January 2009

Summary Report for the Proposed HR Milner Expansion Project
Environmental Impact Assessment
Table of Contents

1 Introduction ................................................................................................................ 1-1
  1.1 Regulatory Context ............................................................................................... 1-1
  1.2 Organization of the EIA Summary Report ............................................................. 1-1
2 The Proponent ........................................................................................................... 2-1
3 The Project ................................................................................................................. 3-1
  3.1 The Need for and Purpose of the Project .............................................................. 3-1
  3.2 Project Schedule .................................................................................................... 3-2
  3.3 Project Components ............................................................................................. 3-5
  3.4 Project Process and Facilities ................................................................................ 3-5
    3.4.1 Project Footprint ............................................................................................... 3-5
    3.4.2 Coal Delivery, Storage and Retrieval Systems ................................................. 3-6
    3.4.3 Ash Handling and Disposal ............................................................................ 3-6
    3.4.4 Combustion System ....................................................................................... 3-6
    3.4.5 Electrical and Control Systems ...................................................................... 3-6
    3.4.6 Cooling Systems ............................................................................................ 3-7
    3.4.7 Other Infrastructure ...................................................................................... 3-7
    3.4.8 Other Facilities and Infrastructure Associated with the Power Plant but not part of the Project ......................................................................................... 3-7
    3.4.9 Construction Materials .................................................................................. 3-8
    3.4.10 Waste Storage and Disposal Sites ............................................................... 3-8
    3.4.11 Project Accommodations ............................................................................ 3-8
    3.4.12 Thermal Recovery Processes and Facilities .................................................. 3-8
    3.4.13 Water Supply ............................................................................................... 3-8
  3.5 Environmental Management Systems ................................................................. 3-9
    3.5.1 MAXIM’s Environmental Policies ................................................................. 3-9
    3.5.2 Maxim’s Environment, Health and Safety Management System .................. 3-10
    3.5.3 MAXIM’s Environmental Protection Plan .................................................... 3-10
    3.5.4 Emergency Response System ...................................................................... 3-10
4 Consultation ............................................................................................................... 4-1
  4.1 Consultation Programs ........................................................................................... 4-1
    4.1.1 Overview ....................................................................................................... 4-1
    4.1.2 Stakeholder Identification ............................................................................. 4-2
    4.1.3 Public Disclosure of Project ......................................................................... 4-2
    4.1.4 Formal Consultation after Public Disclosure ................................................. 4-2
    4.1.5 Open Houses ............................................................................................... 4-2
    4.1.6 Traditional Knowledge Information Sessions ............................................... 4-3
    4.1.7 Traditional Knowledge Studies .................................................................... 4-3
    4.1.8 Cree Language and English Project DVD ...................................................... 4-3
  4.2 Project Concerns Identified During Consultation ..................................................... 4-3
5 The Environmental Assessment Process and Methodology .................................. 5-1
6 Regional Setting ........................................................................................................ 6-1
  6.1 Ecological Context ............................................................................................... 6-1
    6.1.1 Grande Cache Region .................................................................................... 6-1
Environmental Impact Assessment Summary Report Proposed HR Milner Expansion Project

Table of Contents

6.1.2 Area Around and On the Project Site ................................................................. 6-1
6.2 Socio-Economic Context ....................................................................................... 6-2
6.2.1 General Economic Overview ......................................................................... 6-2
6.2.2 Aboriginal Socio-economic Overview ................................................................. 6-3
7 The Biophysical Environment ............................................................................... 7-1
7.1 Effects of the Project on Atmospheric Environment ............................................ 7-1
7.2 Effects of the Project on Sound Environment ......................................................... 7-2
7.3 Effects of the Project on Groundwater Resources ................................................. 7-3
7.4 Effects of the Project on Hydrology .................................................................... 7-3
7.5 Effects of the Project on Surface Water Quality .................................................... 7-4
7.6 Effects of the Project on Aquatic Ecosystem .......................................................... 7-4
7.7 Effects of the Project on Vegetation and Wetlands ............................................... 7-5
7.8 Effects of the Project on Wildlife ........................................................................ 7-6
7.9 Effects of the Project on Terrain and Soils ............................................................ 7-6
8 The Human Environment ....................................................................................... 8-1
8.1 Effects of the Project on Land Use ....................................................................... 8-1
8.2 Effects of the Project on Historical Resources ....................................................... 8-1
8.3 Effects of the Project on Aboriginal Traditional Knowledge and Land Use .......... 8-2
8.4 Effects of the Project on Socioeconomics ............................................................ 8-2
8.5 Effects of the Project on Human and Ecological Health ....................................... 8-3
9 Accidents, Malfunctions and Unplanned Events .................................................... 9-1
10 Conclusions of the Environmental Impact Statement .......................................... 10-1

List of Tables

Table 3-1 Project Schedule for Proposed Facilities ....................................................... 3-2

List of Figures

Figure 1-1 Regional Overview .................................................................................... 1-3
Figure 3-1 Site Plan .................................................................................................... 3-3
1 Introduction

Maxim Power Corp. (MAXIM) owns and operates the HR Milner Generating Station, a 150 MW single unit coal-fired power generation facility. The HR Milner Generating Station and the majority of its associated infrastructure (Existing Facilities) are situated on land owned by MAXIM (Milner Site). The Milner Site is located approximately 20 km north of the Town of Grande Cache, Alberta and is approximately 30 ha in total, with the Existing Facilities covering approximately 12 ha. MAXIM proposes to expand the Existing Facilities by constructing a 500 MW coal fired facility (Proposed Facilities) at the Project Site. See Figure 1-1 for the location of the Proposed Facilities.

An Environmental Impact Assessment (EIA) has been prepared by MAXIM and its consultants as part of the environmental review of the Project by Alberta Environment (AENV), which is required before any approvals for the development can be granted. The major findings and conclusions of the EIA are presented in this Summary Report.

1.1 Regulatory Context

The construction, operation and eventual decommissioning and reclamation of the Proposed Facilities will require approvals and licences from provincial, federal and municipal government agencies.

Two major regulatory agencies from which approvals are required are AENV and the Alberta Utilities Commission (AUC).

AENV is the provincial government ministry responsible for a range of environmental legislation including Alberta’s Environmental Protection and Enhancement Act (EPEA). Under EPEA, the Project requires an EIA. In addition, the Project requires an amendment to the industrial approval for the Existing Facilities. A separate application for the amendment has been prepared and submitted to AENV.

The Project will require approvals under the Alberta’s Water Act for a new intake structure to withdraw water from the Smoky River. A separate application for Water Act approvals has been submitted to AENV. The Project also requires an approval under the Hydro and Electric Energy Act to construct and operate a power plant. A separate application for this approval has been submitted to the AUC.

The Canadian Environmental Assessment Act (CEAA) establishes a process to assess the environmental effects of projects requiring federal action or decisions. Because the construction and operation of the water intake structure might harm, alter, disrupt or destroy fish habitat in the Smoky River, Fisheries and Oceans Canada is required to assess the effects of the Project on the aquatic environment.

MAXIM will submit a separate application to the MD of Greenview No. 16 for a Development Permit for the Project under the Municipal Government Act.

1.2 Organization of the EIA Summary Report

This EIA Summary Report has been structured to reflect the general content of the EIA. The full EIA is composed of a detailed project description, a summary of Aboriginal consultation and public engagement, a description of environmental assessment methods, and an assessment of Project effects on the biophysical and human environments.

This EIA Summary Report mirrors the full EIA and provides a brief summary of the following: the Proponent (see Section 2) and the Project (see Section 3), including the rationale and need for the Project, schedule and workforce, key Project components, and planned environmental management approaches. Section 4 is an overview of the consultation process that has occurred in support of this.
assessment. Section 5 outlines the environmental assessment approach and methods used. Section 6 summarizes the potential effects of the Project on the biophysical environment (atmospheric environment, sound environment, groundwater resources, hydrology, surface water quality, aquatic ecosystem, vegetation and wetlands, wildlife, and terrain and soils). Section 7 presents the potential Project effects on the human environment (land use, historical resources, traditional land use and resource use, socioeconomics and human and ecological health). Section 8 looks at the potential environmental effects of accidents, malfunctions and unplanned events. Finally, Section 9 summarizes the main conclusions of the EIA.
2 The Proponent

The Project proponent, Maxim Power Corp., is based in Calgary, Alberta. MAXIM is an independent power producer, which acquires or develops, owns and operates innovative and environmentally responsible power projects. MAXIM currently owns and operates 34 power plants in Western Canada, the United States and France, which combined have 754 MW of electric and 134 MW of thermal generating capacity.

MAXIM’s experience in coal-fired generation assets is gained from ownership and operation of the HR Milner Generating Station, acquired in 2004. The HR Milner Generating Station is a 150 MW coal-fired power station, which has been in continuous operation since 1972. Since it began operations, the HR Milner Generating Station has used a cost-effective mix of primarily low-grade fuels including by-product coal from the adjacent mining operations. Today, it uses higher-grade fuels resulting in improved environmental performance and the majority of fuel is railed in from Coal Valley near Hinton, Alberta. The HR Milner Generating Station is important to the local economy of the region providing employment to 62 full-time employees.

