Appendix 6

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IN THE MATTER of an experimental scheme of Laricina Energy Ltd. (hereinafter called “the Operator”) for the recovery of crude bitumen from the Upper Grand Rapids Deposit in the Athabasca Oil Sands Area from wells located in the project area outlined in Appendix A to this approval.

The Energy Resources Conservation Board (ERCB), pursuant to the Oil Sands Conservation Act, chapter O-7 of the Revised Statutes of Alberta, 2000, orders as follows:

1) The Operator’s scheme as described in

   a) Application No. 1530968,

   is approved, subject to the Oil Sands Conservation Regulation and the terms and conditions herein contained.

2) 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.

3) (1) The Operator shall notify the ERCB of any proposed material alteration or modification of the scheme or to any equipment proposed for the use therein prior to effecting the alteration or modification.

   (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 approval 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.

4) The recovery process approved for the scheme is Steam-Assisted Gravity Drainage (SAGD) utilizing only steam as the injection fluid unless otherwise stipulated by the ERCB.

5) Data submitted regarding the subject scheme, will be released on October 31, 2012, unless, upon application by the Operator, or if other circumstances so warrant, a later date is approved by the ERCB.
6) This approval expires on October 31, 2019.

7) 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.

END OF DOCUMENT
ATHABASCA OIL SANDS AREA
APPENDIX A TO APPROVAL NO. 11372

Area(s) of Change

- Added
- Deleted
IN THE MATTER of a commercial scheme of Laricina Energy Ltd. (hereinafter called “the Operator”) for the recovery of crude bitumen from the Upper Grand Rapids Deposit in the Athabasca Oil Sands Area from wells located in the project area outlined in Appendix A to this approval.

Whereas the Lieutenant Governor in Council, by Order in Council Number O.C. 351/2010 dated October 14, 2010, authorized the granting of Approval No. 11509;

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. 11509A;

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 A to Approval No. 11509 and issued Approval No. 11509A, orders as follows:

1) The Operator’s scheme as described in
   a) Application No. 1632921,
   b) Proceeding No. 1665464,

   is approved, subject to the Oil Sands Conservation Regulation and the terms and conditions herein contained.¹

2) The recovery of crude bitumen from wells located in the development area outlined in Appendix A is approved.

3) Clauses 1 and 2 do 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.

4) The recovery process approved for the project is Steam-Assisted Gravity Drainage (SAGD) utilizing steam and solvent as the injection fluid unless otherwise stipulated by the ERCB.²

5) Unless otherwise stipulated by the ERCB, the production of bitumen from the project area outlined in Appendix A shall not exceed 795 cubic metres per day (m³/d) on an annual average basis.

¹ Proceeding No. 1665464
² Approval No. 11509A
6) The Operator shall conduct all operations to the satisfaction of the ERCB and in a manner that under normal operating conditions will permit:

   a) the recovery of the practical maximum amount of crude bitumen within the project area outlined in Appendix A,

   b) the conservation of the practical maximum volume of produced gas at the well pads and central facilities,

   c) the minimization of flaring to non-routine operations such as start-up, shutdown, emergencies, infrequent upsets, and maintenance depressuring, and

   d) the practical maximum reuse of produced water, with the minimum recycle rate being 80 per cent on an annual basis, unless otherwise stipulated by the ERCB.

7) Unless otherwise stipulated by the ERCB, the Operator shall:

   a) provide the ERCB with gamma ray spontaneous potential resistivity and gamma ray 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 Upper Grand Rapids Deposit\(^1\) 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 ERCB’s request as shown in Appendix A.

      i) analyze portions of such cores, and

      ii) provide suitable photographs of the clean-cut surface of each core slabbed.

8) Unless otherwise permitted by the ERCB, 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 ERCB.

9) 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 ERCB’s consent therefore is sought, the Operator shall advise the ERCB as to the following:

   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.

\(^1\)Proceeding No. 1665464 Approval No. 11509A
10) 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$_2$S) reach one tonne/day on a calendar quarter-year average basis, unless otherwise stipulated by the ERCB. The calendar quarter-year sulphur recovery shall not be less than set out in Table 1 of ERCB 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.

11) The Operator shall notify the ERCB of any proposed material alteration or modification of the SAGD scheme or to any equipment proposed for use therein prior to effecting the alteration or modification.

12) Where, in the opinion of the ERCB, any alteration or modification referred to in Clause 11 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.

13) Should the ERCB consider the alteration or modification to be major, it may request some or all of the information outlined in Clause 14 below, as it deems appropriate.

14) Any plans for operations or development outside the approved development area shall be applied for to the ERCB for review. Such applications must:

   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 ERCB,

   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 pad design, such as the number of horizontal wells per drainage pad, 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 cross-section profiles for each horizontal well to demonstrate that the location and 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 but not limited to:

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) The Operator shall submit the following to the ERCB, for review and approval, at least six weeks prior to the drilling of the SAGD well pairs in the development area:

a) an up-to-date net bitumen pay map, bitumen top structure map, bitumen/water contact structure map, bottom water isopach map, transition zone isopach map and porosity base structure map at a scale of 1 : 20 000 incorporating available 3D seismic data interpretation and evaluation/observation well data, and
b) a geological cross section showing the placement of a representative well pair illustrating the zone of interest, facies relationships, fluid interfaces, and the placement of the horizontal wells in relation to these aspects.¹

16) Notwithstanding any date by which any work, act, matter, or thing is by this approval required to be done, performed, or completed, the ERCB, if it considers it proper to do so, may by stipulation alter the dates specified.

17) 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.

END OF DOCUMENT
IN THE MATTER of a commercial scheme of Laricina Energy Ltd. (hereinafter called “the Operator”) for the recovery of crude bitumen from the Upper Grand Rapids Deposit in the Athabasca Oil Sands Area from wells located in the project area outlined in Appendix A to this approval.

