

Pure Environmental Waste Management Ltd.

**Applications 1614037, 1784753,
1809825, 1928016, 1928017, 1928430,
30602032, 30608918, and 30608934
Hangingstone Project**

October 20, 2022

Alberta Energy Regulator

Decision 2022ABAER 004: Pure Environmental Waste Management Ltd., Applications
1614037, 1784753, 1809825, 1928016, 1928017, 1928430, 30602032, 30608918, and
30608934, Hangingstone Project

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2022 ABAER 004

Pure Environmental Waste Management Ltd. Applications for the Hangingstone Project

Applications 1614037, 1784753, 1809825, 1928016, 1928017, 1928430, 30602032, 30608918, and 30608934

Decision

[1] Having considered all the evidence carefully, the Alberta Energy Regulator (AER) approves applications 1928017, 1928430, and 30602032, subject to the conditions in the approval documents, and applications 30608918 and 30608934.

[2] The AER denies applications 1614037, 1784753, 1809825, and 1928016.

Introduction

Applications

[3] Pure Environmental Waste Management Ltd. filed nine applications with the AER as part of its Hangingstone project. The applications are summarized in table 1.

[4] Pure's Hangingstone project is an oilfield waste management project located about 25 kilometres (km) south of Fort McMurray in the Regional Municipality of Wood Buffalo. The project involves solution mining or washing salt caverns and using the caverns to store waste. Brine from solution mining or washing will be recovered and treated before being injected into disposal wells. A waste management facility and disposal well were approved by the AER previously.

[5] Pure applied under the *Oil and Gas Conservation Act (OGCA)* for the following:

- A licence to drill two horizontal sweet disposal wells (no hydrogen sulphide) into the Keg River Formation (applications 1784753 and 30602032). One of the wells would be at surface location LSD 07-20-085-09W4M with a bottomhole at LSD 07-16-085-09W4M (07-16 disposal well), and the other would be at surface location LSD 10-25-085-10W4M with a bottomhole at LSD 09-19-085-09W4M (09-19 disposal well).
- Pure applied under *Directive 065: Resources Applications for Oil and Gas Reservoirs* for a new disposal scheme to dispose of Class II and Ib fluids into the Keg River Formation (applications 1928016 and 1928017) using the 07-16 and 09-19 disposal wells.

[6] Pure applied under the *OGCA* (application 1928430) to amend the existing Hangingstone oilfield waste management facility approval (WM 211) to permit the facility to accept additional waste streams and improve operational efficiency. The proposed changes included

- adding tanks and redesigning the approved tank farm,
- adding one tank in a new tank farm,
- adding waste processing for hydrocarbon recovery, separation of fluids and solids, processing of residuals, and treatment of high-pH wastewater,
- adding fluid disposal methods for waste generated by the facility,
- increasing the size of the approved receiving pad,
- realigning the plot plan, and
- adding non-oilfield and imported waste to the previously approved list of waste in Pure's existing waste management facility approval (WM 211).

[7] Pure applied under the *Public Lands Act* (application 1614037) for a mineral surface lease to drill and operate the proposed 07-16 disposal well.

[8] Pure applied under the *Public Lands Act* and *Pipeline Act* for a licence to construct and operate a 4.64 km underground produced water pipeline from its Hangingstone waste management facility at LSD 10-25-085-10W4M to the 07-16 disposal well (application 1809825). Pure also applied for a licence to construct and operate a 0.3 km freshwater pipeline from a saline water well less than 150 metres deep at LSD 07-25-085-10W4M to the facility (application 30608918).

[9] Pure applied under the *Public Lands Act* (application 30608934) to amend the existing miscellaneous lease (MLL 150436) and licence of occupation (LOC 151953) for the facility and access road to accommodate the proposed changes to the facility and drilling of the 09-19 disposal well.

Table 1. Summary of the applications (in order of filing date)

Application	Purpose	Location/length	Filing date
1614037	Mineral surface lease	Location: LSD 07-20-085-09W4M	November 4, 2019
1784753	Disposal well D056 licence	Surface location: LSD 07-20-085-09W4M Bottomhole location: LSD 07-16-085-09W4M	February 7, 2020
1809825	Pipeline	4.64 km	March 26, 2020
1928016	Disposal well D065 Class II and Ib disposal scheme	Bottomhole location: LSD 07-16-085-09W4M	April 1, 2020
1928017	Disposal well D065 Class II & Ib disposal scheme	Bottomhole location: LSD 09-19-085-09W4M	April 1, 2020

30602032	Disposal well	Surface location: LSD 10-25-085-10W4M Bottomhole location: LSD 09-19-085-09W4M	April 3, 2020
1928430	Oilfield waste management facility D058 licence amendment	Surface location: LSD 10-25-085-09W4M	April 28, 2020
30608934	Oilfield waste management facility and access road amendment	N1/2 and SE-25-085-10W4M	May 6, 2020
30608918	Pipeline	0.3 km	May 6, 2020

Regulatory Framework

Responsible Energy Development Act

[10] In deciding whether to approve each of the applications before us, we must consider certain factors set out in our governing legislation, including the AER's mandate. Section 2 of the *Responsible Energy Development Act (REDA)* states that the AER's mandate is to "provide for the efficient, safe, orderly, and environmentally responsible development of energy resources in Alberta."

[11] For Pure's applications filed under the *OGCA* and *Pipeline Act*, section 15 of *REDA* and section 3 of the *Responsible Energy Development Act General Regulation* require the panel to also consider the social, economic, and environmental effects of the energy resource activity, and the effects of the energy resource activity on the environment, and the impacts on a landowner as a result of the use land on which the energy resource activity is or will be located.

Oil and Gas Conservation Act

[12] In considering Pure's applications under the *OGCA*, we must ensure the applications meet the requirements of the *Oil and Gas Conservation Rules* and associated directives. We must also consider the purpose of the *OGCA*, which is set out in section 4 and states:

- (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, efficient and responsible development in the public interest of the oil and gas resources of Alberta;

Pipeline Act

[13] In assessing Pure's applications under the *Pipeline Act*, we must ensure that they meet the requirements of the *Pipeline Rules* and associated directives.

Public Lands Act

[14] The AER is responsible for administering parts of the *Public Lands Act* concerning energy resource activities, which involves ensuring the allocation and management of public lands in Alberta are carried out responsibly.

Alberta Energy Regulator Rules of Practice

[15] Section 18 of the *Alberta Energy Regulator Rules of Practice (Rules of Practice)* allows the AER to conduct a hearing in writing, electronically, or orally, or by any combination of those methods. Section (19)(1)(a) states that for a written hearing the AER “may dispose of the proceeding on the basis of the documents filed by the parties.”

[16] Section 42 of the *Rules of Practice* provides that the AER “may dispense with, vary, or supplement all or any part of the rules if it is satisfied that the circumstances of any proceeding require it.” This authority is subject to the requirements of natural justice and procedural fairness.

Background

[17] On December 1, 2019, Suncor Energy Inc. filed statements of concern about Pure’s applications. The AER decided to consider the applications through a public hearing and struck a hearing panel consisting of hearing commissioners P. Meysami (presiding), A. Bolton, and E. McNaughtan. The AER issued a notice of hearing for this proceeding (proceeding 403) on October 13, 2020, that included an explanation of how to request to participate.

[18] We received one request to participate from Suncor. In its request, Suncor stated that Pure’s applications would have direct and adverse impacts on Suncor’s Meadow Creek East and Meadow Creek West in situ bitumen recovery projects (Meadow Creek projects). Suncor was concerned that Pure’s applications would infringe on Suncor’s right to extract and exploit resources under the leases held by Suncor and affect the value of the mineral leases held by Suncor. Suncor was also concerned about Pure’s proposal to construct and operate disposal wells in the Keg River Formation, the same target disposal formation for Suncor’s approved Meadow Creek projects.

[19] On November 12, 2020, we granted full participation to Suncor and asked Pure and Suncor (see appendix 1 for a list of participants) to provide submissions on

- the issues to be addressed in the proceeding,
- the schedule for filing evidence and written submissions,
- an information request process, and
- hearing format (written or oral).

[20] On December 17, 2020, we set out the issues for the hearing, the schedule for submissions, the information request process, the hearing format (oral), and a May 25, 2021, hearing date.

[21] On January 6, 2020, Pure requested an extension for filing its submission. Suncor agreed with the extension request but asked that the new hearing date be left as “to be determined.” On January 11, 2020, we granted Pure’s extension request and Suncor’s request to leave the hearing date as “to be determined.”

[22] Pure filed its written hearing submission on February 26, 2021, and Suncor filed its written hearing submission on April 5, 2021.

