 1976,

(c) Application No. 810852 dated 21 October 1981,

(d) Application No. 831077 dated 14 November 1983, and

(e) Application No. 882186 dated 15 December 1988,

for operations conducted up to and including 31 December 1988, will be released on 31 December 1998 unless, upon application by the Operator or if other circumstances so warrant, a later date is approved by the Board.

3. The Operator shall, prior to proceeding with any development in Section 11 and the West half of Section 14, Township 58, Range 5, West of the 4th Meridian, obtain from the surface owner of those lands, consent to the location of any surface development or facilities on said lands and, should the Operator be unable to obtain consent, the matter shall be referred to the Board for resolution.

4. The Operator, at least 3 years prior to the termination of recovery operations from any zone of the Lower Grand Rapids Deposit in any legal subdivision in the project area, shall develop a testing program satisfactory to the Board to determine the practicality of recovering crude bitumen from the other zones in the Mannville Formation in the legal subdivision of the project area.

5. (1) Unless otherwise permitted by the Board, cyclic steam stimulation operations, having commenced in a legal subdivision in the project area, shall continue until the area has produced a minimum of 17 per cent of the in-place volume of crude bitumen assigned to that area by the Board.

(2) Where the Operator proposes to cease cyclic steam stimulation operations in a legal subdivision that has produced less than 17 per cent of the in-place volume of crude bitumen, the Board's consent therefore must be sought, and the Operator shall advise the Board as to the following:

(a) the reason for proposing to cease cyclic steam stimulation operations,

(b) details of individual well workovers and recompletions attempted,

(c) details of any infill drilling attempted,

(d) detailed economics of continuing operations, and

(e) future plans for the legal subdivision with reference to possible follow-up recovery techniques that could be applied and other zones that could be exploited.

(3) The Operator, at least 1 year prior to termination of cyclic steam operations in any legal subdivision in the project area, shall undertake extensive field investigations, satisfactory to the Board, of in situ combustion, steam flooding and any other alternative or follow-up recovery method that may have potential application in the legal subdivision or the project area.

6. (1) The Operator shall log all wells from total depth to surface by means of a spontaneous potential-resistivity or gamma ray-resistivity type log device and other such devices as may be required to ensure sufficient depth and directional control.

(2) The Operator, unless otherwise authorized by the Board, shall drill not less than eight vertical evenly spaced wells per section to a depth not less than 5 metres above the top of the Devonian System and from those wells take core of the bitumen-bearing sections of the Mannville Group, and

(a) at the Board's request, analyse portions of such cores, and

(b) provide suitable photographs of the clean cut surface of each core slabbed.

(3) Each of the wells referred to in subclause (2) shall be logged over the entire Mannville Group by means of a Gamma Ray Compensated Neutron-Formation Density log or other suitable log to measure porosity.

7. (1) Attached hereto as Appendix A to this approval is the order of the Lieutenant Governor in Council authorizing the granting of the approval.

(2) This approval is subject to the terms and conditions prescribed by the order of the Lieutenant Governor in Council set out in Appendix A.

8. This approval, insofar as it pertains to matters of the environment, is subject to the approval of the Minister of the Environment, hereto attached as Appendix B to this approval, and insofar as it pertains to matters that affect land and resources that are the property of the Crown in right of Alberta, is subject to the approval of the Minister of Forestry, Lands and Wildlife, hereto attached as Appendix C to this approval, and to the terms and conditions therein contained.

9. (1) The Board may,

(a) upon its own motion, or

(b) upon the application of an interested person,

rescind or amend this approval at any time if, in the opinion of the Board, circumstances so warrant.

(2) This approval expires on 31 December 2009 unless rescinded before that date pursuant to subclause (1).

MADE at the City of Calgary, in the Province of Alberta, this 12th day of June, 1991.

ENERGY RESOURCES CONSERVATION BOARD

Alberta
ORDER IN COUNCIL

APPENDIX A TO APPROVAL 6410

APPROVED AND ORDERED,

Gordon Towers

LIEUTENANT GOVERNOR

O.C. 340/91

May 9, 1991

EDMONTON, ALBERTA

Upon the recommendation of the Honourable the Minister of Energy, the Lieutenant Governor in Council, pursuant to section 14(2) of the Oil Sands Conservation Act, authorizes the Energy Resources Conservation Board to issue Approval No. 6410 to Murphy Oil Company Ltd. in the form attached and subject to the terms and conditions specified in Attachment 1.

CHAIRMAN

ATTACHMENT 1 TO O.C. 340/91

Pursuant to section 10(4) of the Oil Sands Conservation Act, the order of the lieutenant Governor in Council authorizing the issuance of an approval by the Energy Resources Conservation Board to Murphy Oil Company Ltd. (hereinafter called "the Operator") is subject to the following terms and conditions.

1. The Operator shall satisfy the Minister of Economic Development, prior to the commencement of construction and thereafter throughout the term of the approval, with respect to the use, wherever practicable in the project, of Alberta engineering and other professional services; Alberta tradesmen and other construction personnel; and equipment, materials and supplies from Alberta.

APPENDIX B TO APPROVAL NO. 6410

DEPARTMENT OF THE ENVIRONMENT

MINISTERIAL APPROVAL
No. 91-59 ERCB

Edmonton, Alberta
May 29, 1991

Pursuant to Section 14 of the Oil Sands Conservation Act, I, Vance MacNichol, Deputy Minister of the Environment, hereby approve Application No. 901623 dated 30 October 1990 from Murphy Oil Company to the Energy Resources Conservation Board in the matter of an amendment to Board Approval No. 4671 insofar as it affects matters of the environment, such application to be granted by Approval No. 6410.

Murphy Oil Company Ltd. shall comply with the Clean Water Act License 87-WL-118, the Clean Air Act License 87-AL-311, Development and Reclamation Approval No. OS-3-83, and the Water Resources Act License issued October 20, 1986 or any subsequent amendments thereof, issued by the Department of the Environment.

DEPUTY MINISTER

APPENDIX C TO APPROVAL NO. 6410

DEPARTMENT OF FORESTRY, LANDS AND WILDLIFE

MINISTERIAL APPROVAL
No. 91-001 ERCB

Edmonton, Alberta
May 10, 1991

Pursuant to section 14 of the Oil Sands Conservation Act, the Minister of Forestry, Lands and Wildlife, hereby approves Application No. 901623 dated 30 October 1990 from Murphy Oil Company Ltd. to the Energy Resources Conservation Board in the matter of an amendment to Board Approval No. 4671 insofar as it affects lands and resources that are the property of the Crown in right of Alberta, such application to be granted by Approval No. 6410.

DEPUTY MINISTER OF FORESTRY,
LANDS AND WILDLIFE
C. B. SMITH

Province of Alberta
Order in Council

Appendix E to
Approval No. 6410

O.C. 399/2004
AUG 25 2004

ORDER IN COUNCIL

Approved and ordered:

Lieutenant Governor

The Lieutenant Governor in Council authorizes the Alberta Energy and Utilities Board to grant Amendment F to Approval No. 6410 to Pengrowth Corporation in the form attached.

ACTING CHAIR

Alberta

For Information only

Recommended by: Minister of Energy

Authority: Oil Sands Conservation Act (section 13)

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from the Cold Lake Lower Grand Rapids Oil Sands Deposit in the Lindbergh Sector

AMENDMENT OF APPROVAL NO. 6410A

(Amending Approval No. 6410)

The Energy Resources Conservation Board, pursuant to the Oil Sands Conservation Act, being chapter 0-5.5 of the Statutes of Alberta, 1983, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. Clause 1 is amended by adding the following:

   (h) Proceeding No. 911399 dated 30 September 1991,

3. Clause 2 is struck out and the following is substituted:

   2. (1) Data submitted pursuant to

      (a) Application No. 7242 dated 23 July 1973,

      (b) Application No. 9739 dated 21 October 1976, and

      (c) Application No. 810852 dated 21 October 1981,

for operations conducted up to and including 31 July 1984, will be released on 31 July 1994 unless, upon application by the Operator or if other circumstances so warrant, a later date is approved by the Board.

(2) Data submitted pursuant to Application No. 831077 dated 4 November 1983 for operations conducted up to and including 31 December 1988, will be released on 31 December 1998 unless, upon application by the Operator or if other circumstances so warrant, a later date is approved by the Board.

MADE at the City of Calgary, in the Province of Alberta, this 7th day of October, 1991.

ENERGY RESOURCES CONSERVATION BOARD

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from the Cold Lake Lower Grand Rapids Oil Sands Deposit in the Lindbergh Sector

AMENDMENT B TO APPROVAL NO. 6410

The Energy Resources Conservation Board, pursuant to the Oil Sands Conservation Act, being chapter 0-5.5 of the Statutes of Alberta, 1983, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. Clause 1 is amended by adding the following:

   (i) Application No. 930632 dated 29 April 1993,

3. Clause 9 is struck out and the following is substituted:

   9. Approval of operations pursuant to Application No. 930632 expires on 31 August 1998 unless, upon application by the Operator, a later date is approved by the Board.

4. The following clause is added:

   10. (1) The Board may,

   (a) upon its own motion, or

   (b) upon the application of an interested person,

   rescind or amend this approval at any time if, in the opinion of the Board, circumstances so warrant.