Whereas the Lieutenant Governor in Council, by Order in Council Number O.C. 351/2010 dated October 14, 2010, authorized the granting of Approval No. 11509;

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 know as Approval No. 11509B;

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 B to Approval No. 11509 and issued Approval No. 11509B, orders as follows:

1) The Operator’s scheme as described in
   a) Application No. 1632921,
   b) Proceeding No. 1665464,
   c) Application No. 1687922,

   is approved, subject to the Oil Sands Conservation Regulation and the terms and conditions herein contained.¹

2) The recovery of crude bitumen from wells located in the development area outlined in Appendix A is approved.

3) Clauses 1 and 2 do 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.

4) The recovery process approved for the project is Steam-Assisted Gravity Drainage (SAGD) utilizing steam and solvent as the injection fluid unless otherwise stipulated by the ERCB.

¹Application No. 1687922
5) Unless otherwise stipulated by the ERCB, the production of bitumen from the project area outlined in Appendix A shall not exceed 795 cubic metres per day (m³/d) on an annual average basis.

6) The Operator shall conduct all operations to the satisfaction of the ERCB and in a manner that under normal operating conditions will permit:
   a) the recovery of the practical maximum amount of crude bitumen within the project area outlined in Appendix A,
   b) the conservation of the practical maximum volume of produced gas at the well pads and central facilities,
   c) the minimization of flaring to non-routine operations such as start-up, shutdown, emergencies, infrequent upsets, and maintenance depressuring, and
   d) the practical maximum reuse of produced water, with the minimum recycle rate being 80 per cent on an annual basis, unless otherwise stipulated by the ERCB.

7) Unless otherwise stipulated by the ERCB, the Operator shall:
   a) provide the ERCB with gamma ray spontaneous potential resistivity and gamma ray 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 Upper Grand Rapids Deposit 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 ERCB’s request as shown in Appendix A.
      i) analyze portions of such cores, and
      ii) provide suitable photographs of the clean-cut surface of each core slabbled.

8) Unless otherwise permitted by the ERCB, 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 ERCB.

9) 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 ERCB’s consent therefore is sought, the Operator shall advise the ERCB as to the following:
   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.

10) 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$_2$S) reach one tonne/day on a calendar quarter-year average basis, unless otherwise stipulated by the ERCB. The calendar quarter-year sulphur recovery shall not be less than set out in Table 1 of ERCB 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.

11) The Operator shall notify the ERCB of any proposed material alteration or modification of the SAGD scheme or to any equipment proposed for use therein prior to effecting the alteration or modification.

12) Where, in the opinion of the ERCB, any alteration or modification referred to in Clause 11 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.

13) Should the ERCB consider the alteration or modification to be major, it may request some or all of the information outlined in Clause 14 below, as it deems appropriate.

14) Any plans for operations or development outside the approved development area shall be applied for to the ERCB for review. Such applications must:

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 ERCB,
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 pad design, such as the number of horizontal wells per drainage pad, 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 cross-section profiles for each horizontal well to demonstrate that the location and 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 but not limited to:

   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) The Operator shall submit the following to the ERCB, for review and approval, at least six weeks prior to the drilling of the SAGD well pairs in the development area:
a) an up-to-date net bitumen pay map, bitumen top structure map, bitumen/water contact structure map, bottom water isopach map, transition zone isopach map and porosity base structure map at a scale of 1 : 20 000 incorporating available 3D seismic data interpretation and evaluation/observation well data, and

b) a geological cross section showing the placement of a representative well pair illustrating the zone of interest, facies relationships, fluid interfaces, and the placement of the horizontal wells in relation to these aspects.

16) Notwithstanding any date by which any work, act, matter, or thing is by this approval required to be done, performed, or completed, the ERCB, if it considers it proper to do so, may by stipulation alter the dates specified.

17) 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.

18) Approval No. 11509B rescinds Approval No. 11509A.

END OF DOCUMENT
ATHABASCA OIL SANDS AREA
APPENDIX A TO APPROVAL NO. 11509B

Legend
- Project Area
- Development Area

Area(s) of Change
- Added
- Deleted
PROVINCE OF ALBERTA

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

APPROVAL NO. .................................................................
242701-00-00

APPLICATION NO. ..........................................................
001-242701

EFFECTIVE DATE: .........................................................
October 30, 2009

EXPIRY DATE: ............................................................... September 30, 2019

APPROVAL HOLDER: .........................................................
Laricina Energy Ltd.

ACTIVITY: CONSTRUCTION, OPERATION AND RECLAMATION OF THE

Germain enhanced recovery in-situ oilsands or heavy oil processing plant

IS SUBJECT TO THE ATTACHED TERMS AND CONDITIONS.

Designated Director under the Act ...................................................

Date Signed ..............................................................
October 30, 2009
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*, R.S.A. 2000, c.E-12, as amended;

(b) "affected lands" means land 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 human activities;

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

(a) "application" means the written submissions to the Director in respect of application number 001-242701 and any subsequent applications for amendments of approval number 242701-00-00;

(b) "central processing facility" means those building, structures, pollution abatement equipment, process and storage facilities and land use in and for the production of bitumen or heavy oil;

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

(d) "commence 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;

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

(f) "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;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

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

(h) "deep organic soil" means soil with surface organics horizons that are greater than 40 cm in depth;

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

(j) "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;

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

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

(m) "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;

(n) "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;

(o) "Fugitive VOC Emissions Code" means the Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks, CCME-EPC-73E, as amended;

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

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

(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 collect, store or treat industrial runoff from the plant;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(t) "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;

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

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

(w) "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 use capability equivalent to its predisturbed state;

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

(y) "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;

(z) "month" means calendar month;

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

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

(cc) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines and other installations, and includes the land, located on Section 31, Township 84, Range 22, West of the 4th Meridian, that is being or has been used or held for or in connection with the Germain enhanced recovery in-situ oil sands or heavy oil processing plant;

(dd) "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;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(ee) "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;

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

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

(hh) "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;

(ii) "self-sustaining" means able to support various land uses after conservation and reclamation is complete without requiring the application of fertilizers or any other special treatment;

(jj) "shallow organic soil" means soil with surface organic horizons that are less than 40 cm in depth;

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

(ll) "subsoil" means B horizons as defined in Canadian System of Soil Classification, 3rd Edition, 1998 and rated as good, fair or poor as described in the Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, March, 1987;

(mm) "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;

(nn) "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, fair or poor as described in the Soil Quality Criteria Relative to Disturbance and Reclamation, Alberta Agriculture, 1987;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(oo) "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;

(pp) "weeds" means weeds defined as controlled nuisance, or noxious by the Weed Control Act, 1980, as amended;

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

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

PART 2: GENERAL

SECTION 2.1: GENERAL

2.1.1 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.