[23] On July 31, 2021, after filing their submissions and responses to information requests and before setting a new hearing date, the parties requested that the hearing process be adjourned to facilitate discussions between the parties about the applications. In response to the parties’ request for adjournment and three further extension requests, we adjourned the proceeding from August 4, 2021, to February 17, 2022, to allow the parties time to continue their discussions.

[24] On February 1, 2022, we received a joint submission from Pure and Suncor outlining proposed dispositions for the applications, which was based on a commercial agreement that they had reached. The parties asked that the panel consider the proposed disposition. Furthermore, Pure and Suncor requested an opportunity to comment on the draft terms and conditions of any approval documents.

[25] On March 10, 2022, we requested clarification on certain aspects of the joint submission, to which Pure and Suncor provided a joint response on April 4, 2022.

[26] In a letter to the parties dated May 13, 2022, we outlined our views on the joint submission. Since it is the practice of hearing commissioners to question the parties and allow them to comment on potential conditions, we enclosed with that letter two draft approval documents containing the proposed conditions for the parties’ review and comment:

- Class II and Ib disposal approval 12861A
- oilfield waste management facility amendment B to approval WM 211

[27] Any approvals for the well licences, pipeline licences, and the *Public Lands Act* dispositions would be system-generated standard approvals, which the parties did not ask to be modified. We therefore did not include drafts of those documents.

[28] On June 9, 2022, Pure, on behalf of both parties, responded to the panel’s May 13, 2022, letter stating that the parties had no further comments on the panel’s May 13 letter. Also, Pure provided comments on behalf of both parties concerning the draft approval documents.

[29] On June 30, 2022, we provided written clarification in response to the parties' comments on the draft approval documents. We also provided revised versions of the draft approval documents that addressed the parties' comments, where appropriate (see appendix 4). We also asked Pure and Suncor to provide any final comments on the revised draft approval documents. On July 13, 2022, Pure and Suncor submitted that they had no further comments.

[30] On July 22, 2022, we wrote to the parties asking if they wished to make any further submissions or required any further process before the panel decided on the applications. Pure and Suncor each confirmed that no additional submissions nor process was needed.

[31] The parties' joint submission and their responses to the panel's subsequent information request eliminated the need for an oral hearing.

[32] We acknowledge the parties' considerable efforts to resolve their differences and assist with our review and decisions on the applications. We used our powers under section 42 of the *Rules of Practice* to vary our normal procedures and instead relied on the unique written process described above in place of a hearing.

[33] We closed the proceeding on July 27, 2022.

Issues

[34] The parties brought forward in this hearing similar issues to those in the two previous proceedings. In *Decision 2020-004*, the panel found that approval WM 211 for Pure's Hangingstone waste management facility is in the public interest. Also, the panel found that Pure will require sufficient disposal capacity to operate the Hangingstone facility and that if there is no prospect of Pure obtaining that capacity, the facility would not be in the public interest.

[35] In *Decision 2020-005*, the panel acknowledged that Pure's existing disposal well at LSD 01-24-085-10W4M by itself does not currently provide sufficient injection capacity to support development and commercial operation of the salt caverns at the approved Hangingstone facility. Therefore, the panel found that there is a need for disposal wells and disposal capacity to support construction and operation of Pure's approved Hangingstone facility. Despite this need, in *Decision 2020-005*, the panel denied Pure's applications for two of its proposed disposal wells (bottomhole location at LSD 01-36-084-09W4M and 04-32-084-08W4M) due to their potential to interfere with Suncor's planned or approved disposal activities.

[36] Those decisions also identified several factors that require consideration when determining how to allocate limited disposal capacity in a manner that is consistent with the public interest, including:

- Pure and Suncor each require disposal capacity in the Keg River Formation for their operations.
- Subsurface disposal capacity is important in supporting bitumen production.

- An oil sands mineral lease does not give the leaseholder exclusive right to the disposal capacity within the lease boundary.
- The allocation of disposal capacity should be based on the relative benefits of Pure's and Suncor's projects.
- The potential for Pure's proposed disposal wells and disposal scheme to adversely affect bitumen recovery at Suncor's Meadow Creek projects.

[37] After considering each parties' submissions on the issues in this hearing, we concluded that the available disposal capacity of the Keg River Formation in the Hangingstone area and the potential for Pure's proposed injection operations to adversely affect Suncor's planned disposal operations and bitumen recovery at Suncor's Meadow Creek projects to be the core of the dispute between the parties.

[38] Regarding source water quality, we noted that Pure's source water well was previously approved and drilled; its approval was not directly before us. Pure stated in its August 25, 2020, letter to Suncor that third-party sampling and testing of the source water well confirmed that the water was saline. Nonetheless, we recognized that the available disposal capacity in the Keg River Formation can be affected by both the quantity and quality of the injected disposal water and the operating conditions of the injection well. Therefore, as source water quality may affect the amount and quality of cavern wash water and injection water into the Keg River Formation, we considered this a relevant issue for the hearing.

[39] We identified the following issues for the hearing:

- disposal capacity of the Keg River Formation in the Hangingstone area
- the volume and type of fluids injected into the formation and their impact on the disposal capacity, including any impacts from source water quality
- the potential for interference between Pure's proposed disposal operations and Suncor's approved disposal wells
- whether approving the applications is in the public interest having regard for the social, economic, and environmental impacts of the proposed activities and the requirements provided in REDA and the relevant regulatory framework

[40] We also stated that we might consider additional issues arising during the hearing that are relevant and material to the above issues and would assist us in deciding on the applications.

[41] In reaching our decision, we considered all relevant materials properly before us. Accordingly, references to specific portions of the evidence in this decision are intended to assist the reader in understanding our reasoning on a particular matter and do not mean that we did not consider all relevant portions of the evidence.

[42] The following sections cover the individual submissions by the parties on the issues.

Disposal Capacity of the Keg River Formation in the Hangingstone Area

[43] Pure believed that there was a large disposal capacity in the Keg River Formation that would support both Pure's Hangingstone disposal operations and Suncor's disposal needs at the Meadow Creek projects. Pure based its claim on technical models and analysis of formation permeability and porosity provided by its experts: D. Cotterill, a geologist; A. Wright, a geophysicist; and S. Ibrahim, a chemical and petroleum engineer.

[44] The Keg River Formation in the Hangingstone area is divided into upper and lower units. The lower Keg River unit consists of a laterally extensive low-energy platform deposit. The upper Keg River unit comprises high-energy platform margin facies of limited areal extent and widespread lower-energy back-barrier facies. Pure's experts concluded that porosity and permeability throughout the upper and lower Keg River Formation units are well developed. Pure believed disposal capacity is not limited to the high-energy barrier (platform margin) facies of the upper unit and argued that disposal capacity is available throughout the entire Keg River Formation, including the back-barrier facies. Pure stated that the 07-16 and 09-19 wells would be drilled into the back-barrier facies of the Keg River Formation with disposal into these facies. Pure believed extensive fracturing and faulting within the formation would contribute to bleed-off during injection, limiting pressure buildup in the Keg River Formation.

[45] Based on data from Suncor's well at LSD 02-29-085-09W4M and seismic data, Pure also believed that the area of the Keg River Formation extending to the north and northeast of the Hangingstone project had potential for disposal capacity. Pure also said that Suncor's submissions in this proceeding estimated that the high-energy barrier facies were larger in area than indicated in previous proceedings, based on the recent results from the well at LSD 02-29-085-09W4M.

[46] Pure estimated the disposal capacity in the Keg River Formation to be 514 million cubic metres (m^3). Pure stated that its Hangingstone project's disposal operations would need less than 4% of this capacity. Pure based this estimate on the Hangingstone project requiring about $2500\ m^3$ per day of disposal capacity for 20 years.

[47] Suncor provided a geology report and a well-test summary report to support its claim that disposal capacity is limited to the high-energy barrier facies of the upper Keg River Formation (about 5% of the upper Keg River Formation). Suncor maintained that most of the upper Keg River Formation (the back-barrier facies) is salt plugged with poor injectivity, making it unsuitable for disposal. Suncor's analysis also indicated that the lower Keg River Formation is not suitable for disposal, further limiting the available disposal capacity within the formation. Suncor rejected Pure's evidence of extensive fracturing and faulting in the Keg River Formation and the modelling of pressure change in the Keg River Formation from fluid disposal.

[48] Suncor said the suitable disposal area of the Keg River Formation was limited, extending in a northwestward direction along the high-energy barrier facies between its existing disposal wells and an area southeast of the Hangingstone project. Suncor said that the proposed 07-16 disposal well's bottomhole location would be in the high-energy barrier facies of the formation, but the proposed 09-19 disposal well's bottomhole location would be in an area of uncertainty that required more investigation to characterize.

