



Artist rendering of a combined-cycle natural gas power plant.

# **SUNDANCE 7**

## **January 2014**

### Project Information Booklet



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## Introduction to Sundance 7

TransAlta Corporation and MidAmerican Energy Holdings Company joined forces to create the TransAlta MidAmerican Partnership (“TAMA Power”) in October 2012. TAMA Power is committed to building reliable, economical and environmentally responsible natural gas fuelled power generation facilities for Albertans.

Sundance 7 is planned to be a combined-cycle natural gas generation facility. With a gross generation capacity of 834 megawatts (MW), the plant will generate enough electricity to power approximately 720,000 Alberta households.

TransAlta will, for TAMA Power construct, manage, operate and maintain Sundance 7. TransAlta will also lead engagement and consultation with the community on behalf of the TAMA Power Partnership.

TAMA Power is committed to being a good neighbour, by providing information to promote timely and meaningful consultation with Sundance 7 stakeholders. This Sundance 7 Information Booklet introduces the proposed project. It is recognized this booklet will not answer every question and to this end, TAMA Power encourages feedback from all stakeholders as the project is developed. We welcome your input into planning and problem solving and refer you to page 13 of this booklet for contact details.

### TransAlta and MidAmerican

TransAlta is a power generation and wholesale marketing company currently operating a portfolio of assets in Canada, the United States and Australia. For over 100 years TransAlta has been a responsible operator and proud contributor to the communities in which it works and lives.

TransAlta has extensive experience operating natural gas fuelled generating facilities. These facilities are located in Fort Saskatchewan and Fort McMurray, Alberta; Ontario and Western Australia.

MidAmerican Energy Holdings Company, based in Des Moines, Iowa, USA, is a global provider of energy services. Through its energy-related businesses, MidAmerican provides electric and natural gas service to more than 7 million customers worldwide. These businesses are Pacific Power, Rocky Mountain Power and PacifiCorp Energy, comprising PacifiCorp; MidAmerican Energy Company; Northern Powergrid Holdings Company; Northern Natural Gas Company; Kern River Gas Transmission Company; MidAmerican Renewables, LLC; MidAmerican Transmission, LLC; and CalEnergy Philippines. Information about MidAmerican is available at [www.midamerican.com](http://www.midamerican.com).

## Project location

Sundance 7 will be located in Parkland County, approximately nine km southwest of the Village of Wabamun, Alberta. The site is east of the existing Sundance Cooling Pond.

Specifically, the facility will be built on Section 10, Township 52, Range 4, West of the 5<sup>th</sup> Meridian. The land is owned by TransAlta and has been previously used for agriculture.

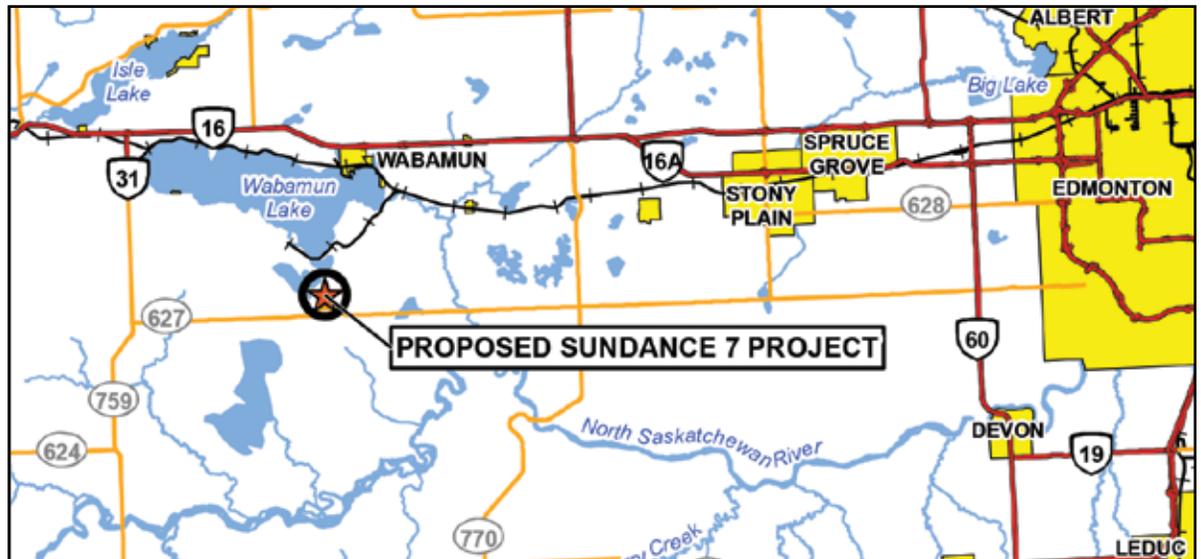


Figure 1 - proposed location of Sundance 7 natural gas power plant.