2.1.2 The approval holder shall submit a written report to the Director within 7 days of the reporting pursuant to 2.1.1.

2.1.3 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.

2.1.4 The approval holder shall immediately notify the Director in writing if any of the following events occurs:

(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.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

2.1.5  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.

2.1.6  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, 1998, as amended, unless otherwise specified in this approval.

SECTION 2.2: RECORD KEEPING

2.2.1  The approval holder shall record and 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:

(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.

SECTION 2.3: ANALYTICAL REQUIREMENTS

2.3.1  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
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(e) analysis;

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

(i) for air monitoring:

(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;

(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 samples:

(A) *Soil Sampling and Methods of Analysis*, Lewis Publishers, 1993, as amended;

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

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

(D) the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites – Volume I: Main Report*, CCME EPC-NCS62E, 1993, as amended; and

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

2.3.3 The term sample as used in clause 2.3.2 does not include samples directed to continuous monitoring equipment, until specifically required in writing by the Director.

2.3.4 The approval holder shall comply with the terms and conditions of any written authorization issued by the Director under 2.3.2.

SECTION 2.4: OTHER

2.4.1 All tanks shall conform to the Guideline for Secondary Containment for Above Ground Storage Tanks, Alberta Environment, 1997, as amended, unless otherwise authorized in writing by the Director.

2.4.1 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, PN1180, as amended.

PART 3: CONSTRUCTION

SECTION 3.1: GENERAL

3.1.1 If construction of the plant as described in application 001-242701 has not commenced by June 30, 2011, or as otherwise specified in this approval, the approval holder shall apply for an amendment to this approval unless otherwise authorized in writing by the Director.

3.1.2 The approval holder shall notify the Director in writing at least 14 days before commencing operations of the plant.

3.1.3 The approval holder shall construct the plant as described in the application and shall include, at a minimum, all of the following:

(a) steam generation;

(b) production (bitumen, water and gas) treating;

(c) water treatment and disposal; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) associated facilities;

unless otherwise authorized in writing to the Director.

SECTION 3.2: AIR

3.2.1 The approval holder shall construct all stacks according to the following height requirements as prescribed in TABLE 3.2-A, unless otherwise authorized in writing by the Director.

TABLE 3.2-A: STACK HEIGHTS

<table>
<thead>
<tr>
<th>STACK</th>
<th>MINIMUM HEIGHT ABOVE GRADE (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two 14.7 MW steam generator exhaust stacks</td>
<td>17.7</td>
</tr>
<tr>
<td>Two 1.0 MW generator exhaust stacks</td>
<td>4.2</td>
</tr>
<tr>
<td>One 220 kW line heater exhaust stacks</td>
<td>4.6</td>
</tr>
<tr>
<td>Central processing facility high and low pressure flare stacks</td>
<td>21.3</td>
</tr>
<tr>
<td>One 1.0 MW emergency diesel generator exhaust stacks</td>
<td>2.9</td>
</tr>
<tr>
<td>Two Tank Firetube stacks</td>
<td>15.2</td>
</tr>
</tbody>
</table>

3.2.2 The approval holder shall install, at a minimum, the following systems on the flare stacks:

(a) wind guard;

(a) a continuously burning pilot light; and

(b) an electric (or equivalent) igniter;

unless an equivalent system is authorized in writing by the Director.

3.2.3 The approval holder shall design and construct all boilers at the plant to meet the requirements prescribed in the National Emission Guideline for Commercial/Industrial Boilers and Heaters, CCME-PN 1286, as amended, unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

MONITORING EQUIPMENT

3.2.4 The approval holder shall install, at a minimum, all of the following monitoring equipment:

(a) a minimum of 4 passive exposure stations for measurement of hydrogen sulphide (H₂S) and sulphur dioxide (SO₂) concentrations.

3.2.5 The following stack(s) shall be equipped with sampling facilities:

(a) the two 14.7 MW steam generator exhaust stacks.

3.2.6 The sampling facilities required by 3.2.5 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

SECTION 3.3: INDUSTRIAL WASTEWATER

3.3.1 The approval holder shall construct the plant according to the application and shall include, at a minimum, all of the following:

(a) the industrial runoff control system at the central processing facility which shall include, at a minimum, all of the following:

(i) a stormwater runoff pond which is sized to contain a 1-in-10 year, 24 hour precipitation event lined with a permeability of no greater than $1 \times 10^{-6}$ cm/sec;

(b) the industrial wastewater control system at the central processing facility which shall include, at a minimum, all of the following:

(i) a disposal water tank;
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(c) incorporate in the design of the plant, equipment and operational procedures as described in the application for the minimization and recovery of spills of process wastewater and process liquids;

(d) above ground storage tanks in accordance with Alberta Energy Resources Conservation Board (ERCB) Directive 055 Storage Requirements for the Upstream Petroleum Industry, as amended;

(e) spill collection boxes at the hose connection point of any new liquid load-out or off-loading areas; and

(f) spill collection boxes shall have a cover and shall be positioned such that each of its sides and bottom can be visually inspected.

SECTION 3.4: WASTE MANAGEMENT

Not used at this time.

SECTION 3.5: DOMESTIC WASTEWATER

Not used at this time.

SECTION 3.6: WATERWORKS

Not used at this time.

SECTION 3.7: LAND CONSERVATION

3.7.1 The approval holder shall salvage merchantable timber as directed in writing by the Inspector.

3.7.2 The approval holder shall dispose of woody debris as directed in writing by the Inspector.

3.7.3 The approval holder shall not conduct tree and brush clearing activities between May 1st and August 15th annually, to protect nesting migratory birds unless authorized in writing by the Inspector.