[49] Suncor maintained that there was not enough capacity within the limited disposal area to accommodate the disposal needs of both the Meadow Creek projects and the Hangingstone project, so the 07-16 disposal well and associated applications should be denied. Suncor further submitted that should the AER decide that approving the applications related to the proposed 07-16 disposal well would be in the public interest, such approvals should contain conditions to protect the Meadow Creek projects. Suncor also requested that if the 09-19 disposal well and associated applications were approved, those approvals should contain conditions to ensure Suncor's approved disposal schemes would not be adversely affected.

Impacts of the Volume and Type of Fluids on the Disposal Capacity

[50] Pure stated that it would be restricted to disposing of fluid types as set out in its applications, which comply with *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging and Testing Requirements*. Pure said the Keg River Formation is compatible with the directive's Class Ib fluids, which generally consist of produced water and common oilfield waste streams. Pure stated that fluids of this type had been disposed into the Keg River Formation without issue at the Long Lake/Kenosis project, east of the Hangingstone area. In addition, these fluids are equivalent to those that Suncor is conditionally approved to inject into its Meadow Creek disposal wells and those that Pure is approved to inject at its existing well at LSD 01-24-085-10W4M.

[51] Pure said the source water it will use for washing caverns is saline, and the quality of this water will have no effect on disposal capacity. Class II fluids sent to the disposal wells will include produced water and brine-equivalent fluids, including fluids from cavern washing.

[52] Suncor said that diverse waste streams injected into the formation might chemically react with each other, and the compatibility of disposal fluids with formation fluids cannot be assumed simply because their disposal is allowed by a licence. Disposal fluids might need treatment to ensure their compatibility and prevent scaling from fouling the disposal container. Suncor provided a technical report completed by A. (Xiaojun) Cui, a geologist, to support its assertions and said that Pure had not undertaken studies to understand the risk to Suncor's disposal operations from incompatible waste fluids.

Potential Interference Between Pure's Proposed Disposal Operations and Suncor's Disposal Wells

[53] Pure's evidence provided by Mr. Ibrahim concluded that reservoir pressure in the Keg River Formation would increase by about 1000 kilopascals (kPa), from about 3500 to 4500 kPa, over the 20-year life of the Hangingstone project. Pure said that the fracturing and faulting would contribute to bleed-off within the Keg River Formation, resulting in dissipating the pressure in the disposal zone.

[54] Pure said that the bottomhole location of its proposed 07-16 and 09-19 disposal wells would be in the back-barrier facies of the upper unit of the Keg River Formation and located some distance from Suncor's Meadow Creek disposal wells, providing physical separation of the operations. Pure relied on its modelling and analysis of permeability and porosity and its analysis of fractures and faults throughout the Keg River Formation as the basis for its claim that its disposal operations are unlikely to affect the disposal capacity at Suncor's wells.

[55] Suncor disagreed with Pure's analysis of extensive faulting and fracturing in the Keg River Formation. Suncor stated that flaws and data gaps in Pure's modelling of potential pressure change provided unreliable results and underestimated the pressure increase in the Keg River Formation.

[56] Suncor stated that injection at the 07-16 disposal well had the potential to interfere with its disposal operations because the well would be located within the high-energy barrier facies of the Keg River Formation, and the direction of flow within the formation is from northwest to southeast. Suncor said that injected disposal fluid from Pure's disposal operations would follow the path of highest transmissivity to the southeast, in the direction of Suncor's disposal wells at LSD 03-31-084-08W4M and LSD 11-29-084-08W4M, limiting their future disposal capacity.

Whether Approving the Applications is in the Public Interest

[57] Pure said that the Hangingstone project would provide additional commercial waste disposal capacity in the Athabasca Oil Sands Area, where commercial disposal operations are limited and located at some distance from many operations. More disposal capacity in the region will reduce trucking costs for some operators. Pure noted that their project had been deemed in the public interest in AER *Decision 2020-004* and *2020-005*, which recognized that to be viable, Pure required additional disposal wells to the existing well at LSD 01-24-085-10W4M.

[58] Suncor said that despite the previous decisions (2020-004 and 2020-005) having found the Hangingstone project to be in the public interest and requiring more disposal wells to be viable, the AER was not limited in its discretion to determine the public interest of any subsequent disposal well applications. Suncor maintained that the previous decisions to deny Pure's proposed wells had been made because of the potential to adversely affect Suncor's disposal wells, which could affect bitumen recovery at the Meadow Creek projects.

Joint Submission

[59] The parties' joint submission stated that Pure and Suncor had reached an agreement and included their proposed dispositions of the applications. They stated that the proposal reflected a compromise that would reasonably balance Pure's and Suncor's needs for disposal capacity in the Hangingstone area.

[60] Given reciprocal commitments made by Pure and Suncor with respect to their operations, the joint submission asked the panel to consider the following dispositions:

- Deny the 07-16 disposal well and related applications 1784753, 1928016, 1614037, and 1809825 without prejudice to Pure's ability to make future applications under the *OGCA*, *Directive 056*, the *Pipeline Act*, and the *Public Lands Act* for injection wells and related well disposal operations anywhere outside the Suncor disposal operating area, as defined in the map attached to the joint submission and provided in appendix 2.
- Conditionally approve applications 1928017 and 30602032 pertaining to the 09-19 disposal well and disposal operations.
- Conditionally approve application 1928430 to amend approval WM 211 for the Hangingstone waste management facility.
- Approve application 30608918 for a licence to construct and operate a pipeline to deliver water from an existing well at LSD 07-25-085-10W4M to the Hangingstone waste management facility and for a LOC for that pipeline.
- Approve application 30608934 to amend the existing MLL 150436 and LOC 151953 for the oilfield waste management facility and access road.

The Panel's Consideration of the Parties' Submissions and the Issues

[61] We considered the parties' individual submissions, the information filed through the formal information request process, and the parties' joint submission and associated responses to the panel's information requests in determining whether the proposed disposition of the applications addressed the issues in this matter.

[62] Although we considered the joint submission, we must still exercise our decision-making function and not simply adopt the parties' proposal without satisfying ourselves that any approvals of the applications are consistent with our mandate and regulatory requirements.

[63] As reflected in their individual submissions, available disposal capacity and the potential interference by Pure's disposal operation with Suncor's disposal operation have remained issues of conflict. However, as reflected in their joint submission, the parties have sought to resolve their conflict on these issues for current and future applications.

[64] Below, we discuss these issues, the commitments made by the parties in their joint submission, and our decision.

Disposal Capacity and Potential Interference Between the Parties' Disposal Operations

[65] In their joint submission, the parties identified discrete operating areas for their respective disposal operations to minimize the potential for interference between the operations. Schedule A of the parties' joint submission is a map created by the parties that identifies the Suncor disposal operating area, the Pure disposal operating area, and the Keg River disposal exclusion area (see appendix 2).

[66] The parties stated that they each agreed not to make nor cause or encourage any third party to make any future applications to the AER for authorizations (including amendments) for any surface or subsurface storage or disposal of any fluid or substance by way of wells, pipelines, or schemes in the other party's operating area or the exclusion area. The joint submission proposed that Pure's commitments be captured in the approvals for applications 30602032 (09-19 well), 1928017 (disposal scheme), and 1928430 (waste management facility), whereas Suncor's commitments be recorded in an internal AER memorandum for reference by future decision makers.

Panel's Analysis and Findings

[67] The proposed disposal operating areas resolve several areas of conflict between the parties concerning the potential available disposal capacity and possible interference between disposal wells in the Hangingstone area of the Keg River Formation. The disposal operating areas also address other concerns raised in the individual submissions, including the available pore space, direction of flow, and permeability of the high-energy barrier facies and back-barrier facies of the Keg River Formation.

[68] The agreement to observe discrete disposal operating areas provides a mutually acceptable resolution for the current applications and may assist future decision makers in evaluating future applications. At the same time, distance is created between the parties' disposal operations while providing Pure with opportunities to obtain disposal capacity in areas it has deemed likely to have sufficient disposal capacity to support its Hangingstone project.

[69] We view the operating and exclusion areas identified by the parties in their joint submission and the terms "Pure disposal operating area," "Suncor disposal operating area," and "Keg River disposal exclusion area" as exclusively applicable to the relationship between Pure and Suncor for the purposes of this proceeding and the proposed application dispositions. In our decision, we are relying on the commitment of the parties not to drill or conduct disposal operations within each other's operating area or the exclusion area. Our understanding of these terms and their use is limited to Pure's and Suncor's disposal operations within the Keg River Formation.

Parties' Commitments

[70] In their joint submission, the parties outlined the commitments that they have made to each other to reach an agreement. The parties requested that Suncor's commitments, as outlined in the joint submission, be expressly acknowledged in the panel's decision on the applications.