## Project need

### Electricity demand

Legislation in Alberta requires the Alberta Electric System Operator (AESO) to provide a comprehensive 20-year forecast of electricity load and generation capacity every two years. The goal is to ensure Albertans have access to safe, reliable and competitively-priced power.

Based on forecast data, Alberta is the fastest growing economy in Canada with \$200 billion in capital projects planned or underway in the province. Population in Alberta is expected to increase to 5.1 million by 2032.

Key projections from the [AESO 2012 Long-term Outlook Update](#)<sup>\*1</sup> for Alberta include the following:

- 4.2 per cent average annual growth in demand for electricity until 2017
- 3.6 per cent average annual growth in demand for electricity thereafter until 2022

<sup>1</sup>Source: AESO 2012 Long-term Outlook Update, Alberta Electric System Operator, Rev. 02/2013 - [http://www.aeso.ca/downloads/AESO\\_LTO\\_Update\\_Final.pdf](http://www.aeso.ca/downloads/AESO_LTO_Update_Final.pdf)

As Alberta's economy and population grow so too does the demand for electricity. In Alberta demand for electricity has steadily grown and is compared to adding two cities the size of Red Deer each year since 2001. Peak demand for electricity has also grown from 9,806 MW in 2008 to record high demand levels in November and December 2013 of more than 10,800 MW.

Taking into consideration the expected retirement of coal-fired generation facilities by the end of 2019 as a result of federal legislation, the Sundance 7 project will be an essential addition to the Alberta market to ensure the province's long-term electricity supply needs are met.

## Project description

### Combined-cycle power generation

Sundance 7 will generate electricity using combined-cycle technology with modern generation equipment and advanced air-emission control systems.

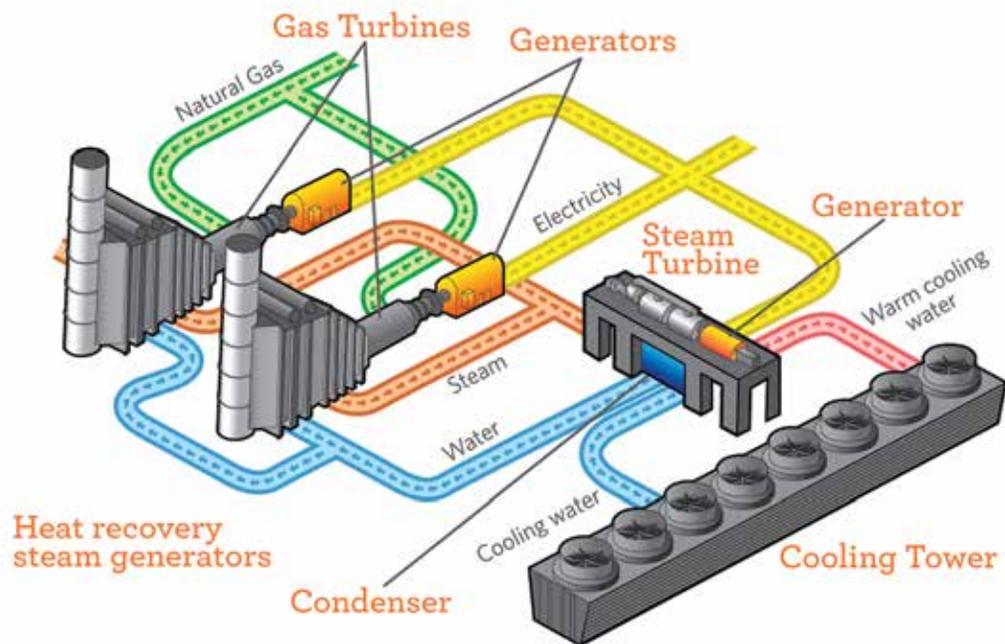


Figure 2 - combined-cycle power generation process.

Sundance 7 will include two natural gas combustion turbine generators to produce electricity. The hot exhaust gases will not be vented to the atmosphere but will instead be used to create steam through the heat recovery steam generators (HRSGs).

