ERCB

Koch Oil Sands Operating ULC

Application for a Bitumen Recovery Scheme
Cold Lake Oil Sands Area

March 13, 2012

Energy Resources Conservation Board

ENERGY RESOURCES CONSERVATION BOARD
Decision 2012 ABERCB 007: Koch Oil Sands Operating ULC, Application for a Bitumen Recovery Scheme, Cold Lake Oil Sands Area

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ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

KOCH OIL SANDS OPERATING ULC
APPLICATION FOR A BITUMEN
RECOVERY SCHEME **2012 ABERCB 007**
COLD LAKE OIL SANDS AREA **Application No. 1617225**

DECISION

[1] Having carefully considered the application, the Energy Resources Conservation Board (ERCB/Board) has determined that Application No. 1617225 is in the public interest and is prepared to approve the application with conditions, subject to the required approval of the Lieutenant Governor in Council.

[2] In considering the environmental effects of the project, the Board recognizes its joint role with Alberta Environment and Water (AEW) and fully supports AEW in its mandate to protect water resources. Therefore, the Board, given the proximity of the project to Angling Lake and several domestic and stock water wells, imposes the following two conditions on the applicant, Koch Oil Sands Operating ULC (Koch):

- **Condition One:**

  The Operator must, as part of the annual performance presentation required by ERCB *Directive 054: Performance Presentations, Auditing, and Surveillance of In Situ Oil Sands Schemes*,[1] provide a summary of its Annual Groundwater Monitoring Program report, that it must prepare annually for Alberta Environment and Water, describing any thermal effects of the scheme on groundwater and Angling Lake.

- **Condition Two:**

  The Operator must submit a plan to mitigate the potential impacts to surface water bodies from wells and facilities associated with Pads 101 and 103, which are within 100 metres (m) of water bodies, for ERCB review and approval, prior to submitting any related *Directive 056: Energy Development Applications and Schedules* applications.

In addition to these conditions, the Board also imposes its standard conditions for commercial thermal in situ oil sands recovery scheme approvals on Koch (see Appendix 1).

APPLICATION

[3] Koch applied to the ERCB for approval to construct and operate a two-stage bitumen recovery scheme, referred to as the Gemini Oil Sands Project, with a production rate of up to 1600 cubic metres (m^3) of bitumen per day (10 000 barrels per day [bpd]) using the steam-assisted gravity drainage (SAGD) recovery process.

[1] Annual performance presentations required under *Directive 054* are publicly available on the ERCB website www.ercb.ca under Industry Zone: Industry Activity and Data: In Situ Progress Reports.

[4] The project would be located about 1 kilometre (km) southwest of the community of Beaverdam, Alberta, at Legal Subdivisions (LSDs) 11, 12, 13, and 14 of Section 12, Township 60, Range 3, West of the 4th Meridian; LSDs 4, 5, 12, and 13 of Section 13-60-3W4M; all LSDs of Section 14-60-3W4M; LSDs 8, 9, and 16 of Section 22-60-3W4M; LSDs 1 to 8 and 10 to 13 of Section 23-60-3W4M; LSD 4-24-60-3W4M; and LSD 1-27-60-3W4M. A map showing the location of the project is attached as Figure 1.

BACKGROUND

[5] Application No. 1617225 was registered with the ERCB on June 22, 2009. Board staff reviewed the application and issued supplemental information requests (SIR) to Koch on December 3, 2009; June 3 and November 10, 2010; April 29, 2011; and January 18, 2012.

[6] Koch responded to the SIRs and made corrections and additions to the application on August 26, 2009; February 26, March 18, September 3, December 6, and December 16, 2010; May 10, July 26, and August 9, 2011; and February 1, 2012.

[7] After receiving objections from Al Best, Gary Gillett, and Joyce Kathan, the Board decided to hold a hearing to consider the application as it appeared that a decision by the Board might directly and adversely affect the rights of those parties.

[8] On November 8, 2011, the Board issued a Notice of Hearing to schedule a public hearing for February 22, 2012, in Cold Lake, Alberta, before Board Members G. Eynon, P.Geol. (Presiding Member), R. C. McManus, M.E.Des, and T. C. Engen.

