

Pure Environmental Waste Management Ltd.

Regulatory Appeal of Approval WM 211 for Pure Environmental Waste Management Ltd.'s Hangingstone Facility

February 27, 2020

Alberta Energy Regulator

Decision 2020 ABAER 004: Pure Environmental Waste Management Ltd., Regulatory Appeal of Approval WM 211 for Pure Environmental Waste Management Ltd.'s Hangingstone Facility

February 27, 2020

Published by

Alberta Energy Regulator

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2020 ABAER 004

Pure Environmental Waste Management Ltd. Regulatory Appeal of Approval WM 211 for Pure Environmental Waste Management Ltd.'s Hangingstone Facility

Decision

[1] The Alberta Energy Regulator (AER) confirms the decision to approve Pure Environmental Waste Management Ltd.'s (Pure's) application 1910941 for the Hangingstone waste management facility and issue waste management approval 211 (WM 211), subject to the conditions in appendix 2.

[2] In reaching its decision, the AER considered all relevant materials properly before it, including the evidence and argument provided by each party. Accordingly, references to specific portions of the evidence in this decision are intended to assist the reader in understanding the AER's reasoning on a particular matter and do not mean that the AER did not consider all relevant portions of the evidence.

Introduction

Application and Request for Regulatory Appeal

[3] On June 29, 2018, Pure filed application 1910941 for a new oilfield waste management facility in Legal Subdivision (LSD) 10, Section 25, Township 85, Range 10, West of the 4th Meridian. The Hangingstone waste management facility (the Hangingstone facility) is one part of Pure's proposed Hangingstone waste management project (the Hangingstone project), which would be located about 25 kilometres (km) south of Fort McMurray (see figure 1).

[4] The Hangingstone facility would accept, for disposal, third-party-generated waste, such as drilling waste, rig washwaters, tank bottoms, boiler blowdown, brine wastewaters, slop oil, landfill leachate, hydrovac waste, and other complex waste streams. No hydrogen sulphide is expected. Waste would be disposed of into washed out / solution-mined salt caverns, which would treat the waste through phase separation. Separated hydrocarbons would be recovered and sold. Brine recovered from the salt caverns would be treated before being injected into disposal wells.

[5] Suncor Energy Inc. (Suncor) filed a statement of concern in respect of application 1910941 on November 21, 2018. On January 30, 2019, the AER advised Suncor that a hearing on the application was not required and that the AER had issued approval WM 211.¹

¹ The following existing AER licences and approvals serve the Hangingstone facility but were not part of this proceeding: (1) a well licence (W0484551) for a proposed disposal well at LSD 01-24-085-10W4M (disposal into this well is subject to the results of proceeding 384); (2) a cavern solution mining scheme (approval 12773A) for the creation of two salt caverns; (3) a well licence for

[6] On February 27, 2019, the AER received a request for regulatory appeal from Suncor, under Part 2, Division 3, of the *Responsible Energy Development Act (REDA)* and Part 3 of the *Alberta Energy Regulator Rules of Practice (AER Rules of Practice)*, of the AER's decision to approve application 1910941 and issue approval WM 211.

[7] On June 6, 2019, the AER advised Pure and Suncor that the other applications Pure had submitted in relation to the Hangingstone project (applications 934887, 1918189, 1918260, 1919152, 1919312, 1920277, MSL181075, MSL190384, LOC181213, and LOC190487) had been set down for a hearing as proceeding 384.

[8] On July 9, 2019, the AER decided to grant Suncor's request for regulatory appeal. The regulatory appeal was subsequently set down for hearing as proceeding 386.

[9] On September 17, 2019, the AER issued an amended notice of hearing for proceedings 384 and 386. The amended notice stated that the AER would first hold a hearing to consider the applications comprising proceeding 384, after which it would hold a hearing for proceeding 386. The amended notice also stated that Suncor, the AER's Authorizations Group (AER Authorizations), and Pure were parties to proceeding 386.

[10] The AER held the public hearing for proceeding 386 in Calgary, Alberta, before hearing commissioners P. Meysami (presiding), A. H. Bolton, and J. Daniels. The evidentiary portion of the hearing was held on November 25 and 26, 2019. Closing arguments were heard on November 29, 2019, and the hearing was closed the same day.

[11] At the outset of the hearing, Pure advised that it had come to an agreement with Suncor regarding which evidence received as part of proceeding 384 could be used in the hearing. This agreement, as captured in the hearing transcript, can be found in appendix 3.

Framework for the Regulatory Appeal

[12] Per section 41(2) of *REDA*, our task in this matter is to determine if we should confirm, vary, suspend, or revoke the AER's decision to approve application 1910941 and issue approval WM 211.

Responsible Energy Development Act

[13] In arriving at a decision, we must consider certain factors set out in our governing legislation, including the AER's mandate. Section 2 of *REDA* states that the AER's mandate is, in part, to "provide for the efficient, safe, orderly, and environmentally responsible development of energy resources in Alberta." Given that this regulatory appeal relates to an application filed under the *Oil and Gas Conservation Act (OGCA)* and *Oil and Gas Conservation Rules (OGCR)*, section 15 of *REDA* and

each of the two salt caverns to be washed out / solution mined (W0484572 and W0485319); and (4) an injection/disposal facility licence (F50832) to accept produced water and brine returns.

section 3 of the *Responsible Energy Development Act General Regulation* (the *REDA General Regulation*) require us to also consider the social and economic effects, environmental effects, and impacts on landowners of application 1910941.

Oil and Gas Conservation Act and Oil and Gas Conservation Rules

[14] Pure submitted application 1910941 under section 12 of the *OGCA* and section 7.002(2) of the *OGCR*, and in accordance with the requirements in *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry*. In considering whether to confirm, vary, suspend, or revoke the AER's decision to approve application 1910941, we must have regard for the purposes of the *OGCA*, as set out in section 4 of that act:

- (a) to effect the conservation of, and to prevent the waste of, the oil and gas resources of Alberta;
- (b) to secure the observance of safe and efficient practices in the locating, spacing, drilling, equipping, constructing, completing, reworking, testing, operating, maintenance, repair, suspension and abandonment of wells and facilities and in operations for the production of oil and gas or the storage or disposal of substances;
- (c) to provide for the economic, orderly and efficient development in the public interest of the oil and gas resources of Alberta;

Other Considerations

[15] To meet our obligations under *REDA*, the *REDA General Regulation*, and the *OGCA*, we must consider the Hangingstone project as a whole. While proceeding 384 (a hearing on applications) and proceeding 386 (a hearing on a regulatory appeal) are separate proceedings, both relate to the Hangingstone project. We cannot ignore the broader context within which the application for the Hangingstone facility was made—as part of the Hangingstone project. We note that in its written evidence filed in this proceeding, Pure referred to the Hangingstone facility as being part of the Hangingstone project.

[16] Given that Suncor's request for regulatory appeal rests in large part on concerns related to the impact of the Hangingstone facility on Suncor's Meadow Creek West project, we also considered the purposes of the *Oil Sands Conservation Act (OSCA)*, the legislation under which Suncor submitted its application for that project. The purposes of *OSCA* are set out in section 3 of that act. While an application under *OSCA* is not the subject of this regulatory appeal proceeding, the AER administers that legislation, and the intent of the legislature of Alberta with regard to oil sands development under the AER's authority is relevant in this proceeding. In particular, we considered the legislature's direction to the AER to effect the conservation and prevent the waste of the oil sands resources of Alberta.

Standard of Review

[17] The parties made submissions regarding the standard of review we should apply in reviewing the AER's decision to approve application 1910941. We recognize that when a court reviews the decision of an administrative body, it applies a specified standard for conducting that review: either reasonableness or

correctness. However, we are not satisfied that applying a standard of review in a regulatory appeal under *REDA* is appropriate given the nature of regulatory appeal hearings.

[18] In a regulatory appeal hearing, a panel determines whether to confirm, vary, suspend, or revoke the decision that is being appealed. To assist in this determination, a panel will typically request that the AER decision maker file a record of the materials it relied on in issuing the appealable decision. The *AER Rules of Practice* also permits a panel to allow new information to be submitted in a regulatory appeal hearing if the information is relevant and material to the decision being appealed and was not available to the AER decision maker at the time the appealable decision was made. Accordingly, an AER regulatory appeal hearing is not the type of review of an administrative decision maker's decision by a court or independent appellate tribunal that has historically required the application of a standard of review. Rather, it is a hybrid *de novo* hearing wherein a panel has before it the record of the original AER decision maker *and* any relevant and material new information filed by the parties that was not before that decision maker.

[19] AER Authorizations provided us with a filed record of the materials it considered in deciding to approve application 1910941. As well, we received new information not before AER Authorizations when the approval decision was made. Given the hybrid *de novo* nature of this hearing, and its distinction from a typical appeal on the record, we do not consider it necessary to apply a standard of review. Little purpose is served in deciding if AER Authorizations' decision to approve application 1910941 was reasonable or correct when it was made based on a record different than the one before us. As set out in *REDA*, we must decide whether to confirm, vary, suspend, or revoke that decision based on the record before us.

Key Issues

[20] Based on the evidence and arguments provided by Pure, Suncor, and AER Authorizations, we considered the following key issues:

- 1) Is there a need for the Hangingstone facility and will it provide benefits to Albertans?
- 2) Is there potential for surface heave and could it negatively impact the Hangingstone facility?
- 3) Will the Hangingstone facility prevent Suncor from recovering bitumen in the area and cause resource sterilization?
 - Is there economically recoverable bitumen beneath the Hangingstone facility and at Section 25-085-10W4M (Section 25)?
 - Does the Hangingstone facility prevent Suncor from characterizing the bitumen and caprock?
 - Will the Hangingstone facility lead to loss of economic benefit to Suncor and the public?

- 4) What is the significance of Pure's access to disposal capacity?
- 5) Would approval of the Hangingstone facility be consistent with the AER's statutory mandate and in the public interest?

There Is a Need for the Hangingstone Facility and It Will Provide Some Benefits to Albertans

Parties' Submissions

[21] Suncor stated that the Hangingstone facility is not desperately or critically needed and provided evidence suggesting (1) that approximately 90 per cent of the waste disposal needs for in situ operators in the Athabasca and Cold Lake Oil Sands Areas are served by integrated disposal wells; and (2) that the remaining 10 per cent originate from smaller operations that are not close to suitable subsurface disposal formations and do not have the scale to economically implement alternative technologies. Suncor argued that these smaller operations could be served by existing and other proposed waste disposal operations in the area.