This steam in turn feeds a steam turbine generator resulting in the production of additional electricity, increasing the efficiency of the plant. Once the steam runs through the steam turbine, it is condensed and returned to the HRSGs for re-use in the process.

## Sundance 7 features

Sundance 7 will be designed to take advantage of existing infrastructure as much as possible, including the Sundance Cooling Pond, and water intake and discharge structures at the North Saskatchewan River. This will reduce the amount of land that is developed.

Other features that will be incorporated into the design of Sundance 7 include the following:

- two natural gas turbine generators, equipped with dry-low emissions systems
- two heat recovery steam generators (HRSG) equipped with a selective catalytic reduction (SCR) system designed to control nitrogen oxide (NOx) emissions
- one condensing steam turbine generator (STG)
- two continuous emission monitoring systems (CEMS) on the HRSG stacks
- an auxiliary boiler
- a multi-cell mechanical draft evaporative cooling tower
- a water treatment facility
- an onsite wastewater management system
- transmission infrastructure connecting the substation to the Alberta Interconnected Electrical System
- a natural gas pipeline system

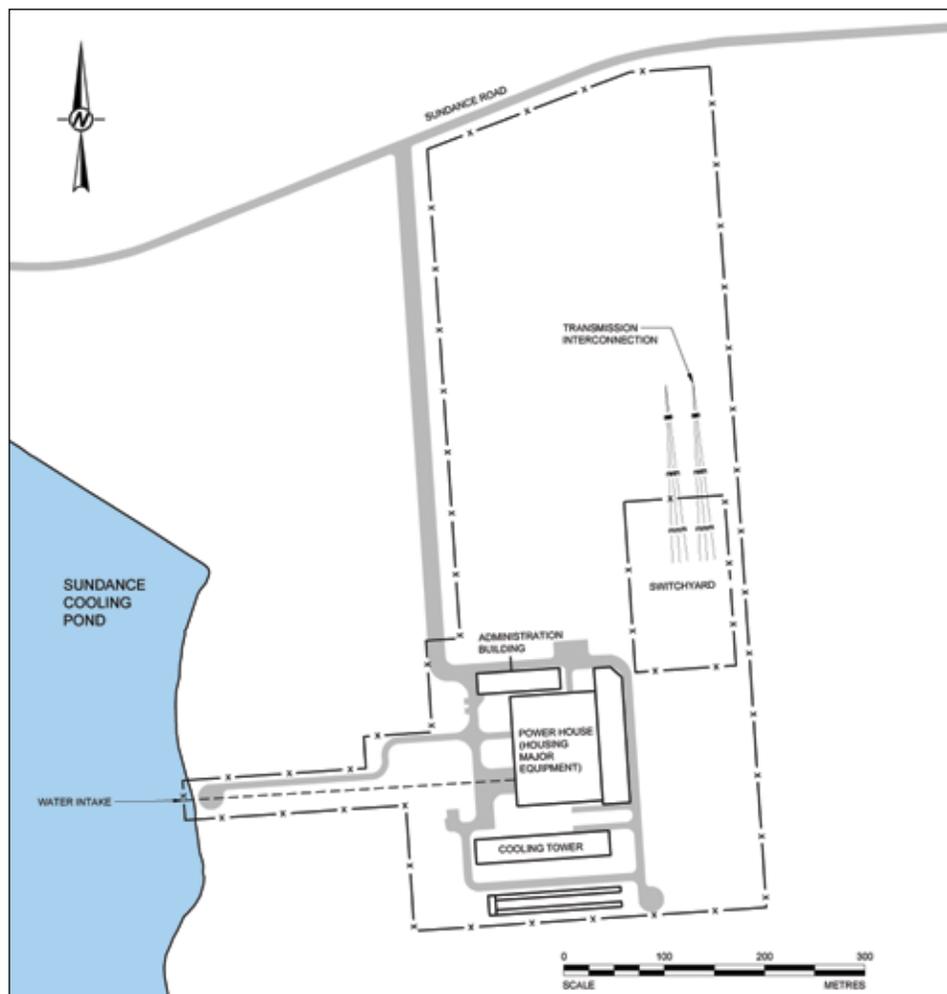


Figure 3 – proposed site layout for Sundance 7, showing the location of some of the key features and buildings.