[71] Suncor's commitments were as follows:

25. In addition, as part of the agreement leading to the Proposed Disposition, Suncor and Pure have each covenanted that they will not make, and will not cause or encourage any third party to make, any future applications to the AER for authorizations (including amendments) for any surface or subsurface storage or disposal of any fluid or substance by way of wells, pipelines or schemes at certain surface or bottom hole locations , as set out in Schedule "A". Specifically, Suncor has committed not to make, cause or encourage any such applications within the purple and green shaded areas identified in the attached Schedule "A". Similarly, Pure has covenanted not to make, cause or encourage any such applications within the purple and blue shaded areas identified in the attached Schedule "A".

26. In addition, as part of the agreement leading to the Proposed Disposition, the Parties further agreed that Suncor would retain the ability to maintain a downhole gauge for continuous monitoring and conduct injection tests using Suncor's 100/02-29-085-09W4/0 Well ("02-29 Well"), provided that any such injection tests into the Keg River Formation would be for a maximum of no longer than two weeks in any given calendar year and provided further that, if Suncor does decide to conduct any injection tests at the 02-29 Well, Suncor agrees to share any Well Information from the 02-29 within 30 days of receiving such information with Pure, provided the tests were conducted and the information was collected and recorded by or for the benefit of Suncor.

[72] The parties also requested that Suncor's commitments be reflected in a memorandum included in the AER's files for Suncor's approvals IA-001 (Meadow Creek West) and PIA-003 (Meadow Creek East). The memorandum would provide assurance to the parties that the AER is aware of Suncor's commitments and that those commitments would be respected until Suncor applies to have the commitments included as conditions in the Meadow Creek West and East approvals. The parties stated that in any future application to amend or renew approvals IA-001 and PIA-003, Suncor would request that the AER include Suncor's commitments as conditions in the approvals.

Panel's Analysis and Findings

[73] Pure has stated that it wants the decisions on its applications to be made as set out in the joint submission.

[74] As the applications before us are from Pure and not Suncor, the commitments from Suncor cannot be captured in any potential approval document. We understand that the aim of asking that a memorandum setting out Suncor's commitments be attached to the current files for approvals IA-001 and PIA-003 is to reinforce these commitments and provide regulatory assurance to Pure. However, said memorandum may not ensure future AER decision makers are aware of the Suncor commitments. The AER cannot enforce those commitments until they are included as conditions in a Suncor approval.

[75] Moreover, we cannot bind future decision makers or constrain their decisions on any future applications that Suncor might submit. However, the panel accepts that Suncor's commitments (see appendix 3) are made in good faith and that Suncor intends to request that its commitments be included as conditions of approvals IA-001 and PIA-003 when an application for renewal or amendment is submitted. We appreciate what the parties sought to accomplish with the proposed memorandum; a memorandum with this decision attached will be sent to the AER's Regulatory Applications Branch.

[76] The parties have agreed that Suncor will retain the ability to maintain a downhole gauge for monitoring and conducting injection tests at its well at LSD 02-29-085-09W4M (02-29 well), which was drilled in 2020 within the Keg River disposal exclusion area. Suncor committed to sharing the results of any injection tests with Pure. The sharing of such information would improve both parties' understanding of the Keg River Formation.

Denial of the Proposed 07-16 Disposal Well and Associated Applications Reduces the Potential for Interference

[77] The parties requested that the panel deny applications 1614037, 1784753, 1809825, and 1928016 without prejudice to Pure's ability to make future applications for injection wells and related disposal operations anywhere outside of the Suncor disposal operating area.

[78] The parties clarified that by asking for the denial of the applications for 07-16 disposal well, they intended for the panel to set a precedent precluding Pure from receiving approval for subsurface disposal applications within the Suncor disposal operating area for as long as Suncor holds scheme approvals under the *Oil Sands Conservation Act* for either the Meadow Creek East or Meadow Creek West projects. The parties' intent to limit Pure's ability to apply in the future for disposal within the Suncor disposal operating area is also captured in the conditions the parties proposed be imposed on approval WM 211.

Panel's Analysis and Findings

[79] Denying the 07-16 disposal well and associated applications would result in separating Pure's disposal operations from the current and conditionally approved disposal wells of Suncor and thereby mitigating potential impacts on Suncor's disposal wells resulting from the volume or quality of wastewater disposed of by Pure in its disposal operating area. Therefore, we deny applications 1614037, 1784753, 1809825, and 1928016 associated with the proposed 07-16 disposal well.

[80] Whereas the parties submitted that they intended that denial of the 07-16 disposal well establish a precedent for denying any future applications that Pure might make (or cause to be made) within the Suncor disposal operating area, our authority over Pure's approvals will cease with this decision. We cannot bind future decision makers or constrain their decisions on any future applications that either party or third party submits to the AER related to any surface or subsurface disposal or storage in the other party's disposal operating area. It is for Pure and Suncor to monitor and uphold their commitments

concerning future applications for disposal operations. As such, the parties can use the AER's statement of concern process to express concerns should any future applications be submitted to the AER concerning each other's operating areas.

Approval of the 09-19 Disposal Well and Related Disposal Operations

[81] The parties jointly requested approval of applications 1928017 and 30602032 for the 09-19 disposal well and related disposal operations. The approvals would be subject to several conditions, which they proposed would provide both parties with information from injection tests completed on the 09-19 disposal well. These conditions are as follows:

- (a) The holder of the licence and scheme approval in respect of the 09-19 Well shall provide 75 days' written notice to Suncor or any successor operator of the Meadow Creek Projects prior to performing injection tests at the 09-19 Well.
- (b) The holder of the licence and scheme approval in respect of the 09-19 Well shall provide Suncor or any successor operator of the Meadow Creek Projects with each piece of the following information within 30 days of the holder receiving such piece of information (collectively the "Well Information"), provided the tests are conducted and information is collected and recorded by or for the benefit of the holder:
 - (i) for any injection or pumping tests, well test data consisting of pressure and metered rates with corresponding time stamps within 30 days after downloading upon completion of any injection test, including production/injection and buildup/falloff periods of any injection or pumping tests. Such well test data must be provided to the maximum gauge/meter resolution in both Excel and PAS formats;
 - (ii) gauge specifications, including type, model, make, accuracy, resolution and landing depth in both measured depth and true vertical depth (with Kelly Bushing elevation reference or the reference datum and elevation clearly specified if different);
 - (iii) perforation interval(s) or open-hole completion zone(s) in measured depth and true vertical depth (with Kelly Bushing elevation reference)
 - (iv) initial formation pressure with units specified (i.e., Absolute or Gauge pressures, kPaa vs kPag);
 - (v) vendor reports for all injection/production tests;
 - (vi) viewing access for drill cuttings or permission to view core for any new drills if not available in the public domain within a reasonable time once a request by Suncor is made; and
 - (vii) porosity and permeability data.
- c. The holder of the licence and scheme approval in respect of the 09-19 Well, or any well that replaces the 09-19 Well if the 9-19 Well is not drilled, shall ensure that the average maximum injection rate measured as a daily average over a twelve month period, does not exceed 3000 m³/day."

[82] The parties submitted that approval, with conditions, of the 09-19 disposal well and associated applications would reasonably balance Pure's and Suncor's needs for disposal capacity in the Hangingstone area.

Panel's Analysis and Findings

[83] We find that the conditions proposed by the parties mitigate the potential risk of impacts on Suncor's operation from the volume and type of fluids to be injected. Moreover, we find that the applications along with the proposed conditions satisfy the AER's regulatory requirements. Furthermore, the 09-19 well and the associated disposal capacity will contribute to the viability of Pure's Hangingstone project, and the conditions will provide both parties with more information on volume and injectivity characteristics in the Keg River Formation. For these reasons, we approve applications 1928017 and 30602032, subject to the conditions in approval 12861A (see appendix 4).

Approval of the Amendments to Approval WM 211

[84] The parties jointly submitted that application 1928430 to amend approval WM 211 should be approved with two conditions:

- a. The holder of Approval WM 211 shall not drill or operate any disposal well, at a surface or bottom hole location, nor contract with any third party to drill or operate, any disposal wells inside the purple and blue outlined area¹⁵ identified in the attached Schedule "A";
- b. The holder of Approval WM 211 shall inject at a maximum injection rate of 3000 m³/day at the 09-19 Well, measured as a daily average over a twelve month period.

[85] The parties clarified that proposed condition (a) would ensure that through the approval for the Hangingstone waste management facility, Pure or any successor operator of the facility would rely only on disposal wells within the Pure disposal operating area or wells outside the Suncor disposal operating area and the Keg River disposal exclusion area. The parties stated that it was important the facility approval contain that condition to provide Suncor with regulatory certainty. The parties submitted that if condition (a) was only included in the disposal scheme approval for the 09-19 disposal well, then Suncor would have less regulatory certainty.