   (2) This approval expires on 31 December 2009 unless rescinded before that date pursuant to subclause (1).

MADE at the City of Calgary, in the Province of Alberta, on 5 August 1993.

ENERGY RESOURCES CONSERVATION BOARD

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from the Cold Lake Upper and Lower Grand Rapids Oil Sands Deposits in the Lindbergh Sector

AMENDMENT C TO APPROVAL NO. 6410

The Alberta Energy and Utilities Board, pursuant to the Oil Sands Conservation Act, being chapter O-5.5 of the Statutes of Alberta, 1983, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. The title is amended by striking out "Cold Lake Lower Grand Rapids Oil Sands Deposit" and substituting "Cold Lake Upper and Lower Grand Rapids Oil Sands Deposits".

3. Clause 1 is amended by adding the following:

   (j) Application No. 960497

4. Clause 4 is struck out and the following is substituted:

   4. The operator, at least three years prior to the termination of recovery operations from any zone of the Upper or Lower Grand Rapids Deposits in any legal subdivision in the project area, shall develop a testing program satisfactory to the Board to determine the practicality of recovering crude bitumen from the other zones in the Mannville Formation in the legal subdivision of the project area.

5. Clause 5 is struck out and the following is substituted:

   5. (1) Unless otherwise permitted by the Board, steamflooding operations, having commenced in a legal subdivision in the project area, shall continue until the area has produced a minimum of 50 per cent of the in-place volume of crude bitumen assigned to that area by the Board.

   (2) Where the Operator proposes to cease steamflooding operations in a legal subdivision that has produced less than 50 per cent of the in-place volume of crude bitumen, the Board's consent therefore must be sought, and the Operator shall advise the Board as to the following:

(a) the reason for proposing to cease steamflooding operations,

(b) details of individual well workovers and recompletions attempted,

(c) details of any infill drilling attempted,

(d) detailed economics of continuing operations, and

(e) future plans for the legal subdivision with reference to possible follow-up recovery techniques that could be applied and other zones that could be exploited.

(3) The Operator, at least one year prior to termination of steamflooding operations in any legal subdivision in the project area, shall undertake extensive field investigations, satisfactory to the Board, of any alternative or follow-up recovery method that may have potential application in the legal subdivision or the project area.

6. Clause 6 is struck out and the following is substituted:

(1) The Operator shall log a minimum of one vertical well per legal subdivision from total depth to surface by means of a spontaneous potential-resistivity or gamma ray-resistivity type log device and other such devices as may be required to ensure sufficient depth and directional control.

(2) The Operator shall log the build portion of all horizontal wells using a minimum of a gamma ray while drilling log.

(3) The Operator, unless otherwise authorized by the Board, shall drill not less than eight vertically spaced wells per section to a depth not less than five metres above the top of the Devonian System and from those wells take core of the bitumen-bearing sections of the Mannville Group, and

(a) at the Board's request, analyze portions of such cores, and

(b) provide suitable photographs of the clean cut surface of each core slabbed.

(4) Each of the wells referred to in subclause (3) shall be logged over the entire Mannville Group, or from total depth to the top of the cored interval, whichever is shallower by means of a gamma ray compensated neutron-formation density log or other suitable log to measure porosity.

7. Clause 9 is struck out and the following is substituted:

9. (1) The Board may,

(a) upon its own motion, or

(b) upon the application of an interested person,

rescind or amend this approval at any time.

(2) This approval expires on 31 December 2009 unless rescinded before that date pursuant to subclause (1).

8. Clause 10 is struck out.

MADE at the City of Calgary, in the Province of Alberta, on 13 December 1996.

ALBERTA ENERGY AND UTILITIES BOARD

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a ~~primary recovery~~ scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from the Cold Lake Upper and Lower Grand Rapids Oil Sands Deposit in the Lindbergh Sector

AMENDMENT D TO APPROVAL NO. 6410

The Alberta Energy and Utilities Board, pursuant to the Oil Sands Conservation Act, being chapter O-5.5 of the Statutes of Alberta, 1983, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. Clause 1 is amended by adding the following:

   (k) Application No. 1006547

MADE at the City of Calgary, in the Province of Alberta, on 5 August 1997.

ALBERTA ENERGY AND UTILITIES BOARD

Note: Amend title when approval amended.

THE PROVINCE OF ALBERTA

OIL AND GAS CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a scheme of Murphy Oil Company Ltd. for the recovery of crude bitumen from all zones above the Lloydminster Member in the Cold Lake Oil Sands Deposits in the Lindbergh Sector

AMENDMENT E TO APPROVAL NO. 6410

The Alberta Energy and Utilities Board, pursuant to the Oil and Gas Conservation Act, being chapter O-5 of the Revised Statutes of Alberta, 1980, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. The title is amended by striking out "Cold Lake Lower Grand Rapids Oil Sands Deposit" and substituting "all zones above the Lloydminister Member in the Cold Lake Oil Sands Deposit"

3. Clause 1 is amended by adding the following:

   (l) Application No. 1033329

MADE at the City of Calgary, in the Province of Alberta, on 3 June 1999.

ALBERTA ENERGY AND UTILITIES BOARD

THE PROVINCE OF ALBERTA

OIL SANDS CONSERVATION ACT

ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of a scheme of Pengrowth Corporation for the recovery of crude bitumen from the Lindbergh Sector of the Cold Lake Oil Sands Area

AMENDMENT F TO APPROVAL NO. 6410

WHEREAS the Alberta Energy and Utilities Board is prepared to grant approval to an application by Murphy Oil Company Ltd., on behalf of Pengrowth Corporation, for the recovery of crude bitumen; and

WHEREAS the Lieutenant Governor in Council, by Order in Council Number O.C. 399/2004 dated August 25, 2004, hereto attached as Appendix E, has authorized the granting of this approval.

THEREFORE, the Alberta Energy and Utilities Board, pursuant to the Oil Sands Conservation Act, being chapter O-7 of the Revised Statutes of Alberta, 2000, hereby orders as follows:

1. Board Approval No. 6410 is amended.

2. The title is amended by striking out the words "Murphy Oil Company Ltd." and substituting the words "Pengrowth Corporation" and by striking out the words "all zones above the Lloydminster Member in the Cold Lake Oil Sands Deposits in the Lindbergh Sector" and substituting the words "the Lindbergh Sector of the Cold Lake Oil Sands Area".

3. Clause 1 is struck out and the following is substituted:

   1. The scheme of Pengrowth Corporation (hereinafter called "the Operator") for the recovery of crude bitumen from the Cold Lake Oil Sands Area from:

      (1) The Lloydminster Zone from wells located in Sections 11, 12, and 14 of Township 58, Range 5, West of the 4th Meridian.

      (2) The Lloydminster and Rex Zones from wells located in Section 13 of Township 58, Range 5, West of the 4th Meridian.

      as such scheme is described in

      (a) Application No. 7242,
      (b) Application No. 9739,
      (c) Application No. 810852,
      (d) Application No. 831077,
      (e) Application No. 841338,
      (f) Application No. 882186,
      (g) Application No. 901623,
      (h) Proceeding No. 911399,
      (i) Application No. 930632,
      (j) Application No. 960497,
      (k) Application No. 1006547,
      (l) Application No. 1033329,
      (m) Application No. 1332222,

   is approved, subject to the terms and conditions herein contained.

4. Attached hereto as Appendix E to this approval is the Order of the Lieutenant Governor in Council authorizing the granting of the approval.

MADE at the City of Calgary, in the Province of Alberta, on August 31, 2004.

ALBERTA ENERGY AND UTILITIES BOARD

ERCB Energy Resources Conservation Board

COMMERCIAL SCHEME
Approval No. 6410G

MADE at the City of Calgary, in the Province of Alberta, on 17th day of November 2009.	 ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a commercial scheme of Pengrowth Corporation (hereinafter called "the Operator") for the recovery of crude bitumen from:

(1) The **Lloydminster Zone in the Cold Lake Oil Sands Area** from wells located in Sections 11, 12, and 14 of Township 58, Range 5, West of the 4th Meridian.

(2) The **Lloydminster and Rex Zone in the Cold Lake Oil Sands Area** from wells located in Section 13 of Township 58, Range 5, West of the 4th Meridian.

Whereas the Lieutenant Governor in Council, by Order in Council O.C. 340/91 dated May 9, 1991, authorized the granting of Approval No. 6410;

Whereas the Energy Resources Conservation Board (ERCB) is prepared to approve an application by the Operator for an amendment to the scheme;

Whereas the ERCB deems it desirable for ease of reference to consolidate the amendment into the existing approval in a document to be known as Approval No. 6410G;

Therefore, pursuant to section 13 of the Oil Sands Conservation Act, chapter O-7 of the Revised Statutes of Alberta, 2000, the ERCB hereby approves Amendment G to Approval No. 6410 and issues Approval No. 6410G as follows:

1) The Operator's scheme as described in

a) Application No. 7242,
b) Application No. 9739,
c) Application No. 810852,
d) Application No. 831077,
e) Application No. 841338,
f) Application No. 882186,
g) Application No. 901623,
h) Proceeding No. 911399,
i) Application No. 930632,
j) Application No. 960497,
k) Application No. 1006547,
l) Application No. 1033329,
m) Application No. 1332222,
n) Application No. 1623411,

is approved, subject to the Oil Sands Conservation Regulation and the terms and conditions herein contained.