Sundance 7 will connect to the Alberta Interconnected Electrical System (AIES) commonly referred to as the “grid,” by way of a new substation, with the routing of the interconnection to be determined as part of the design process. The AESO is responsible for configuration of the connection with the AIES and works with AltaLink, the owner of the transmission facility, to determine the routing of the transmission lines.

Sundance 7 will connect to a natural gas pipeline system, as natural gas will fuel the turbine generators. Natural gas transportation service will be provided by a third party gas pipeline supplier.

The gas supplier will design, permit and construct any required changes to their existing infrastructure to meet the needs of Sundance 7. The gas supplier will undertake independent public consultation for this part of the Sundance 7 project.

### **Emission control**

Sundance 7 will be equipped with advanced emission controls technologies to meet performance expectations for air emissions for the Alberta electricity industry including the Clean Air Strategic Alliance’s (CASA) standards and Alberta’s Ambient Air Quality Objectives and Guidelines.

The combustion of low sulphur natural gas results in emissions of NO<sub>x</sub>, carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>) and trace amounts of sulphur dioxide (SO<sub>2</sub>), particulate matter and volatile organic compounds.

The plant has been designed to incorporate sophisticated, modern emission control systems to minimize these emissions. Each gas turbine will be equipped with advanced dry-low emissions technology designed to minimize both NO<sub>x</sub> and CO emissions. To further reduce NO<sub>x</sub> emissions, a selective catalytic reduction (SCR) system will be installed on each of the two HRSGs.

Continuous emission monitoring systems will be used to ensure the plant continuously meets all environmental regulatory requirements.

### Water use

TAMA Power is committed to reducing the amount of water used in the Sundance 7 facility. A new coal-fired power plant with a similar net output would use approximately twice the volume of water when compared to Sundance 7.

An evaporative cooling tower, designed to work in year-round weather conditions, will be installed to condense the water from the steam turbine. This cooling tower regulates the temperature of water required by the condenser and related equipment.

Water required for Sundance 7 will come from the North Saskatchewan River drawing from the Sundance Cooling Pond, as permitted under existing TransAlta water licences.

As a result, there will be no change to the intake structure on the North Saskatchewan River. The majority of the wastewater from the Sundance 7 facility will be discharged into the Sundance Cooling Pond and will not negatively affect the overall cycle chemistry or temperature of the cooling pond. The discharge from the cooling pond to the North Saskatchewan River will continue to meet the quality standards set by Alberta Environment and Sustainable Resource Development.

### Noise

Noise abatement technology will be incorporated into all aspects of Sundance 7. The generating equipment will be in buildings to minimize sound levels. TAMA Power will use noise impact assessments to ensure its compliance with regulatory requirements.

### Ammonia

Ammonia, stored on site, will be necessary for use in the SCR system. TransAlta has experience with the management and storage of anhydrous ammonia. The ammonia system will be designed to operate within the applicable environmental and safety requirements.

## Project schedule

The current proposed schedule for the project is shown in the figure below. Consultation activities are ongoing, and activities in the first quarter of 2014 include mailing of project information, open houses, face-to-face meetings, and posting of information on TransAlta’s website. Refer to the Public Consultation section of this booklet on page 13 for more detailed information.

Various environmental studies will be conducted into the second quarter of 2014, with a plan to file applications for regulatory review of the project following completion of the studies. If the project is approved, it is expected construction would begin late in 2015, with commissioning in 2018.

Activity	2013				2014				2015				2016				2017				2018				2019	
	Q4	Q1	Q2	Q3	Q4	Q1	Q2																			
<b>Environmental studies and approvals</b>																										
Environmental Studies and Assessments																										
File regulatory applications																										
Permits and approval from regulators																										
Engagement and consultation																										
<b>Power Plant</b>																										
Preliminary engineering and contractor selection																										
Detailed engineering																										
Procurement																										
Construction																										
Commissioning																										

Figure 4 – proposed project schedule.

## Regulatory requirements

### Federal

As required by the Canadian Environmental Assessment Act, TAMA Power will submit a Project Description to the Canadian Environmental Assessment Agency which will then determine if a federal environmental assessment is required for Sundance 7.

### Provincial

In Canada, provincial governments have the primary regulatory responsibility for the review of applications for natural gas fuelled power generation facilities. Accordingly, TAMA Power will be applying to Alberta Environment and Sustainable Resource Development (AESRD), and the Alberta Utilities Commission (AUC) for approval to construct and operate Sundance 7. TAMA Power must receive AUC approval for Sundance 7 prior to the start of construction.