[22] Suncor stated that there are other waste disposal providers close to the Hangingstone facility that manage similar waste streams. For example, Tervita's Fort McMurray facility and White Swan's Conklin facility include treatment recovery and disposal operations that process emulsion into clean production water and saleable crude oil. Suncor also maintained that there are caverns in the region that are used for processing some oilfield waste and that the closest cavern operation is Tervita's Elk Point/Lindbergh facility. Suncor also stated that White Swan has been approved to develop a cavern at its Atmore facility, which would be just as close to the large operators on Highway 881 as the Hangingstone facility. Suncor further stated that Pure has been approved to develop a new cavern at Fort Kent that would also process oilfield waste.

[23] Suncor stated that most of the business Pure may be able to contract would likely come from the smaller in situ operators along Highway 63 that do not have access to integrated waste disposal wells. Suncor further stated that the large-scale in situ operations near Highway 881 have integrated waste disposal wells and that the operators of these facilities dispose of oilfield waste emulsions or sludges, in part, by trucking them to appropriate existing disposal sites near Highway 881.

[24] Suncor stated that Pure estimated a base case of processing 2500 cubic metres per day (m^3/day) of oilfield waste. Suncor noted that the quantification of the benefits of the Hangingstone project cited in Pure's evidence, including reduced carbon dioxide emissions, increased safety, and reduced costs due to a decrease in trucking, are predicated on Pure's base case. Suncor maintained, however, that the volumes reported by in situ operators on Highway 63 that could be trucked to the Hangingstone facility are approximately $900 \text{ m}^3/\text{day}$ or 22 trucks per day, based on a truck capacity of 40 m^3 . Suncor stated that Pure may be able to capture one-third of the trucked waste from Highway 881 in situ operators, which is

approximately 200 m³/day, or five trucks per day. This could result in the Hangingstone facility processing 1100 m³/day, or less than approximately 45 per cent of the base case Pure presented in its evidence. Suncor stated that it determined these estimates based on a daily average obtained from publicly available waste generation information from in situ operations in the region.

[25] Suncor also argued that the economic benefits that will accrue to small producers as a result of the Hangingstone facility are greatly exaggerated because Pure is assuming that 100 per cent of the transportation savings would be passed on to its customers. Suncor maintained that there is no evidence that Pure will actually transfer any of these savings to its customers other than Pure stating that they would charge customers competitive rates. Suncor argued that the economic benefits of the Hangingstone facility would be insignificant and that they do not justify the increased cost to Suncor, the risk of sterilized bitumen, and the loss of royalties to Alberta.

[26] Suncor stated that Pure's estimated reduction of carbon dioxide emissions does not account for increased greenhouse gas (GHG) emissions that are likely to result if the Hangingstone facility and the associated applications, subject of proceeding 384, are approved. Suncor stated that these approvals would likely require Suncor to use an alternative technology for handling disposal water at its Meadow Creek East and West projects because disposal capacity in the Keg River Formation would be consumed by Pure. Suncor said that the most likely alternative technology that it could use would be a zero-liquid-discharge process, which Suncor has experience with. The zero-liquid-discharge process uses fuel gas to operate driers and requires evaporators and crystallizer heaters, making the overall process more energy intensive. Based on its operational data from the MacKay River project, Suncor estimated that implementing a zero-liquid-discharge operation at its Meadow Creek projects could result in GHG emissions of up to 88 000 tonnes of carbon dioxide equivalent per year. On that basis, Suncor said that confirming AER Authorizations' issuance of approval WM 211 and approving the applications that are the subject of proceeding 384 may result in an increase in overall GHG emissions.

[27] Pure submitted that the Athabasca Oil Sands Area needs a local waste management solution. Pure said that the area has been underserved due to its size, the complexities of waste streams, and the lack of suitable local infrastructure that can effectively manage waste products. Pure went on to state that there are no other similar facilities in the area that can handle the range and capacity of waste that the Hangingstone facility is designed to handle. Pure stated that the Tervita Fort McMurray site is limited in what types of waste it can process and only has a capacity of 250 m³ per day. Pure also stated that Tervita's Janvier landfill only takes solid waste such as contaminated soil and solidified cuttings. Pure further noted that White Swan's Conklin facility has no liquids operation and that while liquids could be processed at White Swan's Atmore facility, that facility is not located in the centre of Athabasca Oil Sands Area and is a five-and-a-half-hour return trip from the Hangingstone facility. Pure added that its Fort Kent facility's target market is the local Cold Lake area.

[28] Pure noted that because there are currently no similar local waste disposal providers in the Athabasca Oil Sands Area that can manage all of the complex waste streams produced in the area, operators are required to truck oilfield and industrial waste over large distances, resulting in safety and environmental risks, significant haulage costs and carbon emissions, and increased highway traffic. Pure maintained that the Hangingstone facility will help reduce long-haul-trucking risks and transportation costs, and introduce significant efficiencies to the industry's management of waste. Pure stated that a decrease in heavy truck traffic will further enhance safety and reduce carbon dioxide emissions.

[29] Pure also maintained that tightening environmental regulations, provincial and national policies, and evolving corporate social responsibility standards continue to increase demand for proper and responsible local waste management solutions. Pure stated that the Hangingstone facility and the accompanying caverns are a solution for the waste management needs in the region.

[30] To support its views regarding the need for the Hangingstone facility along Highway 63, Pure submitted letters from smaller producers near Highway 63 that indicated an interest in using the Hangingstone facility for waste disposal. Pure stated that its market analysis indicates that there is a need for 2500 to 3000 m³/day of waste treatment and disposal capacity in the region.

[31] Pure added that estimating waste disposal needs based on a daily average can be difficult. Pure stated that it plans to accept and process a wide range of oil and gas waste streams, including waste streams generated during unplanned plant upsets or plant turnarounds at third-party facilities. Pure stated that the volume of such waste streams can fluctuate, is unpredictable, and is difficult to estimate.

[32] Pure provided forecasts indicating increased bitumen production in the Athabasca Oil Sands Area. Pure predicted that as bitumen production increases, waste production will increase as well. Additionally, Pure stated that as oilfield plays age with time, the volume of waste produced from the plays tends to increase. Pure therefore argued that it had established its base case of processing 2500 m³/day of waste at the Hangingstone facility.

[33] Pure stated that the Hangingstone facility would result in a total emissions reduction of 38 325 000 kg (over 38 000 tonnes) of carbon dioxide per year and \$26.45 million in savings for producers. Pure added that the reduction in emissions would result in tangible cost savings of over \$1.9 million per year in federal carbon taxes that would have to be factored into future waste haulage costs. Pure stated that it arrived at its estimate of savings in annual federal carbon taxes by multiplying its estimate for total emissions reduction (38 000 tonnes) and the potential future value of the carbon tax (\$50 per tonne). While Pure stated in the hearing that it was open to exploring other technological or carbon cost options that could affect carbon tax savings, Pure acknowledged that it had not fully examined these options or taken them into account in assessing the economics of the Hangingstone project.

Panel's Analysis and Findings

[34] The Hangingstone facility will process a wide range of waste streams. Other waste management facilities in the area are much smaller than the Hangingstone facility, are limited in the type of waste they can process, or are far from the bitumen producers along Highway 63, necessitating long-distance trucking. We find that an oilfield waste management facility that can handle a wide range of oilfield waste is needed in this region.

[35] The parties provided contradictory evidence regarding the volume of waste that may be processed at the Hangingstone facility. Suncor stated that, based on publicly available figures for daily waste generation, the volume of waste that Pure can capture to process at the Hangingstone facility is only 45 per cent of what the Hangingstone facility is intended to accommodate. Pure submitted that waste volume can fluctuate daily and that quantifying a need for waste disposal based on a daily average is not practical.

[36] Some of the waste streams that are generated during regular day-to-day operations at third-party facilities, such as brine water and boiler blowdown, can be quantified more easily than waste streams that are produced intermittently, such as off-spec products generated during plant upsets or plant turnaround. We find that it is difficult to quantify the exact volume of waste that may be processed at the Hangingstone facility due to the unpredictable origin of some of the waste. Therefore, we find that reliance on daily average data does not paint an accurate picture of the waste processing capacity that is needed.

[37] To estimate the reduction in the number of trucks carrying waste, parties based their calculation on their interpretation of the volume of waste that needs to be treated at the Hangingstone facility. Suncor estimated 27 trucks per day (5 from producers near Highway 881 and 22 from producers near Highway 63), and Pure estimated 60 trucks per day. The parties did not provide the method by which they arrived at the number of trucks associated with their forecasted waste volumes. Considering the unpredictable nature of waste production, it is also difficult to quantify the reduction in the number of trucks and amount of GHG emissions. We note that both parties' evidence pointed to some reduction of waste haulage and trucking. While the parties did not go into detail regarding how a decrease in truck traffic could improve safety, it follows that the former could lead to an improvement in the latter. Thus, we accept that having a waste management facility in the area will reduce the need to truck oilfield waste to distant waste facilities, thereby improving road safety and reducing GHG emissions. While Suncor provided some evidence on the potential impacts of implementing zero liquid discharge at its Meadow Creek projects on GHG emissions, we did not find that evidence particularly relevant to our decision in this proceeding. The fact that Suncor may need to implement a zero-liquid-discharge process at the Meadow Creek projects if the disposal capacity in the Keg River Formation is consumed by Pure's disposal wells was the subject of proceeding 384. How Pure's disposal wells impact the disposal capacity of the Keg River Formation was not an issue in this proceeding.

[38] The Hangingstone facility is adjacent to Highway 63 and close to smaller in situ producers who, based on both parties' evidence, do not have integrated waste disposal wells and facilities. Both parties' evidence indicated that the smaller producers close to Highway 63 currently use trucking services for disposal of their waste. However, the parties disagreed on the economic benefits that the Hangingstone facility may have for those producers. Pure's view was that those producers will benefit from reduced waste disposal costs as haulage forms a significant portion of disposal cost. Suncor's view was that Pure may not pass any of the savings from haulage to the small producers. Based on Pure's evidence, it was unclear how much of the cost savings resulting from the Hangingstone facility would accrue to Pure's clients and how much would accrue to Pure as profit. We note that for Pure to maintain a viable business, it will need to provide competitive pricing and a valuable service to its costumers. If there is no incentive or value to oil sands producers using Pure's services, then Pure may find itself out of business. We therefore find it unlikely that Pure will attempt to capture all of the costs savings for itself.