2) The Operator shall, prior to proceeding with any development in Section 11 and the West half of Section 14, Township 58, Range 5, West of the 4th Meridian, obtain from the surface owner of those lands, consent to the location of any surface development or facilities on said

lands and, should the Operator be unable to obtain consent, the matter shall be referred to the ERCB for resolution.

3) The Operator, at least three years prior to the termination of recovery operations from any zone of the Upper or Lower Grand Rapids Deposits in any legal subdivision in the project area, shall develop a testing program satisfactory to the ERCB to determine the practicality of recovering crude bitumen from the other zones in the Mannville Formation in the legal subdivision of the project area.

4) (1) Unless otherwise permitted by the ERCB, steamflooding operations, having commenced in a legal subdivision in the project area, shall continue until the area has produced a minimum of 50 per cent of the in-place volume of crude bitumen assigned to that area by the ERCB.

(2) Where the Operator proposes to cease steamflooding operations in a legal subdivision that has produced less than 50 per cent of the in-place volume of crude bitumen, the ERCB's consent therefore must be sought, and the Operator shall advise the ERCB as to the following:

a) the reason for proposing to cease steamflooding operations,
b) details of individual well workovers and recompletions attempted,
c) details of any infill drilling attempted,
d) detailed economics of continuing operations, and
e) future plans for the legal subdivision with reference to possible follow-up recovery techniques that could be applied and other zones that could be exploited.

(3) The Operator, at least one year prior to termination of steamflooding operations in any legal subdivision in the project area, shall undertake extensive field investigations, satisfactory to the ERCB, of any alternative or follow-up recovery method that may have potential application in the legal subdivision or the project area.

5) (1) The Operator shall log a minimum of one vertical well per legal subdivision from total depth to surface by means of a spontaneous potential-resistivity or gamma ray-resistivity type log device and other such devices as may be required to ensure sufficient depth and directional control.

(2) The Operator shall log the build portion of all horizontal wells using a minimum of a gamma ray while drilling log.

(3) The Operator, unless otherwise authorized by the ERCB, shall drill not less than eight vertically spaced wells per section to a depth not less than five metres above the top of the Devonian System and from those wells take core of the bitumen-bearing sections of the Mannville Group, and

a) at the ERCB's request, analyze portions of such cores, and
b) provide suitable photographs of the clean cut surface of each core slabbed.

(4) Each of the wells referred to in subclause (3) shall be logged over the entire Mannville Group, or from total depth to the top of the cored interval, whichever is shallower by means of a gamma ray compensated neutron-formation density log or other suitable log to measure porosity.

6) (1) The ERCB may,

a) upon its own motion, or
b) upon the application of an interested person,

rescind or amend this approval at any time.

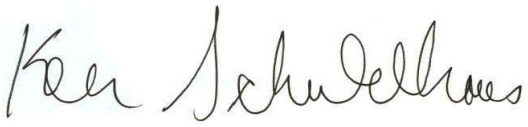
(2) This approval expires on December 31, 2011[1] unless rescinded before that date pursuant to subclause (1).

7) Approval No. 6410G rescinds Approvals No. 6410A, 6410B, 6410C, 6410D, 6410E, and 6410F.

END OF DOCUMENT

ERCB Energy Resources Conservation Board

COMMERCIAL SCHEME
Approval No. 6410H

MADE at the City of Calgary, in the Province of Alberta, on 4th day of July 2011.	 ENERGY RESOURCES CONSERVATION BOARD

IN THE MATTER of a commercial scheme of Pengrowth Energy Corporation[1] (hereinafter called "the Operator") for the recovery of crude bitumen from the **Lloydminster Formation and Rex Formation in the Cold Lake Oil Sands Area** from wells located in the project area outlined in Appendix A[1] to this approval:

(1) <rescinded[1]> The **Lloydminster Zone in the Cold Lake Oil Sands Area** from wells located in Sections 11, 12, and 14 of Township 58, Range 5, West of the 4th Meridian.

(2) <rescinded[1]> The **Lloydminster and Rex Zone in the Cold Lake Oil Sands Area** from wells located in Section 13 of Township 58, Range 5, West of the 4th Meridian.

Whereas the Lieutenant Governor in Council, by Order in Council O.C. 340/91 dated May 9, 1991, authorized the granting of Approval No. 6410;

Whereas the Energy Resources Conservation Board (ERCB) is prepared to approve an application by the Operator for an amendment to the scheme;

Whereas the ERCB deems it desirable for ease of reference to consolidate the amendment into the existing approval in a document to be known as Approval No. 6410H;

Therefore, pursuant to Section 13 of the Oil Sands Conservation Act, chapter O-7 of the Revised Statutes of Alberta, 2000, the ERCB hereby approves Amendment H to Approval No. 6410 and issues Approval No. 6410H as follows:

1) The Operator's scheme as described in

a) Application No. 7242,
b) Application No. 9739,
c) Application No. 810852,
d) Application No. 831077,
e) Application No. 841338,
f) Application No. 882186,
g) Application No. 901623,
h) Proceeding No. 911399,
i) Application No. 930632,
j) Application No. 960497,
k) Application No. 1006547,
l) Application No. 1033329,
m) Application No. 1332222,
n) Application No. 1623411,
o) Application No. 1568932,

is approved, subject to the Oil Sands Conservation Regulation and the terms and conditions herein contained[1].

2) <rescinded[1]> The Operator shall, prior to proceeding with any development in Section 11 and the West half of Section 14, Township 58, Range 5, West of the 4th Meridian, obtain from the surface owner of those lands, consent to the location of any surface development or facilities on said lands and, should the Operator be unable to obtain consent, the matter shall be referred to the ERCB for resolution.

3) <rescinded[1]> The Operator, at least three years prior to the termination of recovery operations from any zone of the Upper or Lower Grand Rapids Deposits in any legal subdivision in the project area, shall develop a testing program satisfactory to the ERCB to determine the practicality of recovering crude bitumen from the other zones in the Mannville Formation in the legal subdivision of the project area.

4) <rescinded[1]> (1)Unless otherwise permitted by the ERCB, steamflooding operations, having commenced in a legal subdivision in the project area, shall continue until the area has produced a minimum of 50 per cent of the in-place volume of crude bitumen assigned to that area by the ERCB.

<rescinded[1]> (2) Where the Operator proposes to cease steamflooding operations in a legal subdivision that has produced less than 50 per cent of the in-place volume of crude bitumen, the ERCB's consent therefore must be sought, and the Operator shall advise the ERCB as to the following:

a) the reason for proposing to cease steamflooding operations,
b) details of individual well workovers and recompletions attempted,
c) details of any infill drilling attempted,
d) detailed economics of continuing operations, and
e) future plans for the legal subdivision with reference to possible follow-up recovery techniques that could be applied and other zones that could be exploited.

<rescinded[1]> (3) The Operator, at least one year prior to termination of steamflooding operations in any legal subdivision in the project area, shall undertake extensive field investigations, satisfactory to the ERCB, of any alternative or follow-up recovery method that may have potential application in the legal subdivision or the project area.

5) <rescinded[1]> (1)The Operator shall log a minimum of one vertical well per legal subdivision from total depth to surface by means of a spontaneous potential-resistivity or gamma ray-resistivity type log device and other such devices as may be required to ensure sufficient depth and directional control.

<rescinded[1]> (2) The Operator shall log the build portion of all horizontal wells using a minimum of a gamma ray while drilling log.

<rescinded[1]> 3) The Operator, unless otherwise authorized by the ERCB, shall drill not less than eight vertically spaced wells per section to a depth not less than five metres above the top of the Devonian System and from those wells take core of the bitumen-bearing sections of the Mannville Group, and

a) at the ERCB's request, analyze portions of such cores, and

b) provide suitable photographs of the clean cut surface of each core slabbed.

<rescinded[1]> (4) Each of the wells referred to in subclause (3) shall be logged over the entire Mannville Group, or from total depth to the top of the cored interval, whichever is shallower by means of a gamma ray compensated neutron-formation density log or other suitable log to measure porosity.

6) Clause 1 does not preclude alterations in design and equipment, provided that the ERCB is satisfied that the alterations are compatible with the outline of the scheme, are made for the better operation of the scheme, and do not result in unacceptable adverse impacts.[1]

7) (1) The Operator shall notify the ERCB of any proposed material alteration or modification of the scheme or to any equipment proposed for use therein prior to effecting the alteration or modification.[1]

(2) Where, in the opinion of the ERCB, any alteration or modification to the scheme or to any equipment proposed for use therein:

a) is not of a minor nature,

b) is not consistent with the scheme approved herein, or

c) may not result in an improved or more efficient scheme or operation,

the alteration or modification shall not be proceeded with or effected without the further authorization of the ERCB. The Operator must provide evidence that this major alteration or modification to the scheme or to any equipment will result in a benefit to the scheme or operation and be in the public interest.[1]

8) The Operator shall notify the approval holder(s) of any primary recovery scheme located in the subject project area outlined in Appendix A to this approval upon commencement of steam injection.