3.7.4 The approval holder shall salvage topsoil as follows, unless otherwise authorized in writing by the Director:

(a) on mineral and shallow organic soil areas, the approval holder shall salvage all topsoil;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) on areas of deep organic soil where pad materials will be left in place, the approval holder shall:

(i) salvage topsoil to a minimum depth of 40 cm; or

(ii) provide to the Director for his authorization, an alternative plan for obtaining topsoil materials for reclamation; and

(c) on areas of deep organic soil where pad materials will be removed, the approval holder shall not salvage topsoil.

3.7.5 The approval holder shall salvage, separately from topsoil, all subsoil from the central processing facility site to a maximum thickness of 30 cm, unless otherwise authorized in writing by the Director.

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

(a) topsoil and subsoil shall be stockpiled separately from each other and from other materials;

(b) stockpile foundations must be stable;

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

(d) stockpiles shall be accessible and retrievable;

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

(f) stockpiles shall include signage that indicates, at a minimum, the type of reclamation material in the stockpile.

3.7.7 The approval holder shall immediately suspend topsoil and subsoil salvage when:

(a) wet or frozen field conditions will result in the degradation of topsoil or subsoil quality; unless otherwise authorized in writing by an Inspector; or

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

(c) directed to do so in writing by an Inspector.
3.7.8 The approval holder shall only recommence topsoil or subsoil salvage when suspended under 3.7.7 if:

(a) field conditions referred to in 3.7.7 no longer exist; or

(b) directed in writing by an Inspector.

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

(a) during construction, operation and reclamation; or

(b) as directed in writing by an Inspector.

SECTION 3.8: WILDLIFE

3.8.1 The approval holder shall submit a Caribou Protection Plan to the Director prior to infrastructure construction or by October 15th of each year, unless otherwise authorized in writing by the Director, that is consistent with the Strategic Plan and Industrial Guidelines for Caribou Range in Northern Alberta, Boreal Caribou Committee, September 2001.

3.8.2 The approval holder shall conduct construction activities only as outlined in the most current Caribou Protection Plan and as provided for in the Strategic Plan and Industrial Guidelines for Caribou Range in Northern Alberta, Boreal Caribou Committee, September 2001.

PART 4: OPERATIONS, LIMITS, MONITORING AND REPORTING

SECTION 4.1: AIR

OPERATIONS

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

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

(a) the two 14.7 MW steam generator exhaust stacks;

(b) the two 1.0 MW generator exhaust stacks;

(c) the one 220 kW line heater exhaust stack;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(d) the central processing facility high and low pressure flare stacks;
(e) the one 1.0 MW emergency diesel generator exhaust stack;
(f) the two tank firetube stacks;
(g) the space ventilation exhaust stacks;
(h) the space heater exhaust vents; and
(i) any other source authorized in writing by the Director or by an amendment to this approval.

4.1.3 Annulus gas and Produced gas shall be collected and only be 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 high and low pressure flare stacks.

4.1.5 The approval holder shall ensure that all central processing facility pressure and safety valves in sour service shall be connected to the flare system.

4.1.6 The approval holder shall operate and maintain the following stacks according to the height requirements as prescribed in TABLE 4.1-A, unless otherwise authorized in writing by the Director.

TABLE 4.1-A: STACK HEIGHTS

<table>
<thead>
<tr>
<th>STACK</th>
<th>MINIMUM HEIGHT ABOVE GRADE (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two 14.7 MW steam generator exhaust stacks</td>
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</tr>
<tr>
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<td>21.3</td>
</tr>
<tr>
<td>One 1.0 MW emergency diesel generator exhaust stacks</td>
<td>2.9</td>
</tr>
<tr>
<td>Two Tank Firetube stacks</td>
<td>15.2</td>
</tr>
</tbody>
</table>

4.1.7 Except as provided for by the Director in writing, the approval holder shall control fugitive emissions and any source not specified in 4.1.2 in accordance with 4.1.8 of this approval.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.1.8  With respect to fugitive emissions and any source not specified in 4.1.2, 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; or

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

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

4.1.9  The approval holder shall submit a Fugitive Emissions Leak Detection and Correction Program to the Director by November 30, 2011.

4.1.10 The Fugitive Emissions Leak Detection and Correction Program shall include the periodic inspection and repair of any equipment found to be leaking.

4.1.11 The approval holder shall implement the Fugitive Emissions Leak Detection and Correction Program as authorized in writing by the Director.

AIR LIMITS

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

TABLE 4.1-B: LIMITS

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>AIR CONTAMINANT</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>Sulphur dioxide</td>
<td>0.17 tonnes per day</td>
</tr>
<tr>
<td>Each of the two 14.7 MW steam generators</td>
<td>Oxides of nitrogen (expressed as NO₂)</td>
<td>1.38 kilograms per hour</td>
</tr>
</tbody>
</table>

4.1.13 The net or lower heating value of the combined gas stream released to the central processing facility high and low pressure flare stacks 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.

MONITORING AND REPORTING

4.1.14 The approval holder shall monitor the following emission sources as specified in TABLE 4.1-C, unless otherwise authorized in writing by the Director.
**TERMS AND CONDITIONS ATTACHED TO APPROVAL**

4.1.15 The approval holder shall report to the Director the results of the emission source monitoring as required in TABLE 4.1-C, unless otherwise authorized in writing by the Director.

**TABLE 4.1-C: AIR EMISSION SOURCE MONITORING AND REPORTING**

<table>
<thead>
<tr>
<th>EFFLUENT STREAM/ EMISSION SOURCE</th>
<th>PARAMETER</th>
<th>METHOD</th>
<th>FREQUENCY</th>
<th>REPORTING FREQUENCY</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Produced gas and residue or fuel gas to the central processing facility high and low pressure flare stacks</td>
<td>Volumetric flow rates</td>
<td>Measured or Estimated</td>
<td>Continuously</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Central processing facility high and low pressure flare stacks</td>
<td>Sulphur dioxide</td>
<td>Calculated</td>
<td>Daily</td>
<td>Yes (tonnes per day)</td>
</tr>
<tr>
<td></td>
<td>Produced gas at the central processing facility</td>
<td>Hydrogen sulphide</td>
<td>Gas analysis</td>
<td>Monthly</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total hydrocarbons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower heating value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each of the two 14.7 MW Steam generators</td>
<td>Oxides of nitrogen (expressed as NO₂)</td>
<td>Manual stack survey as per Alberta Stack Sampling Code</td>
<td>Once within six months of commissioning</td>
<td>Yes</td>
</tr>
</tbody>
</table>

4.1.16 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.