Panel's Analysis and Findings

[86] Proposed condition (a) prohibits any holder of approval WM 211 or contracted third party to drill or operate a disposal well within the Suncor disposal operating area or the Keg River disposal exclusion area. This condition will reduce the risk of potential interference between Pure's and Suncor's disposal operations. We have included this condition in both the approval 12861A (disposal scheme approval Class II and Ib) for the proposed 09-19 disposal well and approval WM 211 to reduce the potential for uncertainty if the waste management facility (WM 211) and disposal scheme (12861A) approvals were severed.

[87] Proposed condition (b) sets a maximum daily average injection rate of 3000m³/day over a twelve-month period. Establishing a maximum daily average injection rate provides a mechanism to limit both the total annual volume of fluids that Pure can inject and the associated rate of pressure increase that may occur in the formation due to injection operations. This maximum daily average injection rate helps

mitigate the potential risk of interference with Suncor's proposed disposal operations and balances Pure's and Suncor's needs for disposal capacity in the Hangingstone area. We have included this condition in the disposal scheme approval (12861A) for the 09-19 disposal well to reflect the parties' compromise, and because the condition concerns the manner of disposal, it will be more enforceable in that approval.

[88] The applied-for amendments to approval WM 211 satisfy the AER's regulatory requirements for the facility. Therefore, we approve application 1928430, subject to the conditions in the draft approval documents in appendix 4. The approval document addresses how waste must be received, managed, and treated before disposal into the Keg River Formation.

Approval of the Pipeline from LSD 07-25 and Amendments to PLA Dispositions

[89] The parties jointly proposed that applications 30608934 and 30608918 should be approved.

Panel's Analysis and Findings

[90] Application 30608918 is for a freshwater pipeline, but the source well at LSD 07-25-085-10W4M that it would be connected to is classified as saline. In a July 9, 2020, supplemental information request, the AER noted that the substance and operating pressure in the application were incorrect. In response to the supplemental information request, Pure acknowledged the errors and confirmed that it had sent out a corrected project information package to all stakeholders on July 14, 2020. Pure further committed that it would submit an application to amend the substance type from fresh water to saline water and amend the maximum operating pressure to 1100 kPa within 14 days of approval of the pipeline. We rely on Pure's commitments (see appendix 3) to make the necessary amendment applications within 14 days of approval of the pipeline.

[91] The proposed pipeline otherwise meets the AER's regulatory requirements. The pipeline approval is required to support the operation and development of disposal capacity for the Hangingstone facility, and both parties support approval of the application. Therefore, we approve application 30608918.

[92] Approval of the proposed amendments to MLL 150436 and LOC 151953 for the Hangingstone waste management facility and access road are consistent with our decisions to approve amendments to the existing waste management facility approval and drilling of the 09-19 disposal well.

[93] Changes to the size and orientation of MLL 150436 and LOC 151953 are required to accommodate the additional equipment to be added and to facilitate drilling the 09-19 disposal well to ensure requirements related to equipment spacing are satisfied and to allow for operational efficiency.

[94] Moreover, the proposed amendments satisfy AER regulatory requirements and are required to support operations of the Hangingstone waste management facility, and both parties agree to the approval of this application. For these reasons, we approve application 30608934.

Public Interest and the AER's Mandate

[95] In its February 26, 2021, submission, Pure stated that the approval of the applications is required to advance the development of the Hangingstone project. Pure submitted that the Hangingstone project would provide important social, economic, and environmental benefits in the region, including the following:

- providing employment and capital investment
- providing a needed and environmentally responsible local waste management solution to Athabasca oil sands producers that would directly reduce their operating costs
- reducing greenhouse gas emissions and environmental liabilities
- enhancing highway safety for the benefit of all Albertans

Pure further submitted that the approval of the applications would enable the company to operationalize the Hangingstone project.

[96] In its April 5, 2021, submission, Suncor stated that the AER, as part of its public interest mandate, should consider that approving the applications could adversely affect resource conservation for the Meadow Creek projects. Suncor also noted that approval of the applications would likely have significant adverse effects on its Meadow Creek projects.

Panel's Analysis and Findings

[97] The parties' joint submission and the proposed disposition of the applications offer a balanced approach. It provides Pure access to the disposal capacity it needs to operationalize the Hangingstone project while minimizing potential adverse effects on bitumen recovery at the Meadow Creek projects.

[98] Based on the submissions received, we find that the proposed activities for the Hangingstone project will generate low to moderate positive economic effects on the region, including reduced operating costs to local producers, increased employment, and increased government revenue through taxes. The information before us indicates the proposed activities will not result in any significant adverse social or environmental effects, including on landowners.

[99] Therefore, we conclude that the disposition of the applications described above is consistent with the AER's mandate, provides for the orderly and efficient development of energy resources in Alberta, and is in the public interest.

Conclusion

[100] For the reasons outlined in this decision report, we've decided to

- approve applications 1928017 and 30602032 for the 09-19 disposal well and related well disposal operations, subject to the conditions in the approval documents,
- approve application 1928430 to amend approval WM 211, subject to the conditions in the approval documents,
- approve application 30608918 for a pipeline and 30608934 to amend the PLA dispositions, and
- deny applications 1614037, 1784753, 1809825, and 1928016 without prejudice to Pure's ability to make future applications for injection wells and related disposal operations anywhere outside of the Suncor disposal operating area (as defined in the joint submission).

Dated in Calgary, Alberta, on October 20, 2022.

Alberta Energy Regulator

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

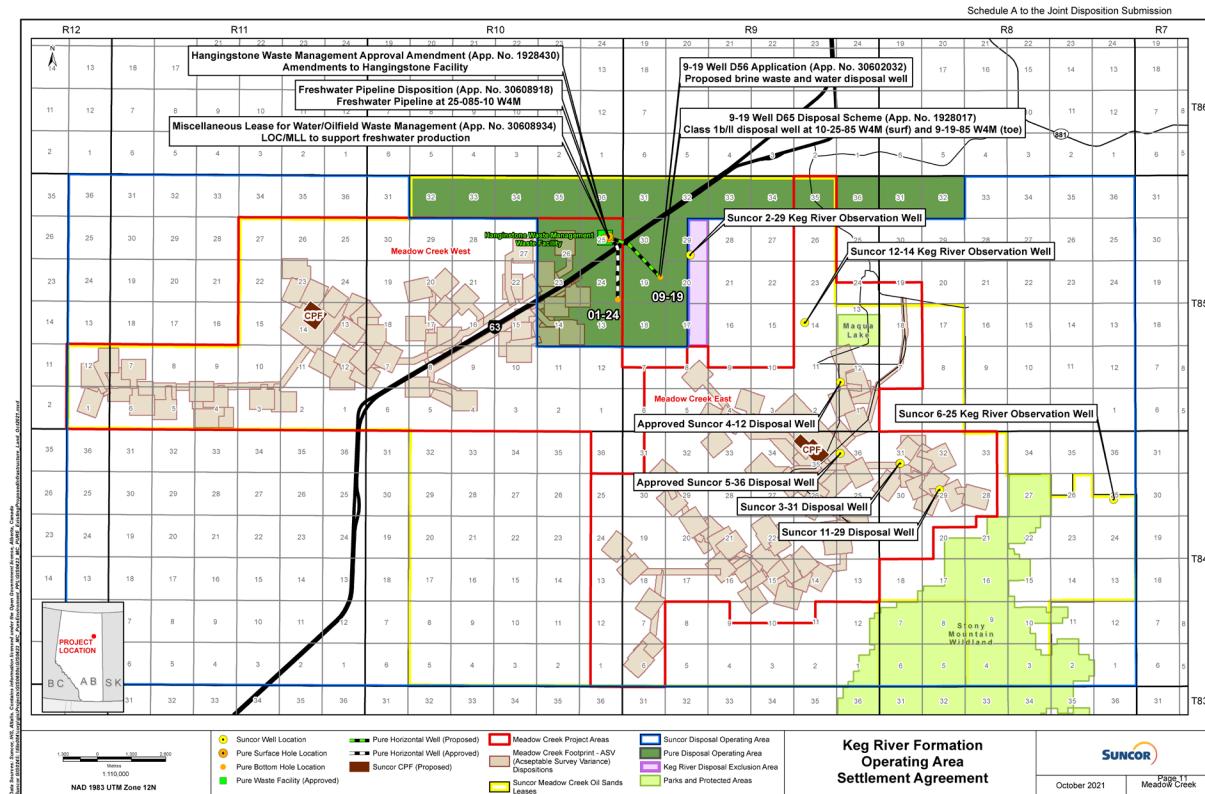
Alex Bolton, P.Geo.
Hearing Commissioner

Elizabeth McNaughtan, MBA, P.Ag.
Hearing Commissioner

Appendix 1 Hearing Participants

Pure Environmental Waste Management Ltd.	S. Dhalla, counsel A. MacKinnon, counsel
Suncor Energy Inc.	B. Roth, counsel D. Collins, counsel
Alberta Energy Regulator staff	M. LaCasse, AER counsel A. Hall, AER counsel B. Goudreau S. Harbidge E. Laratta D. Parsons K. Priest V. Pugh T. Rempfer D. Rosso-Peck V. Silva T. Turner B. Welsh

Appendix 2 Keg River Formation Operating Areas



Appendix 3 Summary of Participant Commitments

The AER notes that Pure and Suncor have made commitments involving activities or operations that are not strictly required under AER requirements. These commitments are separate arrangements between the parties and do not constitute conditions to the AER's approval of the applications. The commitments that have been given some weight by the AER are summarized below. The AER expects the applicant to comply with its commitments made to any parties and the AER. Despite considering these commitments in arriving at our decision, the AER cannot enforce them.