9) The recovery process approved for the scheme is Steam-Assisted Gravity Drainage (SAGD) unless otherwise stipulated by the ERCB.[1]

10) (1) The ERCB may,

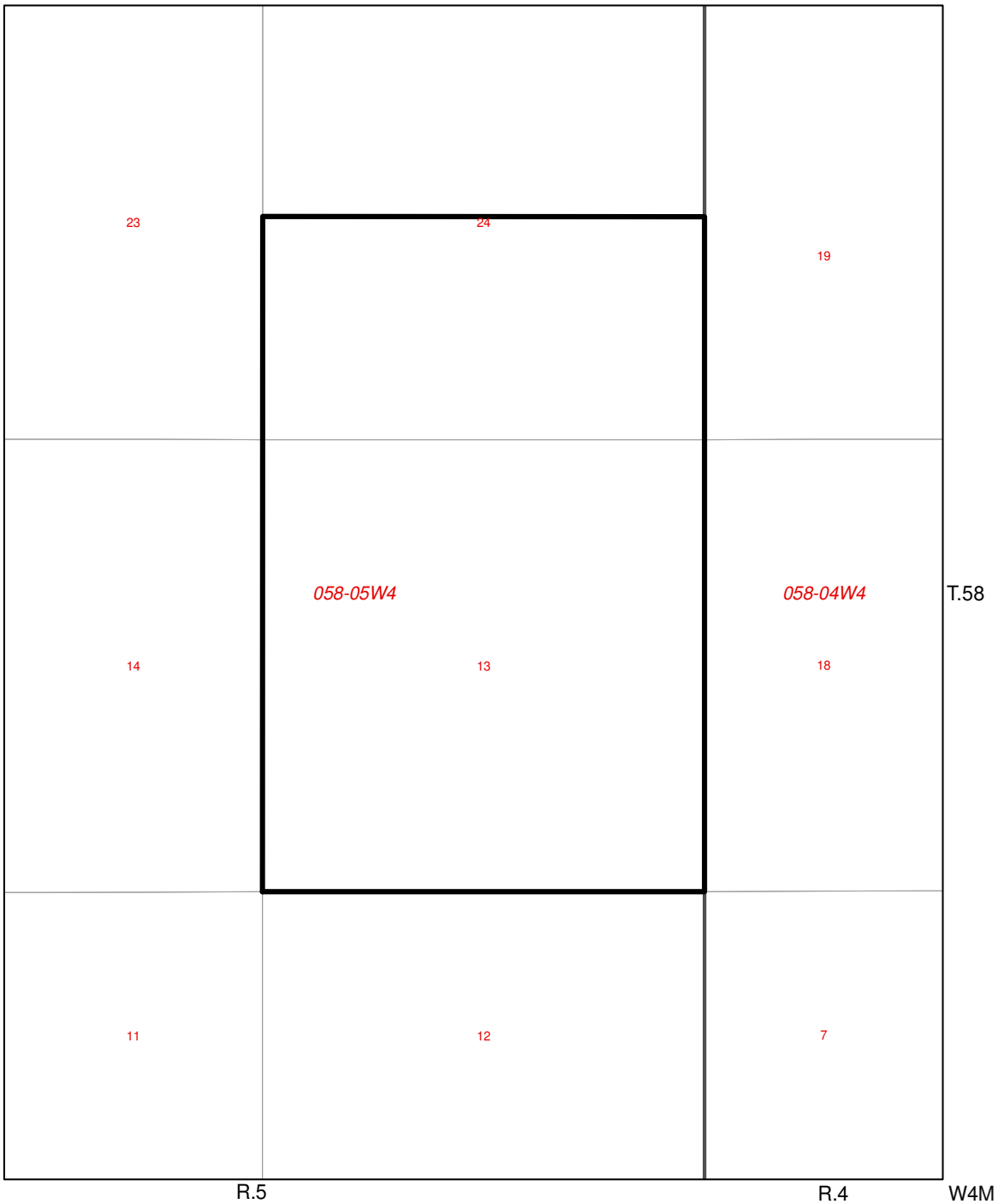
a) upon its own motion, or
b) upon the application of an interested person,

rescind or amend this approval at any time.

<rescinded[1]> (2) This approval expires on December 31, 2011 unless rescinded before that date pursuant to subclause (1).

11) Approval No.6410H rescinds Approval No.6410G.

END OF DOCUMENT



COLD LAKE OIL SANDS AREA
APPENDIX A TO APPROVAL NO. 6410H

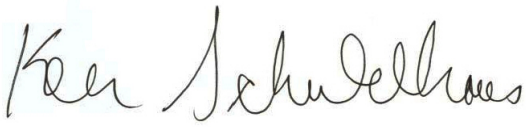
Area(s) of Change

Added

Deleted

Alberta Energy Regulator

COMMERCIAL SCHEME
Approval No. 6410I

MADE at the City of Calgary, in the Province of Alberta, on 12th day of July 2013.	 ALBERTA ENERGY REGULATOR

IN THE MATTER of a commercial scheme of Pengrowth Energy Corporation (hereinafter called "the Operator") for the recovery of crude bitumen from the **Lloydminster Formation and Rex Formation of the Lower Grand Rapids Deposit[1] in the Cold Lake Oil Sands Area** from wells located in the project area outlined in Appendices A[1] and C[1] to this approval.

Whereas the Lieutenant Governor in Council, by Order in Council O.C. 340/91 dated May 9, 1991, authorized the granting of Approval No. 6410;

Whereas the Alberta Energy Regulator (AER) is prepared to approve an application by the Operator for an amendment to the scheme;

Whereas the AER deems it desirable for ease of reference to consolidate the amendment into the existing approval in a document to be known as Approval No. 6410I;

Therefore, pursuant to Section 13 of the *Oil Sands Conservation Act*, chapter O-7 of the Revised Statutes of Alberta, 2000, the AER hereby approves Amendment I to Approval No. 6410 and issues Approval No. 6410I as follows:

1) The Operator's scheme as described in

   a) Application No. 7242,
   b) Application No. 9739,
   c) Application No. 810852,
   d) Application No. 831077,
   e) Application No. 841338,
   f) Application No. 882186,
   g) Application No. 901623,
   h) Proceeding No. 911399,
   i) Application No. 930632,
   j) Application No. 960497,
   k) Application No. 1006547,
   l) Application No. 1033329,
   m) Application No. 1332222,
   n) Application No. 1623411,
   o) Application No. 1568932,
   p) Application No. 1713445,

   is approved, subject to the *Oil Sands Conservation Rules* and the terms and conditions herein contained[1].

2) (1) The recovery of crude bitumen from the Lloydminster Formation from wells located in the development area outlined in Appendix A is approved.

   (2) The recovery of crude bitumen from the Rex Formation from wells located in the development area outlined in Appendix C[1] is approved.

3) Clause 1 does not preclude alterations in design and equipment, provided that the AER is satisfied that the alterations are compatible with the outline of the scheme, are made for the better operation of the scheme, and do not result in unacceptable adverse impacts.

4) The recovery process approved for the project is Steam-Assisted Gravity Drainage (SAGD) utilizing only steam as the injection fluid unless otherwise stipulated by the AER.[1]

5) Unless otherwise stipulated by the AER, the production of bitumen from the project area outlined in Appendix A shall not exceed 1987 cubic metres per day (m^3/d) on an annual average basis.[1]

6) The Operator shall conduct all operations to the satisfaction of the AER and in a manner that under normal operating conditions will permit:[1]

   a) the recovery of the practical maximum amount of crude bitumen within the project area,
   b) the conservation of the practical maximum volume of produced gas at the well pads and central facilities, and
   c) the minimization of flaring to non-routine operations such as start-up, shutdown, emergencies, infrequent upsets, and maintenance depressuring.

7) The maximum bottomhole injection pressure for the approved drainage patterns in the Development Area outlined in Appendix A must not exceed 5 500 kPa (gauge), with the exception of a higher injection pressure to displace liquid in the wellbore to commence circulation as described in Application No. 1713445.[1]

8) Unless otherwise stipulated by the AER, the Operator shall:[1]

   a) provide the AER with gamma ray, spontaneous potential, resistivity neutron density logs from total depth to surface casing for all vertical wells, and
   b) take full diameter cores of the entire bitumen-bearing interval of the Lloydminster Formation and Rex Formation from not less than four evenly spaced vertical wells per section, and take full-diameter cores of bitumen-bearing intervals of other zones in the Mannville Group, if any, from at least one well per section, and at the AER's request

      i) analyze portions of such cores, and
      ii) provide suitable photographs of the clean-cut surface of each core slabbed.