MAXIM trades on the TSX under the symbol MXG. For more information about MAXIM, visit the website at www.maximpowercorp.com.

The proponent’s address and the Project contact are listed below:

Maxim Power Corp.
1210, 715 – 5 Avenue SW
Calgary, Alberta
T2P 2X6
Canada

Mr. Tony Mauro
Director, Corporate Development
MAXIM Power Corp.
Telephone: (403) 750-9309
Facsimile: (403) 263-9125
Email: tmauro@maximpowercorp.com
3 The Project

MAXIM proposes to construct, operate and eventually decommission a 500 MW coal-fired electric generating unit and ancillary facilities (the Project). The new 500 MW unit and ancillary facilities will take up approximately 5 ha after it enters commercial service. Most of the Project will be constructed on the existing Milner Site.

The construction of the Proposed Facilities will entail building:

- a pulverized coal combustion system
- a high efficiency supercritical high pressure steam generator
- a high efficiency steam-turbine generator
- air emissions control equipment
- a water treatment system
- an electrical substation
- ancillary systems to support these major systems

In addition, a number of new systems will be installed that will serve both the Existing Facilities and the Proposed Facilities. These include rail offloading facilities; coal receipt; coal storage and management; and ancillary components to support the major systems.

The Project will be constructed and operated on the Project Site. The Project Site will include the:

- Existing Facilities located within the Milner Site
- area for the Proposed Facilities and internal paved, gravel and dirt roads that are located within the Milner Site
- wetland area located within the Milner Site
- proposed water intake structure will be located off the Milner Site on adjacent Crown lands
- temporary storage area required during construction of the Proposed Facilities that is located off the Milner Site on adjacent Crown lands

As part of the construction phase of the Project, there will also be a separate camp for construction workers located on Crown lands near Sheep Creek that will be used to house construction workers and for laydown and storage of construction equipment. The construction camp location is on disturbed land that has been previously used for a construction camp as well as for the storage of construction materials and equipment.

See Figure 3-1 for the site plan for the Existing and Proposed Facilities.

3.1 The Need for and Purpose of the Project

As Alberta continues to grow, in terms of both residences and businesses, so does the need for new electricity generating resources. At the same time, older generating units are approaching the end of their economic lifecycles and their output will need to be replaced.

The Alberta Electric System Operator’s estimates that Alberta will require an additional 4,000 MW of new generation capacity by 2017 to serve growing demand while retiring older, less efficient facilities and maintaining extra capacity to meet demand during planned and unplanned facility outages.
The purpose of the Project is to provide a source of cost-effective energy for the Alberta electricity market. The Project will produce 500 MW of electricity (approximately 10% of the projected generation deficit) and provide a source of cost-effective, base-load energy for the Alberta market. The Project has an estimated capital cost of $1.5 billion with approximately 50% of this total expected to be spent in Alberta. An estimated $110 million of this $1.5 billion is for environmental protection and control systems.

The Project will generate electricity in northwest Alberta, an area identified as having a generation deficit, and will thus contribute to the overall reduction of electrical transmission loss charges that all Albertans currently pay for.

### 3.2 Project Schedule

The Proposed Facilities are expected to have a commercial life of 40 years. Construction will start after all permits and approvals have been acquired and financing is in place. See Table 3-1 for an outline of key dates associated with the construction of the Proposed Facilities. The actual dates for the tasks listed in Table 3-1 will depend on factors such as when approvals are received and delivery times for major equipment at the time orders are placed.

#### Table 3-1 Project Schedule for Proposed Facilities

<table>
<thead>
<tr>
<th>Project Task</th>
<th>Planned Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue Project Disclosure Document</td>
<td>Q4 2007 (actual)</td>
</tr>
<tr>
<td>Submit Regulatory Applications</td>
<td>Q1 2009</td>
</tr>
<tr>
<td>Obtain Regulatory Approvals</td>
<td>Q1 2010</td>
</tr>
<tr>
<td>Notice To Proceed</td>
<td>Q1 2010</td>
</tr>
<tr>
<td>Start Site Preparation and Equipment Procurement</td>
<td>Q1 2010</td>
</tr>
<tr>
<td>Construction Commencement</td>
<td>Q1 2010</td>
</tr>
<tr>
<td>Construction Completed</td>
<td>Q1 2013</td>
</tr>
<tr>
<td>Commissioning Completed</td>
<td>Q2 2013</td>
</tr>
<tr>
<td>Start of Commercial Operation</td>
<td>Q2 2013</td>
</tr>
<tr>
<td>Decommissioning and Reclamation</td>
<td>2053</td>
</tr>
</tbody>
</table>
3.3 Project Components

A Best Available Technology Economically Achievable (BATEA) study was completed to evaluate the power generation technologies available for the Project using the following categories and selection criteria:

- commercially proven technology
- generating capacity
- reliable, operable and maintainable
- environmental performance
- economically competitive
- safety
- implementation schedule

The following criteria were used to select the Project Site:

- economic access to available resources such as fuel, water and personnel
- existing power plant site with space available for expansion
- existing infrastructure in terms of equipment, manpower and services
- need for the Project in the designated area
- strong support from the local community

The plot plan layout was developed using the following criteria:

- proximity to and optimal use of existing infrastructure and services
- site access for construction and on-going operational activities
- fuel delivery and storage for both the Existing and Proposed Facilities
- need to minimize impact to the Existing Facilities during the Project’s construction phase
- physical size and required location of the major components of the Proposed Facilities

The result of the study was the selection of the proposed site at the Existing Facilities and the layout as shown (see Figure 3-1).

The preferred combustion technology was a Pulverized Coal Supercritical configuration as it offers the best combination of environmentally responsible development and cost-effective electricity supplies to all Albertans. Using pulverized coal combustion technology, increased efficiency can be attained with a supercritical boiler design, which operates at higher steam temperatures and pressures where water turns directly to steam without going through a vapour stage, as occurs with a subcritical configuration.

With over 400 PCC Supercritical power plants operating reliably worldwide, this type of design has become the technology of choice for many new coal-fired power plants including the last two projects in Alberta (Genesee 3 commissioned in 2005 and Keephills 3 currently under construction and expected to be commissioned in 2011).

3.4 Project Process and Facilities

3.4.1 Project Footprint

The Milner Site is approximately 30 ha, and the Existing Facilities take up approximately 12 ha of land (see Figure 3-1). Approximately 5 ha will be used for the Proposed Facilities. There is an existing wetland on the Milner Site that will not be disturbed. The only new area of undisturbed land that will be disturbed permanently by the Project is approximately 0.30 ha of land to be used for the raw water intake system.
3.4.2 Coal Delivery, Storage and Retrieval Systems

Coal will continue to be delivered to the Project Site from local and regional sources and blended on the Project Site. A new CNR coal train unloading system will replace the existing facility including a new rail siding, railcar rotary dump and conveyor systems. A new truck unloading facility will be required, located on the east side of the new coal stockpile to support truck deliveries.

The existing coal pile at the Project Site will be reconfigured to accommodate the increased demand created by the Proposed Facilities. A new conveyor belt and surface mounted stacker system will be used to place the coal on this pile. To manage disruptions in coal supply, the coal pile will be sized to hold a 14-day supply of coal for both the Existing Facilities and Proposed Facilities, operating at full-load.

A new surface scraper system will be used to retrieve coal from the coal pile for delivery to both the Existing and Proposed Facilities. A conveyor system will move the retrieved coal from the coal pile to the steam generators for both the Existing and Proposed Facilities.

3.4.3 Ash Handling and Disposal

When coal is burned inside the furnace, two types of ash are formed from the non-combustible components of the coal. Fly ash is comprised of very small particles, which are light enough to be carried over with the flue gases as they exit the furnace. Bottom ash, which is made up of the heavier ash particles together with slag that forms on the furnace walls, falls to the bottom of the furnace.

A fabric filter baghouse unit will remove fly ash. The baghouse will be equipped with an automatic, on-line bag cleaning system. A pneumatic conveying system will transport this material from the baghouse to a storage silo located outside the powerhouse.

The Proposed Facilities’ steam generator will be equipped with a bottom ash system capable of removing over 150 t/d of bottom ash. A crusher will be used to break down the bottom ash material to a suitable size before it is transported by conveyor to a storage silo.

The collected fly ash and bottom ash will be transported by truck for disposal at the existing Flood Creek Ash Disposal Facility.

3.4.4 Combustion System

The Proposed Facilities will produce power using a supercritical steam-generating boiler. The combustion system for the boiler will be comprised of coalbunkers, coal feeders, pulverizers and natural gas burners.

3.4.5 Electrical and Control Systems

Electrical power required to operate the Proposed Facilities’ auxiliary equipment will be supplied via the existing substation. A diesel driven standby generator will provide emergency power in conjunction with an uninterruptible power supply and direct current battery system. These systems will provide the Proposed Facilities with a means of safe and orderly shutdown in the event that the electrical supply from the grid is interrupted.