Commitments by Pure and Suncor

- Neither party will drill or conduct disposal operations or cause third parties to drill or conduct disposal operations within each other's operating area or the exclusion area, as shown on the map in appendix 2.

Commitments by Pure

- Pure will submit an application to the AER to amend the substance type from fresh water to saline water and amend the maximum operating pressure to 1100 kPa within 14 days of approval of the pipeline (application 30608918).

Commitments by Suncor

- Suncor will retain the ability to maintain a downhole gauge for monitoring and conducting injection tests at its well at LSD 02-29-085-09W4M in the exclusion area.
- Any injection tests into the Keg River Formation would be for a maximum of no longer than two weeks in any given calendar year.
- If Suncor does decide to conduct injection tests at the 02-29 well, Suncor agrees to share any well information from the 02-29 well within 30 days of receiving such information with Pure, provided the tests were and the information was collected and recorded by or for the benefit of Suncor.
- Suncor will request to the AER that its commitments be included as conditions of approvals IA-001 and PIA-003 when an application for renewal or amendment is submitted.

Appendix 4 Draft Approval Documents

OILFIELD WASTE MANAGEMENT FACILITY

Amendment B to Approval WM 211

MADE at the City of Calgary, in the Province of Alberta, on	
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	ALBERTA ENERGY REGULATOR
--	--------------------------

IN THE MATTER of Pure Environmental Waste Management Ltd. (A7LH) operating an oilfield waste management facility for the purpose of waste processing, cavern disposal, and fluid disposal in the Hangingstone area.

WHEREAS Pure Environmental Waste Management Ltd. submitted Application 1928430, dated April 29, 2020, to amend Approval WM 211 by requesting the addition of tanks, redesign of the facility, addition of waste processing activities, increase solids pad size, the acceptance of imported waste streams and additional non-oilfield waste streams; and

THEREFORE pursuant to the *Oil and Gas Conservation Act*, chapter 0-6 of the Revised Statutes of Alberta, 2000, the AER hereby grants Pure Environmental Waste Management Ltd. (**hereinafter called “Approval Holder”**) approval to construct and operate an oilfield waste management facility (facility) for the purpose of waste processing, cavern disposal and fluid disposal located in Legal Subdivision 10 of Section 25, Township 085, Range 10 West of the 4th Meridian, and issues Amendment B to Approval WM 211 as described in:

- a) Application 1910941,
- b) Application 1927483,
- c) Application 1928430,

and is subject to the following terms and conditions herein contained:

- 1) The following waste streams are approved to be accepted at the facility specific to the authorized activity:

Waste Processing

Alberta Generated Oilfield Waste

Dangerous and Non-Dangerous oilfield wastes

Alberta Generated Non-Hazardous Recyclable or Waste (non-oilfield [NONOFD])

Contaminated Debris and Soil

Hydrovac Material

Process Water

Wash Fluids (water – car wash)

Waters Contaminated (leachate, collected surface waters)

Imported Hazardous Recyclable (non-oilfield, ABR XXXXX [NONOFD])

Contaminated Debris and Soil (crude oil/condensate)

Contaminated Debris and Soil (emulsion)

Contaminated Debris and Soil (refined fuels/oil)

Drilling Waste Hydrocarbon

Frac Fluid (hydrocarbon based)

Hydrovac Material (crude oil/condensate impacted)

Hydrovac Material (refined fuels/oil impacted)

Hydrovac Material (emulsion impacted)

Sand – Produced

Sludge – Emulsion

Sludge – Hydrocarbon

Water Produced (including brine solution)

Well Workover Fluids

Imported Non-Hazardous Recyclable or Waste (non-oilfield [NONOFD])

Contaminated Debris and Soil (crude oil/condensate)

Contaminated Debris and Soil (emulsion)

Contaminated Debris and Soil (refined fuels/oil)

Drilling Waste Hydrocarbon

Frac Fluid (hydrocarbon based)

Hydrovac Material (crude oil/condensate impacted)

Hydrovac Material (refined fuels/oil impacted)

Hydrovac Material (emulsion impacted)

Sand – Produced

Sludge – Emulsion

Sludge – Hydrocarbon

Water Produced (including brine solution)

Well Workover Fluids

Cavern Disposal

Until approval for disposal of waste down caverns at 00/10-25-085-10W4M (Cavern 1, pending approval) and 02/10-25-085-10W4M (Cavern 2, pending approval) are obtained from the AER, Saline Water/Brackish Water can only be accepted at the facility for the purpose of cavern solution mining. Approval Holder must notify the AER via email at Directive058@aer.ca with the disposal scheme number upon receipt of the cavern disposal scheme approval.

Alberta Generated Oilfield Waste

Dangerous and Non-Dangerous oilfield waste. Waste injected into the cavern(s) must be in accordance with the class Ib Cavern Disposal Scheme Approval.

Alberta Generated Non-Hazardous Recyclable or Waste (non-oilfield [NONOFD])

Process Water

Wash Fluids

Waters Contaminated (leachate, collected surface waters)

Saline Water/Brackish Water can be accepted at the facility for the purpose of cavern solution mining only.

Imported Hazardous Recyclable (non-oilfield, ABR XXXXX [NONOFD])

Contaminated Debris and Soil (crude oil/condensate)

Contaminated Debris and Soil (emulsion)

Contaminated Debris and Soil (refined fuels/oil)

Drilling Waste Hydrocarbon

Frac Fluid (hydrocarbon based)

Hydrovac Material (crude oil/condensate impacted)

Hydrovac Material (refined fuels/oil impacted)

Hydrovac Material (emulsion impacted)

Sand – Produced

Sludge – Emulsion

Sludge – Hydrocarbon

Water Produced (including brine solution)

Well Workover Fluids

Imported Non- Hazardous Recyclable or Waste (non-oilfield [NONOFD])

Contaminated Debris and Soil (crude oil/condensate)

Contaminated Debris and Soil (emulsion)
Contaminated Debris and Soil (refined fuels/oil)
Drilling Waste Hydrocarbon
Frac Fluid (hydrocarbon based)
Hydrovac Material (crude oil/condensate impacted)
Hydrovac Material (refined fuels/oil impacted)
Hydrovac Material (emulsion impacted)
Sand – Produced
Sludge – Emulsion
Sludge – Hydrocarbon
Water Produced (including brine solution)
Well Workover Fluids

Fluid Disposal

Alberta Generated Oilfield Waste

Fluids that meet *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements (Directive 051)* disposal criteria for class II and class Ib disposal wells prior to receipt.

Alberta Generated Non-Hazardous Waste (non-oilfield [NONOFD])

Contaminated Debris and Soil
Hydrovac Material
Process Water
Wash Fluids (water – car wash)
Waters Contaminated (leachate, collected surface waters)

Approval Holder must have a documented quality assurance/quality control program in place to demonstrate that the fluids received at the facility meet the disposal criteria set out in *Directive 051*.

In the event of disposal complications at 01-24-085-10W4M in accordance with Disposal Scheme Approval 12861 (as amended), Approval Holder must manage oilfield waste in an alternative manner consistent with *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry (Directive 058)*.

- 2) The Approval Holder shall not drill and operate, nor contract any third party to drill and operate, any disposal well at a surface or bottomhole location inside the purple and blue outlined area identified in

the attached Schedule A. Any amendment to this condition requires an amendment to Disposal Scheme Approval 12861 (as amended).

- 3) Approval Holder must only accept waste exhibiting the properties the facility is capable of handling and that do not result in operational issues (e.g., plant upsets, leaks, and off lease odours).