9) Prior to drilling SAGD wells in an area, all wells that could be impacted by thermal operations must be completed or abandoned in a manner that is compatible with the thermal operations. The Operator must contact the AER for discussion of and obtain approval for the manner in which to complete or abandon wells not considered to be compatible with the thermal operations.[1]

10) Unless otherwise permitted by the AER, steam injection operations, having commenced at a well pad, shall continue until the well pad has produced a minimum of 50 per cent of the in-place volume of crude bitumen assigned to that well pad by the AER.[1]

11) Where the Operator proposes to cease SAGD operations at a well pad that has produced less than 50 per cent of the in-place volume of crude bitumen and the AER's consent therefore is sought, the Operator shall advise the AER as to the following:[1]

a) the reason for proposing to cease SAGD operations,
b) details of individual well workovers and recompletions attempted,
c) detailed economics of continuing operations,
d) the effect of ceasing SAGD operations on the bitumen recovery ultimately achievable from that part of the reservoir associated with the pad and immediately offsetting pads, and
e) future plans for the well pad with reference to possible follow-up recovery techniques that could be applied and other zones that could be exploited.

12) The Operator shall ensure that sulphur recovery will be operational at the facilities before total sulphur emissions from flaring and combustion of gas containing hydrogen sulphide (H_2S) reach one tonne/day on a calendar quarter-year average basis, unless otherwise stipulated by the AER. The calendar quarter-year sulphur recovery shall not be less than set out in Table 1 of AER *Interim Directive (ID) 2001-03: Sulphur Recovery Guidelines for the Province of Alberta* on the basis of the calendar quarter-year daily average sulphur content of produced gas streams flared and used as fuel at each central processing facility.[1]

13) (1) The Operator shall notify the AER of any proposed material alteration or modification of the scheme or to any equipment proposed for use therein prior to effecting the alteration or modification.

(2) Where, in the opinion of the AER, any alteration or modification to the scheme or to any equipment proposed for use therein:

a) is not of a minor nature,

b) is not consistent with the scheme approved herein, or

c) may not result in an improved or more efficient scheme or operation,

the alteration or modification shall not be proceeded with or effected without the further authorization of the AER. The Operator must provide evidence that this major alteration or modification to the scheme or to any equipment will result in a benefit to the scheme or operation and be in the public interest.

14) Any plans for operations or development outside the approved development area shall be applied for to the AER for review. Such applications must:[1]

a) describe the facility and infrastructure locations and the operation of the surface facilities. Justify any changes from those described in the original application and associated amendments. Evaluate the potential environmental impacts in the context of these changes and contrast with impacts predicted in the original application;
b) verify predictions and evaluate the performance of the environmental mitigation strategies proposed by the operator in the original application and associated amendments. Discuss how the approach to various mitigation strategies might be altered based on the findings of the evaluation and incorporated into future operations;

c) provide a summary of the information submitted for the Environmental Protection and Enhancement Act (EPEA), as well as any other environmental information related to the scheme and its amendment that may be required by an agency other than the AER;
d) provide geological and reservoir data that demonstrate that the reservoir in the proposed development area has been fully evaluated, including evaluation wells and seismic interpretation to fully understand where well pads and wells will be located. Submit updated bitumen, gas, and water mapping, reservoir properties, and reserves estimates for the existing development area, the proposed additional area, and the overall development area;
e) describe the Operator's participation in regional environmental initiatives. Discuss recommendations that have been generated from these regional initiatives and how these recommendations have been incorporated into the project;
f) provide a detailed description of the proposed amendment, including subsurface drainage pattern design, such as the number of horizontal wells per drainage pattern, the lateral spacing between horizontal wells, the length and trajectory of each horizontal well, the horizontal well elevations, and the subsurface drainage area corresponding to each horizontal well. Provide an annotated log cross section for one representative well pair per pattern to demonstrate that the well locations and pattern design have been optimized to conserve bitumen;
g) provide a detailed discussion of the scheme performance to date, with specific emphasis on key factors affecting the success of the scheme, and how this experience has been incorporated into the operating of the existing scheme and the design and operation of the scheme within the proposed additional area, including:

   i) the impact of top gas,
   ii) the impact of top water,
   iii) the impact of bottom water,
   iv) the effectiveness of the cap rocks, and
   v) the state of the steam chamber.

h) provide a discussion on modeling results, including the input data, modeling runs carried out, and the latest model predictions of bitumen recovery and pad production profiles based on history matching the field performance data. This information shall include:

   i) a description of the model used;
   ii) the input data files for the model cases run;
   iii) for each case run, cross sections perpendicular to the wellbore showing the changing fluid saturations and temperature with time to illustrate the growth of the steam chamber to abandonment;
   iv) a discussion of the history match and parameters adjusted to achieve the match obtained; and
   v) a discussion of the prediction cases run, plots of the results for key performance predictions (e.g. rates, steam oil ratio), and how the results were used in operation of the existing scheme, in the design and operation of the proposed new area, and in the scheduling of future development of the scheme.

15) Notwithstanding any date by which any work, act, matter, or thing is by this approval required to be done, performed, or completed, the AER, if it considers it proper to do so, may by stipulation alter the dates specified.[1]

16) The Operator shall notify the approval holder(s) of any primary recovery scheme located in the subject project area outlined in Appendix A to this approval upon commencement of steam injection.