[39] We find that the smaller producers, who are close to Highway 63 and do not have an on-site waste disposal system, could benefit from probable cost savings resulting from a nearby oilfield waste management facility that can handle a wide range of oilfield waste. As well, even if we assume most of the cost savings related to reduced trucking will accrue to Pure, we consider economic benefit as a relevant consideration under section 3 of the *REDA General Regulation* and also one that contributes to the public interest. What is in the public interest in a particular matter is contextual, and factors that contribute to the viability of a participant in the Alberta economy that pays taxes and employs Albertans are relevant to the public interest. These same considerations also satisfy us that the Hangingstone facility will provide benefits, such as emissions reductions and highway traffic reductions, to Albertans as a whole and thus contribute to the public interest.

[40] While Pure said its base case for waste volumes was based on its market analysis, Pure did not provide its market analysis on the record of this proceeding. This makes it difficult for us to confirm the volumes of waste that Pure expects to attract to its Hangingstone facility. We are satisfied, however, that we have sufficient evidence to demonstrate a need for the Hangingstone facility. In addition to the waste volumes generated by small producers in the vicinity of the Hangingstone facility, we acknowledge that there are significant volumes of waste generated within the Athabasca Oil Sands Area and that this is expected to continue for the foreseeable future. Additionally, Pure's evidence indicated some potential growth in bitumen production in the region, as well as growth in waste volumes from aging plays, which was not contested by Suncor. It is more likely than not that any potential increase in bitumen production would result in increased waste generation. Building one facility that is large enough to handle current waste volumes and any future growth in waste volumes, rather than building multiple smaller facilities, is consistent with the AER's mandate of orderly development. Building multiple smaller facilities would be less efficient and would collectively create more environmental disturbance and a larger total footprint area. While there is some uncertainty as to whether Pure will be able to secure enough waste to satisfy its base case, we find that there is still evidence of need for the Hangingstone facility and waste management

services in the region. There was some discussion by the parties as to whether the need for the Hangingstone facility is “desperate” or “critical”; however, we do not consider it necessary to characterize the need in that way. We are satisfied that the need is real. Suncor challenged the value of the letters of support submitted by Pure. Our conclusions on need are not dependent on those letters.

The Potential for Surface Heave Does Not Pose a Significant Risk to the Hangingstone Facility

[41] Suncor is planning to use steam-assisted gravity drainage (SAGD) technology to extract bitumen from its Meadow Creek West lease, which includes the area beneath and around the Hangingstone facility. When steam is injected into bitumen reservoirs at high pressure and temperatures, the ground surface above the reservoir can deform or heave. We assessed whether the potential for surface heave poses a significant risk to the Hangingstone facility and whether surface heave could impact Suncor’s ability to extract bitumen in the area of the Hangingstone facility.

Parties’ Submissions

[42] In its submissions, Suncor identified heave as a risk to the Hangingstone facility and its personnel. Suncor submitted that heave is documented across Suncor’s operating SAGD assets and across the SAGD operations within industry. Suncor stated that heave measurements from Suncor’s existing in situ assets, including Firebag and MacKay River, and from other operators’ existing SAGD operations near Meadow Creek West, show surface heave measurements of up to 70 centimetres (cm). Suncor also stated that actual heave growth rates of 3 to 4 cm per year were measured at the Surmont, Long Lake, MacKay River, and Firebag in situ projects. Nonetheless, during the hearing, Suncor stated that it did not provide any measurement data from its Firebag operations because some of the characteristics of Firebag’s reservoir made it less comparable than Suncor’s MacKay River.

[43] Suncor argued that surface heave of this magnitude could have the potential to seriously affect the Hangingstone facility and stated that it was uncomfortable with not fully understanding the risks of placing the Hangingstone facility over a steam chamber. Suncor stated that it does not place occupied facilities above steam chambers and that it designs its projects to avoid placement of surface developments above steam chambers. Suncor also stated that it has successfully avoided any heave issues by acquiring all subsurface information and quantifying what the heave would look like. Suncor stated that it has required that third-party facilities placed over its steam chambers be designed to withstand anticipated heave.

[44] Pure’s expert stated that heave values ranging from a few centimetres up to 70 centimetres have been measured across in situ operations. Pure stated that facilities and their foundations are all required to be designed to account for this type of loading because differential heave is analogous to differential ground settlement. Pure also stated that industry experience shows that heave has not detrimentally affected facilities. Pure noted that operations such as the Imperial Cold Lake Mahkeses project and the

Japan Canada Oil Sands Limited project in the Hangingstone area (JACOS Hangingstone) have their central processing facilities located directly above steaming wells and that existing design methods have proven sufficient.

[45] To estimate the expected heave at the Meadow Creek West project, Pure's expert analyzed publicly available heave measurements at Suncor's McKay River project and at JACOS Hangingstone. Pure selected these two projects for comparison because both have operated for more than 17 years and measured heave at or very near their maximum values. Pure stated that the reported heave at Suncor McKay River was 84 cm, while the reported heave at JACOS Hangingstone was 39 cm.

[46] Pure's expert report indicated that the maximum observed heave at Suncor MacKay River is not a close analog for Meadow Creek West. The report stated that the JACOS Hangingstone project is the best analog for Suncor Meadow Creek West due to its proximity and similar reservoir parameters. Pure did note one key difference: JACOS has operated Hangingstone consistently at about 4300 kilopascal (kPa) (at a temperature of 255°C), while Suncor, according to its Meadow Creek West application, plans to start operating at 3500 kPa, after the early ramp-up phase, and gradually drop to 2500 kPa (with a steam temperature of 225°C). Noting that lower pressure correlates to lower heave in similar reservoirs, Pure stated that a conservative estimate for the maximum heave in the vicinity of the Hangingstone facility would be 30 to 35 cm, with a maximum slope of 0.07 per cent. Pure estimated the heave rate to be about 2 cm per year.

[47] According to Pure's expert, given that JACOS Hangingstone has been shown to be a reasonable analog to Suncor Meadow Creek West and that JACOS has effectively managed the impact of heave on its facilities located immediately above SAGD wells, it is reasonable to expect that the Hangingstone facility can be designed to manage any potential heave impacts. Pure's expert stated that Pure, like JACOS, should be able to appropriately consider potential heave in the design of its facilities. Pure's expert also recommended that a monitoring program be implemented to validate the design assumptions of the Hangingstone facility if Suncor ever operates SAGD wells in the vicinity of the Hangingstone facility.

[48] Pure maintained that the Hangingstone facility has been designed and would be constructed to industry-leading, world-class standards. Pure stated that the foundation of the Hangingstone facility would be extensively reinforced with rebar to protect its structural integrity against various external forces, including frost heave, lateral soil movement, and heave caused by SAGD operations. According to Pure, this engineered design allows for the pad on which the Hangingstone facility would be constructed to lift as a whole and still maintain its integrity. Pure stated that an added layer of protection would be achieved through the use of flex connections for the tank farm and at other key points throughout the Hangingstone facility. Pure maintained that these measures would guard against damage to the Hangingstone facility in the event facility components shift or settle due to heave or other causes. Pure stated that heave is a relatively slow process that develops over a period of years, allowing for effective

monitoring of the process, timely identification of potential issues, and mitigation should it ever be needed.

[49] Suncor stated that Pure used publicly available industry data to provide a high-level estimate of expected heave and maximum heave slope in the Meadow Creek West project area. Suncor submitted that the full set of measured field data provides more resolution than the publicly available data. Suncor indicated that Pure's analysis does not consider the potential for increased heave in localized areas, as well as the potential for cracking and shifting of the surface soil. Suncor stated that it has collected and analyzed a substantial quantity of data to estimate surface heave from SAGD operations in the Meadow Creek project area, including various well logs and cores within the oil sands and overburden zones. Suncor stated that it has also measured reservoir pressures and conducted fracture tests to better understand the stress state of the reservoir and overburden zones. In addition, Suncor stated that it has conducted laboratory tests to determine bitumen properties and mechanical rock properties in the Meadow Creek project area.

[50] Suncor explained that it used all of this information as inputs into coupled reservoir and geomechanical models in order to estimate the ranges of surface heave that can be expected. Suncor provided a graph from its Meadow Creek West project application demonstrating average modelled values for heave. This graph indicated an expected maximum heave range of approximately 35 to 55 cm at an injection pressure of 2500 kPa, and 58 to 80 cm at an injection pressure of 3500 kPa. Suncor stated that the heave profile was not calibrated with any field operation data from Meadow Creek West since there are no data. Suncor stated that the modelling result was compared to surrounding analogs such as JACOS Hangingstone. Suncor indicated that JACOS Hangingstone, being the closest, is a reasonable analog despite the fact that it is a demonstration project and smaller.

[51] Suncor also provided examples of localized maximum surface heave measurements of up to roughly 82 cm at its McKay River operations that Suncor obtained at the well pads located at the shallower side of the reservoir where the reservoir depth is approximately 90 m. Suncor confirmed that beneath the Hangingstone facility, the reservoir depth to the base of caprock is 240 m. Suncor further indicated that it initially started operating those McKay River well pads using an injection pressure of 1750 kPa and that, despite reducing the pressure gradually so that the wells have been operating at a pressure of approximately 1000 kPa for most of their life, the heave has continued to increase.

[52] Suncor stated that a good understanding of the oil sands reservoir, the operating parameters for the reservoir, and the overburden layers above the reservoir are required to accurately estimate surface heave. However, Suncor maintained that many areas near Pure's planned infrastructure have not been fully delineated and that reservoir information from additional delineation is required to obtain a more accurate heave profile in those areas.

[53] Suncor indicated that the highest slope changes would typically be at the edges of the development going from heated or partially heated reservoir to cold, undisturbed reservoir. Suncor stated that Pure's expert calculated a maximum slope change of 0.2 per cent using public data; however, the measured value was 0.4 per cent at McKay River.

Panel's Analysis and Findings

[54] In SAGD operations, the amount of surface heave or ground deformation that may occur depends on factors such as the depth of the reservoir; the vertical thickness of the bitumen-containing reservoir; the reservoir and overburden rock's thermal, hydraulic, and mechanical properties; and the temperature and pressure of steam injection.

[55] The parties used different methods in preparing their evidence regarding heave magnitude. Pure used publicly available data to estimate heave at the Meadow Creek West project. Suncor provided the results of heave modelling prepared for its Meadow Creek West application, as well as examples of heave measured at its McKay River operation. Suncor noted that its geomechanical modelling techniques rely on detailed data and consider many reservoir characteristics, overburden parameters, and reservoir operating conditions. However, Suncor didn't provide the specific inputs and assumptions that were used to obtain the heave modelling results for its Meadow Creek West projects.