3.4.5.1 Air Emission Controls

The Proposed Facilities will control air emissions by minimizing production wherever possible and by installing post-combustion control equipment to remove contaminants from the flue gases before they reach the plant stack.
Environmental control equipment to ensure that the Proposed Facilities meet the Alberta Ambient Air Quality Objectives for air emissions will include:

- advanced low NOX burner system to minimize the production of nitrogen oxides
- a Selective Catalytic Reduction (SCR) system to reduce nitrogen oxides
- a Flue Gas Desulphurization (FGD) scrubber system to reduce sulphur dioxide
- a fabric filter baghouse system to remove particulate matter
- a powdered activated carbon injection system to assist in reducing mercury
- a high efficiency power generation cycle using supercritical steam generator technology to minimize the production of carbon dioxide

### 3.4.5.2 Wastewater Discharge Controls

Process water will be monitored to ensure compliance with surface water quality guidelines prior to release into the on-site wetland and ultimately to the Smoky River. Two process water management ponds will allow suspended solids to settle out before the water is discharged to a natural wetland. Dissolved substances will not be removed by physical settling in the process water management pond and might subsequently be discharged with the effluent.

Monitoring is proposed to identify if additional water treatment would be required; this will be evaluated in conjunction with AENV through the adaptive management process.

### 3.4.5.3 Industrial Runoff Controls

Stormwater runoff from the Project Site will be directed to on-site stormwater collection ponds. Under normal conditions, the stormwater stored in these ponds will be allowed to evaporate. However, if discharge from the stormwater management ponds is required, the water will be tested to ensure compliance with surface water quality guidelines prior to release into the on-site wetland.

### 3.4.6 Cooling Systems

There will be two independent cooling systems associated with the Proposed Facilities: an open loop cooling system and a closed loop cooling system.

The open loop cooling system will provide cooling water to the steam turbine condenser. Closed loop cooling systems operating with demineralised water will be used to provide cooling to key equipment where piping and components are prone to oxygen-related corrosion.

### 3.4.7 Other Infrastructure

The Proposed Facilities will share much of the Existing Facilities' infrastructure (see Figure 3-1). Several of the infrastructure facilities will be upgraded as part of the Project, including the access road, rail loading and unloading facilities, coal handling system, the stormwater ponds and the water intake structure.

### 3.4.8 Other Facilities and Infrastructure Associated with the Power Plant but not part of the Project

The Alberta Electric System Operator advises that a new 240 kV transmission line will also be required to service the Project. The alignment of this new facility will be the subject of an independent application to be brought forward by ATCO Electric, the transmission facility owner for this area. A new 240 kV substation will also be built on the Project Site in conjunction with the transmission interconnection.
MAXIM is exploring potential sites for a new ash disposal site to replace the Flood Creek Disposal Facility (FCDF) site when that facility reaches capacity. A licence for the new site will be applied for separate from this Project.

### 3.4.9 Construction Materials

Aggregate for the construction phase will be obtained from local sources and any stockpiles of material will be located on the existing, disturbed Milner Site.

### 3.4.10 Waste Storage and Disposal Sites

Cooling water blowdown, water treatment wastewater, floor wash, equipment wash and filter backwash will be directed to the Process Water Management Ponds (PWMP) before release into the on-site natural marshland. Waste oils will be collected in drums. Solid wastes will be collected in drums or metal containers. Waste oils and solid wastes will be transported offsite for disposal at approved facilities. Recycling will be used to the maximum extent practical.

### 3.4.11 Project Accommodations

The estimated 450-person work force during the construction phase will be housed at a construction camp to be located near the Sheep River (see Figure 3-1). This site, located on a former gravel pit, has been a work camp site for other projects in the area over the past several years. The estimated 30 new employees who will form the permanent workforce during the operation phase are expected to live in Grande Cache or nearby communities.

### 3.4.12 Thermal Recovery Processes and Facilities

#### 3.4.12.1 Energy Requirements

The Proposed Facilities will use coal as fuel, consuming approximately 32,522 terajoules annually. Natural gas will be used for steam generator start-up, coal ignition support and building heating when both the Proposed and Existing plants are temporarily out of service. Annual natural gas consumption is estimated to be 23,700 gigajoules.

#### 3.4.12.2 Hydrocarbon and Chemical Storage

Water treatment chemicals and miscellaneous products (oils and lubricants) will be stored in the main powerhouse building as well as the main pump house building. The storage areas in each of these buildings will incorporate a secondary containment structure consisting of concrete berms. All chemicals and miscellaneous products will be stored according to applicable storage guidelines. All substance storage tanks for the Proposed Facilities will be aboveground.

### 3.4.13 Water Supply

MAXIM currently has a license to withdraw 10,000 acre-feet (12,334,800 m$^3$) annually from the Smoky River. The diversion is currently accomplished by way of an existing intake structure immediately adjacent to the Project Site. The existing intake structure does not have sufficient capacity to service the Proposed Facilities. Therefore, the water needed for the Proposed Facilities will require a new intake system and pumping facility in addition to the existing intake structure and pumping facility. The new water intake structure will be comprised of an excavated backwater with a perforated box covered by gabion rock. The
large surface area of the gabion rock lowers the velocity near the structure and prevents entrainment of fish.

The total net annual water requirement for the Proposed Facilities is 6,017,000 m$^3$. The average water requirement for the Project is approximately 0.3 m$^3$/sec. This volume of water is available, on a monthly average, throughout the year and the Project’s requirements are from 0.5% to 16.6% of the available flow of the Smoky River. Available flow is defined as the maximum rate of flow that is available for diversion as per Alberta Environment’s in-stream objectives for the river.

The water withdrawn from the Smoky River will be filtered and treated before being used in the power plant boilers. Potable water will not be used at the power plant site; bottled drinking water will be supplied to all employees.

The plant is designed to minimize water consumption and to maximize the recycling of water during operation. The following practices will reduce water consumption and increase the efficiency of water use:

- once through supercritical steam generator, eliminating boiler blowdown
- cooling tower using maximum cycles of concentration to minimize blowdown requirements
- recycled water (cooling tower blowdown) used for ash handling purposes
- industrial wastewater from the Process Water Management Ponds recycled to the facility

### 3.5 Environmental Management Systems

The Existing Facilities have environmental management systems in place and these will be upgraded and expanded for the Proposed Facilities.

#### 3.5.1 MAXIM’s Environmental Policies

MAXIM recognizes its responsibility to protect the environment and do its business operations in an environmentally responsible manner. This includes using resources wisely to:

- produce electricity
- minimize environmental effects on the air, soil, and water
- safeguard the health, safety and well-being of employees and the public

MAXIM’s corporate environmental principles outline the Company’s approach to environmental management. MAXIM’s policy on environmental health and safety expectations of employees and contractors is as follows:

<table>
<thead>
<tr>
<th>Employees and Contractors will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure compliance with applicable laws, regulations, industry standards, and corporate standards; and</td>
</tr>
<tr>
<td>Carry out work in a healthy and safe manner to ensure MAXIM’s expectations regarding the prevention of harm to people, property, and the environment are met.</td>
</tr>
</tbody>
</table>

Environmental Responsibilities:

- Managing Facility/Activity Impacts

  Decisions made and actions taken during the life cycle of any project, facility or activity may have an impact on the environment. Environmental considerations are a part of each stage of a facility’s development, operation and closure. Project evaluation includes determination and mitigation of environmental impacts. The facility life cycle phases include: 1) planning, 2) construction, 3) operations, 4) reclamation, and 5) property transactions.
• Waste Management
  If the use of some products can be reduced through efficient cost-effective purchasing practices, fewer wastes will be generated. Prior to disposing of materials, due consideration will be given to reuse, recycle and recovery options. Waste disposal is the least desirable option and if required will be done in an environmentally acceptable manner.

• Managing Special Materials
  MAXIM deals with materials that can potentially affect our environment adversely. They require special attention throughout their life cycle. Responsible corporate environmental programs seek to identify these materials and handle them in an environmentally sound fashion. Some of these materials include liquid fuels, lubricants, coolants, fly ash, bottom ash and asbestos.

• Air and Water Quality Management
  MAXIM aims to meet all regulatory requirements both for point-source emissions covered by approvals and non point-source activities that can also affect the environment.

3.5.2 Maxim’s Environment, Health and Safety Management System
MAXIM is committed to preventing injuries and maintaining a healthy environment for its employees. MAXIM will develop and implement comprehensive safety and loss-control programs that incorporate the prevention of accidents, injuries and illnesses into normal work activities. Effective use of personal protective equipment and employee training on safe work practices and procedures are a part of these programs.

3.5.3 MAXIM’s Environmental Protection Plan
MAXIM will develop an Environmental Protection Plan (EPP) for the Project. The EPP will be developed based on other industry EPPs, the recommendations and results of the project environmental assessment, contributions from stakeholders during public consultations, and consultation with regulators during the regulatory review process. The EPP is a dynamic document that will be updated as required to address new protection and reporting procedures throughout the life of the Project.

3.5.4 Emergency Response System
MAXIM’s existing Emergency Response Plan (ERP) addressing emergency scenarios, potential hazards to the general public, and environmental contingency procedures and systems in place for adequate response to emergencies will be upgraded for the Proposed Facilities, following Project approval.
4 Consultation

4.1 Consultation Programs

4.1.1 Overview

MAXIM recognizes the importance of public consultation in the regulatory approval process and is committed to open, meaningful and transparent communication and consultation with all affected stakeholders, Aboriginal groups and interested parties.