[9] After issuing the Notice of Hearing, the Board also received an objection from Theodore Charlton. Following engagement in the ERCB's appropriate dispute resolution program, all objections, including those of Mr. Best, Mr. Gillett, and Mrs. Kathan, were withdrawn. On February 15, 2012, as there were no outstanding objections to the application, the Board issued a Notice of Cancellation of Hearing.

DISCUSSION

[10] The Board notes that Koch must comply with all regulatory requirements, including those that relate to noise, odours, and air and water quality. Further, Koch must apply to the ERCB for any material modifications to the project in accordance with *Directive 078: Regulatory Application Process for Modifications to Commercial In Situ Oil Sands Projects*. Koch is required to notify potentially affected parties if the modifications may result in adverse and material changes to the environmental and socioeconomic impacts predicted and assessed in the subject application.

[11] Koch provided preliminary information on expected thermal effects related to groundwater and surface water. Given the proximity of the project to Angling Lake and water wells, the Board believes that additional scrutiny of thermal effects on groundwater and surface water is warranted. Therefore, the Board imposes Condition One. In addition, the Board will look to AEW for advice on assessing these matters. Thermal effects that occur may cause the ERCB to modify or rescind this approval.

[12] With respect to Condition Two, the Board notes that Pads 101 and 103 are within 100 m of a water body as defined in *Directive 056*. Koch is required to provide additional information on its plan to mitigate potential effects of any wells and facilities related to this scheme that are to be located within 100 m of a water body. The additional information would at a minimum include the following items:

- a discussion of the preventive measures that will be employed at the facility to minimize the risk of a spill occurring and, in the event of a spill, the preventive measures for ensuring that the spill does not reach the water body;
- a description of the proposed equipment, tanks, and piping that will be located less than 100 m from the water body and the fluids involved;
- a description of the types of automatic controls that will be installed;
- a detailed survey plan that clearly identifies the location of the facility and its distance from the associated water body; and either
- the commitment to construct and maintain a berm around the perimeter of the equipment that will prevent any spill from reaching the water body; this berm should not be confused with the secondary containment requirements set out in *Directive 055*; or
- a description of an alternative method or operating condition that would demonstrate how the water body is protected.

Dated in Calgary, Alberta, on March 13, 2012.

ENERGY RESOURCES CONSERVATION BOARD

<original signed by>

G. Eynon, P.Geol.
Presiding Member

<original signed by>

R. C. McManus, M.E.Des
Board Member

<original signed by>

T. C. Engen
Board Member

APPENDIX 1 STANDARD CONDITIONS FOR SCHEME APPROVAL

Conditions, generally, are requirements in addition to or otherwise expanding upon existing regulations and guidelines. An applicant must comply with conditions or it is in noncompliance of its approval and subject to enforcement action by the ERCB. Enforcement of a scheme approval includes enforcing the conditions attached to the approval. Sanctions imposed for noncompliance of such conditions may result in the shut-in of a facility.

The standard conditions imposed on Koch Oil Sands Operating ULC's (Operator) scheme approval are listed below.

1) The Operator's scheme as described in

   a) Application No. 1617225,

   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) 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 ERCB.

4) Unless otherwise stipulated by the ERCB, the production of bitumen from the project area shall not exceed 1600 cubic metres per day (m^3/d) on an annual average basis.

5) 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 Figure 1.
   b) the conservation of the practical maximum volume of produced gas at the well pads and central facilities,
   c) the minimization of flaring during 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 90 per cent on an annual basis, unless otherwise stipulated by the ERCB.

6) Prior to drilling SAGD wells in an area, all ERCB regulated wells that could be impacted by thermal operations must be repaired or abandoned in a manner that is compatible with the thermal operations. The Operator must contact the ERCB for discussion of and obtaining approval for the manner in which to repair or abandon wells not considered to be compatible with the thermal operations.

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

a) provide the ERCB with gamma ray, spontaneous potential, resistivity, neutron, and density log measurements from total depth to surface casing for all vertical wells, and

b) take full diameter cores of the entire bitumen-bearing interval of the Lower Grand Rapids 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.