4.1.17 The approval holder shall monitor ambient levels of the parameters as specified in TABLE 4.1-D, unless otherwise authorized in writing by the Director.
4.1.18 The approval holder shall report to the Director the results of the ambient air quality monitoring as required in TABLE 4.1-D, unless otherwise authorized in writing by the Director.

**TABLE 4.1-D: AMBIENT AIR MONITORING AND REPORTING**

<table>
<thead>
<tr>
<th>MONITORING STATION</th>
<th>PARAMETER</th>
<th>MONITORING PERIOD</th>
<th>REPORTING FREQUENCY</th>
<th>SPECIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four passive exposure monitoring stations as per Air Monitoring Directive</td>
<td>Hydrogen sulphide concentrations and sulphur dioxide concentrations</td>
<td>Monthly</td>
<td>MONTHLY (On or before the end of the month following the month in which the information was collected)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ANNUALLY (On or before March 31st of the year following the year in which the information was collected)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SPECIAL</td>
<td>No</td>
</tr>
</tbody>
</table>

4.1.19 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.

4.1.20 In addition to the annual reporting requirement in TABLE 4.1-C and TABLE 4.1-D, the annual Air Emission Summary and Evaluation Report shall contain:

(a) information related to the plant operation;

(b) the performance of air pollution control equipment;

(c) air contaminant emissions; and

(d) any other information requested in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

SECTION 4.2: INDUSTRIAL WASTEWATER

OPERATIONS

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

4.2.2 Industrial wastewater shall be managed as described in the application, unless otherwise authorized in writing by the Director.

4.2.3 All industrial wastewater and process liquids contained in above ground and below ground storage tanks, shall be contained in accordance with the Alberta Energy Resources Conservation Board (ERCB) Directive 055 Storage Requirements for the Upstream Petroleum Industry, as amended.

4.2.4 Industrial wastewater, produced water and boiler blowdown shall only be disposed of as follows:

(a) directed to the water disposal tank;

(b) ERCB approved disposal well;

(c) ERCB approved Waste Processing and Disposal Facility; or

(d) as otherwise authorized in writing by the Director.

4.2.5 Industrial runoff for the plant shall be directed to the Industrial Runoff Control System, specifically one stormwater runoff pond.

4.2.6 The approval holder shall only release industrial runoff from the Industrial Runoff Control Systems to the land adjacent to the central processing facility.

4.2.7 All industrial runoff from the plant developed area shall be directed to the Industrial Runoff Control System.

LIMITS

4.2.8 Releases from the Industrial Runoff Control System shall not exceed the limits for the parameters specified in TABLE 4.2-A.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

TABLE 4.2-A: INDUSTRIAL RUNOFF LIMITS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>PARAMETER OR CONCENTRATION LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge Volume</td>
<td>--</td>
</tr>
<tr>
<td>pH</td>
<td>6.0 – 9.5 units</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>No visible sheen</td>
</tr>
<tr>
<td>Chloride</td>
<td>500 mg/L</td>
</tr>
</tbody>
</table>

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

MONITORING AND REPORTING

4.2.10 The approval holder shall monitor the Industrial Runoff Control Systems as required in TABLE 4.2-B.

4.2.11 The approval holder shall report to the Director the results of the Industrial Runoff Control Systems monitoring as required in TABLE 4.2-B.

TABLE 4.2-B: INDUSTRIAL RUNOFF CONTROL SYSTEMS MONITORING AND REPORTING

<table>
<thead>
<tr>
<th>MONITORING</th>
<th>REPORTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER, TEST, EVENT, STUDY PROPOSAL OR REPORTING REQUIREMENT</td>
<td>PRIOR TO RELEASE</td>
</tr>
<tr>
<td>Frequency</td>
<td>Sample Type</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Discharge volume (in cubic meters)</td>
<td>-</td>
</tr>
<tr>
<td>pH</td>
<td>Once</td>
</tr>
<tr>
<td>Oil and Grease</td>
<td>Once</td>
</tr>
<tr>
<td>Chloride in mg/L</td>
<td>Once</td>
</tr>
</tbody>
</table>

A= Discharge point of industrial runoff control system (stormwater runoff pond)
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.2.12 In addition to the annual reporting in TABLE 4.2-B, the annual Industrial Wastewater and Industrial Runoff Report shall include, at a minimum, all of the following information:

(a) a summary and evaluation of management and disposal of the following for the previous year:
   (i) industrial wastewater;
   (ii) industrial runoff;
   (iii) domestic wastewater;

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

(c) any other information required by the Director.

SECTION 4.3: WASTE MANAGEMENT

Not used at this time.

SECTION 4.4: DOMESTIC WASTEWATER

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

4.4.2 All domestic wastewater shall be directed to a septic tank with subsequent disposal to a domestic wastewater treatment facility holding a current approval under the Act.

4.4.3 Sludge produced by the domestic wastewater system shall be disposed of at a domestic wastewater treatment facility holding a current approval under the Act.

SECTION 4.5: WATERWORKS

Not used at this time.

SECTION 4.6: GROUNDWATER

4.6.1 The approval holder shall implement the Groundwater Monitoring and Management Program as described in the “Groundwater Monitoring and Management Plan – Non-saline Groundwater in Contact with Bitumen,” dated July 2009, submitted by Laricina Energy Ltd., unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.6.2 The approval holder shall submit two copies of updated proposals for the Groundwater Monitoring and Management Program, as per 4.6.1, to the Director at least six months prior to commencing operations, unless otherwise authorized in writing by the Director.