There are four Aboriginal cooperatives and two enterprises in the Grande Cache region:

- Muskeg Seepee Cooperative
- Susa Creek Cooperative
- Wanyandie Flats Cooperative comprised of:
  - the Eastland Holdings (known as #119)
  - the Westland Holdings (known as Wanyandie Flats)
- Victor Lake Cooperative
- Kamisak Enterprise (known as Grande Cache Lake)
- Joachim Enterprise

These cooperatives and enterprises have a total land area of 4,159 acres. The lands are owned by the individual cooperatives and enterprises on behalf of their residents. Residents of these aboriginal communities further identify themselves as members of either the Aseniwuche Winewak Nation (AWN) or the Métis Nation of Alberta Local #1994.

MAXIM held open houses and traditional knowledge sessions with the Aboriginal groups, as well as personal visits and correspondence to inform them of the Project and solicit their comments.

The information that was provided during the initial public notification described the scope and scale of the Project. It highlighted the key features relating to environmental, health and safety, and socio-economic factors associated with the Project. The intent of this consultative approach was to assist stakeholders in understanding the key project issues, the regulatory process (and their rights in this respect) and to convey MAXIM’s proposal to develop the Project.

MAXIM’s public consultation program was carefully planned to go beyond the minimum public notification requirements for power plant projects as set out by the Alberta Utilities Commission (AUC) Rule 007. The consultation process completed to date consists of extensive information gathering and dissemination through discussions with directly affected stakeholders; personal one-on-one meetings; information mail-outs; open house events; interviews; and articles in local newspapers. Meetings and written correspondence was conducted with stakeholders, municipal and provincial officials, regulators, and other community representatives.

The multi-stakeholder consultation process was initiated in December 2007. Preliminary information regarding directly affected stakeholders and interested parties was previously compiled during the consultation process from MAXIM’s #14 Mine, which initiated consultation activities in 2005. This lead-time allowed the public consultation team to become familiar with all aspects of the Project area as well as potential community issues.
4.1.2 Stakeholder Identification
Residents and landowners within 5000 m of the Project Site were identified and included in the consultation process. This is greater than the AUC Rule 007 requirement that proponents identify all potentially affected parties within a 2000 m radius of proposed power plants. However, since there are no residential stakeholders within 2000 m of the Project Site, MAXIM expanded its consultation radius to 5000 m based upon MAXIM’s desire to ensure that the nearest residents or landowners were included in the consultation process and given the opportunity to discuss any issues or concerns with MAXIM.

4.1.3 Public Disclosure of Project
The Project required an Environmental Impact Assessment (EIA) to be completed. The EIA process, administered by Alberta Environment, requires proponents to publish a Public Disclosure Document (PDD) and the proposed Terms of Reference (ToR) for the EIA. Formal notice of these documents was provided in area newspapers during the week of December 10, 2007. In addition to the formal notice provided in area newspapers, an introduction letter on the Project including the PDD and proposed Terms of Reference was sent to key stakeholders on or before December 10, 2007. The PDD and ToR were also made available at the Grande Cache Public Library and the Aseniwuche Winewak Nation of Canada (AWN) office.

4.1.4 Formal Consultation after Public Disclosure
The Project was announced to the general public on December 10, 2007. Given MAXIM’s previous consultation experience in the area, the consultation process was further refined to accommodate Aboriginal engagement. The nearest residents are located in the Aboriginal Cooperative of Wanyandie Flats (Westland Holdings), approximately 5 km northeast of the Project Site. Some of these residents maintain membership in Grande Cache Métis Local #1994 (GCML) while others maintain membership in the Aseniwuche Winewak Nation (AWN). Customary consultation practices for the community have involved the GCML or the AWN, who provide translation services for consultation. Initial introduction to the Project was accomplished by way of letter to the elected leaders of the Cooperatives, Enterprises, GCML and the AWN during the week of December 10, 2007.

Follow-up consultation with the nearest residents was facilitated by a combination of personal visits, traditional knowledge sessions, open house events, and both an English and Cree language project DVD.

Given that the proposed Project is located approximately 20 km from the Town of Grande Cache, consultation for all other stakeholders was facilitated by open house events in Grande Cache.

All stakeholders, regardless of proximity to the proposed Project, were provided with an opportunity to assess the Project and submit any concerns or questions, or to identify topics about which they would like to receive additional information.

A toll free telephone line was established to facilitate public calls and requests for information and a web site was established with Project information, links related to the electricity sector, and further information pertaining to MAXIM.

4.1.5 Open Houses
MAXIM hosted two introductory Open House events in the spring of 2008 to support its public consultation efforts. The Open Houses were held in Grande Cache. One of the open houses was focused on the Aboriginal community; the other was for the entire Grande Cache community. The intent of the introductory Open Houses was to introduce the Project and the EIA studies that would be conducted over the course of the summer.
MAXIM hosted three Open House events in September 2008 to provide information prior to the submission of the EIA. The Open House events were held in Grande Cache and were organized to present the results of the EIA. One of the Open Houses was dedicated to the AWN; one was dedicated to the GCML; and the third was a general Open House for the entire Grande Cache community.

4.1.6 Traditional Knowledge Information Sessions

Specific to Traditional knowledge, MAXIM hosted information sessions on May 14, 2008 for the Aseniwuche Winewak Nation (AWN) and on June 24, 2008 for the Grande Cache Métis Local #1994. These sessions provided participants an introduction to the Traditional Knowledge studies that MAXIM would complete over the course of the summer.

4.1.7 Traditional Knowledge Studies

MAXIM conducted Traditional Knowledge studies with each of the AWN and the GCML. These studies engaged the Elders of each group, provided detailed project information and collected traditional land use and traditional knowledge information that would ultimately be used in assessing the Project impact on traditional pathways.

Although different in their views and organization, both the AWN and GCML shared traditional information that was very consistent. This consistency affirms that the Traditional Knowledge sessions were successful in capturing the traditional knowledge specific to the local aboriginal community.

4.1.8 Cree Language and English Project DVD

MAXIM commissioned a Cree language DVD to facilitate the consultation process with the aboriginal community. The project DVDs provided a project overview and summarized the results of the environmental studies completed by MAXIM. The DVD was scripted by MAXIM and translated by a member of the Grande Cache aboriginal community. The DVD was also produced in Grande Cache with the assistance of the GCML. MAXIM also commissioned an English language version of this DVD to facilitate the consultation process with the general community and key stakeholders.

4.2 Project Concerns Identified During Consultation

MAXIM received no concerns for the Project from residents of Grande Cache. Aboriginal community members identified potential concerns related to the following:

- air quality, specifically the effects of emissions, including fugitive dust
- water quantity and quality
- water intake structure
- ash disposal
- reclamation
- human health
- socio-economics
- traffic
- ecological effects
- traditional values
- consultation
- plant gathering
- spiritual sites
- recreational land use
MAXIM provided responses to the Aboriginal groups which demonstrates that the Milner Expansion project complies with all relevant regulatory guidelines. Maxim will formally request letters of informed consent from both the AWN and the GCML. These letters will be forwarded to regulatory bodies once they are received by MAXIM.
5 The Environmental Assessment Process and Methodology

This environmental assessment has been completed using the standard corporate methodological framework developed by Jacques Whitford AXYS Ltd. to meet the requirements of Canadian Environmental Assessment Act (CEAA) and Environmental Protection and Enhancement Act (EPEA). The environmental effects assessment method is based on a structured approach that considers:

- mandatory and discretionary factors required under Section 16 of CEAA
- federal and provincial regulatory requirements for the assessment of environmental effects
- issues raised by the public, aboriginal people and public stakeholders
- engineering designs and programs for mitigation and monitoring within the context of a comprehensive environmental planning process

The environmental assessment focuses on valued environmental components (VECs), which are of particular interest to regulators and other stakeholders. Fourteen VECs were identified: Atmospheric Environment, Sound Environment, Groundwater Resources, Hydrology, Surface Water Quality, Aquatic Ecosystem, Vegetation and Wetlands, Wildlife, Terrain and Soils, Land Use, Historical Resources, Aboriginal Traditional Knowledge and Land Use, Socioeconomics, and Human and Ecological Health.

Residual effects of the Project on the VECs were described following the implementation of mitigative measures. For the biophysical VECs, the consequence of the effects on the Atmospheric Environment, Sound Environment, Groundwater Resources, Hydrology, and Surface Water Quality were determined based on how users or receptors of the VECs were affected. For example, potential changes to surface water quality were evaluated from the context of the users of the water. The significance of environmental effects of the Project on the receptor VECs (Vegetation and Wetlands, Wildlife, Terrain and Soils, and Human and Ecological Health) was assessed based on the extent and persistence of change to those VECs.