[56] We accept that estimating heave based on analogous publicly available data, as done by Pure, is a more generic approach that may not incorporate the detailed geomechanical or operational parameters that Suncor indicated it used in its detailed modelling. However, we note that the heave data relied on by Pure has been gathered, as well as reported to the AER and its predecessors, over many years of SAGD operations. These data provide a reasonable range of expected possible outcomes for reservoirs that have generally comparable parameters, such as reservoir depth, vertical thickness, age of steam chamber, duration of operation, and injected steam temperature and pressure.

[57] Conversely, the accuracy of modelling results is contingent upon the validity of the applied methodology, inputs, and assumptions used. Moreover, modelling results can be influenced by varying reservoir properties that may be unknown at the time the model is built, and before field operations occur. The accuracy of modelling improves through calibrations of the model with field monitoring results (i.e., history matching) and improving geological knowledge over time. The Meadow Creek West modelling provided by Suncor cannot yet be calibrated to actual measured results from the Meadow Creek West project because the reservoir is not operational yet. Further, Suncor's modelling is based on and calibrated with data from different reservoirs than Meadow Creek West and Suncor did not provide any evidence that allowed us to assess the model inputs or assumptions. We also did not have any evidence indicating the success of Suncor's model on predicting heave at Suncor's other in situ operations (i.e., how closely the results of the model aligned with actual heave measurements). Suncor only provided a snapshot of the model's heave prediction for three different steam injection pressures and within a 10-year operating

window. In the absence of any evidence enabling us to validate the modelled heave values Suncor provided, we find it more reasonable to rely on the publicly available data provided by Pure and not contested by Suncor to evaluate the degree of surface heave that may occur at the Hangingstone facility.

[58] While Suncor noted that there are many nuances in determining heave, it did not contest Pure's evidence that heave is inversely proportionate to the true vertical depth of a reservoir; the deeper the reservoir, the less noticeable the surface deformation. We agree with this general proposition. Suncor indicated localized maximum heave measurements of up to 82 cm at its shallower reservoirs, including at the MacKay River project. Suncor stated that this maximum heave has been observed at locations where the reservoir depth is 90 m. The top of the Meadow Creek reservoir beneath the Hangingstone facility is approximately 240 m deep, substantially deeper than 90 m. This depth is similar to the depth of the reservoir at the JACOS Hangingstone project, which, according to Pure's expert, averages 280 m. Suncor did not contest this information. Therefore, it is reasonable to expect that heave at the location of the Hangingstone facility would be more comparable to the 39 cm value measured at JACOS Hangingstone rather than the 84 cm value measured at MacKay River.

[59] Both parties stated that reservoir thickness and operating pressure can also impact the magnitude of surface heave. Pure noted that the operating pressure at JACOS Hangingstone has been 4500 kPa. This is higher than Suncor's planned operating pressure at Meadow Creek West, which will start at 3500 kPa and gradually drop to 2500 kPa. Additionally, the reservoir beneath the Hangingstone facility is thinner than the average thickness of the reservoirs at Suncor MacKay River and JACOS Hangingstone. Based on Pure's expert report, which Suncor did not contest, the average reservoir thickness at Suncor MacKay River is 22 to 30 m and the average reservoir thickness at JACOS Hangingstone is 18 to 28 m. Pure asserts that the reservoir beneath the Hangingstone facility is less than 10 m thick, while Suncor asserts that the reservoir is 16 m thick. Therefore, even based on Suncor's interpretation of the thickness of the reservoir beneath the Hangingstone facility, any heave in the vicinity of the Hangingstone facility will likely be closer to Pure's estimate due to the lower operating pressure at Meadow Creek West and the lower reservoir thickness beneath the Hangingstone facility.

[60] Both parties noted that another phenomenon caused by surface heave is slope change and spoke to the degree of slope that surface heave can create. Using publicly available slope measurements, Pure estimated the slope for the Meadow Creek West area to be 0.07 per cent. Suncor provided a maximum measured slope of 0.4 per cent between adjacent heave monuments at the McKay River operation.

[61] We agree with Suncor that the most noticeable slope is around the edge of the reservoir. However, even if the Hangingstone facility is located on the edge of the steam chamber, and there is no evidence on the record to support such an assumption, because the gradient of slope is spread over the surface of the Hangingstone facility, the resulting change in ground elevation will be small over the area of the facility. We note that the slope of heave correlates with the magnitude of the heave; in other words, the smaller the predicted heave, the less the slope. Based on the similarities of reservoir depth and

thickness, we find that the slope of heave in Section 25 will be modest and closer to Pure's estimated slope.

[62] Based on the foregoing, we find that the heave rate that may occur at the location of the Hangingstone facility if Suncor steams the reservoir within Section 25 as part of its Meadow Creek West operations will be modest and close to Pure's estimate of 2 cm per year, with a maximum heave of 30 to 35 cm and a slope of 0.07 per cent.

[63] We accept that even in the absence of heave caused by SAGD operations, facilities and their foundations must be designed to account for loading caused by frost heave, ground settlement, and lateral soil movements. We find that any risk to the Hangingstone facility caused by the amount of heave estimated by Pure or even modelled by Suncor can be mitigated through engineering design. We therefore accept Pure's evidence that the Hangingstone facility can and will be built to withstand the anticipated range of heave and that heave will not adversely affect the operation or integrity of the Hangingstone facility.

[64] We note that all oil and gas exploration, production, and operational activities have some degree of risk associated with them, and the presence of risk is a normal part of these activities. Across the province, the industry assesses the potential for risk, whether financial, environmental, or safety-related, and applies appropriate mitigations. As long as there is appropriate mitigation, the mere presence of risk should not prevent oil and gas exploration, production, processing, and transportation. Furthermore, risk that can be appropriately mitigated should not prevent companies from continuing their operations in proximity to one another.

[65] In their submissions, both Suncor and Pure identified two measures to mitigate the risk surface heave may pose to the Hangingstone facility. The first mitigation measure is anticipating any impacts from heave and incorporating appropriate design measures into the design of the Hangingstone facility. The second mitigation measure is to effectively monitor surface heave and its potential impact on the Hangingstone facility when and if reservoir steaming at Meadow Creek West begins.

[66] Based on our conclusions about the potential magnitude of heave, we are satisfied that proper design and effective monitoring will sufficiently mitigate the risk surface heave may pose to the Hangingstone facility. We note that the development of heave is a slow process that will allow for intervention if needed. We will therefore include conditions requiring Pure to ensure that the design of the Hangingstone facility is sufficient to protect the facility from surface heave resulting from Suncor's operations, and to monitor for any potential effects of surface heave on the integrity of the Hangingstone facility should Suncor commence steam operations in the vicinity of the facility.

[67] In light of the panel's findings and conditions, we find it unlikely that the risk of surface heave will prevent Suncor from safely producing the bitumen under the Hangingstone facility. While we have

no authority in the current proceeding to require Suncor to monitor for heave, we assume that an experienced operator such as Suncor, for which safety is a top priority, will do so.

Conditions of Approval

[68] At least 15 days prior to recommencing construction of the facility, Pure must provide to the AER, and the AER must accept, a statement and supporting engineering drawings stamped and approved by a professional registered with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) with expertise in surface heave. These documents must demonstrate to the AER's satisfaction that the facility has been designed and will be constructed to maintain its integrity and containment in response to surface heave that may result from nearby SAGD operations.

[69] Upon receiving notice that SAGD operations will occur in Section 25-085-10W4M, Pure must submit to the AER a plan, satisfactory to the AER, to monitor the potential impact of surface heave on the Hangingstone facility.

The Hangingstone Facility Will Not Prevent Suncor From Recovering Bitumen in the Area or Cause Resource Sterilization

[70] Suncor stated that it is concerned that the Hangingstone facility will infringe upon Suncor's right to extract and exploit resources in leases held by Suncor, affect the value of mineral leases held by Suncor, and potentially sterilize bitumen resources, impacting resource conservation.

[71] Pure and Suncor provided conflicting evidence regarding the amount of economically exploitable bitumen in Section 25 and under the Hangingstone facility. The parties provided differing views regarding the effect the Hangingstone facility may have on Suncor's ability to obtain data, characterize the bitumen, or evaluate caprock integrity under the Hangingstone facility. This in turn could affect Suncor's ability to effectively place its well pads and well pairs and exploit the resource.

[72] We assessed if approval of the Hangingstone facility at its current location would be aligned with the AER's mandate to provide for the efficient, safe, orderly, and environmentally responsible development of energy resources and the legislature's direction to effect the conservation and prevent the waste of Alberta's oil sands resources.

[73] To assess the impact of the Hangingstone facility on resource conservation, we considered the following questions:

- Is there economically recoverable bitumen beneath the Hangingstone facility and in Section 25?
- Does the Hangingstone facility prevent Suncor from characterizing the bitumen and caprock?
- Will the Hangingstone facility lead to loss of economic benefits to Suncor and the public?

There May Be Economically Recoverable Bitumen Beneath the Hangingstone Facility and in Section 25

Parties' Submissions

[74] The Hangingstone facility is in LSD 10-25-085-10W4M, approximately 343 m northwest of Highway 63. Suncor stated that it included Section 25 within the environmental impact assessment for the Meadow Creek West project because it believes that there is economically recoverable bitumen in Section 25, which it expects to recover. Suncor provided extracts from Cynthia Hagstrom's published doctoral thesis, which show the valley trends targeted by Suncor and her interpretation of the valley trends in Section 25. Based on Ms. Hagstrom's work, Suncor determined that the valley trends mapped in Section 25 suggest a possible accumulation of point bar sands resulting in a reservoir.

[75] Suncor stated that it has not yet fully delineated Section 25. Suncor added that the McMurray Formation in Meadow Creek, including the area around the Hangingstone facility, consists of point bar deposits. Point bars are features of fluvial and estuarine meandering channel systems (depositional environments) that can be difficult to interpret and map in the subsurface. Channel systems can change very rapidly (within a few hundred metres) and are difficult to predict without sufficient data.

[76] Suncor provided an example from Meadow Creek West that is approximately three sections away from the Hangingstone facility. According to Suncor, the example demonstrates rapid changes in reservoir thickness and properties over relatively short distances of approximately 300 to 600 m. Suncor stated that this characteristic applies to the reservoir around Section 25. Suncor also stated that seismic data demonstrate extensive reservoir deposition across Section 25.