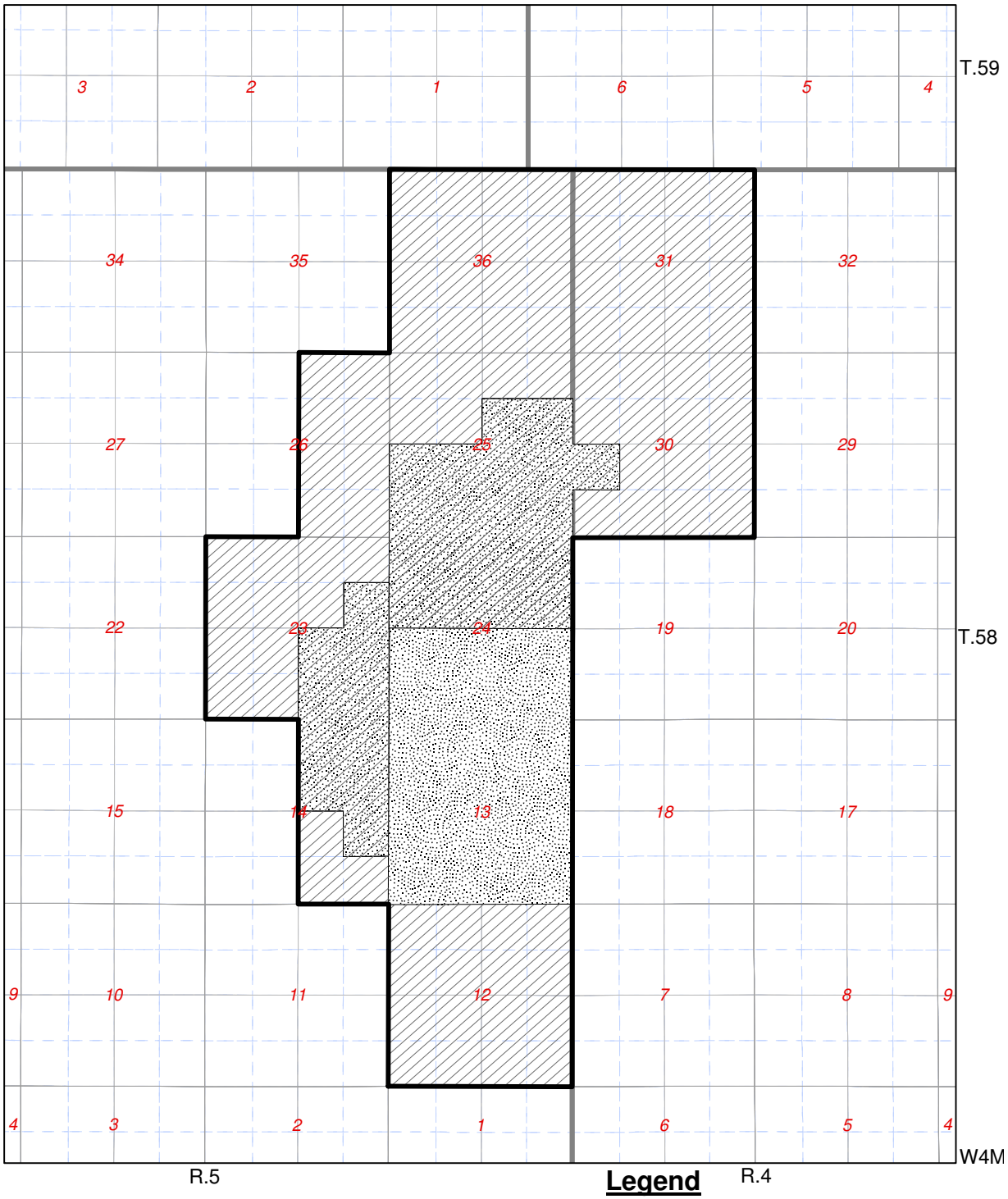
17) The AER may,

a) upon its own motion, or
b) upon the application of an interested person,

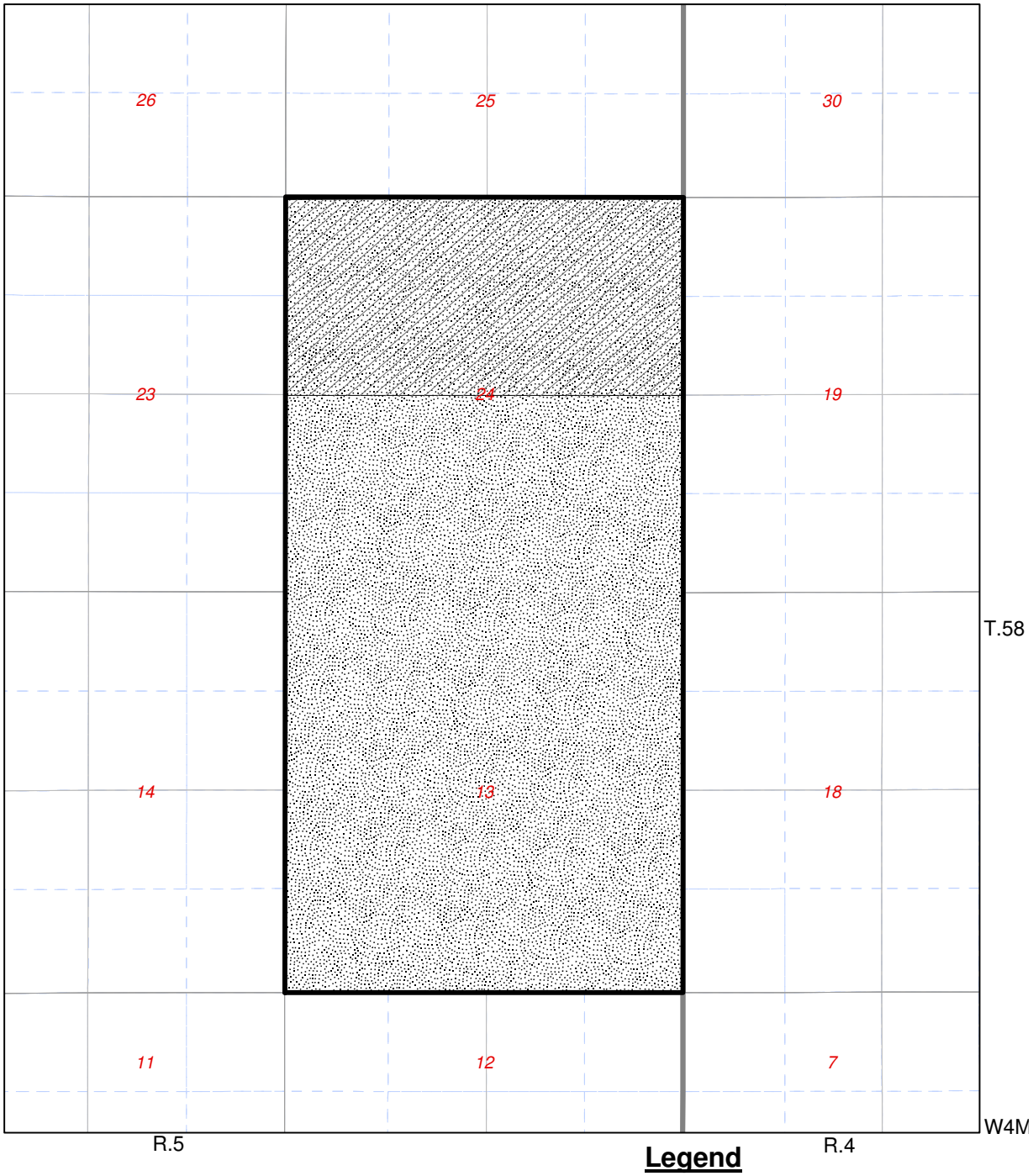
rescind or amend this approval at any time.

18) Approval No.6410I rescinds Approval No.6410H.

END OF DOCUMENT



COLD LAKE OIL SANDS AREA
LLYODMINSTER FORMATION OF
LOWER GRAND RAPIDS DEPOSIT
APPENDIX A TO APPROVAL NO. 6410I



COLD LAKE OIL SANDS AREA
REX FORMATION OF LOWER GRAND RAPIDS DEPOSIT
APPENDIX C TO APPROVAL NO. 6410I

Legend

Project Area

Development Area

Area(s) of Change

Added

Deleted

Alberta Energy Regulator

CLASS Ib DISPOSAL
Approval No.12088A

MADE at the City of Calgary, in the Province of Alberta, on 21st day of August 2013.	Steve Thomas ALBERTA ENERGY REGULATOR

The Alberta Energy Regulator, pursuant to the *Oil and Gas Conservation Act*, chapter O-6 of the Revised Statutes of Alberta, 2000, orders as follows:

1) The scheme of Pengrowth Energy Corporation in the **Cold Lake Oil Sands Area** for the disposal of Class Ib fluids, as identified in ERCB *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* and generated in the Province of Alberta, is approved subject to the terms and conditions stipulated on Table 1 of this approval. Such scheme is described in

   a) Application No. 1761750,

   b) Application No. 1768552,

2) The disposal of fluids, substantially in accordance with the scheme, in the well(s) referred to in column (1) on Table 1 which have satisfied *Directive 051* requirements, may commence or continue.

3) Approval No. 12088A rescinds Approvals No. 12088.

END OF DOCUMENT

TABLE 1
APPROVAL NO. 12088A

1	2	3	4	5	6
Unique Well Identifiers (*Directive 051* satisfied)	Unique Well Identifiers (*Directive 051* not satisfied)	Disposal Zone	Top of Injection Interval (Measured depth - metres KB)	Depth of Production Packer (Measured depth - metres KB)	Maximum Wellhead Injection Pressure (kilopascals gauge)
04/05-13-058-05W4/0		Cambrian	1500.0	1489.6	13 000
11/15-13-058-05W4/2[1]		Cambrian	1397.0	1379.7	12 600

[1]Application No. 1768552
* Surface Location
† The pressure of the tubing/casing annulus shall be continuously monitored with any significant fluctuations immediately reported to the Well Operations Section of the AER Technical Operations Group.

ERCB Energy Resources Conservation Board

CLASS Ib DISPOSAL
Approval No.12088

MADE at the City of Calgary, in the Province of Alberta, on 30th day of May 2013.	Steve Thomas ENERGY RESOURCES CONSERVATION BOARD

The Energy Resources Conservation Board, pursuant to the *Oil and Gas Conservation Act*, chapter O-6 of the Revised Statutes of Alberta, 2000, orders as follows:

1) The scheme of Pengrowth Energy Corporation in the **Cold Lake Oil Sands Area** for the disposal of Class Ib fluids, as identified in ERCB *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* and generated in the Province of Alberta, is approved subject to the terms and conditions stipulated on Table 1 of this approval. Such scheme is described in

   a) Application No. 1761750,

2) The disposal of fluids, substantially in accordance with the scheme, in the well(s) referred to in column (1) on Table 1 which have satisfied *Directive 051* requirements, may commence or continue.

END OF DOCUMENT

TABLE 1
APPROVAL NO. 12088

1	2	3	4	5	6
Unique Well Identifiers (*Directive 051* satisfied)	Unique Well Identifiers (*Directive 051* not satisfied)	Disposal Zone	Top of Injection Interval (Measured depth - metres KB)	Depth of Production Packer (Measured depth - metres KB)	Maximum Wellhead Injection Pressure (kilopascals gauge)
04/05-13-058-05W4/0		Cambrian	1500	1489.6	13 000

*Surface Location

†The pressure of the tubing/casing annulus shall be continuously monitored with any significant fluctuations immediately reported to the ERCB Technical Operations Group.

AUC
Alberta Utilities Commission

Pengrowth Energy Corporation

Construct and Operate a 15.92-MW Cogeneration Power Plant

July 25, 2013

The Alberta Utilities Commission
Decision 2013-275: Pengrowth Energy Corporation
Construct and Operate a 15.92-MW Cogeneration Power Plant
Application No. 1609102
Proceeding ID No. 2292

July 25, 2013

Published by
The Alberta Utilities Commission
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The Alberta Utilities Commission
Calgary, Alberta

Decision 2013-275
Pengrowth Energy Corporation **Application No. 1609102**
Construct and Operate a 15.92-MW Cogeneration Power Plant **Proceeding ID No. 2292**

1 Introduction

1. Pengrowth Energy Corporation (Pengrowth) filed an application with the Alberta Utilities Commission (AUC or the Commission) for approval to construct and operate a 15.92-megawatt (MW) cogeneration power plant (the power plant) pursuant to Section 11 of the *Hydro and Electric Energy Act*. This application was registered on December 4, 2012, as Application No. 1609102.

2. The power plant would consist of two gas-turbine generating units with a rated output of 7.96-MW each. It would be installed within the central processing facility of Pengrowth's future Lindberg In-Situ Oil Sands Commercial Scheme located in the southwest quarter of Section 25, Township 58, Range 5, west of the Fourth Meridian, approximately 22 kilometres southeast of Bonnyville, Alberta.

3. The Commission issued information requests to Pengrowth on December 21, 2012, January 28, 2013 and March 27, 2013. Pengrowth responded to the information requests on January 9, 2013, January 29, 2013 and April 5, 2013, respectively.

4. The Commission issued a notice of application on January 30, 2013, to all stakeholders, agencies and companies within 2,000 metres of the proposed project.