Effects were assessed for three project phases (construction, operation, and decommissioning and reclamation) and for three cases:

- Baseline Case, including the existing conditions and existing and approved projects
- Application Case, including the Baseline Case with the effects of the Project
- Planned Development Case, including past, existing and anticipated future environmental conditions

For most VECs, effects were assessed for a local assessment area (LAA), usually in the immediate vicinity of the Project site, and a regional assessment area (RAA) that encompasses the widest extent where cumulative effects could be felt.
6 Regional Setting

6.1 Ecological Context

6.1.1 Grande Cache Region

The Grande Cache region is located within the Inner Foothills belt of the Rocky Mountains Montane Subregion. This ecoclimatic zone is distinguished from the surrounding areas by the common occurrence of stands dominated by aspen and grassy patches on south-facing slopes. The Montane Subregion, covering approximately 0.9% of Alberta, is considered an important ecological resource in Alberta. However, the plant communities associated with this ecosystem in the Grande Cache area are not botanically unique.

The Rocky Mountain Natural Region contains a highly diverse mosaic of habitats, which support a large number of species. An important part of the grizzly bear’s range in Alberta occurs within the Rocky Mountain Natural Region. A few species, including the Willow Ptarmigan and woodland caribou, are found only in the northern and central part of the Rocky Mountain Natural Region. Douglas fir and lodgepole pine forests in the Montane Subregion of the Rocky Mountain Natural Region provide habitat for the Yellow-rumped Warbler, Dark-eyed Junco, Chipping Sparrow, Red Crossbill, Pine Siskin and red squirrel. Mixedwood forests support a diverse avian community, including Alder Flycatcher, Swainson’s Thrush, Warbling Vireo, Calliope and Rufous Hummingbirds, Tennessee Warbler, Orangecrowned Warbler, Northern Waterthrush, MacGillivray’s Warbler, American Redstart and Western Tanager. Wetlands, mixed woods and shrubbery associated with beaver ponds, streams and lakes in the Montane Natural Subregion also support a diverse array of wildlife species. Species that occur in open water and marsh habitats include the Barrow’s Goldeneye, Common Snipe, Red-winged Blackbird, Common Yellowthroat, Lincoln’s Sparrow, beaver, muskrat, western toad, spotted frog and longtoed salamander.

There are species of concern that might be found in the Grande Cache region. Bird species of management concern include the barn swallow, common yellowthroat, sora, least flycatcher and the great blue heron. Mammal species of special concern include the grizzly bear, wolverine and woodland caribou.

Native fish species of the Rocky Mountain Natural Region include lake trout, bull trout, mountain sucker (in the south), and local populations of rainbow trout and cutthroat trout. Within the Grande Cache region, the Smoky River is the main watercourse.

6.1.2 Area Around and On the Project Site

Most of the area around the Project Site is closed deciduous, coniferous or mixedwood forest. There are also small pockets of mixed grasslands and some wetlands, open water and watercourses. The majority of the Project Site is a disturbed cleared site with little or no vegetation; however, there is one relatively large marsh-type wetland (4.4 ha) located east of the existing facilities.

Deposition of coal dust from coal mining and washing operations and from coal storage has occurred on the Project Site for the past 35 years. All of the wetlands on the Project Site appear to be fed by underground hydrological processes. The 4.4 ha marsh wetland complex is also fed by process water discharge from the Existing Facilities.
The Project Site is adjacent to the northwestern bank of the Smoky River. Fish species found in the Smoky River include sportfish species such as mountain whitefish, bull trout and Arctic grayling, as well as non-sportfish species including longnose sucker, white sucker, slimy sculpin and longnose dace. During fishing surveys, the majority of the fish species captured in the Smoky River are sportfish species.

The portions of the Smoky River near the Project Site provide suitable fish habitat for rearing and feeding, and is likely a migratory corridor for many fish species. Spawning habitat for sportfish is limited to mountain whitefish, which use the run habitat in the middle of the river. Side margins of the Smoky River near the Project Site also provide spawning habitat for longnose dace and sculpin species.

### 6.2 Socio-Economic Context

#### 6.2.1 General Economic Overview

In the late 1960s, the government of Alberta created the Town of Grande Cache with the purpose of opening the area for the development of coal mines. Construction started in 1969 and by 1971, basic infrastructure such as a hospital, schools, stores and homes had been built. The town quickly grew with the opening of McIntyre Mines in 1969. By 1983, Grande Cache received official town status. Currently, Grande Cache Coal Corporation operates a coal mine north of town, employing about 325 people with production estimated of 1 million tonnes in 2007.

As a resource-based community, the town has experienced boom-bust cycles because of its dependence on coal. The town has diversified its economy by attracting other industries such as the correctional institute and sawmill. The town is also working to build a stronger tourism industry.

In 2000, the town experienced a serious economic downturn with the closure of the Smoky River Coal Mine. The closure was followed by the shutdown of the local sawmill several years later. The closures caused hundreds of families to move away from Grande Cache.

Since late 2005, the town has seen substantial improvements in the local economy. Both the mine and the local sawmill have reopened and there has been a noticeable increase in oil and gas activity in the corridor between Grande Prairie and Hinton. Major businesses in the area include the HR Milner Generating Station, the Grande Cache Coal Corporation mine operations and processing plant, Correctional Services Canada, the Foothills Forest Products Sawmill and a number of oil and gas companies.

The closest Forestry Management Area is #20, which is located north of Grande Cache and is operated by Weyerhaeser Company Ltd. There is also a coniferous timber licence near Grande Cache held by Foothills Forest Products (FFP). The one full-time sawmill in the Grande Cache, the FFP sawmill, is located east of Grande Cache along Highway 40 and employs about 100 people.

The Town of Grande Cache is located in a region with potential major natural gas and condensate reserves. Almost a dozen oil and gas companies are operating in the area. Other industrial and resource development activities in the area include natural gas pipelines operated by ATCO Gas and Pipelines Ltd., Alta Gas Utilities, and sand and gravel extraction leases.

Tourism and recreation are other important components of Grande Cache’s economy.

Population data from the 2006 Census reported that the population of Grande Cache was 3,783, which is very close to the 2001 population figure of 3,828.
6.2.2 Aboriginal Socio-economic Overview

The local Aboriginal population has been present in the area for many years. An influx of Aboriginal people to the area occurred in 1907 when Aboriginal people living in Jasper were evicted to create the National Park. Between 1972 and 1974, the local Aboriginal population organized themselves into two enterprises and four co-operatives and were granted seven parcels of land by the government of Alberta. In 1994, the Aseniwuche Winewak Nation (AWN) was incorporated and represents over 400 of the Aboriginal people in the area. The area is also home to 300 Métis people, with half living in the Co-operatives/enterprises and half living in the Town of Grande Cache. Métis Local #1994 is located in Grande Cache and is key contact for local Métis issues.
7 The Biophysical Environment

7.1 Effects of the Project on Atmospheric Environment

Potential environmental effects of the Project on the Atmospheric Environment are related to increases in air contaminants for which there are regulatory objectives, increases in water vapour and increases in greenhouse gases.

Air contaminants and Water Vapour

Mitigative measures to reduce the increases in air contaminants include the incorporation of Best Available Technology Economically Achievable (BATEA) into Project design, minimizing the Project footprint to minimize the area of emissions, and keeping vehicles properly tuned and maintained. With the incorporation of mitigation measures, the changes to air quality as a result of Project-related increases in CACs and other air contaminants are negligible to low in magnitude. Similarly, the changes to air quality as a result all past, present and reasonably foreseeable projects/actions, in combination with the environmental effects of the Project are negligible to low in magnitude. Overall, air quality is not expected to change substantially in residential areas and locations where the public are anticipated to spend appreciable time. All parameters will remain within the Alberta Ambient Air Quality Objectives (AAAQO) in these areas.

The release of water vapour from the cooling towers was assessed in terms of its residual and cumulative effects on the environment. Modelling indicated that condensed water vapour both aloft and in proximity to Highway 40 is infrequent to very infrequent. Visibility is not expected to change substantially compared to what is currently experienced.

Overall, effects of the Project on air quality are predicted to be of low consequence. Air quality monitoring will be ongoing, the specifics to be determined in consultation with AENV.

Greenhouse Gases

The increase in GHG emissions is regulated by the Specified Gas Emitters Regulation (SGER). The existing HR Milner generation facility has been filing GHG emission inventory information under the Specified Gas Reporting Regulation (SGRR) since 2003. MAXIM filed its verified baseline GHG emission intensity application in 2007 and its 2007 compliance report in 2008 with Alberta Environment. The Project will be considered a new facility under the SGER and will therefore be required to report GHG emissions annually upon start-up, establish a baseline GHG emission intensity over the first three years, and begin reducing that intensity by 2% per year for the first five years of operation.

The GHGs of consideration for this Project are carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Total GHG emissions are normally reported as carbon dioxide equivalents (CO₂eq). For this Project, the operation phase represents the most substantial GHG contributions. The operational Proposed Facilities will emit an estimated 3,010,000 tonnes of CO₂ per year. The CH₄ and N₂O emissions are estimated at 31 and 23 tonnes per year, respectively. The annual carbon dioxide equivalent (CO₂eq) emissions will be 3,017,781 tonnes per year.

The amount of GHG emissions from the Project represents 0.96% of the total Alberta projected GHG emissions for the year 2015 and 0.34% of the total Canada projected GHG emissions for the year 2015. The contribution of greenhouse gases to the Project-Atmospheric Environment interactions are considered to be negligible, which is consistent with the Canadian Environmental Assessment Agency.

