1 PROJECT INTRODUCTION

1.1 PROJECT BACKGROUND

Grizzly Oil Sands ULC (Grizzly) is a privately owned Canadian corporation formed in 2006 that currently operates in northern Alberta. Grizzly is committed to being socially responsible and environmentally accountable in all its activities to preserve the quality of life for future generations.

This application is seeking approval for the May River SAGD Project (the Project), which is a bitumen recovery scheme using steam-assisted gravity drainage (SAGD) technology to produce bitumen up to a rate of 1,908 m³/d (12,000 bpd). The bitumen will be produced from a portion of Grizzly’s May River oil sands leases #7400010009, #7400010010, #7400010012 and #7406020403, located in Townships 76 to 77, Ranges 8 to 10, W4M (Figure 1.1-1).

The May River oil sands leases were acquired from Petrobank Energy and Resources Ltd. (Petrobank) in February of 2012. Petrobank operated the Whitesands Project, which was an experimental in situ combustion project approved in 2004, started construction in 2005, and operated through to August 2011. The leases were sold to Grizzly in early 2012. The acquisition included Environmental Protection and Enhancement Act (EPEA) Approval #201967-00-07 (as amended), associated land dispositions, and facilities and equipment that were used for the Whitesands Project and Whitesands Project Expansion. The existing Whitesands Project facilities at the Project site are currently shut in and not in operation; however, the facilities are yet to be decommissioned. The Project will be a new scheme, separate from the existing facilities, but Grizzly will incorporate as much existing disturbance for the new footprint as practicable.

The central processing facility (CPF) for the Project will be located in Section 12 of 77-9 W4M and Section 7 of 77-8 W4M, approximately 14 km northwest of Conklin, Alberta, within the Regional Municipality of Wood Buffalo (Figure 1.1-2). The location of the Project facilities is presented on Figures 1.1-2 and 1.1-3. Access to the Project will be from the existing access road that was built for the Whitesands Project. The existing access road is not expected to be upgraded for the Project.

The Project will recover an estimated 22.3 million m³ (140 million barrels) of bitumen over its projected 37 year production life. Production from the Project will be marketed as a bitumen blend (dilbit). Onsite construction is expected to begin in the third quarter of 2015 with first steam at the Project anticipated in the fourth quarter of 2016. Reclamation will begin in approximately 2054 and last for approximately 3 years.

Gas production from the McMurray and Clearwater Formations is common in the area. To ensure the successful recovery of bitumen from the McMurray C reservoir, Grizzly purchased all the disposed P&NG rights in the Wabiskaw and McMurray Formations over the Development Area in October 2013. Grizzly has shut in all gas production below the Clearwater Formation and will abandon all wells drilled into gas zones in direct or indirect contact with the bitumen zone prior to commencing SAGD operations (see Section 4.1.8).

For the purpose of this application, Grizzly has identified a Project Area and Development Area (Section 3). The Project Area is the resource area required to supply the bitumen required for the life of the Project and encompasses approximately 6 sections of land. The Development Area is the
resource area required to supply bitumen for the initial stages of development to reach a design production capacity of 1,908 m³/d (12,000 bpd). Sufficient exploration has been conducted to define the resource within the Development Area. The Project Area and Development Area are shown on Figure 3.1-1 and described below:

**Project Area:**
- Portions of Sections 31 and 32 of Township 76, Range 8, W4M
- Sections 5, 6 and 7 of Township 77, Range 8, W4M
- Portions of Sections 18 and 19 of Township 77, Range 8, W4M
- Portions of Section 1 of Township 77, Range 9, W4M
- Section 12 of Township 77, Range 9, W4M

**Development Area:**
- Section 6 of Township 77, Range 8, W4M
- Portions of Section 5 of Township 77, Range 8, W4M
- Portions of Section 7 of Township 77, Range 8, W4M
- Portions of Section 1 of Township 77, Range 9, W4M
- Portions of Section 12 of Township 77, Range 9, W4M

The Project components, including initial and sustaining development infrastructure, are presented on Figure 1.1-2. Grizzly has defined the location of the well pads required for each stage of development. Future well pads needed for sustaining development have also been selected and will be refined based on the results of future exploration activities and performance of wells from the first stage of development.