5. No objections to the power plant were received by the submission deadline.

2 Findings

6. The Commission has reviewed the application and has determined that the technical, siting, emissions, environmental and noise aspects of the power plant have been met the information requirements of AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* (AUC Rule 007) and AUC Rule 012: *Noise Control*. The Commission deems the application complete as of July 17, 2013.

7. The Commission accepts Pengrowth's submission that the power plant is intended to meet the electrical loads of the Lindberg steam-assisted gravity drainage (SAGD) project and that Pengrowth plans to sell excess energy into the Alberta Interconnected Electric System via ATCO Electric Ltd.'s distribution system at the ATCO Lindbergh substation.

8. Pengrowth has received regulatory approvals for the SAGD project from the Alberta Energy Regulator and Alberta Environment and Sustainable Resource Development in May and July 2013, respectively.

9. The Commission recognizes that Pengrowth conducted an historical resource assessment for the Lindberg SAGD project and that Pengrowth stated that it had applied for *Historical Resources Act* clearance for the Lindberg SAGD project with the cogeneration plant as part of the footprint of the project.

10. The Commission finds that Pengrowth complied with the consultation and notification requirements contained in AUC Rule 007. The Commission also finds that Pengrowth's consultation steps were adequate given the nature and scope of the power plant project. The Commission concludes that Pengrowth's participant involvement program has been conducted satisfactorily and there are no outstanding public or industry objections or concerns.

11. Since no parties objected to the application and the project is necessary to allow for the efficient extraction of natural resources by using steam generated by the power plant to help extract the heavy oil from the sand and provide economic benefits to Alberta, the Commission considers the project to be in the public interest.

12. Based on the foregoing, the Commission considers the project to be in the public interest in accordance with Section 17 of the *Alberta Utilities Commission Act*.

3 Decision

13. Pursuant to Section 11 of the *Hydro and Electric Energy Act*, the Commission approves the application and grants Pengrowth the approval set out in Appendix 1 – Power Plant Approval No. U2013-345 – July 25, 2013 (Appendix 1 will be distributed separately).

Dated on July 25, 2013.

The Alberta Utilities Commission

Tudor Beattie, QC
Commission Member

AUC
Alberta Utilities Commission

Power Plant
Approval No. U2013-345

Dated on the	The Alberta Utilities Commission
25th day of July, 2013	

Appendix 1 to Decision 2013-275	
Pengrowth Energy Corporation 15.92-MW Cogeneration Power Plant	Application No. 1609102 Proceeding ID No. 2292

Pengrowth Energy Corporation (Pengrowth) by Application No. 1609102, registered on December 4, 2012, applied to the Alberta Utilities Commission (AUC or the Commission) for approval to construct and operate a 15.92-megawatt (MW) cogeneration power plant (the power plant) located approximately 22 kilometres southeast of Bonnyville, Alberta.

Pursuant to Section 11 of the *Hydro and Electric Energy Act*, the Commission approved the application in Decision 2013-275[1] and granted an approval to Pengrowth, to construct and operate the power plant, subject to the provisions of the *Hydro and Electric Energy Act* and the *Alberta Utilities Commission Act*, any regulations made under the acts, any orders made under the acts, the Commission rules made pursuant to the *Alberta Utilities Commission Act*, and the following terms and conditions:

1. The power plant shall be located in the southwest quarter of Section 25, Township 58, Range 5, west of the Fourth Meridian, as further described in the application.

2. The power plant shall consist of two gas-turbine generating units, with a total generating capacity of 15.92 MW, and as further described in the application.

3. Pengrowth shall submit a progress report to the Commission in writing, once every three months, on construction progress pursuant to Section 3 of the *Hydro and Electric Energy Regulation*. The first progress report shall be filed with the Commission three months from the date of issuance of this approval.

4. Unless otherwise authorized by the Commission, construction of the power plant shall be completed by December 31, 2014.

5. Pengrowth shall notify the Commission within 30 days of completing the power plant.

6. Pengrowth shall obtain Commission approval prior to making any substantive changes to the power plant or substantially varying the design or specifications of the power plant from what was stated in the application or what the Commission has approved.

[1] Decision 2013-275: Pengrowth Energy Corporation – Construct and operate a 15.92-MW Cogeneration Power Plant, Application No. 1609102, Proceeding ID No. 2292, July 25, 2012.

7. This approval is not transferable unless approved by the Commission.

The Commission may cancel or suspend this approval, in whole or in part, in accordance with Section 41 of the *Hydro and Electric Energy Act*, or may review this approval, in whole or in part upon its own motion, or upon an application by an interested party, in accordance with Section 10 of the *Alberta Utilities Commission Act*.

END OF DOCUMENT

AUC
Alberta Utilities Commission

Pengrowth Energy Corporation

Lindberg SAGD Industrial System Designation

August 20, 2013

The Alberta Utilities Commission
Decision 2013-308: Pengrowth Energy Corporation
Lindberg SAGD Industrial System Designation
Application No. 1609200
Proceeding ID No. 2366

August 20, 2013

Published by
The Alberta Utilities Commission
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The Alberta Utilities Commission
Calgary, Alberta

Decision 2013-308
Pengrowth Energy Corporation **Application No. 1609200**
Lindberg SAGD Industrial System Designation **Proceeding ID No. 2366**

1 Introduction and background

1. Pengrowth Energy Corporation (Pengrowth) will operate bitumen extraction facilities at its future Lindberg steam-assisted gravity drainage (SAGD) industrial complex located approximately 18 kilometres north of Lindbergh. Pengrowth previously received approval, in Approval No. U2013-345,[1] to construct a new 15.92-megawatt (MW) cogeneration power plant (the power plant) at the Lindberg SAGD site. Pengrowth filed an application with the Alberta Utilities Commission (AUC or the Commission), registered on January 17, 2013, as Application No. 1609200, for approval of:

- an industrial system designation (ISD) encompassing all the proposed electric facilities at the Lindberg SAGD site pursuant to Section 4 of the *Hydro and Electric Energy Act*
- rules exempting the electric energy produced from and consumed by the industrial system from the operation of the *Electric Utilities Act*

2. The legal land descriptions of the Lindbergh SAGD project area are:

- sections 30 and 31, Township 58, Range 4, west of the Fourth Meridian
- sections 12, 13, E ½ 14, 23, 24, 25, E ½ 26 and 36, Township 58, Range 5, west of the Fourth Meridian

3. The industrial system would consist of the power plant and 25-kilovolt (kV) distribution lines to submersible production pumps, transfer pumps and other loads such as electric heat tracing within the project area.

4. The Commission issued information requests to Pengrowth on February 20, 2013, and March 27, 2013. Pengrowth responded to the information requests on March 4, 2013, and April 5, 2013 respectively.

5. The Commission issued a notice of application for the industrial system application on March 28, 2013. The notice was mailed directly to those parties identified by Pengrowth as parties who may be affected by or have an interest in the application. The Commission's notice specified April 22, 2013, as the deadline for submissions.

[1] Power Plant Approval No. U2013-345, Pengrowth Energy Corporation, 15.92-MW Cogeneration Power Plant, July 25, 2013

2 Discussion

6. The Commission has reviewed the application, and accepts that Pengrowth's participant involvement program is satisfactory and there are no outstanding public or industry objections or concerns with respect to its ISD application.

7. The requirements to designate an electric system as an industrial system are outlined in Section 4 of the *Hydro and Electric Energy Act*. Specifically, Section 4(2) sets out the principles that the Commission must consider and Section 4(3) sets out the criteria for evaluating an ISD application.

Principle 4(2)(a) – most economical source of generation

8. This principle requires applicants to demonstrate that the internal supply through on-site generation is the most economical source of power for the industrial complex. To this end, Pengrowth performed an economic comparison for the two following scenarios:

- no on-site generation – Pengrowth's electrical requirements would be met from the Alberta wholesale electricity market and all of the steam requirements would be met through a conventional boiler
- on-site cogeneration – Pengrowth's electrical and steam requirements would be met from the 15.92-MW cogeneration power plant

9. The Commission accepts the results of the economic comparison showing that the on-site cogeneration scenario will yield annual savings of approximately $1.4 million. Hence, the Commission finds that the proposed industrial system, with the cogeneration power plant, satisfies the principle of the most economical source of generation.

Principle 4(2)(b) – efficient exchange, with the interconnected electric system, of electric energy that is in excess of the industrial system's own requirements, improved voltage stability, reduction of losses and congestion of transmission lines

10. This principle requires applicants to demonstrate that the industrial system designation supports the development of the economical supply of generation to meet the requirements of integrated industrial processes, the efficient exchange with the interconnected electric system of electric energy that is in excess of the industrial system's own requirements, and the making of decisions respecting the location of generation and consumption facilities so that the efficiency of the interconnected electric system is improved, including improved voltage stability and reduction of losses and congestion on transmission lines.

11. The Lindberg SAGD industrial system would be comprised of a 15.92-MW cogeneration power plant to provide power and steam for Lindberg SAGD industrial operations. The total field and central processing facility load for the Lindberg SAGD is estimated to be 15.3 MW. The proposed cogeneration plant thus provides sufficient capacity to match Lindberg SAGD's peak load requirement. Under some ambient or maintenance conditions, Pengrowth would purchase power from the Alberta Interconnected Electric System (AIES), while the power generated in excess of the on-site demand would be exported to the AIES. Therefore, the Commission finds that the proposed industrial system would support the continued exchange with the interconnected electric system of electric energy that is in excess of the industrial system's own requirements.