The Project's approach to controlling GHG emissions will be to minimize their production. Mitigation measures for GHG emission reductions focus particularly on an improvement in fuel use and energy efficiency during operations, the phase responsible for the largest volume of GHG emissions associated with the Project. Post combustion control equipment will be installed to ensure that all applicable regulatory air pollutant emission requirements are met. To manage GHG emissions from the operation of the Project, the primary design consideration to minimize the production of carbon dioxide emissions is a high efficiency power generation cycle using supercritical steam generator technology to achieve improved efficiency. With the deployment of PCC Super boiler design, high efficiency steam turbines, and energy efficient BATEA, the resulting GHG emission intensity is anticipated to be well below the current Canadian average intensity for coal-fired electricity generation. Due to these mitigations and design features, the Project's GHG emission intensity of 762 kg CO$_2$ equivalent/MWh is low compared to the average of 970 kg CO$_2$ eq/MWh for coal plants operating in Canada.

Overall, GHG emissions from the Project are relatively small when compared to provincial and federal inventories, and are small compared to existing projects of similar type due to the implementation of best practices and BATEA throughout. As directed by the Canadian Environmental Assessment Agency guidance, Project effects on climate are assumed to be not significant, since the incremental contribution of the Project to national or global GHG emissions cannot be linked to specific changes in global climate. Project risks to climate change are rated as nil to low. The Project's contribution to greenhouse gases is assessed as being of low consequence.

## 7.2 Effects of the Project on Sound Environment

A noise impact assessment (NIA) evaluating the expected noise contribution of the Project was conducted as part of the EIA. The noise sources affecting existing sound levels in the area include basic plant operations such as the main plant building (housing the power island and associated ancillary equipment), exhaust stack and cooling tower.

The applicable regulatory requirements with respect to environmental noise emissions for facilities are defined in the AUC Noise Control Rule 012. Rule 012 specifies maximum allowable outdoor sound levels for noise from the operation of power generation facilities. Permissible sound levels for noise from the Project were determined for identified residences in accordance with the requirements of Rule 012.

The Project is located in a remote area with few nearby dwellings. For such remote facilities, the AUC assigns a permissible sound level of 40 dBA Leq at a distance of 1.5 km from the facility fence line. As there are no residences within 1.5 km of the Project, the NIA local study area for the sound environment is defined as the area out to a distance of 1.5 km around the Project Development Area (PDA). The NIA also included a regional study area for the sound environment for the region around the PDA where the Project may be audible and increase the existing sound levels for residences. The Wanyandie Flats area, located approximately 4 km northeast of the PDA, contains several residences. Therefore, the regional study area was defined as the area out to a distance of 5 km around the PDA.

During the preliminary design of the proposed power plant, MAXIM identified all major noise sources and applied an iterative process of applying mitigation measures to ensure the proposed facility would comply with the noise control objectives outlined in Rule 012.

Computer modeling was used to determine predicted sound level contributions at nearby residential locations, the nearest of which is approximately 4 km away. The modeling assumed that noise mitigation measures mentioned above would be incorporated into the power plant design. The predicted sound levels generated from project construction activities range from 45.0 dBA at 1.5 km to 29.7 dBA at the Wanyandie Flats residences. The predicted sound levels generated from project operation activities range from 40 dBA at 1.5 km to 36.9 dBA at the Wanyandie Flats residences.
range from 38.3 dBA at 1.5 km to 25.9 dBA at the Wanyandie Flats residences. The predicted combined sound levels (contribution from the Project plus assumed existing ambient levels) during project operation range from 40.0 dBA 1.5 km to 35.5 dBA at the Wanyandie Flats residences.

The NIA concludes that sound levels from the Project will comply with the AUC’s Noise Control Rule 012 following the implementation of noise reduction measures. These include restricting construction activities to between 0700 and 2200, informing residents of anticipated unusual noise events, and providing noise control measures on equipment and facilities. The effects of the Project on the Sound Environment were assessed as being not significant.

### 7.3 Effects of the Project on Groundwater Resources

The potential effects of the Project on groundwater consist of changes to groundwater quantity and quality caused by foundation excavation activities and the storage and discharge of facility process water. These effects were assessed by comparing the effects of the Existing Facilities on groundwater to the expected changes in construction and operation techniques to be followed by the expansion of the plant. Several years of monitoring data from the Existing Facilities as well as the adjacent GCCC facility provided an excellent basis for understanding the effects of the Project on the groundwater.

The effects of the Project on groundwater resources will be mitigated through restriction of excavations to less than 4 m depth where possible, providing secondary containment for chemical storage and through maintenance of holding tanks and water lines. With the incorporation of proposed Project mitigation measures, the changes to groundwater quantity are expected to be low to negligible, since dewatering during construction is not expected to be substantive and groundwater will not be used in operation. Changes to groundwater quality are expected to be within the Canadian Drinking Water Quality Guidelines.

Overall, effects of the Project on groundwater are predicted to be of low consequence. The continuation of the existing groundwater monitoring plans in place for the Milner Site will allow for verification of the assessment and the identification of any variances from the expected effects on the groundwater resource. The details of the monitoring program will be determined in consultation with AENV.

### 7.4 Effects of the Project on Hydrology

The potential effects of the Project on hydrology consist of alterations to the flow of the Smoky River, water use conflicts with other water licence holders of the Smoky River, and increased sediment loadings on the Smoky River.

Alterations in the flow regime of the Smoky River due to water extraction for the Project are expected to range between 0.5% and 16.6% of the available flow (or at most, 0.33% of the annual flow). The effect of the Project on flow regimes is assessed as having a low consequence.

The water licence for the Existing Facilities allow for the annual extraction of 12.3 million m$^3$ of water from the Smoky River. The net Project needs, even with those of the Existing Facilities and Proposed Facilities combined, are less than 60% of this allowable amount. Therefore, the effects of the Project on other licensed water users are assessed as having a low consequence.

Surface erosion and sedimentation of the Smoky River as a result of the Project will be controlled by a Sediment and Erosion Management Plan. This Plan will include the existing Stormwater Management Plan, which will be modified and expanded for the Project. Increased sediment loading of the Smoky River is expected to be not measureable and sediment loading on water users is assessed as having a low consequence.
Overall, effects of the Project on hydrology are predicted to be of **low consequence**. The findings of the assessment support the conclusion that no follow-up monitoring is needed.

### 7.5 Effects of the Project on Surface Water Quality

The potential effects of the Project on surface water quality consist of changes to water quality of the Smoky River from the release of silt and effluent discharge into the Smoky River and changes to the water quality of regional lakes from increased acid emissions.

The release of silt during Project construction and operation could affect levels of TSS, nutrients and metals in the Smoky River. Most of the potential effects from release of silt will occur during the construction phase when the land is disturbed for the construction of the new water intake structure and the temporary storage area. Bottom silt/sediment might also be re-suspended in the Smoky River during construction of the proposed water intake structure. During operation, silt release might occur in runoff during extreme rain events. Mitigation measures include implementation of an Erosion and Sedimentation Control Plan, a Stormwater Management Plan and use of recognized instream construction practices. With the application of these mitigation measures, there should be no exceedances of the Alberta or CCME guidelines for suspended solids and the environmental effect of silt release on water quality of the Smoky River is predicted to be of low consequence.

The effluent from the process water management ponds on the Milner Site could potentially enter the Smoky River and affect water quality. The paths by which the process water could enter the Smoky River are through seepage into the aquifer below the ponds and subsequent migration to the Smoky River, or through a culvert which connects the wetland in the northeastern portion of the Milner Site to the Smoky River. Current mitigation measures in place are the use of the wetlands for water purification and the periodic removal of sludge from the wastewater ponds. With the application of these mitigation measures, there should be no exceedances of water quality guidelines or other thresholds. The effect of the increased wastewater effluent on water quality of the Smoky River is predicted to be of low consequence.

Operation of the Project will result in an increase in air emissions, which could result in the acidification of regional lakes. Measurable water quality parameters that indicate acidification include pH, alkalinity (acid neutralizing capacity), sum of base cations, nitrates, sulphates, aluminum and dissolved metals. There are no lakes at risk of acidification within the study area. Mitigation measures to reduce levels of sulphur emissions include the application of post-combustion desulphurization technology. With the application of mitigation measures at the emissions sources, the effect of the increased emissions on regional lake chemistry is predicted to be of low consequence.

Overall, effects of the Project on surface water quality are predicted to be of **low consequence**. Follow-up and monitoring surface water quality work include daily monitoring of the Smoky River for Total Suspended Solids (TSS) during construction of the intake structure and semi-annual monitoring of the Smoky River upstream and downstream of the Milner Site on the left (north) bank of the river. During operations, water quality monitoring of the process water management ponds will continue to ensure that water discharged to the wetland meets surface water quality objectives.

### 7.6 Effects of the Project on Aquatic Ecosystem

The potential effects of the Project on aquatics consist of direct loss of fish habitat from construction of the water intake, changes in fish mortality risk due to the potential of increased sedimentation into the Smoky River during construction and operation, and increased fishing pressures due to increased workforce during construction.