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_2S) 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) (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.

(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 material

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.

12) 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 operation 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 horizontal portion of 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.

13) 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.

14) 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.

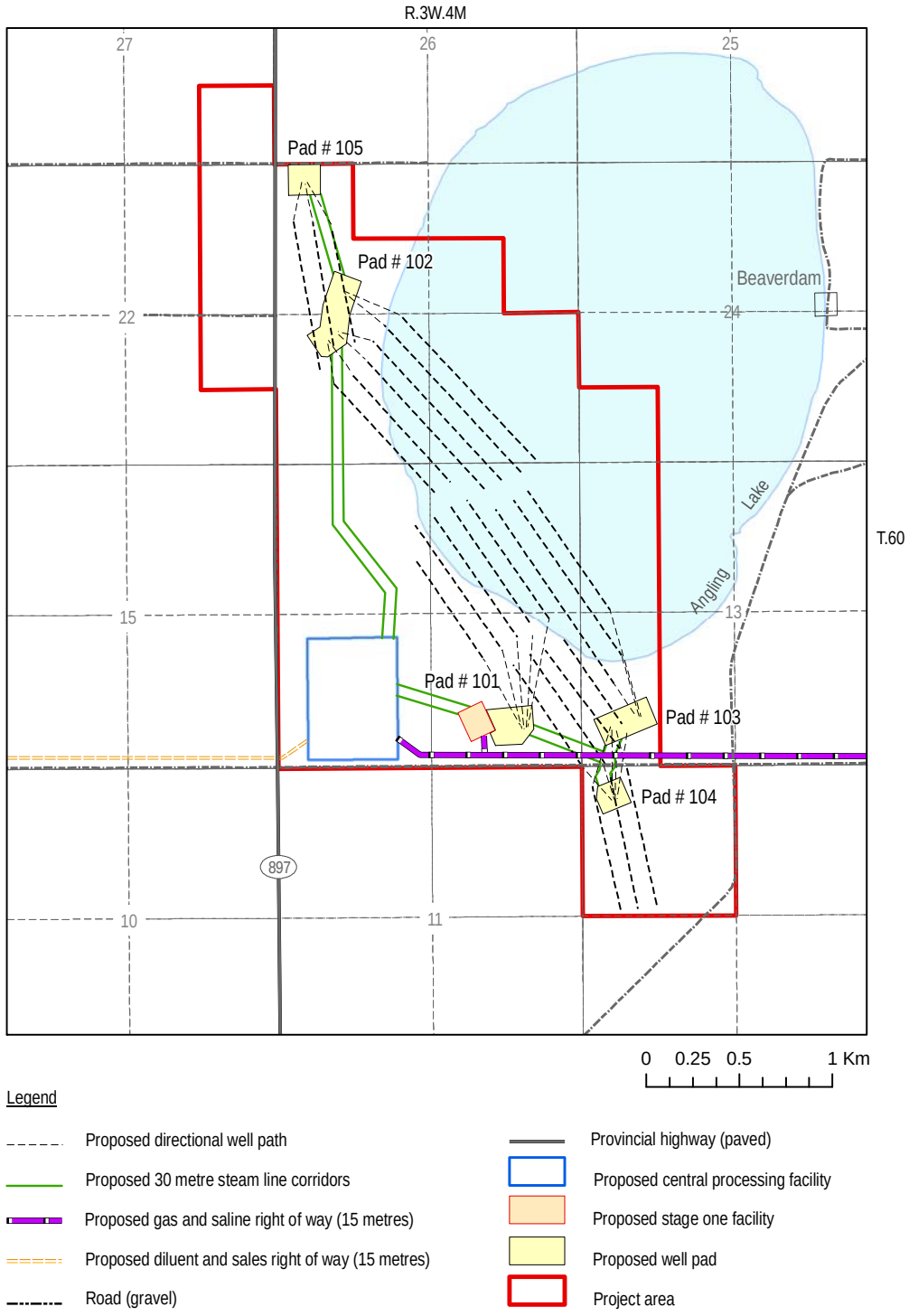

Figure 1. Map of the Gemini Oil Sands Project