In the event acceptance of waste causes an operational issue, the Approval Holder must investigate the situation, report the incident if required, implement corrective actions to prevent reoccurrence, and notify the AER by email at Directive058@aer.ca within 30 days.

- 3) Approval Holder is not approved to accept Alberta generated oilfield waste streams laden with naturally occurring radioactive material (NORM) or waste streams requiring special handling (e.g., ASBEST, FRFLDR, FRSDR, PCBBAL, PCBLIQ, PCBSGI, PCBSLI, PCBSLF, WSTPLQ, WSTPSD, WSTRDM).
- 4) Approval Holder must appropriately characterize and classify all Alberta generated non-oilfield and imported oilfield waste streams prior to receipt. The documentation, including receipts, must be retained at the facility for a minimum of 5 years.
- 5) The combined volume of all non-exempted Alberta generated non-oilfield waste streams received annually must not exceed 25 per cent of the total annual volume of oilfield waste and imported oilfield waste received at the facility.
- 6) Approval Holder must provide documentation, upon request, to demonstrate that the approved hazardous Alberta generated non-oilfield waste streams and hazardous imported oilfield waste streams contained a recoverable component upon receipt and that the facility's waste processing activities produced a recoverable material from the waste stream.
- 7) Approval Holder must not store Alberta generated non-oilfield and imported oilfield waste at the facility for longer than 1 year.
- 8) Approval Holder is not approved to accept waste streams containing hydrogen sulphide.
- 9) Approval Holder must document and implement an odour management plan to control odours during receiving, processing, treating, and disposing of all waste materials. If at any time it is determined that the odour management plan is not adequate to control odours, the Approval Holder must update the plan with improvements. The updated odour management plan must document the changes being implemented.
- 10) Approval Holder must not accept dangerous/hazardous wastes that are classified as dangerous/hazardous due to flashpoint or leachable BTEX content, or if separated residuals that exhibit dangerous/hazardous properties based on flashpoint of leachable BTEX content, onto the receiving pad for the purpose of reducing the properties so the material becomes non-dangerous/non-hazardous.
- 11) Approval Holder must document and implement a quality assurance/quality control program, for all waste (oilfield, non-oilfield, and imported oilfield) accepted for waste management activities authorized under condition 1, for the approval and residuals intended for disposition and further management.

12) Approval Holder must verify characterization of all incoming waste streams as per *Directive 058* (unless the waste stream is well known through prior testing and the operations or process that generated the waste have not changed).

13) The maximum storage capacity of the facility consists of the following:

Tank Farm 1

<u>Tank Name</u>	<u>Tank Size</u>	<u>Tank Name</u>	<u>Tank Size</u>
T-300	168.5 m ³	T-360 (Clean Oil)	168.5 m ³
T-310	168.5 m ³	T-370	168.5 m ³
T-320	168.5 m ³	T-371	168.5 m ³
T-330	168.5 m ³	T-372	168.5 m ³
T-340	168.5 m ³	T-373	168.5 m ³
T-350	168.5 m ³	T-374	168.5 m ³

Tank Farm 2

<u>Tank Name</u>	<u>Tank Size</u>
T-380	63 m ³

Yard

<u>Pad Name</u>	<u>Pad Size</u>
Receiving Pad (includes Receiving Area and Trench)	25.2 m x 58.2 m
Centrifuge Tank	
V-400 (CO ₂ Storage Bullet)	

14) Approval Holder must only conduct one activity (i.e., fluid disposal or waste processing) in a tank at a time, unless specified above. The tanks are to be cleaned before another activity occurs. An accurate record of tanks and tank operations must be documented and maintained at the facility, including the time frame for each tank activity and the date of change in activity, and made available to AER upon request.

15) Approval Holder must monitor the groundwater at the facility as outlined in *Directive 058* and notify the AER if impacts to groundwater are identified by submitting an AER Record of Site Condition (RoSC) along with a groundwater report through OneStop. The AER RoSC must contain information on plans for implementing remedial measures of the identified impacts.

16) Groundwater samples must be analyzed for the following parameters in addition to those listed in *Directive 058*:

- dissolved organic carbon, and
- phenols

17) Approval Holder must notify the AER at Directive058@aer.ca within 60 days where leak detection (monthly or yearly) or visual monitoring of storage devices indicates a concern including identifying the parameters that have changes, the investigative work conducted, and any remedial or corrective work that has occurred.

18) Approval Holder must test any fluids present within the tank farm area(s) and document the results of the following parameters to determine whether the fluids are a result of a potential tank leak or collected surface water:

- pH,
- visible oil sheen, and
- chloride content.

If the fluids are determined to be the result of a potential tank leak, the Approval Holder must satisfy AER *Directive 055: Storage Requirements for the Upstream Petroleum Industry (Directive 055)* and manage the fluid as per *Directive 058*. If the fluids are determined to be the result of surface water, they may surface discharge in accordance with *Directive 055*.

19) At least 15 days prior to commencing construction of the facility, Approval Holder must provide to the AER via email (Directive058@aer.ca) 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. The statement and engineering drawings must state and 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 steam assisted gravity drainage (SAGD) operations. Approval Holder cannot commence construction of the facility until the AER has received and accepted this signed statement and the supporting engineering drawings.

20) Upon receiving notice that SAGD operations will occur within section 25-085-10W4M, Approval Holder must submit to the AER via email (Directive058@aer.ca) a plan to monitor the potential impact of surface heave on the facility that is satisfactory to the AER.

21) Approval Holder must give Suncor Energy Inc. (Suncor) a reasonable opportunity to place geophones, use vibroseis trucks or do both within the boundaries of Approval Holder's Miscellaneous Lease 150436 to allow Suncor to obtain seismic data.

22) With respect to operational safety procedures, the Approval Holder must keep the following additional documents to those outlined in *Directive 058* on site and accessible at all times:

- current plot plan, process flow diagram and as-built diagrams,
- safety procedures, and
- operational procedures.

23) The AER may cancel this approval if Approval Holder has not commenced construction prior to Month Day, Year (per OGCA section 25(c)).

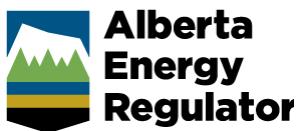
24) This approval must accurately reflect the status of the facility. The status must be changed from operating to suspended if the facility has no waste receipt activity within a 12-month period.

25) This approval must not be transferred to, or the facility operated by a new owner without being amended to reflect the change in ownership.

26) The waste plant facility ID code is ABWP0150289 and the injection facility ID code is ABIF0150288.

END OF DOCUMENT

DRAFT



CLASS II & Ib DISPOSAL

Approval No. 12861A

MADE at the City of Calgary,
in the Province of Alberta, on

ALBERTA ENERGY REGULATOR

The Alberta Energy Regulator (AER) pursuant to the Oil and Gas Conservation Act, chapter O-6 of the Revised Statutes of Alberta, 2000, orders as follows:

- 1) The scheme of Pure Environmental Waste Management Ltd. (hereinafter called “the Operator”) in the **Athabasca Oil Sands Area** for the disposal of Class II & Ib fluids, as identified in *AER Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* and generated in the Province of Alberta, is approved subject to the terms and conditions of this approval. Such scheme is described in
 - a) Application No. 1920277,
 - b) Application No. 1928017.
- 2) The disposal of fluids may commence in the well(s) referred to in Table 1 once the AER has confirmed in writing that *Directive 051* requirements have been met.
- 3) The well(s), in this clause that received AER *Directive 056: Energy Development Applications and Schedules* well license number approvals through Application No. 30602032, may be eligible for approval for fluid disposal into the Keg River formation subject to the provision and successful review of the AER *Directive 065: Resources Applications for Oil and Gas Reservoirs* requirements described in clause 4, through an application. Commencement of disposal operations through the well(s) would then be subject to the submission and approval of the *Directive 051* requirements.¹

Approved undrilled well(s):

00/09-19-085-09W4/0

- 4) The minimum *Directive 065* application requirements for undrilled wells listed in clause 3 must include:¹
 - a) geological interpretation of the target disposal formation, as described in clause 3, in the well, including:
 - i) updated gross sand thickness isopach map over the approval area, and
 - ii) updated interpreted and annotated log cross-section showing:
 - (1) stratigraphic interpretation of the zone(s) of interest,
 - (2) completions/treatments to the wellbore(s), with dates,
 - (3) finished drilling date and kelly bushing (KB) elevation and the scale of the log readings, and