[77] Suncor provided core photos and well logs for the two wells next to Section 25 (one in LSD 06-30-085-09W4M and the other in LSD 12-23-085-10W4M) to demonstrate the point bar deposits and a continuous reservoir pay thickness of 10 to 18 m near Section 25 where the Hangingstone facility would be located. According to Suncor, although the wells are not in Section 25, the core photos, well logs, and 2-D seismic demonstrate that Section 25 is within a point bar depositional environment with the potential for resource recovery.

[78] Pure's experts conducted an appraisal of wells within Section 25 and within neighbouring sections to evaluate the bitumen within the McMurray Formation in Section 25. Pure reviewed 8 wells in Section 25 and then included these wells as part of the 15 wells later used in cross-sections. Based on the evidence collected from these wells, Pure stated that bottom water exists beneath and in the vicinity of Section 25. Pure interpreted that the bottom water varies in thickness from 5 to 8 m under Section 25. According to Pure, the best bitumen pay in 2 of the 8 wells (10-24-085-10W4M and 06-25-085-10W4M) was identified as being in contact with bottom water. Pure indicated that where the best continuous net bitumen pay is connected to bottom water, a producer well needs to be placed 1 to 2 m above the bottom water. This "standoff" is required to reduce the cooling effect of bottom water on the bitumen in the

producing well. Pure stated that such a standoff from bottom water reduced the net pay thickness available for production. Pure said that the presence of bottom water must be considered when determining pay thickness above the injector well, which is key in determining if economic criteria are met for the reservoir.

[79] Pure's expert report mapped a continuous bitumen pay thickness slightly greater than 5 m at the location of the Hangingstone facility. This 5 m pay thickness includes the entire pay interval with no standoff.

[80] Pure maintained that the reservoir beneath the Hangingstone facility does not meet Suncor's own economic criteria for economically recoverable bitumen. In its geological appraisal and evaluation of pay thickness, Pure used the cutoffs Suncor used in its 2015 Meadow Creek East application to the AER. The cutoffs were pay thickness greater than or equal to 10 m, gamma-ray less than or equal to 60° API, and resistivity greater than or equal to 20 ohm-m. Pure's expert estimated the bitumen pay beneath and closely surrounding the Hangingstone facility to be 5 to 6 m, and assessed the continuous bitumen reservoir pay thickness with no significant mud horizons to be 3 to 7 m.

[81] Pure maintained that the bitumen reservoir beneath the Hangingstone facility cannot be economically recovered because the pay is thin, heterogenous, and in contact with bottom water, and because the elevation of the base of the deposit is too variable to effectively place wells.

[82] Suncor disagreed with Pure's methodology in mapping the reservoir pay interval. Suncor indicated that it does not use one-dimensional grid thickness values to create the reservoir interpretation of best pay interval. Rather, Suncor uses multiple data sets and methods of interpretation to map the reservoir, and not strict log cutoffs. Section 25 is what Suncor considers to be an area of exploration, and until additional information is gathered and incorporated, such as additional seismic and well data, the interpretation of the resource would have a probabilistic range. This range is based on the data available.

[83] Suncor stated that its interpretation of the wells directly beneath the Hangingstone facility is drastically different than the interpretation provided by Pure. Suncor's interpretation indicates a resource thickness of 16.4 m under the Hangingstone facility at the 00/10-25-085-10W4/0 salt cavern well (10-25 well), rather than the 5.5 m of thickness interpreted by Pure.

[84] Suncor stated that it completed a petrophysical analysis on all wells within and surrounding the Meadow Creek East and West project areas, including the 10-25 well, that showed additional resource below the 5.5 m resource interval interpreted by Pure. Suncor interpreted this section of reservoir to be either non-continuous inclined heterolithic strata or breccia. As these are only thin non-continuous mud layers, Suncor stated that it would still consider this area to be reservoir containing recoverable resource.

[85] Suncor maintained that it continues to make significant improvements in well and facility design and execution that is dramatically decreasing the capital cost to produce bitumen. These improvements

enable Suncor to economically produce bitumen from thinner and more challenging reservoirs. Based on its experience using SAGD and wellbore equipment such as flow control devices, Suncor stated that it can reduce the well spacing between injector and producer wells to less than 5 m of separation. Suncor also stated that reducing vertical separation between these wells reduces circulation time and improves efficiency, which would provide the opportunity to economically develop thinner pay zones.

Panel's Analysis and Findings

[86] Reservoir characteristics are one of the key factors in the economic viability of producing a reservoir. Reservoir characteristics include reservoir pay thickness, reservoir heterogeneity, and the presence of water or gas in the reservoir. Bitumen lease holders invest in delineation programs in order to acquire data to characterize (describe) a reservoir. These data are then used to assign or assess the potential economic value to the reservoir.

[87] The evidence suggests there is some bitumen beneath the Hangingstone facility and in Section 25. However, Pure and Suncor provided differing interpretations of that bitumen. We note that Pure, as part of its evidence, conducted a broader geological analysis of the reservoir beneath the Hangingstone facility. Pure demonstrated that the reservoir is heterogeneous, which makes well placement challenging, and that the reservoir does not seem to meet some of Suncor's cut-off criteria. Furthermore, we note that the lower part of the reservoir is wet and appears to be in contact with bottom water. It therefore seems that the net pay is less than Suncor suggests and that it may be difficult to produce. Suncor indicated that the amount of data is limited for Section 25 and that with more data, Suncor will have a better understanding of the resource quality.

[88] We accept that as more data are acquired, uncertainties surrounding the quality of the resource and its economic viability will be reduced. That being said, based on the evidence before us regarding pay thickness, bitumen saturation, and the presence of bottom water, it is currently unclear whether it would be economic to recover bitumen located in Section 25 and beneath the Hangingstone facility.

[89] Suncor's view was that through design advancements, the application of new technologies, and cost reductions, Suncor will be able to economically produce thinner pay zones in the future. We agree that as technologies advance, resources that have historically been challenging to recover may become more economical. While production of bitumen in Section 25 and beneath the Hangingstone facility may not currently be economical, it may become economically viable in the future.

The Location of the Hangingstone Facility Does Not Prevent Suncor From Acquiring Data to Characterize Bitumen and Evaluate Caprock

Parties' Submissions

[90] Suncor stated that it currently plans to access the bitumen within Section 25 and beneath the Hangingstone facility as early as 10 years after the start of SAGD operations at Meadow Creek West. Prior to accessing this resource, Suncor would need to drill additional delineation wells and acquire 3-D seismic in order to properly assess the bitumen and caprock integrity in this area. Suncor maintained that it often uses seismic mapping to determine the thickness of bitumen reservoir, as well as the lateral quality of the reservoir such as the depositional environment. Suncor stated that it would not be able to drill additional vertical delineation wells or acquire 3-D seismic of sufficient quality at the location of the Hangingstone facility once the facility is constructed and operational.

[91] Suncor explained that, as part of its risk assessment, it prefers to shoot 3-D seismic over every area that it plans to operate SAGD in order to image the caprock and ensure that there are no concerns with caprock integrity. Suncor maintained that the Hangingstone facility would not allow Suncor to lay out the seismic source and receiver lines in the density that it would like. As a result, according to Suncor, there would be two data quality issues. The first would be a data gap, which Suncor explained using an ice cream cone analogy. There would be a cone-shaped area below the Hangingstone facility where data could not be imaged. This image gap would be largest immediately below the Hangingstone facility and would be reduced with depth. Suncor noted that the caprock and reservoir would be affected and there would be a data gap for these intervals. The second data quality issue would be reduced data quality similar to the shape of an iceberg (or the inverse of the cone shape above), where there would be some data under the Hangingstone facility but the resolution of data would be poor and the area of this poor-quality data would increase with depth. Suncor estimated that the data gap would be one legal subdivision or a few hundred metres by a few hundred metres. Suncor stated that this would be a fairly high-risk area because this data gap would be directly beneath a manned facility. Suncor was concerned by the risk posed if it could not image the caprock properly prior to operating SAGD and steaming under the Hangingstone facility.

[92] Suncor stated that to mitigate the safety risks related to any features (such as faults and fractures) within the caprock, Suncor needs to properly understand the rock properties and the structure of the caprock through collecting and analyzing additional data, such as rock samples and core data. Suncor stated that it uses such data to create geomechanical models, which it has not done yet for Section 25. According to Suncor, this modelling would allow it to properly adjust the maximum operating pressure within the reservoir, allowing Suncor to steam safely. Suncor stated that it would not be sufficient to lower the maximum operating pressure without understanding the structure of the caprock because it needs the risk assessment to determine if and how much to lower the maximum operating pressure. Moreover, Suncor stated that lowering the maximum operating pressure could negatively impact the

economics of the Meadow Creek West project because the rate of bitumen production is directly tied to the operating pressure.

[93] Pure noted that the footprint of the Hangingstone facility is approximately 2.3 acres and that this represents approximately 0.35 per cent of the total surface area of Section 25, or 0.0153 per cent of Suncor's approximately 15 000-acre Meadow Creek West project area. For the sake of further comparison, Pure also noted that the footprint of the Hangingstone facility is only about 7 per cent the size of Suncor's proposed Meadow Creek West central processing facility.

[94] Pure argued that Suncor will be able to use existing technologies to characterize the resource and caprock and stated that Pure would allow Suncor to place geophones and use vibroseis trucks within the Hangingstone project area where appropriate to gather seismic data. While Pure acknowledged the benefits of having 3-D seismic data, Pure stated that they are only one type of data and that they are not necessary to ensure caprock integrity. Pure noted that seismic data are subject to interpretation, often have gaps, and will not always be 100 per cent reliable.

[95] In response to questions regarding the use of geophones and vibroseis trucks to collect seismic data, Suncor asserted that these alternative methods of data collection would not generate the same quality of seismic data as data collected via the use of dynamite, which is Suncor's preferred approach, and that gaps would still exist because of the need for offsets from the Hangingstone facility. However, Suncor confirmed that it uses a vibroseis truck for producing seismic data beneath Highway 63. It also acknowledged that being able to place geophones or use a vibroseis truck within the area of Pure's surface lease would help mitigate the effects of a data gap.

Panel's Analysis and Findings

[96] We accept that to maximize resource recovery and optimize well and pad placement, Suncor must properly characterize the resource. We also acknowledge that to safely produce bitumen and contain the high-pressure steam within the reservoir, it is important to evaluate the reservoir's caprock integrity.