12. Without the cogeneration plant, the Lindberg SAGD project will add approximately 15.3 MW of load to the AIES coming from generating sources outside the Lindberg SAGD site with system losses incurred in the AIES. The Commission accepts Pengrowth's statements that the Lindberg SAGD ISD would improve the efficiency of the AIES by removing base load from the system and reducing transmission system losses.

13. Therefore, the Commission finds that the proposed ISD meets the principles in subsection 4(2)(b) of the *Hydro and Electric Energy Act*.

Principle 4(2)(c) and (d) – cost avoidance, uneconomic bypass and duplication

14. This principle requires applicants to demonstrate that the industrial system designation does not facilitate the development of independent electric systems that attempt to avoid costs associated with the interconnected electric system and uneconomical bypass of the interconnected electric system.

15. The Lindberg SAGD is a greenfield development and there are no existing Alberta Interconnected Electric System facilities in the SAGD area. The ISD will not facilitate an uneconomical bypass of any existing Alberta Interconnected Electric System infrastructure.

16. The Lindberg SAGD industrial system will be connected to the AIES via a planned 25-kV distribution line from ATCO Electric's Lindberg substation. This connection will allow Pengrowth to export surplus electric energy to the Power Pool of Alberta as well as to import electric energy from the Power Pool of Alberta during planned and unplanned outages of the power plant. Pengrowth will be paying tariffs for the supply of electric energy to the Power Pool of Alberta and for receiving stand-by energy from the Power Pool of Alberta. Therefore, the Commission is satisfied that there will be no avoidance of costs associated with the interconnected electric system.

17. The Commission finds that the proposed ISD meets the principles in Section 4(2)(c) and (d) of the *Hydro and Electric Energy Act.*

Criterion 4(3)(a)

18. This criterion requires applicants to demonstrate that the electric system includes a generating unit located on the property of the one or more industrial operations it is intended to serve, that there is a high degree of integration of the electric system with one or more industrial operations the electric system forms part of and serves, and a high degree of integration of the components of the industrial operations.

19. In this case, the Lindberg SAGD ISD will be equipped with one 15.92-MW cogeneration power plant, which will provide power and steam for the industrial operations. The Lindberg SAGD project, owned by Pengrowth, is a commercial scheme for the extraction of bitumen from the oil sands reservoir, using an in situ steam-assisted gravity drainage technology. Steam from the power plant will be injected into wells to warm up the bitumen and allow it to flow out of the formation along with gas and any water from the condensation of injected steam. At the central processing facility, water and gas are separated from the bitumen. The gas produced is then processed and used as a fuel for the power plant. The water produced will be treated and used for steam generation.

20. Based on the above information, the Commission considers that Criterion 4(3)(a) is met as there is internal power generation and a high degree of integration of the components for the industrial operations.

Criterion 4(3)(b)

21. This criterion states that the industrial operations process a feedstock, produce a primary product or manufacture a product.

22. In this case, the steam-assisted gravity drainage process used by the Lindberg SAGD yields diluted bitumen, which is shipped to an upgrading facility and ultimately sold as premium synthetic crude or sold as bitumen to market. Based on this process, the Commission finds that Criterion 4(3)(b) is met.

Criterion 4(3)(c)

23. This criterion states that there is a common ownership of all the components of the industrial operations.

24. In this case, the Lindberg SAGD project is wholly owned by Pengrowth. There is no other ownership associated with the facilities. Therefore, the Commission considers that Criterion 4(3)(c) is met.

Criterion 4(3)(d)

25. This criterion states that the whole of the output of each component within the industrial operation is used by that operation and is necessary to constitute its final products.

26. In this case, the whole of the output of each component within the industrial operation of obtaining reservoir fluid from production wells is used by the operation and is necessary to constitute the final diluted bitumen product. Therefore, the Commission finds that Criterion 4(3)(d) is met.

Criterion 4(3)(e)

27. This criterion states that there is a high degree of integration for management of the components and processes of the industrial operations.

28. In this case, the Lindberg SAGD is owned by Pengrowth and it has one management organization responsible for conducting operations for the entire Lindberg SAGD. Therefore, the Commission finds that Criterion 4(3)(e) is met.

Criterion 4(3)(f)

29. This criterion states that an application to the Commission for an industrial system designation demonstrates significant investment in both the expansion and extension of the industrial operations processes and development of the electricity supply.

30. In this case, the total investment for the Lindberg SAGD project is budget to be $590 million. Therefore, the Commission finds that Criterion 4(3)(f) is met.

Criterion 4(3)(g)

31. This criterion applies where an industrial operation extends beyond contiguous property. It states that the owner of the industrial operation must satisfy the Commission that the overall cost of providing the owner's own distribution or transmission facilities to interconnect the integral parts of the industrial operation is equal to or less than the tariffs applicable for distribution or transmission in the service area where the industrial operation is located.

32. In this case, the proposed project is wholly located within the oil sands lease boundaries for the Lindberg SAGD operations. Therefore, the Commission finds that Criterion 4(3)(g) is met.

33. Having considered all of the principles and criteria set out in Section 4 of the *Hydro and Electric Energy Act*, the Commission finds that Pengrowth's proposal substantially meets all the principles and criteria for an industrial system designation, and also demonstrates significant and sustained increased efficiency.

34. Since no parties objected to the application and the project is necessary to provide electricity to Pengrowth's Lindberg SAGD project, the Commission considers the project to be in the public interest in accordance with Section 17 of the *Alberta Utilities Commission Act*.

35. It is noted that although Pengrowth has received approval to construct the 15.92-MW cogeneration power plant at the Lindberg SAGD site, it has not applied for a connection order pursuant to Section 18 of the *Hydro And Electric Energy Act* to connect and operate the power plant in synchronism with ATCO Electric's 25-kV distribution system as contemplated in this application. The Commission expects that Pengrowth will soon file the application for the connection order in accordance with the requirements stipulated in AUC Rule 007: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations*.

3 Decision

36. Pursuant to Section 4 of the *Hydro and Electric Energy Act* and sections 2(1)(d) and 117 of the *Electric Utilities Act*, the Commission approves the application and grants to Pengrowth an industrial system designation as set out in Appendix 1– Industrial System Designation – Order No. U2013-366 – August 20, 2013 (Appendix 1 will be distributed separately).

Dated on August 20, 2013.

The Alberta Utilities Commission

(original signed by)

Tudor Beattie, QC
Commission Member

AUC
Alberta Utilities Commission

Industrial System Designation
Order No. U2013-366

Dated on the 20th day of August, 2013	 The Alberta Utilities Commission

Appendix 1 to Decision 2013-308 Pengrowth Energy Corporation Lindberg SAGD Industrial System Designation	 Application No. 1609200 Proceeding ID No. 2366

The Alberta Utilities Commission (AUC or the Commission), pursuant to Section 4 of the *Hydro and Electric Energy Act*, sections 2(1)(d) and 117 of the *Electric Utilities Act*, and Decision 2013-308,[1] grants to Pengrowth Energy Corporation (Pengrowth) this order for an industrial system designation, subject to the provisions of the *Hydro and Electric Energy Act*, the *Electric Utilities Act* and the *Alberta Utilities Commission Act*, any regulations made under the acts, any orders made under the acts, the Commission rules made pursuant to the *Alberta Utilities Commission Act*, and the following terms and conditions:

1. The industrial system designation encompasses all electric facilities at the Lindberg SAGD site located approximately 18 kilometres north of Lindbergh and as further described in the application. The major components of the industrial system are:
   - a cogeneration power plant consisting of two gas-turbine generating units, with a total generating capacity of 15.92 megawatts (MW)
   - a 25-kilovolt (kV) distribution system
   - electric facilities within the Lindbergh steam-assisted gravity drainage (SAGD) central processing facility

2. Pengrowth shall apply to the Commission, pursuant to sections 14 and 15 of the *Hydro and Electric Energy Act*, for transmission facilities should Pengrowth intend to include electric transmission facilities in the subject industrial system.

3. The electric energy produced from and consumed by the subject industrial system is exempt from the operation of the *Electric Utilities Act*.

4. Pengrowth shall notify the Commission of any proposed changes to the subject industrial system including changes in ownership that may result in contravening the principles and the criteria set out in Section 4 of the *Hydro and Electric Energy Act* and applied by the Commission in its decision to grant the application.

[1] Decision 2013-308: Pengrowth Energy Corporation – Lindberg SAGD Industrial System Designation, Application No. 1609200, Proceeding ID No. 2366, August 20, 2013.

5. Pengrowth shall notify the Commission of any proposed changes to the subject industrial system that may affect other parties and (or) adjacent occupants, and shall make an application for the proposed changes pursuant to relevant sections of the *Hydro and Electric Energy Act*, if the Commission so directs.

The Commission may cancel or suspend this order, in whole or in part, in accordance with Section 41 of the *Hydro and Electric Energy Act* or may review this order, in whole or in part, upon its own motion or upon an application by an interested party, in accordance with Section 10 of the *Alberta Utilities Commission Act*.

END OF DOCUMENT