4.6.3 The updated proposals, as per 4.6.2, shall include, at a minimum, all of the following information:

(a) the development of site-specific targets and thresholds once sufficient baseline data has been collected;

(b) an analytical program of naphthenic acids for the Plant Site monitoring wells and Viking Formation monitoring wells;

(c) expected timelines for the completion of the Groundwater Response Plan as specified in the Groundwater Monitoring and Management Program; and

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

4.6.4 The approval holder shall not commence operations until the updates to the proposal for the Groundwater Monitoring and Management Program, as per 4.6.1, is authorized in writing by the Director. The updated Groundwater Monitoring and Management Program shall be in accordance with any Policies and Guidelines issued by Alberta Environment dealing with Assessment and Management of Non-Saline Groundwater in Direct Contact with Bitumen for In-situ Oil Sands Operations.

4.6.5 If the Groundwater Monitoring Program proposal is found deficient by the Director, the approval holder shall correct all deficiencies as outlined in writing by the Director within 120 days of the deficiency letter.

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

4.6.7 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 hydrostratigraphic units at existing facilities.

unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.6.8 The sampling events referred in 4.6.7 shall be at intervals of no less than one month and must demonstrate stable groundwater conditions.

4.6.9 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.

4.6.10 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.

4.6.11 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.

4.6.12 In addition to the sampling information recorded in 2.2.1, 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;

(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.

4.6.13 The approval holder shall compile an Annual Groundwater Monitoring Program Summary Report which shall include, at a minimum, all of the following information:

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

(b) a topographic map of the plant;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

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

(d) 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 three 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 4.6.6 and 4.6.12;

(l) a summary of fluid elevations recorded as required in 4.6.12(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

   (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;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(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.

4.6.14 The approval holder shall submit two copies of the Annual Groundwater Monitoring Summary Report to the Director on or before March 31 of the year following the year in which the information on which the report is based was collected, unless otherwise authorized in writing by the Director.

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, Alberta Environment, 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 October 31, 2012; and
   (b) for the second soil monitoring proposal, no later than October 31, 2017; or unless otherwise authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

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.


STANDARDS

4.7.6 For the purpose of soil monitoring reports, the approval holder shall compare the concentration of substances in soil to the corresponding concentrations set out in or derived from the following:

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

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

REPORTING

4.7.7 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 October 31, 2013; and

(b) for the second soil monitoring report, no later than October 31, 2018; or unless otherwise authorized in writing by the Director.

4.7.8 The Soil Monitoring Program reports shall be as prescribed in the reporting requirements of the Soil Monitoring Directive, May 1996, as amended.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

SOIL MANAGEMENT PROGRAM

4.7.9 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, 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.

4.7.10 If required pursuant to 4.7.9, 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 4.7.7 is due.

4.7.11 The Soil Management Program Proposal shall include, at a minimum, all of the following:

(a) steps to be taken to control sources of contamination;
(b) remediation objectives for substances identified by soil monitoring as exceeding the applicable maximum standards in 4.7.6;
(c) proposed steps for management of soil contamination; and
(d) a schedule for implementing the Soil Management Program.

4.7.12 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.

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

4.7.14 If the approval holder must implement a Soil Management Program pursuant to 4.7.13, 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.

4.7.15 The Soil Management Program report shall include, at a minimum, all of the following information:

(a) a summary of actions taken under the Soil Management Program during the previous year;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(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.

SECTION 4.8: WILDLIFE


PART 5: RECLAMATION

SECTION 5.1: RECLAMATION

5.1.1 The approval holder shall apply for an amendment to this approval to reclaim the plant by submitting Decommissioning and Land Reclamation Plans to the Director.

5.1.2 The Decommissioning and Land Reclamation Plans referred to in 5.1.1 shall be submitted within six months of the plant ceasing operation, except for repairs and maintenance, unless otherwise authorized in writing by the Director.

SECTION 5.2: DECOMMISSIONING

5.2.1 As required in 5.1.1, the approval holder shall develop and submit a plan for the Decommissioning phase to the Director which 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 produced at the plant during operation and decommissioning;

(d) evaluation of remediation technologies proposed to be used at the plant and affected lands;
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(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, 2009, as amended;

(ii) for soil or groundwater, *Alberta Tier 2 Soil and Groundwater Remediation Guidelines*, Alberta Environment, 2009, as amended;

(iii) for drinking water, *Canadian Environmental Quality Guidelines*, Canadian Council of Ministers of the Environment, PN1299, 1999, as amended; and

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

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

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

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

5.2.2 All analytical protocols shall be in accordance with the *Guidance Manual on Sampling, Analysis and Data Management for Contaminated Sites - Volume 1: Main Report*, CCME EPC-NCS62E, as amended.

5.2.3 The approval holder shall submit an Annual Decommissioning Report to the Director by December 30 of each year until decommissioning is complete which shall include, at a minimum, all of the following:

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

(b) status of decommissioning;

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

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

(e) interpretation of monitoring data collected historically.
SECTION 5.3: LAND RECLAMATION

GENERAL

5.3.1 As required in 5.1.1, the approval holder shall develop a plan for the Land Reclamation phase 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) information about areas where reforestation will occur;

(iii) justification for areas where reforestation is not proposed;

(iv) fertilization rates and methods;

(v) a vegetation management plan;

(vi) wildlife habitat plans where applicable;

(g) reclamation sequence and schedule; and

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

5.3.2 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.

5.3.3 The approval holder shall remove all watercourse crossings as part of the final reclamation, unless otherwise authorized in writing by the Director.
5.3.4 Unless otherwise authorized in writing by the Director, the approval holder shall reclaim all access roads and haul roads, including removal of culverts and other structures, recontouring, restoration of drainage, decompaction of subsoil, replacement of topsoil and revegetation.

5.3.5 The approval holder shall re-establish surface drainage on all reclaimed plant areas such that it is integrated with the adjacent land.

**CONTOURING AND MATERIALS PLACEMENT**

5.3.6 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 authorized in writing by the Director.