[97] When acquiring data, bitumen producers, including Suncor, frequently face surface constraints. Some of these constraints, such as lakes and rivers, are naturally occurring, while others, such as third-party facilities or public infrastructure, are manmade. As noted by Suncor, acquiring subsurface data is complex and requires long-term planning and execution often stretching over decades.

[98] Suncor did not contest that the footprint of the Hangingstone facility is a small fraction of the Meadow Creek West project area, approximately 0.0153 per cent. Given the expansiveness of Athabasca oil sands leases and the time required to acquire data, we are of the opinion that it is not reasonable to expect to be able to rely on unconstrained surface access over the entirety of leases as a means of ensuring the acquisition of comprehensive data. Although not ideal, producers often use different methods, such as

directional delineation drilling and vibroseis trucks, to obtain the subsurface information required to explore and characterize the bitumen and to evaluate caprock integrity.

[99] Currently, Suncor has one delineation well within Section 25. Pure has drilled three wells at the location of the Hangingstone facility, which provide some additional publicly available subsurface information, such as well logs. Suncor indicated that it would use vibroseis trucks to characterize the resource underneath the highway. We understand that the quality of the data acquired in this manner may not be as high as the quality of the data gathered through the use of dynamite. That being said, as acknowledged by Suncor, it would provide data to mitigate the risks associated with a data gap. Moreover, any such data gap would be for a relatively small portion of Suncor's overall Meadow Creek West project area and Section 25. While Suncor may not be able to use its preferred method of evaluation, it will still have viable options. The presence of the Hangingstone facility does not prevent Suncor from sufficiently characterizing the resource and caprock.

[100] While Suncor made passing mention of caprock integrity in its written submissions, it raised that issue in a more substantial way at the hearing. Suncor suggested that one of the problems it will encounter if it cannot conduct 3-D seismic is that it will be unable to adequately assess the integrity of the caprock, which will call into question its ability to safely extract bitumen in Section 25. However, Suncor did not present any evidence suggesting that there is the potential for issues with caprock integrity or that caprock integrity could change over short distances, such as the space of a legal subdivision, in the Meadow Creek West area. Suncor will also have multiple sources of information on caprock integrity from outside the immediate area of the Hangingstone facility, including 3-D seismic, delineation wells, and mini-fracturing tests. We find it unlikely that the potential absence of data over one legal subdivision will prevent Suncor from having confidence in its interpretation of caprock integrity in Section 25. Therefore, we are satisfied that Suncor's ability to assess caprock integrity and related safety issues will not be affected by the Hangingstone facility.

[101] While not determinative of this matter, we note that some of the physical infrastructure for the Hangingstone facility has already been constructed pursuant to a licence obtained under a *Directive 056: Energy Development Applications and Schedules* application (licence F50382). That infrastructure will not need to be removed even if approval WM 211 is rescinded; some of the physical infrastructure of which Suncor complains will exist irrespective of the outcome of this appeal. Suncor has suggested that the fact that Pure built much of the infrastructure required for the Hangingstone facility under licence F50382 supports its position that approval WM 211 should be rescinded. We disagree. Pure obtained licence F50382 and was entitled to build the infrastructure it did with that licence. Suncor did not demonstrate Pure was wrong in this regard. We note that Suncor did not challenge by regulatory appeal or otherwise the AER's decision to issue licence F50382, the step it could have taken if it considered that it was adversely impacted by that licence.

[102] Further, the fact that Pure will need to apply to amend the Hangingstone facility approval before it can commence operation is not a reason to rescind approval WM 211. It is a common and normal occurrence for a proponent to file subsequent amendment applications in relation to a development as new information is received and the development progresses.

Conditions of Approval

[103] Pure must give Suncor a reasonable opportunity to place geophones, use vibroseis trucks, or do both within the boundaries of Pure's miscellaneous lease 150436 (MLL) to allow Suncor to obtain seismic data.

The Hangingstone Facility Would Not Lead to a Material Loss of Economic Benefits to Suncor and the Public

Parties' Submissions

[104] Suncor argued that the interference caused by the Hangingstone facility and its operations will limit Suncor's ability to access the site for the purpose of evaluating bitumen, will impede Suncor's facility design, and may compromise Suncor's ability to safely operate its site. According to Suncor, this interference could prevent Suncor from extracting an estimated 6 million to 15 million barrels of bitumen with a royalty value of between \$30 million and \$75 million in the area of the Hangingstone facility.

[105] Suncor used several assumptions to calculate the 6 million to 15 million barrels of bitumen that Suncor stated could be sterilized due to the Hangingstone facility. Rather than implementing a 10- or 15-m pay thickness economic cutoff, Suncor based economic recovery on the ability to recover 6 million barrels per section. To calculate the 6 million barrels, Suncor used a cutoff of 600 000 recoverable barrels per well pair and multiplied that by the number of well pairs per section, which is typically ten. Suncor used this assumption because using a longer well can increase production out of thinner reservoirs. If a longer well can produce 600 000 recoverable barrels, that well becomes economic even if the reservoir has a pay thickness thinner than 10 or 15 m. Suncor stated that it would not develop any well pads in a section if it could not recover 6 million barrels from that section and added that it has forecast that it will be able to recover 15 million barrels of bitumen from pads near Section 25.

[106] To calculate the \$30 million to \$75 million range in lost royalties, Suncor assumed royalties of \$5 per barrel based on publicly available royalty data for Alberta oil sands. Suncor stated that the \$5 per barrel royalty applies to well pads that are in the royalty payout phase, and Suncor added that the well pad in Section 25 would likely be brought into service in an after-payout royalty regime. Suncor stated that the royalty value at Meadow Creek West would be comparable to other thermal bitumen projects in northeast Alberta. Suncor also stated that the production amount and royalty value of the potentially sterilized bitumen resource in Section 25 was about 2 per cent of the total Meadow Creek West project (1 out of 58 pads, or 1.7 per cent).

[107] Pure noted that the Hangingstone facility is located just off Highway 63, approximately 343 m northwest of the road. Pure also noted that InterPipeline's pipeline corridor runs between the Hangingstone facility and Highway 63, and that the pipeline corridor contains three large crude oil and diluent pipelines. Further, Pure provided a map indicating that approximately seven legal subdivisions within the southeast corner of Section 25 already have existing surface infrastructure and intersect with the pipeline corridor or Highway 63.

[108] Pure noted that the Hangingstone facility is located approximately 5.2 km from the nearest proposed well pad described in Suncor's Meadow Creek West application. Pure said that this well pad is described as a sustaining well pad, and because it is not part of Suncor's first proposed phase of development for Meadow Creek West, it may never be drilled. Pure also noted that Suncor's Meadow Creek West application indicates that the development of sustaining well pads would not start until 2036 at the earliest.

[109] Suncor stated that it does not plan to place any pads or steam chambers underneath the highway. Suncor said it recognized that the highway is critical infrastructure in the region. Suncor also said that it would ensure that the steam chambers are far enough from the highway to reduce any risk to the public.

[110] Suncor stated that the closest Meadow Creek West well pad to Section 25 would be well pad 40, which is in LSD 07-26-085-10W4M. Suncor said that if it were to drill its wells from pad 40 towards the east and Section 25, it could probably recover bitumen from the two most western legal subdivisions within Section 25. Suncor said that any wells drilled from pad 40 would not be able to reach the area beneath the Hangingstone facility. Also, Suncor suspected that an east-west well trajectory may not be an optimal direction for well placement in relation to the direction of the channel.

[111] Suncor stated that additional factors must also be considered in assessing whether it is economic to recover bitumen, including proximity to existing gathering system infrastructure and the flexibility to choose precise surface locations that would enable the drilling of long SAGD wells. Suncor noted that longer SAGD wells can access more bitumen, which allow for economic production in thinner pay areas.

Panel's Analysis and Finding

[112] We note that nearly half of the legal subdivisions within Section 25 have other infrastructure in place, including a pipeline corridor and Highway 63. This infrastructure will affect Suncor's ability to recover bitumen within Section 25. Suncor confirmed that it will not be steaming under the highway. Additionally, the pipeline corridor may also affect Suncor's ability to acquire data and place well pads within Section 25. In comparison with the footprints of the highway and pipeline corridor, the footprint of the Hangingstone facility is small, 0.35 per cent of the section. If the presence of the highway and pipeline corridor does not make the production of bitumen within Section 25 uneconomical, it is unlikely that the Hangingstone facility (which has a relatively small footprint and is located close to the highway

and pipeline corridor) will prevent Suncor from extracting the bitumen beneath it or from selecting the most efficient pad location.

[113] Suncor stated that the presence of the Hangingstone facility could prevent it from extracting an estimated 6 million to 15 million barrels of bitumen. To extract all of that bitumen, Suncor explained that it will require a well pad with approximately 10 well pairs. Suncor further explained that typical SAGD well pairs are approximately one-kilometre long and that a SAGD well pad steam chamber can cover roughly an entire section. Given the size of the Hangingstone facility, it is unlikely that its presence will prohibit Suncor from steaming all of the well pairs within that well pad. The Hangingstone facility's small size and proximity to the existing infrastructure in Section 25 indicate to us that the facility will not materially interfere with Suncor's flexibility in pursuing the resource.

[114] Even if Suncor decides not to steam beneath the Hangingstone facility, it is unlikely that this would lead to a reduction in bitumen production significant enough to render the entire section uneconomic. We note that Suncor has already stated that it will avoid steaming under Highway 63. Not steaming under the Hangingstone facility will increase the size of the area where steaming will not occur by less than 1 per cent of Section 25.

[115] The evidence did not convince us that this 1 per cent is so significant that it will sterilize or make uneconomical the remainder of the resource in the section. We therefore find it unlikely that the presence of the Hangingstone facility will prevent Suncor from extracting 6 million to 15 million barrels of bitumen in Section 25 and that this would lead to a corresponding loss of \$30 million to \$75 million in royalties.

[116] We are satisfied that given the small amount of bitumen that Suncor may not be able to extract because of the presence of the Hangingstone facility, resource conservation and sterilization/waste are not a concern. Not recovering absolutely all bitumen is unavoidable and permitted so long as it is not excessive.

[117] Given the above conclusion, there is no basis for concluding that the value of Suncor's mineral leases will be diminished. There is also no basis for concluding that the rights granted to Suncor through its mineral leases will be negatively affected. Those instruments do not provide Suncor with a guarantee that it will be able to extract 100 per cent of the bitumen in the area.