Sundance 7 requires approval from AESRD under the Environmental Protection and Enhancement Act and the Water Act. TAMA Power will file a detailed Industrial Approval Application with AESRD, which will include a description of Sundance 7, environmental information, assessment of environmental effects of Sundance 7 and a summary of all consultation and engagement undertaken.

The project also requires approval from the AUC under the [Hydro and Electric Energy Act](#). A Facility Application will be submitted to the AUC that will include technical details, an assessment of potential environmental effects and a summary of consultation efforts. Additionally, a Connection Order from the AUC will be required.

More information about public involvement is found in the brochure, [Public Involvement in Needs or Facilities Applications](#), a publication of the AUC, which accompanies this document.

A Historical Resources Clearance from Alberta Culture must be obtained to ensure proper identification and management of archaeological and paleontological resources.

### **Municipal**

The land owned by TransAlta, on which Sundance 7 is to be located, is zoned 'RE' (Resource Extraction) within Direct Control Area 2 (Highvale Area Structure Plan). A new power plant is a discretionary use within lands as currently zoned. Approval from Parkland County is also required along with other municipal approvals such as safety codes, road access and road approach permits.

### **Pipeline**

Sundance 7 requires a natural gas pipeline, to be built, owned and operated by a third party pipeline supplier. A third party gas supplier will, independently of TAMA Power, obtain the necessary regulatory approvals and construct any new facilities that are required. TAMA Power will forward to the third party pipeline company any comments received from stakeholders that relate to the proposed pipeline.

### **Transmission lines**

The Alberta Electric System Operator (AESO) will determine the point of interconnection of Sundance 7 to the existing electrical transmission system. AESO will study connection alternatives at both 240kV and 500kV voltages to ensure that the connection of Sundance 7 will not negatively impact reliability of the transmission system. AESO will engage AltaLink, the transmission facility owner in the area, to finalize the connection and routing of the new electrical transmission line.

Each organization, AESO and AltaLink, independently of TAMA Power, will conduct consultation with affected parties in the region. Each will file applications to the AUC for approvals prior to beginning any physical work on a new electrical transmission line. Affected landowners will have an opportunity to participate in the AUC process.

TAMA Power will forward to the AESO and/or AltaLink any comments or concerns received from stakeholders that relate to the proposed transmission line.

## Environmental studies

### Understanding project interactions with the environment

Understanding how Sundance 7 will interact with and affect the natural environment forms an important part of the environmental assessment work for the project.

Identifying potential effects on the environment is critical. Sundance 7 design, controls or procedures will be established to mitigate, reduce or eliminate the identified negative impacts.

TAMA Power has initiated environmental studies based on certain assumptions in the design of Sundance 7. Details of these studies will be included in the applications for Sundance 7.

Air quality, noise, aquatic environment (including water use), wildlife, soils, vegetation and historical resources are being assessed. Golder Associates, an experienced environmental consulting firm, is providing support to TAMA Power in undertaking these studies.

### Air quality

An air quality assessment will be used to predict the effects of Sundance 7 on ambient air quality. This assessment will take into account the emission controls proposed by Sundance 7. The assessment will include dispersion modeling to predict ground level concentrations of NO<sub>x</sub>, CO, SO<sub>2</sub>, ammonia and fine particulate matter.

The cumulative effects of Sundance 7 emissions will be assessed taking into consideration the operating facilities of Sundance, Keephills, the Highvale Mine and other existing and approved industrial sources. The predicted ground level concentrations will be compared to Alberta Ambient Air Quality Objectives (AAAQO).

Preliminary work completed thus far suggests that the emissions from Sundance 7 are not expected to result in concentrations exceeding the applicable AAAQO.

Plumes from the Sundance 7 cooling towers, boilers, and turbines have high moisture content and may be visible under certain meteorological conditions. Modelling analysis will be completed to predict the potential for visible water vapour plumes as well as ground level fogging and icing associated with Sundance 7.

TAMA Power will have a key role to play in maintaining local and regional air quality. TransAlta participates in a number of regional monitoring programs and routinely conducts voluntary monitoring. TransAlta is a member of the West Central Airshed Society ([www.wcas.ca](http://www.wcas.ca)) which monitors and promotes effective management of air quality within the airshed management zone, from the western boundary of Edmonton to the British Columbia border.