### 1.1.1 Project Components

The Project components are summarized below:

**Wells and well pads:**
- up to 110 production wells;
- up to 110 injection wells;
- at least 13 observation wells; and
- 13 production well pads.

**CPF and associated facilities:**
- steam generation facilities;
- production (bitumen, gas and water) handling and treatment facilities;
- tankage;
- water treatment and recycle facilities;
- two co-generation (electricity/steam) units;
- utility systems;
- laydown area;
- lease automated custody transfer (LACT);
- storage areas;
• borrow pits; and
• support buildings.

Offsite services and utilities:
• main access road (existing);
• construction/operations camp and associated infrastructure;
• source water wells (existing); and
• all-weather right-of-way (ROW) corridors that include:
  o infield roads connecting the CPF to the production well pads;
  o aboveground power lines; and
  o aboveground pipelines.

1.1.2 Location

Grizzly plans to develop the Project on oil sands leases 7400010012, 7406020403, 7400010009 and 7400010010 in Township 77, Ranges 8 and 9 W4M, approximately 14 km northwest of Conklin, Alberta (Figure 1.1-2). The CPF for the Project will be located in 12-77-9 W4M and 7-77-8 W4M. The initial production and injection wells required to meet the design production capacity will be drilled from two well pads located southeast of the CPF (Figure 1.1-2).

1.1.3 Schedule

Pending approval, offsite engineering and long lead equipment purchase is expected to start in Q3 2015. Site construction is planned to begin in Q3 2015 and is expected to continue until the plant is commissioned in Q4 2016. The development schedule for the Project is provided in Table 1.1-1.

Table 1.1-1 Schedule

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Terrestrial Local Study Area
May River Lease Boundary
Water Body
Watercourse
Road
Industry Road
Cutline
Pipeline
Project Component
Borrow ROW
Borrow
Camp
CWP
Laydown
Production ROW
Production Well Pad

Borrow 3
Borrow 1
Borrow 2
Well Pad J
Well Pad N
Well Pad L
Well Pad M
Well Pad K
Well Pad H
Well Pad D
Well Pad F
Well Pad E
Well Pad A
Well Pad C
Well Pad B
Well Pad G

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Terrestrial Local Study Area
May River Lease Boundary
Water Body
Watercourse
Road
Industry Road
Cutline
Pipeline
Project Component
Borrow ROW
Borrow
Camp
CWP
Laydown
Production ROW
Production Well Pad

Disclaimer: Prepared solely for the use of Grizzly Oil Sands as specified in the accompanying report. No representation of any kind is made to other parties with which Grizzly Oil Sands has not entered into contract.
Project Footprint
Terrestrial Local Study Area
May River Lease Boundary
Water Body
Watercourse
Road
Industry Road
Outline
Pipeline

Disclaimer: Prepared solely for the use of Grizzly Oil Sands as specified in the accompanying report. No representation of any kind is made to other parties with which Grizzly Oil Sands has not entered into contract.

M. Wilkinson
B. Fuchs
N. Huq

Imagery obtained from Grizzly Oil Sands ULC (2013).

Reference: Data obtained from AltaLIS ©Government of Alberta used under license. GDM midstream and transportation infrastructure data provided by IHS© 2013 used under license.

NAD 1983 UTM Zone 12N
1:20,000
250 Metres

May River SAGD Project
Project Footprint with Aerial Imagery

9 Dec 2013
16351-514
1.2 PROONENT

Grizzly is a privately owned company, with its head office in Calgary, that was formed in September of 2006 for the acquisition, exploration and development of bitumen production using thermal technologies. The company has assembled an extensive portfolio of Alberta oil sand leases within the Athabasca and Peace River oil sand areas. Grizzly is currently commissioning the Algar Lake SAGD Project, approved in 2011, which is scheduled to begin operating in early 2014. Grizzly submitted the Application for the Thickwood Thermal Project in November 2012, which is currently under review for approval. The May River SAGD Project is the subject of this Application and was chosen for its resource recovery potential and proximity to existing infrastructure.