[118] We note Suncor's evidence that its commercial cutoff for developing Section 25 is 6 million barrels of bitumen. Suncor says that if it cannot achieve that level of production, it will not consider it economic to produce bitumen in Section 25. This evidence is an indication Suncor considers that it will meet its obligations to conserve bitumen and avoid wasteful operations, even where it is leaving a significant amount of bitumen in the ground.

Disposal Capacity

Parties' Submissions

[119] Suncor maintained that the caverns are integral to the Hangingstone facility and that they need to be washed out or solution mined before the facility can become operational. Suncor stated that the formation of the caverns will require a significant amount of water and disposal capacity in the Keg River Formation, the formation into which Pure proposes to dispose. Suncor noted that Pure's cavern applications stated that the caverns require a total of 7 million m³ of washwater to create a total cavern capacity of 675 180 m³; this means over 10 m³ of washwater for every 1 m³ of cavern space created. According to Suncor, the volume of disposal capacity that would be consumed just to create these two caverns is equivalent to approximately eight years of disposal required for Suncor's Meadow Creek East and West operations, which will produce up to 120 000 barrels per day of bitumen.

[120] Suncor also noted that after creating the caverns, Pure would require ongoing disposal capacity to maintain its operations at the Hangingstone facility. Suncor stated that the volume of water Pure needs to dispose of is 2500 m³ per day, which is about equivalent to that of Meadow Creek East and West. Suncor estimated that after cavern completion and two years of operation at these rates, Pure would have consumed the disposal capacity available in the Keg River Formation. Suncor maintained that the creation of these caverns and operation of the Hangingstone facility is an inefficient use of the limited disposal capacity of the Keg River Formation.

[121] Finally, Suncor stated that it was concerned with the Hangingstone facility's ability to properly process the waste that it receives in a way that ensures disposal fluids are compatible with the Keg River Formation and the fluids that are already in it. Suncor added that it has not reviewed or been provided any details on Pure's process, testing, or monitoring plans to ensure the integrity of the Keg River Formation disposal reservoir.

[122] In response, Pure's expert stated that the cleaner the salt, the easier it is to dissolve. Pure stated that its salt deposit is clean and that, as a result, the ratio of the volume of washwater to cavern capacity created would be 6 to 1. Pure stated that it will start washing the sump of the caverns at a slower rate and will slowly ramp up the cavern wash rate.

[123] Pure also stated that it has worked on its disposal procedures and incorporated information based on its many years of experience operating disposal wells to ensure the compatibility of the disposal fluid with the formation water within the intended disposal formation and to enhance the disposal well's longevity. Pure further stated that in contrast to some producers who dispose of waste products such as untreated boiler blowdown directly into disposal formations, Pure uses a multistage treatment process prior to injection into a disposal formation.

[124] Pure stated that it intends to commission third-party testing of the water in the Keg River Formation for compatibility with the brine given that disposal wells are an important asset for its operations. Pure stated that it takes great care of all of its disposal wells and target formations.

[125] Suncor maintained that the Hangingstone facility is one part of a larger integrated project by Pure that includes the facilities that are the subject of proceeding 384. Suncor stated that the Hangingstone facility, as currently proposed, will be unable to function without these associated facilities. As a result, Suncor stated that construction of the Hangingstone facility implies the future construction of the remaining facilities in the Hangingstone project. Suncor said that these associated facilities will have additional detrimental impacts on its Meadow Creek East and Meadow Creek West projects, which Suncor addressed in proceeding 384.

Panel's Analysis and Findings

[126] As noted above, we consider it necessary to have regard for the Hangingstone project as a whole in considering this appeal. This has been somewhat complicated by the fact that the applications for the disposal wells that will support Pure's operations at the Hangingstone facility, which we considered in proceeding 384, and this appeal are being considered in separate hearings with separate records. Nonetheless, we must have regard for the overall Hangingstone project. If the Hangingstone project is not needed or cannot succeed, it is difficult to see how the Hangingstone facility can be in the public interest.

[127] Suncor has suggested that the Hangingstone project cannot succeed because a necessary component, disposal capacity, has not been proven and that, as a result, the Hangingstone facility cannot be approved. We disagree. There is no requirement that disposal capacity be proven prior to approval of the Hangingstone facility. However, if there was no prospect of Pure obtaining disposal capacity, this would be relevant to the overall viability of the Hangingstone facility and the Hangingstone project.

[128] To create caverns, a cavern operator requires three elements: a salt deposit, washwater, and disposal wells with sufficient capacity. Suncor and Pure stated that as an accepted fact. Pure has successfully secured salt deposits and washwater and has approvals to use the washwater to wash out two caverns. Pure needs disposal capacity equivalent to the volume of disposal required to wash out the caverns and continue operating the caverns for the life of the Hangingstone facility and the Hangingstone project. Without sufficient disposal capacity, the Hangingstone facility and the Hangingstone project may not be viable.

[129] Building a waste disposal facility and washing caverns is an expensive endeavour requiring millions of dollars in capital investment. It would not be in the public interest or arguably even in Pure's interest if we were to approve the Hangingstone facility without having some confidence in its viability. While Pure has not demonstrated to us that it has proven disposal capacity, there is nothing on the record of this proceeding demonstrating that it will not be able to secure the required capacity. Irrespective of the

outcome of proceeding 384, we do not have evidence to demonstrate Pure cannot obtain sufficient disposal capacity, so we see no basis for rescinding the approval because disposal has not yet been proven.

[130] We note that no evidence was provided demonstrating that the wastewater from the Hangingstone facility would be incompatible with the Keg River Formation. Approval WM 211 includes a condition requiring Pure to have a quality assurance / quality control program at the Hangingstone facility which demonstrates that the fluids disposed of in accordance with its disposal scheme meet the disposal criteria set out in *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* prior to injection.

[131] The issue of disposal capacity also raises the issue of how Pure made its applications for the Hangingstone project. Pure's decision to file its applications for the Hangingstone project in a staggered manner caused considerable regulatory inefficiency. On behalf of the AER, we encourage applicants to bundle their applications whenever possible. Considering and deciding on related applications together creates a more effective process that allows the AER, applicants, and the public to address a proposed development as a whole. The result is a more efficient use of public resources and greater transparency within the AER's proceedings.

[132] Also related to how Pure applied for its applications is Suncor's suggestion that Pure's intention to later file for amendments to approval WM 211 is somehow improper. That is not the case. It is normal for project proponents to apply for amendments to approvals. Pure's need for amendments does not call into question the Hangingstone facility approval.

Approval of the Hangingstone Facility Is Consistent With the AER's Regulatory Mandate and Is in the Public Interest

[133] In assessing whether approval of the Hangingstone facility is consistent with the AER's mandate and in the public interest, we needed to evaluate whether the potential benefits of the Hangingstone facility outweigh any potential negative impacts to Suncor or the public.

[134] Section 15 of *REDA* and section 3 of the *REDA General Regulation* required us to consider the Hangingstone facility's social and economic effects, environmental effects, and impacts on landowners. We also took into account the purposes of the *OGCA* and that the provincial legislature has directed the AER to effect the conservation and prevent the waste of Alberta's oil sands resources. We recognize that under the energy resource enactments, including the *OGCA* and the *OSCA*, resource conservation (which goes hand in hand with preventing waste) is a primary consideration. This, however, does not mean that resource conservation and the avoidance of waste are the only considerations or that the interests of bitumen producers always take precedence over those of other participants in the oil and gas industry. Determining public interest is more nuanced than has been suggested to us by Suncor. Development must

be done in an efficient, safe, orderly, and environmentally responsible manner, which requires balancing a number of considerations.

[135] We assessed the need for the Hangingstone facility and found that the smaller producers, who are close to Highway 63 and do not have an on-site waste disposal system, can benefit from a nearby oilfield waste management facility. We also found that the Hangingstone facility will reduce emissions and traffic, therefore providing benefits to Albertans.

[136] We assessed surface heave and its impact on the Hangingstone facility and Suncor's operations. We found that any heave will be less than suggested by Suncor and can be accommodated by the Hangingstone facility's design. We are imposing conditions on the approval that will mitigate any potential impact of heave on the Hangingstone facility. We do not find that the presence of the Hangingstone facility and the potential impact of heave on that facility should prevent Suncor from conducting SAGD operations under the facility.

[137] We also assessed the impact of the Hangingstone facility on Suncor's ability to gather seismic data and characterize the bitumen and caprock. We found that the Hangingstone facility will not materially impair Suncor's ability to acquire data and characterize the bitumen and caprock beneath the facility. We are also imposing a condition on the approval that will allow Suncor to place geophones, use vibroseis trucks, or do both within the boundaries of Pure's miscellaneous lease to allow Suncor to obtain seismic data.

[138] We further assessed the impact the Hangingstone facility may have on Suncor's ability to produce bitumen in Section 25 and specifically beneath the Hangingstone facility. We found it unlikely that the Hangingstone facility would prevent Suncor from extracting the 6 million to 15 million barrels of bitumen that Suncor suggested and that this would lead to a corresponding loss of \$30 million to \$75 million worth of royalties.

[139] We recognize that Pure will require sufficient disposal capacity to operate the Hangingstone facility as currently applied for and that if there is no prospect of Pure obtaining that capacity, the facility would not be in the public interest. However, it has not been demonstrated that Pure cannot obtain the necessary disposal capacity.

[140] For the reasons set out above, we find that approval of the Hangingstone facility is consistent with the AER's mandate and in the public interest. We therefore confirm AER Authorizations' decision to approve application 1910941 and issue approval WM 211, subject to the conditions outlined in this decision report.

Dated in Calgary, Alberta, on February 27, 2020.