## Noise

The AUC regulates noise from power plants. TAMA Power has completed preliminary noise modelling on the cumulative effect of Sundance 7 and expects to meet current regulatory requirements. These results will be confirmed once the noise assessment is finalized as part of the submission of the Facility Application to the AUC.

The modelling completed to date is based on international standards and the methods required by the AUC (specifically outlined in the AUC's Rule 012), and includes the existing "soundscape", being the sounds from natural sources and sounds produced from existing facilities such as the Sundance and Keephills plants.

## Aquatic environment

Sundance 7 will be located near the Sundance Cooling Pond, and will use water directly from the Sundance Cooling Pond which is fed from the North Saskatchewan River. Currently, water from the cooling pond is periodically discharged back to the North Saskatchewan River as part of the normal operations of the existing Sundance coal-fired power plant. The water is discharged through existing infrastructure and is regulated by the AESRD.

TAMA Power is assessing the potential impact of this project to the North Saskatchewan River. This assessment reviews existing water quality information for the North Saskatchewan River, and information about water-dwelling invertebrates and fish in the area. New survey information will be added where required to determine if, and how, Sundance 7 may affect these aquatic resources.

Sundance 7 is designed to ensure any water releases will meet the applicable provincial and federal environmental quality guidelines.

Based on the preliminary results of the aquatic resource assessment, it is not expected that Sundance 7 will have measureable effects on aquatic resources in the studied area.

## Traffic study

TAMA Power will assess the impact of Sundance 7 on traffic flow in the vicinity and will implement a traffic management plan during the construction of the facility to minimize disruptions to the travelling public.

## Public consultation

TransAlta is committed to being an active partner in the local community throughout the entire life cycle of Sundance 7, from the permitting and consultation phase, through construction and continuing during operations.

TransAlta has been an important contributor to the communities in the Lake Wabamun region since the building of the Wabamun power plant more than 55 years ago. TAMA Power will carry on this commitment to engage and consult with the public and will work to build and maintain strong relationships with its neighbours, interested stakeholders and other participants.



TAMA Power encourages involvement in Sundance 7. Consultation undertaken will include:

- mailing of this Sundance 7 Information Booklet and other materials
- public open houses
- regular meetings with public advisory groups, municipalities, First Nations and non-government organizations
- individual face-to-face meetings with landowners, residents and community groups
- information in TransAlta's newsletter, [Kilowatt Connection](#)
- up-to-date Sundance 7 information on TransAlta's website at <http://www.transalta.com>

The public participation and involvement program for Sundance 7 will:

- identify people who may be affected by Sundance 7 and those who may be interested in Sundance 7
- identify potential concerns about Sundance 7 and where possible, identify appropriate mitigation measures
- provide accurate, timely and understandable information about Sundance 7 on an on-going basis
- ensure that stakeholders have the opportunity to raise concerns and discuss potential mitigation measures related to Sundance 7
- provide feedback to stakeholders on how their input was considered in the planning, construction and operation stages.

## Engagement with First Nations

TransAlta strives to be a responsible neighbour that partners with local communities and Aboriginal groups to meet our collective needs.

TransAlta will engage the local First Nations to provide timely and accurate information about Sundance 7. We will seek input into the design of the engagement process to ensure it respects and meets the communication needs of our neighbours. We value the input of our neighbours and will work with them to ensure they have an opportunity to raise concerns and to discuss potential mitigation measures.

TransAlta is committed to our long-term relationships with our First Nation neighbours and through ongoing dialogue we strive to minimize the impacts of our operations while exploring opportunities for mutual benefit.

## Contacting TAMA Power

Sundance 7 Community Relations phone:

Toll-free number: **1.855.825.3993**

Email: [Sundance7@transalta.com](mailto:Sundance7@transalta.com)

## Contacting the regulators

Interested community participants are encouraged to direct inquiries and concerns about Sundance 7 to TransAlta directly. If, however, you want to direct your inquiries or concerns to the regulators directly, the details follow:

### **Alberta Utilities Commission (AUC)**

Calgary Head Office:

Fifth Avenue Place

Fourth Floor, 425 First Street SW

Calgary, AB T2P 3L8

Phone: 403.592.8845

or toll free by dialing 403.310.0000 then the 10-digit number above.

### **Alberta Environment and Sustainable Resource Development (AESRD)**

Spruce Grove

200 Diamond Avenue

Spruce Grove, AB T7X 4C7

Phone: 780.960.8600

Phone: toll free by dialing 780.310.0000 then the 10-digit number above.