- (4) tabulation of the interpreted net reservoir thickness, permeability, and porosity for the well(s).
- b) geological interpretation of the bounding formations, based on all information from the well, including:
- i) continuity and thickness of base and caprock,
 - ii) integrity of the base and caprock, including:
 - (1) a discussion of any known natural fracturing in the general area,
 - (2) a discussion on vertical and lateral containment of the disposal fluid, and
 - (3) a discussion on monitoring strategy to ensure vertical and lateral containment during disposal operations.
- 5) The *Directive 065* application for the well listed in clause 3 is to be submitted within 24 months of the date of this approval. The AER will not grant any extension requests on the stated deadline and may rescind the scheme or undrilled well approvals without further notice to the Operator.¹
- 6) The Operator must provide an update of drilling activity in the area of influence for the well listed in clause 3 since the date of this approval. Confirm there are no new wells with potential hydraulic isolation risks.¹
- 7) The Operator must carry out a review of the mineral rights ownership and well licensees in the area of the wells listed in clause 3 and notify any new holders and licensees as per *Directive 065* notification requirements before the application is submitted.¹
- 8) The Operator must provide evidence of the continued maintenance of a valid Crown Mineral Authorization provided by Alberta Crown at the time of submission of the *Directive 065* application to validate the penetration details of the wells listed in clause 3.¹
- 9) Upon validation of the *Directive 065* submissions addressed in clause 4; commencement of disposal operations in the well listed in clause 3 is conditional on the approval of the *Directive 051* requirements submission.¹
- 10) The Operator shall provide 75 days written notice to Suncor Energy Inc. (Suncor) or any successor operator of approvals IA-001 (Meadow Creek West) and PIA-003 (Meadow Creek East) prior to performing injection tests at the well listed in clause 3.¹
- 11) A *Directive 065* injectivity test application must be submitted for the well listed in clause 3:¹
- a) if the total water injection volume is more than 500 m³ and the well has not satisfied clause 9 and has not met the requirements of *Directive 051*, or
 - b) to perform any injectivity testing above the approved maximum wellhead injection pressure in Table 1, once the well has satisfied clause 9 and has met the requirements of *Directive 051*.
- 12) The Operator shall ensure all obtained injectivity test data is submitted in accordance with AER *Directive 040: Pressure and Deliverability Testing Oil and Gas Wells*.

- 13) The Operator shall provide Suncor or any successor operator of the Meadow Creek East and West approvals with each piece of the following information, in respect of the well listed in clause 3, within 30 days of the Operator receiving such piece of information, provided the tests are conducted and information is collected and recorded by or for the benefit of the Operator:¹
- a) for any injection or pumping tests, well test data consisting of pressure and metered rates with corresponding time stamps within 30 days after downloading upon completion of any injection test, including production/injection and buildup/fall-off periods of any injection or pumping tests. Such well test data must be provided to the maximum gauge/meter resolution in both Excel and PAS formats;
 - b) gauge specifications, including type, model, make, accuracy, resolution and landing depth in both measured depth and true vertical depth (with kelly bushing elevation reference or the reference datum and elevation clearly specified if different);
 - c) perforation interval(s) or open-hole completion zone(s) in measured depth and true vertical depth (with kelly bushing elevation reference);
 - d) initial formation pressure with units specified (i.e. absolute or gauge pressure, kPaa vs kPag);
 - e) vendor reports for all injection/production tests;
 - f) viewing access for drill cuttings or permission to view core for any new drills if not available in the public domain within a reasonable time once a request by Suncor is made; and
 - g) porosity and permeability data.
- 14) The Operator shall ensure all drill cuttings, porosity, permeability data, and any core, if obtained, is submitted in accordance with *Directive 056* and part 11 of the *Oil and Gas Conservation Rules*.¹
- 15) The Operator shall ensure that the average maximum injection rate measured as a daily average over a 12-month period does not exceed 3000 m³/day for the well listed in clause 3.¹
- 16) The Operator shall not drill and operate, nor contract with any third party to drill and operate, any disposal well at a surface or bottomhole location inside the purple and blue outlined area identified in the attached Schedule A. Any amendment to this clause requires an amendment to Oilfield Waste Management Facility Approval No. WM 211.¹
- 17) The receipt and injection of Class Ib fluids can only commence once the *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry* have been met.
- 18) Approval No. 12861A rescinds Approval No. 12861.

END OF DOCUMENT

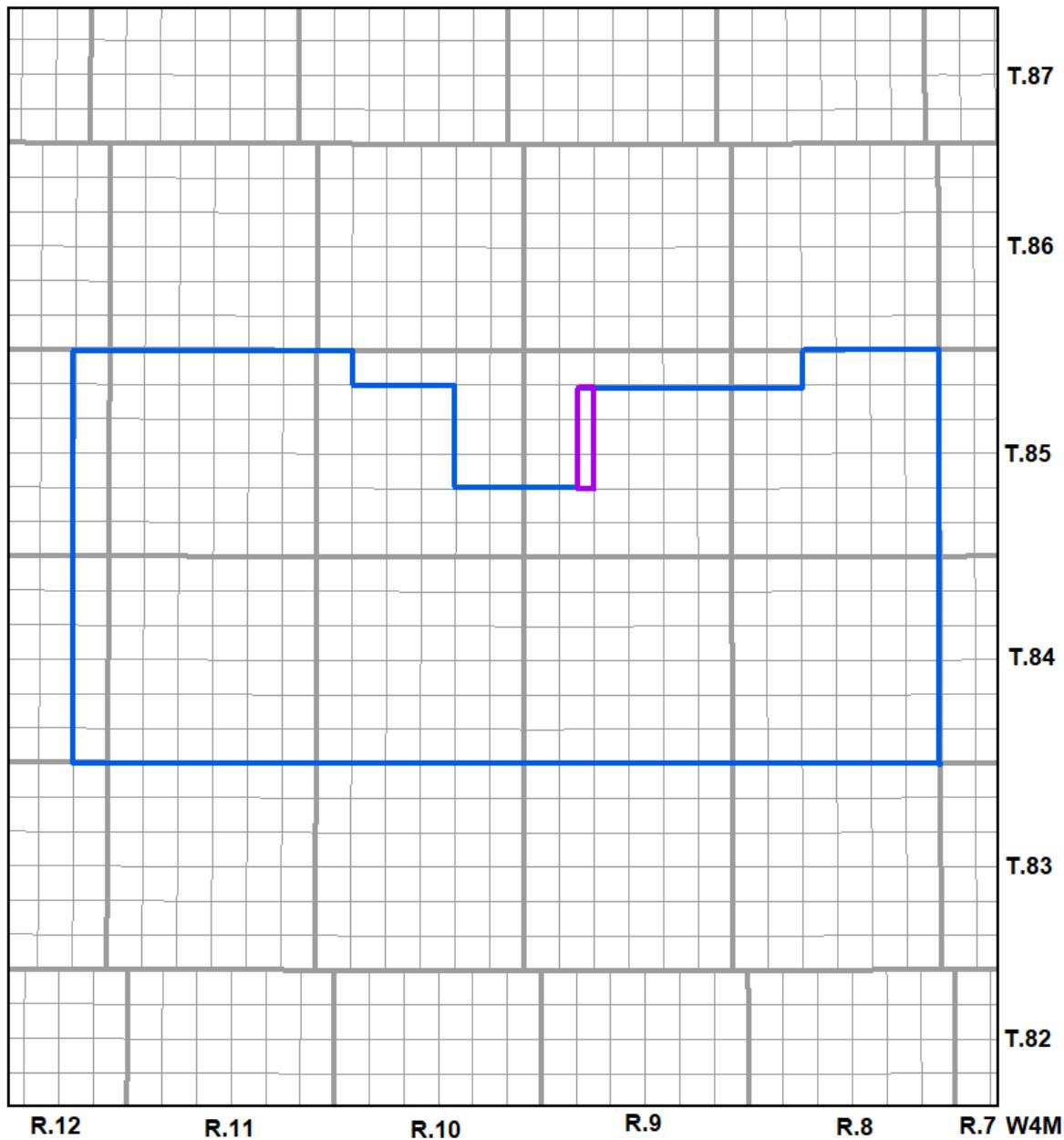
TABLE 1
APPROVAL NO. 12861A

1	2	3	4	5
Unique Well Identifiers	Disposal Zone	Top of Injection Interval (Measured depth - metres KB)	Depth of Production Packer (Measured depth - metres KB)	Maximum Wellhead Injection Pressure (kilopascals gauge)
00/01-24-085-10W4/0	Keg River	818.0	815.4	3550

* Surface Location

† The pressure of the tubing/casing annulus shall be continuously monitored with any significant fluctuations immediately reported to the AER via ResourceCompliance@aer.ca.

SCHEDULE A TO APPROVAL NO. 12861A



The AER does not warrant the accuracy or completeness of the information contained in this map and is not responsible for any errors or omissions in its content and accepts no liability for the use of this information.

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