Alberta Energy Regulator

Parand Meysami, M.Sc., P.Eng.
Presiding Hearing Commissioner

Alex Bolton, P.Geo.
Hearing Commissioner

Jude Daniels, LL.B.
Hearing Commissioner

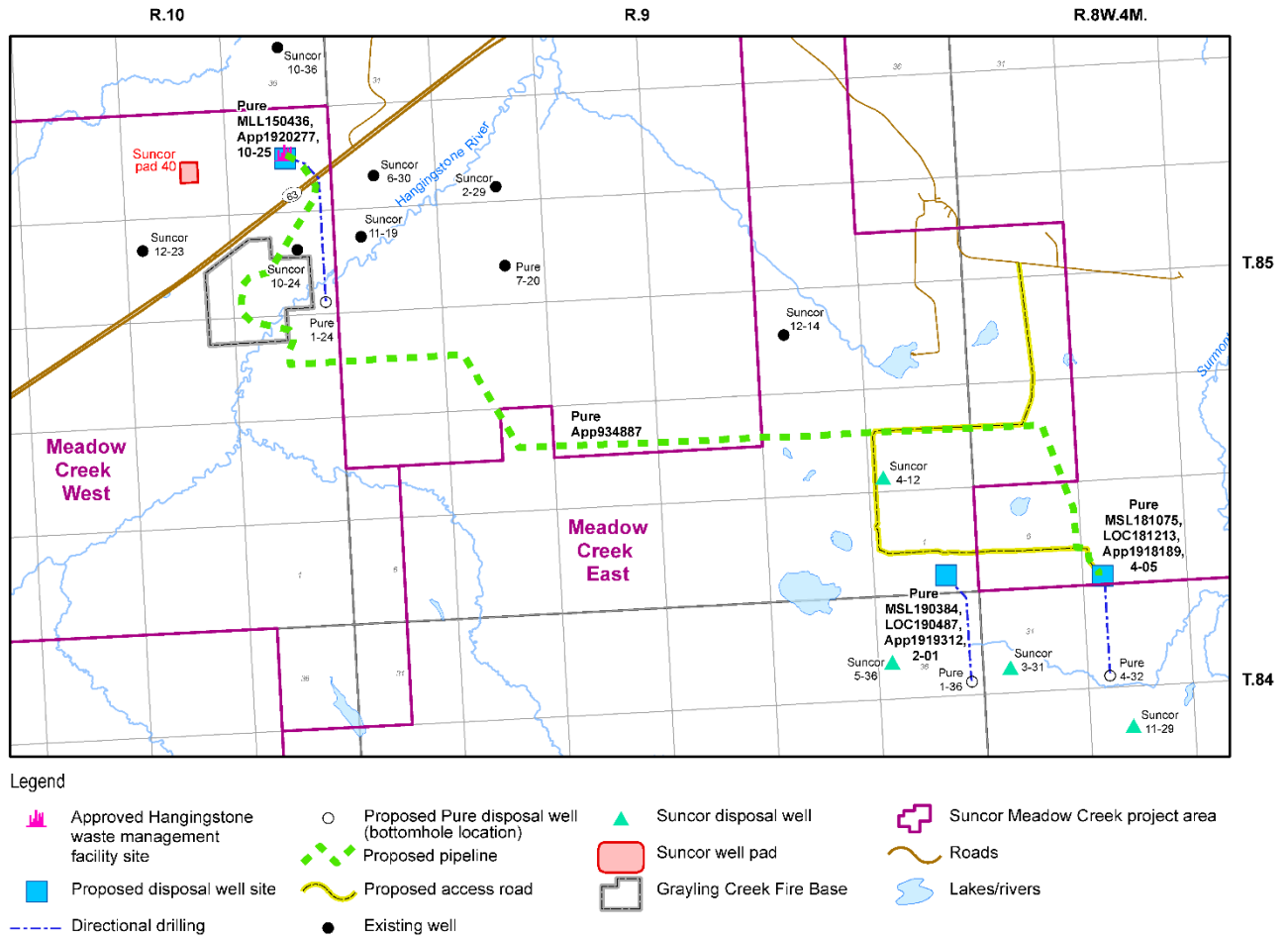


Figure 1. Map of Hangingstone project area

Appendix 1 Hearing Participants

Principals and Representatives
(Abbreviations used in report)

Witnesses

Pure Environmental Waste Management Ltd.
(Pure)
S. Dhalla
A. MacKinnon
L. Manning

D. Baillie
R. Bogzaran
T. Boone
D. Cotterill
R. Rice
D. Schooley
A. Wright

Suncor Energy Inc. (Suncor)
B. Roth
C. Graham

B. Braaten
R. Chan
C. Debiasio
N. Hunter
D. Walters

Alberta Energy Regulator staff

M. LaCasse, AER Counsel
F. De Luca, AER Counsel
L. Forbes
S. Harbidge
S. Hardie
L. Kirkpatrick
T. Hauck
E. Laratta
A. Panwar
V. Pugh
T. Rempfer
L. Shen
A. Shukalkina
T. Turner

Appendix 2 Summary of Conditions

Generally speaking, conditions are requirements that supplement or otherwise expand upon existing regulations and guidelines. An applicant must comply with conditions, and if an applicant fails to do so, it will be in breach of its approval and subject to enforcement by the AER. Enforcement of an approval includes enforcement of the conditions attached to that approval. Sanctions imposed for the breach of such conditions may include suspension of the approval, resulting in the shut-in of the facility.

The conditions imposed on approval WM 211 are as follows:

Conditions

- At least 15 days prior to recommencing construction of the facility, Pure must provide to the AER, and the AER must accept, a statement and supporting engineering drawings stamped and approved by a professional registered with the Association of Professional Engineers and Geoscientists of Alberta (APEGA) with expertise in surface heave. These documents must demonstrate to the AER's satisfaction that the facility has been designed and will be constructed to maintain its integrity and containment in response to surface heave that may result from nearby SAGD operations.
- Upon receiving notice that SAGD operations will occur in Section 25-085-10W4M, Pure must submit to the AER a plan, satisfactory to the AER, to monitor the potential impact of surface heave on the Hangingstone facility.
- Pure must give Suncor a reasonable opportunity to place geophones, use vibroseis trucks, or do both within the boundaries of Pure's miscellaneous lease 150436 (MLL) to allow Suncor to obtain seismic data.

Appendix 3 Agreement on the Use of Evidence from Proceeding 384

The agreement is recorded on page 12, line 16, to page 15, line 13, of the hearing transcript.

1 last for three days. If -- if needed, the Panel is
2 prepared to sit late to complete the hearing. However,
3 after 6 PM, the building will be locked. While we can
4 remain in this area of the building, if anybody leaves
5 the building, they won't be able to get back to the
6 building after 6 PM. We plan to hear oral final
7 argument after the evidentiary portion of
8 Proceeding 386 is complete this week on Friday, the --
9 the 29th of November 2019.

10 Are there any questions about the procedure for
11 today?

12 I take none.

13 Do the parties have any preliminary matters they
14 wish to raise at this time?

15 Discussion

16 MR. MACKINNON: Good morning, Madam Chair,
17 Panel Members. My name is Alastair MacKinnon, counsel
18 to Pure. I am pleased to advise that over the weekend,
19 the parties have reached an agreement between
20 themselves which will hopefully streamline and expedite
21 proceedings this week. The agreement allows for
22 reference to the transcript from Proceeding 384 on
23 certain select topics. The agreement also expressly
24 precludes reference to the 384 transcript on certain
25 other topics, and there are two important caveats to
26 the agreement.

1 So what I would propose to do is read the
2 agreement into the record, ask my friends from Suncor
3 to confirm their agreement, and then, subject to the
4 Panel's approval, we will govern ourselves accordingly
5 in this proceeding.

6 The following is the list of topics where either
7 party may refer to the record from Proceeding 384 for
8 the purposes of Proceeding 386: Number 1, witness
9 credentials; Number 2, company background for either
10 Pure or Suncor; Number 3, background for Pure's
11 Hangingstone project or Suncor's Meadow Creek east and
12 Meadow Creek west projects; Number 4, the economics of
13 Pure's Hangingstone project and the economics of
14 Suncor's Meadow Creek east and Meadow Creek west
15 projects; and Number 5, Suncor's potential
16 implementation of zero liquid discharge or ZLD
17 technology at its Meadow Creek projects.

18 The parties are agreed that the inclusion of any
19 topic on this list does not preclude either Pure or
20 Suncor from adducing the same or further evidence on
21 such topics or on any other topics in Proceeding 386 to
22 the extent that such evidence would otherwise have been
23 admissible in Proceeding 386 in the absence of this
24 agreement.

25 The parties are also agreed that the list of
26 inclusion topics is necessarily generic, and Pure

1 expressly reserves its right to object to Suncor's
2 reliance on any portions of the Proceeding 384 record
3 that might notionally fall within any of the topics
4 previously listed but which issues or facts are not
5 raised in the parties' written submissions in
6 Proceeding 386.

7 In particular, and without limiting Suncor's --
8 pardon me -- Pure's reservation of right to object,
9 Pure expressly does not consent to referring to any
10 portions of the Proceeding 384 record on the following
11 two issues: Number 1, any evidence regarding the size
12 or disposal capacity of the Keg River Formation; and
13 Number 2, any evidence regarding Suncor's allegations
14 of bitumen sterilization as a result of Pure's proposed
15 pipeline and disposal wells.

16 I would now ask my -- I would now ask my friends
17 from Suncor to confirm that this accurately reflects
18 the terms of our agreement, and then we would request
19 that the Panel approve this agreement for the purposes
20 of Proceeding 386.

21 MR. ROTH: Madam Chair, that was our
22 understanding, I guess -- and I don't think there will
23 be any concern -- that it would apply both ways if -- I
24 don't envision how it would arise, but if Pure were to
25 try and raise a 384 matter in 386, Suncor would have
26 the opportunity to express its objections on -- on that

1 as well. But subject to that, I don't think there was
2 any controversy on -- on that. That is our agreement.

3 THE CHAIR: Thank you, Mr. Roth.

4 Mr. MacKinnon?

5 MR. MACKINNON: Yes, that's agreeable. Suncor
6 can also reserve its right to object to any portion of
7 the 384 record that Pure might attempt to rely on.

8 THE CHAIR: Thank you very much,
9 Mr. MacKinnon.

10 We, the Panel, appreciate your efforts -- the
11 parties' efforts to streamline the matters and come to
12 an agreement, and we accept that agreement, and that's
13 an acceptable approach to us. So you may proceed now.

14 With that, I will ask Suncor to seat their witness
15 panel and proceed with its direct. Just procedurally,
16 they need to be sworn again. Thank you.

17 MS. GRAHAM: Thank you, Madam Chair. As
18 you'll see, our witnesses are largely the same panel as
19 we had for the 384 proceeding, and we've again chosen
20 to seat them as front row and back row witnesses. And,
21 again, in this proceeding, the only witnesses that will
22 be giving evidence will be our front row panel. So I
23 propose to have only them sworn or affirmed.

24 THE CHAIR: Thank you. That's acceptable.

25 CAROLANNE DEBIASIO, NICOLE HUNTER, RICHARD CHAN, DALE
26 WALTERS, Sworn