Interactions between the Project and the Aquatic Ecosystem are expected to be minimal, restricted primarily to the construction of the water intake structure. Construction of the intake structure will require
limited instream works in the Smoky River when the bank is excavated and the channel deepened to allow flow to the created backwater area. This activity will result in a temporary disturbance of fish habitat within the river. Construction of the water intake was the only activity that was determined to have a potential interaction with the aquatic ecosystem with the potential to result in an environmental effect of concern.

Proposed mitigation measures include adherence to construction timing restrictions, standard instream construction procedures, isolation of the work site, and proper sediment and erosion control measures. With the implementation of proposed mitigation measures, the residual effect of the water intake will be the alteration of approximately 120 m$^2$ of the active channel and the creation of approximately 2000 m$^2$ of backwater habitat. Alteration of the habitat will create some diversity along the shoreline and may actually enhance or increase the amount of available fish habitat in that area of the Smoky River.

Overall, with the incorporation of proposed Project mitigation measures, the Project will result in no net loss of fish habitat in the Smoky River and the effects of the Project on aquatics are predicted to be **positive and not significant**. Monitoring will be required as part of the *Fisheries Act* authorization granted for the construction of the water intake. Details of the monitoring will be specified in the authorization and will be designed to assess the stability and effectiveness of mitigation measures.

### 7.7 Effects of the Project on Vegetation and Wetlands

The potential effects of the Project on vegetation consist of direct loss of vegetation from clearing activities associated with the 1.4 ha temporary storage area and the 0.3 ha new water intake structure, changes in abiotic conditions during construction, and changes in vegetation health and diversity during operation.

Residual environmental effects associated with direct vegetation loss from Project clearing consist of the loss of 0.03 ha of wetlands, representing 1.3% of the wetlands in the LAA, and 1.1 ha of riparian ecosystems, representing 6% of the riparian ecosystem in the LAA. No rare plants or plant communities of ecological concern were recorded in the area to be cleared. Mitigative measures proposed include restricting disturbance to the minimum area needed for the Project. Since the area lost represents a small proportion of the RAA, the loss will not affect the sustainability of communities or species at risk in the RAA. The effect is assessed as **not significant**.

Changes in abiotic conditions refer to changes in drainage patterns that might affect vegetation by starving or flooding communities from or with water. The only potential change in water supply to a vegetation community is associated with the loss of a very small wetland in the temporary storage area. This loss is not expected to have any effect on abiotic conditions and no residual effects have been identified. The effect is assessed as not significant.

Atmospheric emissions from the Project will affect plant communities sensitive to NO$_2$ fumigation and nitrogen deposition. The short-term (5 to 10 years) increase in NO$_2$ fumigation and small extent of increases in nitrogen deposition suggest that the sustainability of plant communities will not be jeopardized. The effect is assessed as **not significant**.

Most of the Project footprint and activities are restricted to an existing industrial site and the only new disturbance will be the 0.3 ha water intake structure site and 1.4 ha temporary storage area, both of which are in an area that is not unique in the region. The Project is not expected to affect biodiversity.

Overall, effects of the Project on vegetation are predicted to be **not significant**. Given the small area of vegetation disturbance and the lack of unique habitat, monitoring is not warranted.
7.8  Effects of the Project on Wildlife

The potential effects of the Project on wildlife consist of reduced habitat availability or effectiveness of wildlife habitat.

The Milner Site is a brownfield site with undisturbed wildlife habitat restricted to 19.7 ha of wetland, mixed woodland, and riparian grassland and forest. Approximately 1.4 ha of riparian area will be temporarily lost and 0.03 ha of wetland will be permanently lost due to the Project. The habitat that will be lost is of low quality and is not unique in the region.

By restricting the size of the Project footprint, minimizing the duration of construction, avoiding construction and decommissioning activities during critical wildlife periods, maintaining waste disposal practices to avoid attracting wildlife and revegetating the temporary storage site, the effects of the Project on wildlife diversity and wildlife habitat are predicted to be not significant. Based on the findings of the wildlife studies, wildlife monitoring is not planned.

7.9  Effects of the Project on Terrain and Soils

The potential effects of the Project on soils consist of soil sensitivities to acidification from air emissions. The effects of the Project on soils will be mitigated by minimizing emissions generated at source. With the incorporation of proposed Project mitigation measures, residual environmental effects on soils associated with potential acidification resulting from Project operation are predicted to be not significant. Assessment results indicate that soils follow-up and monitoring is not warranted,
8 The Human Environment

8.1 Effects of the Project on Land Use

The Project Site is a brownfield site that is used for industrial activities. Its modification and development for expanded industrial use will have limited potential environmental effects on Land Use. The Project will not impede access to the Smoky River, or prime wilderness, hunting areas, recreational sites or environmentally significant areas. The ability to fish, hunt, trap and access recreational activities will not be affected.

Proposed Project mitigations include communication with land users prior to construction, implementation of an environmental protection plan, and use of standard construction codes and practices. By following these measures, the residual environmental effect of the Project on trapping, hunting, recreational and industrial land use is predicted to be not significant. No follow-up or monitoring land use work is planned.

8.2 Effects of the Project on Historical Resources

Historical Resources include archaeological sites, historic period sites (i.e., homesteads, cabins, forts, artefacts, trails, foundations and campsites) and palaeontological resources. Precontact archaeological sites include remains (e.g., stone tools, butchered bones and fire-cracked rock) resulting from the traditional occupation of Alberta by Aboriginal people before contact with European traders in the late 1700s. Aboriginal people have lived in northern Alberta since the establishment of vegetation and wildlife habitat following the retreat of glaciers and glacial lakes about 10,500 years ago. Historic archaeological sites can be Aboriginal or non-Aboriginal, and date from the time of European contact until 1960.

Palaeontological sites and specimens occur in both bedrock and unconsolidated fossiliferous glacial and non-glacial deposits. Specimens include fossils found in ancient sediments and unfossilized remains of plants, invertebrates and vertebrates.

Historical resources are protected under the Alberta Historical Resources Act. Under this Act, no impact can occur to any historical resources sites without approval of the Minister of Alberta Culture and Community Spirit (ACCS), which issues Historical Resources Act clearance.

Project activities have the potential to result in a change to site contents or site context of historical resources. Project interactions with historical resources that might result in environmental effects of concern are surface preparation activities and construction of the water intake structure. An HRIA was conducted on the LAA.

During field studies, no historical resource sites were identified within the LAA. Given that no historical resources sites were identified, no effects are anticipated on known historical resources sites. There will be no residual effects on historical resources as a result of the Project.

Historical Resources Act clearance for the Project to proceed has been received from ACCS. The effect of the Project on Historical Resources is assessed as not significant.

There is potential for the Project to affect small, buried archaeological sites that might have been missed during HRIA field studies, although the likelihood is limited and very low. If buried archaeological or palaeontological sites are discovered during construction or decommissioning and reclamation, work will be halted and a qualified archaeologist or palaeontologist will examine the find and report to ACCS. Mitigation measures required by ACCS might include annotation of the site or removal of artefacts or
fossils. MAXIM will follow the instructions from ACCS to mitigate the effect and will not continue activities at the discovered site until permission to do so is granted.

### 8.3 Effects of the Project on Aboriginal Traditional Knowledge and Land Use

Traditional land uses include fishing, hunting, nutritional or medicinal plant harvesting, and cultural use by local aboriginal peoples.

The potential effects to traditional land use during the construction phase are directly related to the surface footprint of the Project Site. Typically, this would include primary impacts to Aboriginal dwellings, spiritual sites, gravesites, trails, resource harvesting locales, or specific resource habitats (e.g., wildlife, vegetation) or features (e.g., bear dens). During operations, potential effects relate to the environment, health and well-being of wildlife and vegetation resources, and the health and well-being of Aboriginal peoples. These effects are not usually site-specific. During decommissioning and reclamation phases, there are Project effects that may remain after decommissioning of Project components, including traditional land use sites/areas, resource harvesting locales, specific resources, the environment, and community health and well-being. Project interactions also include changes in land use that arise from changing social and economic conditions related to the Project, such as demographic shifts, access restrictions, increased outsider access, and changes to the local and regional economy.

Perceived interactions and potential issues of the Project with traditional uses were identified by the Aboriginal communities and each issue was addressed as part of the Consultation process. Effects on Traditional Land Use and Resource Use are addressed within the assessment of effects on Socioeconomics and Human and Ecological Health. Both of these specific assessments conclude that the impact of the project is **not significant**.

### 8.4 Effects of the Project on Socioeconomics

The potential effects of the Project on socio-economics are assessed through changes to economic and social conditions to:

- the local and provincial economies
- demographics and the effect these changes could have on community life, key services and infrastructure

Project construction will last for a little more than three years and will require an average of 450 workers on-site. Construction activities will affect the local and provincial economies as money is spent on goods and services. The local economy will receive about $18 million in labour income spending which equates to about 95 person-years of work during construction. The Provincial economy will see about 4,180 jobs created during construction, as a result of the Project directly spending about $560 million in Alberta. The operation of the construction crew work camp will affect social services as a result of the increase in temporary workers. The increased demand on local services and infrastructure will be minimized by mitigation actions that the Project will implement.