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

5.3.8 The approval holder shall cap any unsuitable material, as described in the *Soil Quality Criteria Relative to Disturbance and Reclamation*, Alberta Agriculture, March 1987, 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, March 1987, prior to subsoil and topsoil replacement.

5.3.9 The approval holder shall replace all salvaged subsoil on the decommissioned, contoured, and decompacted central processing facility.

5.3.10 The approval holder shall replace all salvaged topsoil on all recontoured areas such that the average depth of the replaced topsoil in the reclaimed profile for each reclamation area shall be equivalent to or greater than 80% of the original topsoil depth, or as otherwise authorized in writing by the Director.

5.3.11 The approval holder shall immediately suspend topsoil or subsoil replacement when:

(a) wet or frozen field conditions will result in the degradation of topsoil or subsoil quality; unless otherwise authorized in writing by an Inspector;

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

(c) directed to do so in writing by an Inspector.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

5.3.12 The approval holder shall only recommence the topsoil or subsoil replacement when suspended under 5.3.11 if:

(a) the conditions specified in 5.3.11 no longer exist; or

(b) directed in writing by an Inspector.

REVEGETATION

5.3.13 The approval holder shall only use the following types of seed for revegetation:

(a) for agronomic species that:
   (i) is equivalent to Canada #1 seed;
   (ii) is free of prohibited and primary noxious weeds;

(b) for native species that:
   (i) is free of prohibited and primary noxious weeds;
   (ii) has a count of 5 or less secondary noxious weed seeds per 25 g of seed; and
   (iii) has a count of 50 or less for other weed seeds per 25 g of seed.

5.3.14 The approval holder shall obtain and retain documentation that verifies that the seed used for revegetation meets the criteria specified in 5.3.13.

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

REPORTING

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

5.3.17 The approval holder shall prepare an Annual Conservation and Reclamation Report that meets the information requirements outlined in the Guide to the Preparation of Applications and Reports for Coal & Oil Sands Operations, Alberta Environment, 1991, as amended and includes the following:

(a) any proposed changes to the reclamation seed mix; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) any other information requested by the Director.

5.3.18 The approval holder shall submit the Annual Conservation and Reclamation Report to the Director on or before March 31 of each year and the report shall be based on the information collected in the preceding year.

DATED October 30, 2009

DESIGNATED DIRECTOR UNDER THE ACT
AMENDING APPROVAL

PROVINCE OF ALBERTA

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

242701-00-01

APPROVAL NO.: .................................................................

002-242701

APPLICATION NO.: ................................................................

October 20, 2010

EFFECTIVE DATE: ............................................................

September 30, 2019

EXPIRY DATE: .................................................................

Laricina Energy Ltd.

APPROVAL HOLDER: ..........................................................

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:

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

is amended as per the attached terms and conditions.

Designated Director under the Act .............................................................................

Date Signed .................................................................

October 20, 2010

………………………………………………………………………..

Alberta
TERMS AND CONDITIONS ATTACHED TO APPROVAL

Environmental Protection and Enhancement Act Approval No. 242701-00-00 is hereby amended as follows:

1. Subsection 1.1.2 (cc) is deleted and the following is substituted:

   1.1.2. (cc) "plant" means all buildings, structures, process and pollution abatement equipment, vessels, storage facilities, material handling facilities, roadways, pipelines and other installations, and includes the land, located on LSD 5 and 12, Section 3 and LSD 8 and 9, Section 4, Township 85, Range 22, West of the 4th Meridian, that is being or has been used or held for in connection with the Germain enhanced recovery in-situ oil sands or heavy oil processing plant;

2. Subsection 3.1.1 is deleted and the following is substituted:

   3.1.1 If construction of the plant as described in application 002-242701 has not commenced by October 31, 2011, or as otherwise specified in this approval, the approval holder shall apply for an amendment to this approval unless otherwise authorized in writing by the Director.

3. Subsection 3.2.1 is deleted and the following is substituted:

   3.2.1 The approval holder shall construct all stacks according to the following height requirements as prescribed in TABLE 3.2-A, unless otherwise authorized in writing by the Director.

   **TABLE 3.2-A: STACK HEIGHTS**

<table>
<thead>
<tr>
<th>STACK</th>
<th>MINIMUM HEIGHT ABOVE GRADE (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three 14.7 MW steam generator exhaust stacks</td>
<td>21.0</td>
</tr>
<tr>
<td>The 5.6 MW glycol heater exhaust stack</td>
<td>12.5</td>
</tr>
<tr>
<td>The 740 kW propane vapourizer exhaust stack</td>
<td>10.0</td>
</tr>
<tr>
<td>The 1.1 MW diluent injector heater exhaust stack</td>
<td>10.0</td>
</tr>
<tr>
<td>The central processing facility high pressure and low pressure flare stack</td>
<td>32.0</td>
</tr>
<tr>
<td>The standby generator exhaust stack</td>
<td>6.0</td>
</tr>
</tbody>
</table>

4. Subsection 3.2.5 is deleted and the following is substituted:

   3.2.5 The following stack(s) shall be equipped with sampling facilities:

   (a) the three 14.7 MW steam generator exhaust stacks; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(b) the 5.6 MW glycol heater exhaust stack.

5. The following subsections are added after subsection 3.7.9:

3.7.10 The approval holder shall submit a Stockpile Summary Report to the Director within six months of the plant commencing operations, unless otherwise authorized in writing by the Director.

3.7.11 The Stockpile Summary Report, referred to in 3.7.10, shall include, at a minimum, all of the following:

(a) final locations and dimensions of topsoil and subsoil stockpiles, including survey drawings;

(b) a description of the source and characteristics of the materials included in the topsoil and subsoil stockpiles;

(c) location and volume of topsoil and subsoil used for interim reclamation or in direct placement for final land reclamation; and

(d) final volumes of topsoil and subsoil stockpiles.