The name and address of the applicant for the Project is:

Grizzly Oil Sands ULC
#2700, 605 - 5th Avenue S.W.
Calgary AB T2P 3H5

Correspondence concerning this application should be directed to the above address to the attention of:

Name: Mr. John Eubank, P. Eng.
Phone: (403) 930-6457
E-Mail: john.eubank@grizzlyoilsands.com
1.2.1 Signed ESRD Applicant Form

Forms

Authorization of Application for Approval By Owner/Agent

This application must be submitted in accordance with the Environmental Protection and Enhancement Act.

An application for an Approval shall not be deemed to be filed until all the information, documents, and authorizations referenced in the application submission, and, the appropriate fee has been received by the Regulatory Approvals Centre, Alberta Environment and Sustainable Resource Development.

The application must be complete before review and processing of the application takes place.

The application MUST be signed by the owner or his agent, using the following signature block.

___________
(Date)

___________________________
(Signature)

Thermal Development Engineer

(Title of Applicant)
1.3 PROJECT NEED AND BENEFITS

The Project will recover bitumen from the McMurray Formation of the Athabasca oil sands deposit utilizing the in situ SAGD process. The oil sands resource in the Grizzly Project Area is expected to be sufficient to produce up to 1,908 m$^3$/day (12,000 bpd) for 37 years.

The Project will be a positive addition to local communities and the Alberta economy, both during construction and operations. Some of the Project highlights include:

- the total project construction costs will be approximately $450 million.
- the Project will contribute an estimated $405 million in taxes and $1,317 million in royalties to the Federal, Provincial and Municipal governments;
- the Project is expected to employ a full time work force of 45 to 50 people; and
- during construction, the Project is expected to employ a peak work force of 120 people.

1.4 ALTERNATIVES CONSIDERED

Key factors considered in the Project design include:

- **Facility siting**: Site selection considered access to the bitumen resource, maintaining required setbacks from watercourses, topographical constraints and minimizing new surface disturbance.

- **Water treatment technology**: Grizzly has selected an evaporative water treatment process to minimize make up water demand and related use of local aquifers. Alternative water treatment technologies (such as ion exchange or lime softening) result in higher disposal volumes. The use of an evaporator eliminates lime sludge ponds associated with lime softening technology. The Project design also results in less disposal, higher water utilization efficiency, and reduced make up water demand when compared to alternative technologies.

- **Steam generation equipment**: Grizzly has selected drum-type power boilers for the Project. Alternatives considered included forced circulation steam generators and once through steam generators. Drum boilers have proven to be successful in SAGD applications for maintaining high efficiency through continued operation.

1.4.1 Site Selection of Project Facilities

For locating the Project facilities, Grizzly engaged a process to identify the various site selection options where economic, environmental and social sensitivities or constraints would determine the most suitable locale.

For locating surface facilities, site selection criteria were considered such as:

- the CPF be centrally located to the bitumen reservoir;
- the CPF be located in close proximity to existing utilities;
- the CPF be located on high ground for easier construction;
- the well pads be located to minimize operating distance between the pad site and the CPF, yet still optimize resource recovery;
the location of Project facilities and infrastructure be optimized by incorporating key design and environmental features which encourage maximum resource utilization and minimize environmental impacts; and

- utilizing existing surface disturbances where practical.

1.5 PROJECT REGULATORY APPROVAL PROCESS

Procedures for regulatory approval of oil sands developments in Alberta are determined by the *Oil Sands Conservation Act* (OSCA) and the EPEA. Key agencies involved in the coordination of the review of the Project are the Alberta Energy Regulator (AER), and Alberta Environment and Sustainable Resource Development (ESRD).

1.5.1 Existing Approvals

Grizzly acquired the Whitesands Project and Whitesands Project Expansion, including all associated oil sands leases and EPEA Approval No. 201967-00-07, from Petrobank in 2012. The Whitesands Project (AER Scheme Approval No. 97701), constructed by Petrobank, started operating in 2006. Annual progress reports were filed from 2006 to 2011.