The Projects operation phase will also generate economic activity which in turn affects economic and social variables. Operation is expected to create about 45 long-term permanent jobs in Grande Cache, which equates to an annual increase in local income of approximately $3 million. The provincial economy will also benefit from the $3 million per year in new taxes. The MD of Greenview will receive about $5 million in property taxes per year.

The influx of these additional approximate 45 permanent workers to the local area is not expected to significantly affect the level of demand on social services and infrastructure in the local area.
Overall, the residual economic effects of the Project will be an increase in local employment throughout the construction and operation phases of the Project. With a young population, the Project will contribute to stable long-term employment for the local area. Economic effects of the Project have been assessed as positive and therefore their significance is not assessed.

The construction and operation of the Project will put added pressure on key services and infrastructure in the Grande Cache area. With the mitigation proposed, the effect of the Project on social services and infrastructure will be minimized and is predicted to be not significant.

Follow-up and monitoring to ensure that the mitigation options proposed are implemented may include:

- monitor level of usage of bussing at beginning and end of construction rotations
- monitor number of workers sent to the Emergency Room in Grande Cache
- follow-up with RCMP to ensure they have easy access to key contacts at the work camp
- follow-up with the Attainable Housing Program and participate as require
- follow-up with regular meetings with Family and Community Support Services
- follow-up with meetings at the High School and share info on job opportunities

8.5 Effects of the Project on Human and Ecological Health

The assessment of Project environmental effects to Human and Ecological Health evaluates the potential for changes to air, water, soil, vegetation and game quality caused by Project-related emissions to result in a change in human health or the health of wildlife. The Human Health and Ecological Risk Assessment (HHERA) uses predictive models to estimate exposure.

The change in human health refers to Aboriginal people and residents living in the Grande Cache area and individuals who use the assessment area for residential and recreational purposes (e.g., hunting, fishing, camping, tourism); it does not include Project construction or operational worker health. Workers employed for the Project will be protected by applicable Occupational Health and Safety laws of the Province of Alberta.

Effects on human health are assessed in terms of exceedances of a hazard quotient or incremental lifetime cancer risk.

Effects on ecological health were considered due to the presence of wildlife habitat near the proposed Project. Ecological health is important to Aboriginal people and recreational users who might be harvesting plant and wildlife species for consumption and other uses. Exposures of ecological receptors (i.e., mammals, birds, soil invertebrates) to emissions from the Project were assessed.

Environmental effects of the Project on human and ecological health are assessed by calculating the potential risk of human end ecological exposure to Project-related emissions to air and their subsequent deposition in the environment. An HHERA was conducted to provide a quantitative assessment of the potential risk to human receptors (i.e., Aboriginal Resident, Grande Cache Resident, Grande Cache Trapper/Hunter, Recreational Receptor) for sensitive age-groups (infants and toddlers) and well as chronic lifetime exposure to carcinogens; and the potential ecological health risk to key indicator species of mammals and birds, and community receptors. Together, these receptors are considered representative of the people and wildlife in the RAA.

Mitigation and management of chemical releases are examined if the potential exposure is determined to result in a potential effect on either human or ecological health. Mitigation measures for the Project that reduce air emissions are effective mitigations for a change in human health and no specific human or ecological health-specific mitigation measures are recommended.

The Project will not result in exceedances of hazard quotient or incremental lifetime cancer risk benchmarks with the exception of 1-hour hydrogen fluoride hazard quotient at one cabin location.
With incorporation of the air emissions mitigations, the environmental effect of the Project on human and ecological health is predicted to be **not significant**. The Project is not anticipated to affect the existing health status of residents or wildlife in the RAA.

Although the 1-hour maximum concentrations of hydrogen fluoride and the 24-hour maximum concentrations of acrolein are not expected to result in a change in human health, an air-monitoring program for these two chemicals is recommended as their predicted maximum concentrations exceed the Alberta AAQO. Similarly, monitoring to confirm the baseline concentrations of cadmium in fish tissues is recommended as the health risks associated with ingestion of cadmium (primarily through fish consumption) is approaching the benchmark criteria and there is currently no baseline data for metal concentrations in fish. This monitoring will help to evaluate the potential that health risks associated with the multiple pathway risk assessment, when coupled with environmental effects of industrial emissions, do not exceed the threshold for unacceptable risk. MAXIM will work with Alberta Health and Wellness to develop monitoring programs for Human and Ecological Health.
9 Accidents, Malfunctions and Unplanned Events

The Proposed Facilities are designed to meet all applicable codes and standards. All Project personnel will receive WHMIS and TDG training and all personnel and contractors will receive environmental and safety orientation. While all efforts will be made to prevent accidents, there is a potential for unplanned events such as accidents and equipment malfunctions to occur. The types of accidents and malfunctions include: fuel and chemical spills, gas releases, air emission control equipment failure, forest fires and explosions. These events have the potential to contaminate air, water and soil; damage or impact vegetation, wildlife and aquatic habitat; affect recreational land uses; impair human and ecological health; and in the worst case, cause mortalities in humans and wildlife.

Accidents and malfunctions occurring within the facilities and on the cleared area around the buildings will have limited effects on the biophysical environment; however there is still the potential for fatal injury to humans from gas releases, fires and explosions. For this reason, such potential occurrences are rated as having a significant environmental effect. Given the design and operational safeguards, the likelihood of the significant effects is rated as low. Contamination of water and the aquatic environment from spills of onsite fuel delivery or ash transportation could result in significant effects to the aquatic environment and ultimately impair human or wildlife health. Such effects are rated as significant but with standard procedures being followed, the likelihood of a significant effect is low.

MAXIM is committed to designing, constructing and operating the Project in a safe and environmentally sound manner. The Emergency Response Plan in place for the Existing Facilities will be upgraded for the Proposed Facilities, providing protocols for addressing accidents, malfunctions and unplanned events, should they occur.
10 Conclusions of the Environmental Impact Statement

MAXIM is proposing to expand its existing 150 MW coal-fired power generation facility at the Milner Generating Station near Grande Cache, Alberta with the addition of a 500-MW coal-fired power plant. This Milner Expansion Project will, for the most part, be constructed on the existing brownfield site. A new water intake structure covering 0.3 ha will be the only permanent area of new disturbance outside the existing site. A temporary storage area covering 1.4 ha will be cleared during the construction phase. The construction phase will also require a construction camp which will be located near Sheep Creek at a cleared area that has recently been used as a construction camp and storage site for other projects in the area.

The Proposed Facilities will be designed to incorporate the BATEA and to meet regulatory standards and objectives. Through project design and additional mitigative measures, the Project is expected to have a minimal environmental impact.

This Environmental Impact Assessment has been prepared following Terms of Reference from Alberta Environment. A comprehensive methodology has been used to assess the effects of the Project on 14 VECs:

- Atmospheric Environment
- Sound Environment
- Groundwater Resources
- Hydrology
- Surface Water Quality
- Aquatic Ecosystem
- Vegetation and Wetlands
- Wildlife
- Terrain and Soils
- Land Use
- Historical Resources
- Traditional Land Use and Resource Use
- Socioeconomics
- Human and Ecological Health

The effects of the Project have been assessed for three cases:

- Baseline Case, including the existing conditions and existing and approved projects
- Application Case, including the Baseline Case with the effects of the Project
- Planned Development Case, including past, existing and anticipated future environmental conditions

Effects have been assessed for three project phases: construction, operation, and decommissioning and reclamation.

The effects of the Project on the Atmospheric Environment, Sound Environment, Groundwater Resources, Hydrology and Surface Water Quality are assessed as being of low or moderate consequence. Standards and objectives will be met in most cases with the exceptions of concentrations of SO₂ and particulate matter in remote areas, and water quality values for some salts and metals in production waters that are not expected to reach the Smoky River.
The effects on the biophysical receptors (Aquatic Ecosystem, Vegetation and Wetlands, Wildlife, Terrain and Soils, and Human and Ecological Health) are assessed as being not significant, as changes to these VECs will not result in long-term alterations to the present conditions. The Project is expected to have a positive effect on the Aquatic Ecosystem through the creation of new aquatic habitat at the water intake structure. In the case of Human and Ecological Health, the Project will not result in exceedances of hazard quotient or incremental lifetime cancer risk benchmarks with the exception of 1-hour hydrogen fluoride hazard quotient at one cabin location. This exceedance, however, is lower than recent regulatory guidance on hydrogen fluoride and human health effects are not expected.

Effects of the Project on Land Use are assessed as being not significant. The Project will not limit the existing land uses or conflict with existing land use policies. Effects on Historical Resources are assessed as not significant since damage to historic sites or artefacts is not expected, given that the development of the Project is primarily on disturbed land. The Project is not expected to affect aboriginal traditional land use.

The Project is assessed as having a positive economic effect on the Grande Cache area. Social effects are assessed as not significant.

Accidental events, such as spills, gas releases, failure of air emission environmental control equipment, forest fires and explosions have the potential to cause significant effects but the project design using BETEA and preventive measures in place, the likelihood of such events is low.

The findings of the EIA support the conclusion that MAXIM can construct, operate and decommission the Milner Expansion Project in a manner that will not have significant effects on the environment.