6. Subsection 4.1.2 is deleted and the following is substituted:

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

(a) the three 14.7 MW steam generator exhaust stacks;

(b) the 5.6 MW glycol heater exhaust stack;

(c) the 740 kW propane vapourizer exhaust stack;

(d) the 1.1 MW diluent injector heater exhaust stack;

(e) the central processing facility high pressure and low pressure flare stack;

(f) the standby generator exhaust stack;

(g) the space ventilation exhaust stacks;

(h) the space heater exhaust vents; and
TERMS AND CONDITIONS ATTACHED TO APPROVAL

(i) any other source authorized in writing by the Director or by an amendment to this approval.

7. Subsection 4.1.6 is deleted and the following is substituted:

4.1.6 The approval holder shall operate and maintain the following stacks according to the height requirements as prescribed in TABLE 4.1-A, unless otherwise authorized in writing by the Director.

TABLE 4.1-A: STACK HEIGHTS

<table>
<thead>
<tr>
<th>STACK</th>
<th>MINIMUM HEIGHT ABOVE GRADE (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three 14.7 MW steam generator exhaust stacks</td>
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</tr>
<tr>
<td>The 5.6 MW glycol heater exhaust stack</td>
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<td>10.0</td>
</tr>
<tr>
<td>The central processing facility high pressure and low pressure flare stack</td>
<td>32.0</td>
</tr>
<tr>
<td>The standby generator exhaust stack</td>
<td>6.0</td>
</tr>
</tbody>
</table>

8. Subsection 4.1.9 is deleted and the following is substituted:

4.1.9 The approval holder shall submit a Fugitive Emissions Leak Detection and Correction Program to the Director by November 30, 2013.

9. Subsection 4.1.12 is deleted and the following is substituted:

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

TABLE 4.1-B: LIMITS

<table>
<thead>
<tr>
<th>EMISSION SOURCE</th>
<th>AIR CONTAMINANT</th>
<th>LIMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>Sulphur dioxide</td>
<td>0.3 tonnes per day</td>
</tr>
<tr>
<td>Each of the three 14.7 MW steam generators</td>
<td>Oxides of nitrogen (expressed as NO₂)</td>
<td>1.4 kilograms per hour</td>
</tr>
<tr>
<td>5.6 MW Glycol Heater</td>
<td>Oxides of nitrogen (expressed as NO₂)</td>
<td>0.6 kilograms per hour</td>
</tr>
</tbody>
</table>
TERMS AND CONDITIONS ATTACHED TO APPROVAL

10. Subsection 4.1.15 is deleted and the following is substituted:

4.1.15 The approval holder shall report to the Director the results of the emission source monitoring as required in TABLE 4.1-C, unless otherwise authorized in writing by the Director.

TABLE 4.1-C: AIR EMISSION SOURCE MONITORING AND REPORTING

<table>
<thead>
<tr>
<th>EFFLUENT STREAM/EMISSION SOURCE</th>
<th>MONITORING</th>
<th>REPORTING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PARAMETER</td>
<td>METHOD</td>
</tr>
<tr>
<td>Produced gas and residue or fuel gas to the central processing facility high pressure and low pressure flare stack</td>
<td>Volumetric flow rates</td>
<td>Measured or Estimated</td>
</tr>
<tr>
<td>Central processing high pressure and low pressure flare stack</td>
<td>Sulphur dioxide</td>
<td>Calculated</td>
</tr>
<tr>
<td>Produced gas at the central processing facility</td>
<td>Hydrogen sulphide</td>
<td>Gas Analysis</td>
</tr>
<tr>
<td></td>
<td>Total hydrocarbons</td>
<td>Lower heating value</td>
</tr>
<tr>
<td>Each of the three 14.7 MW steam generators</td>
<td>Oxides of nitrogen (expressed as NO2)</td>
<td>Manual Stack survey as per Alberta Stack Sampling Code</td>
</tr>
<tr>
<td>The 5.6 MW glycol heater</td>
<td>Oxides of nitrogen (expressed as NO2)</td>
<td>Manual Stack survey as per Alberta Stack Sampling Code</td>
</tr>
</tbody>
</table>

11. Subsection 4.6.1 is deleted and the following is substituted:

4.6.1 The approval holder shall implement the Groundwater Monitoring and Management Program as described in the “Germain Commercial Demonstration SAGD Project Groundwater Monitoring and Management Plan Non-saline Groundwater in Contact with Bitumen,” dated October 2009, submitted by Laricina Energy Ltd., unless authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

12. Subsections 4.7.1 to 4.7.15 are deleted and the following are substituted:

4.7.1 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

4.7.2 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 October 31, 2013; and
(b) for the second soil monitoring event, on or before October 31, 2017; or

unless otherwise authorized in writing by the Director.

4.7.3 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.

4.7.4 Subject to 4.7.3, the approval holder shall implement the Soil Monitoring Program as authorized in writing by the Director.

4.7.5 If an authorization or a deficiency letter is not issued within 120 days of the applicable date required by 4.7.2, 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 4.7.2.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.7.6 The approval holder shall submit to the Director each Soil Monitoring Program Report obtained from the soil monitoring referred to in 4.7.4 and 4.7.5 according to the following schedule:

(a) for the first Soil Monitoring Report on or before October 31, 2014; and

(b) for the second Soil Monitoring Report on or before October 31, 2018; or

unless otherwise authorized in writing by the Director.

4.7.7 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

4.7.8 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.

4.7.9 If a Soil Management Program Proposal is required pursuant to 4.7.8, the approval holder shall submit a Soil Management Program Proposal to the Director according to the following schedule:

(a) for Soil Management Proposal that is triggered by the findings from the first soil monitoring event on or before the date in 4.7.6(a);

(b) for Soil Management Proposal that is triggered by the findings from a second soil monitoring event on or before the date in 4.7.6(b); or

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

4.7.10 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.

4.7.11 The approval holder shall implement the Soil Management Program as authorized in writing by the Director.
TERMS AND CONDITIONS ATTACHED TO APPROVAL

4.7.12 If the approval holder is required to implement a Soil Management Program pursuant to 4.7.11, 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.

4.7.13 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.

13. Subsections 5.3.16 to 5.3.18 are deleted.

DATED October 20, 2010

DESIGNATED DIRECTOR UNDER THE ACT