The acquisition of the Whitesands Project and Whitesands Project Expansion included all associated facilities and land dispositions, including (but not limited to): the CPF (mineral surface lease [MSL] 043171), camp (miscellaneous lease [MLL] 070141), laydown area (MSL 072254), access road, water source wells and natural gas pipeline. The existing dispositions and disturbances are further described in Section 6.1 and on Figures 6.1-2 and 6.1-3.

The Whitesands Project and Expansion were designed to utilize the toe to heel air injection (THAI) process, which is an experimental in situ combustion scheme. The existing Whitesands Project facilities may have limited applicability for the May River SAGD Project. Currently, Grizzly plans to utilize the existing laydown area, camp site, water source wells, natural gas pipeline and the former well pad that were developed as part of the Whitesands Expansion.

Grizzly has extended EPEA Approval No. 201067-00-08 until January 31, 2015. Grizzly will apply for a renewal to maintain the existing EPEA approval until the Project is approved, and then will seek to amend or cancel the existing approval. The existing groundwater diversion license acquired by Grizzly (252083-00-03) is valid until January 31, 2014. Grizzly will apply for a renewal to maintain the existing groundwater diversion licence. Grizzly is applying for a new groundwater diversion licence to meet the full water demands of the Project as part of this Application (Appendix K).

Petrobank submitted an environmental assessment (EA) in 2008 for their May River Phase 1 Project. That application was under review at the time of Grizzly’s acquisition of the asset, and was subsequently withdrawn. Grizzly has incorporated the applicable baseline environmental data from the EA into this Application.

The current design of the Project CPF is to occupy an area that was cleared for the Whitesands Project Expansion well pad directly south of the Whitesands Project plant site. Additional details for the Project CPF are presented in Section 4.2. Grizzly plans to utilize the existing dispositions for the
Project, and will incorporate as much existing disturbances and facilities into the Project footprint and CPF as practicable.

1.5.2 Application Approvals

This Application will be submitted to the AER and ESRD jointly. Concordance tables relating to the AER and ESRD requirements are provided in Appendix A.

Grizzly is seeking approval from:

1. The AER:
   
   • oil sands scheme approval to construct and operate the May River SAGD Project pursuant to Sections 10 and 11 of the *Oil Sands Conservation Act* and Sections 3 and 33 of the *Oil Sands Conservation Regulation*;

2. ESRD:

   • approval, pursuant to Part 2, Division 2 and Section 66 of the EPEA, to construct and operate the project including facilities to recover and treat bitumen and processed water;

   • conservation and reclamation approval, as required under the EPEA, to develop, operate and reclaim the components of the Project; and

   • a groundwater diversion licence for the water supply pursuant to Part 4 of the *Water Act* (Appendix K).

The Project is classified under the *Activities Designation Regulation* as an enhanced recovery in situ oil sands processing plant. The Project is not a mandatory activity under the *Environmental Assessment (Mandatory and Exempted Activities) Regulation*; therefore, an environmental impact assessment (EIA) is not mandated. Grizzly contacted ESRD and received confirmation on December 4, 2013 that an EIA is not required for the Project.

1.5.3 Additional Approvals Associated with the Application

Grizzly will file separate applications for those parts of the project that are legislated under various other statutes. Regulatory application and approval requirements applicable to the Project which will be submitted under separate cover are:

   • surface rights requirements pursuant to the *Public Lands Act*;

   • site surface disturbance clearance pursuant to the *Historical Resources Act*;

   • production and injection well drilling licenses issued pursuant to the *Oil and Gas Conservation Act*;

   • development permit issued pursuant to the *Municipal Government Act*, from the Regional Municipality of Wood Buffalo for construction and operation of the Project and related infrastructure;

   • Power generation facility approval as per Part 2 Section 11 of the *Hydro and Electric Energy Act* to be filed with the Alberta Utilities Commission; and
electrical power interconnections issued pursuant to the *Electrical Utilities Act*.

### 1.5.4 Waivers and Variances

Grizzly is not requesting variances as part of this Application. Grizzly will apply for required waivers as applicable.