Athabasca Oil Sands Corp.

Requests for Interim Shut-in of Gas
Liege Field
Athabasca Oil Sands Area

May 10, 2011

Energy Resources Conservation Board

ENERGY RESOURCES CONSERVATION BOARD
Decision 2011 ABERCB 012: Athabasca Oil Sands Corp., Requests for Interim Shut-in of Gas, Liege Field, Athabasca Oil Sands Area

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Calgary Alberta

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ATHABASCA OIL SANDS AREA **and April 15, 2010, Submission**

1 INTERIM DECISION

Having considered the evidence submitted to the interim hearing, the Energy Resources Conservation Board (ERCB/Board) concludes that continued production of gas from 455 intervals in 321 wells may present a significant risk to the ultimate recovery of Wabiskaw bitumen, as contemplated in Section 3(5) of the *Oil Sands Conservation Regulation*. The Board, therefore, grants the requests by Athabasca Oil Sands Corp. (AOSC) for the interim shut-in of gas production from the intervals specified by AOSC. The Board also decides to shut in gas on an interim basis from 152 additional intervals, as discussed in Sections 5.1.1.1 and 5.1.2.1 of this report. Specifically, the Board will order the interim shut-in of gas production effective May 31, 2011, from the intervals listed in Appendices 1 and 2. Production from these intervals must remain shut in pending the Board's final hearing and decisions regarding Applications No. 1613543, 1616123, 1647807, and 1506272 and AOSC's April 15, 2010, submission. The Board will issue an order requiring the interim shut-in of gas production in due course.

In overlapping gas pools where one pool is required to be shut in and another is not, there must be segregation between the pools in all wellbores or all the intervals in the wells must be shut in. For wells that continue to produce gas under this requirement, zonal segregation tests must be conducted and submitted to the ERCB in accordance with Section 11.150(1) and (2) of the *Oil and Gas Conservation Regulations* to confirm that segregation has been established.

The Board intends to conduct a final hearing to more fully consider the applications and submission for permanent shut-in orders. Accordingly, this interim decision should not be considered as conclusive or permanent.

2 INTRODUCTION

2.1 Background

In May 2009, Sunshine Oilsands Ltd. (Sunshine) and Total E&P Canada Ltd.(Total) applied for the interim and permanent shut-in of natural gas production from specific intervals in 105 wells located in the northern part of the Athabasca Oil Sands Area (Applications No. 1613543 and 1616123). Sunshine subsequently requested the interim and permanent shut-in of gas production from three more intervals, of which two were in additional wells. The applicants' requests for interim shut-in were based on their view that ongoing gas production had resulted in the reservoir pressure declining at a rate that placed the bitumen at risk of sterilization if gas production was allowed to continue pending the Board's decisions on the applications for permanent shut-in.

Considering the state of pressure depletion in the area and the ongoing gas production, the Board conducted an interim written hearing on the Sunshine and Total applications. On October 15, 2009, the Board issued *Decision 2009-061*,[1] and consequently issued *Interim Shut-in Order 09-003*, shutting in gas production from 228 intervals in 158 wells. Through two subsequent amendments, the Board added 39 intervals in 37 wells to the interim shut-in order.

On October 30, 2009, Canadian Natural Resources Limited (CNRL) requested clarification of the production status of nine wells within the Liege Wabiskaw Q Pool and the Liege McMurray F, H, and J Pools. The Board advised CNRL that it would allow wells to continue producing from these pools if the producing intervals were segregated from intervals in the shut-in pools.

In preparation for the final hearing to consider the permanent shut-in requests, the Board determined that there was a need to have additional well logs submitted to assist in the understanding of the location of gas, bitumen, and shales/mudstones and of the quality of the bitumen to be protected by shutting in gas production. Following a technical meeting between the parties and Board staff on October 27, 2009, the Board requested interested parties to provide annotated well logs for 318 wells located in the application area and a surrounding buffer area.

The Board scheduled a final hearing to commence on November 23, 2010, for the Sunshine and Total applications and Application No. 1506272 by Paramount Energy Operating Corp. (predecessor to Perpetual Energy Operating Corp. [Perpetual]) for approval to produce gas.

2.2 AOSC Application and Submission

On April 15, 2010, in a submission filed in support of Sunshine's shut-in application, AOSC made a request for interim and permanent shut-in of 38 intervals in 25 wells. For the purpose of this proceeding, these wells are in an area that the Board will refer to as the Liege East area, shown in Appendix 3 of this decision report. On the same date, AOSC filed Application No. 1647807 requesting the interim and permanent shut-in of 256 intervals in 188 wells located in an area that the Board will refer to as the Liege West area, also shown in Appendix 3.

2.3 Interventions

CNRL, licensee of 95 gas wells affected by AOSC's application and submission, objected to AOSC's shut-in requests. In the Liege East area, CNRL objected to the shut-in of five intervals in five wells based on its belief that these intervals were separate from the previously shut-in Liege Wabiskaw A Pool (Wabiskaw A Pool), were not connected to the previously shut-in Liege Wabiskaw O Pool (Wabiskaw O Pool), and were not included in *Interim Shut-in Order 09-003* or its amendments. In the Liege West area, CNRL objected to the shut-in of gas production from its interpreted Wabiskaw Undefined, Grosmont C and D, and Nisku intervals, based on its belief that the gas was not in communication with potentially recoverable bitumen. Although CNRL did not provide a list of wells and intervals for which it was objecting to the shut-in, the Board estimates that CNRL objected to 63 intervals in 63 wells.

Perpetual, licensee of 111 gas wells affected by AOSC's application and submission, initially objected to AOSC's shut-in requests, but subsequently withdrew its objection and filed a

[1] *Decision 2009-061: Sunshine Oilsands Ltd. and Total E&P Canada Ltd., Applications for Interim Shut-in of Gas, Liege Field, Athabasca Oil Sands Area*, October 15, 2009.

submission indicating that it had voluntarily shut in 80 intervals in 70 wells in the application area, based on the lack of pressure barriers between the gas zones and potentially recoverable bitumen in the Wabiskaw.

Stating that it intended to protect its bitumen rights in the Devonian section, mainly within the Grosmont Formation, Husky Oil Operations Limited (Husky) filed a submission supporting AOSC's shut-in application and requested the shut-in of 21 intervals in 17 wells within AOSC's application area (of which 5 intervals were additional to the requests for shut-in by AOSC), 14 intervals in 13 wells outside of AOSC's application area, and several unidentified gas wells within a common pool outside Husky's land.

Sunshine stated that it concurred with AOSC and Perpetual that natural gas production within the AOSC shut-in area is associated with bitumen, pressures are critically low, and the Liege Commingled Pool No.1 is extensive, and therefore, the impacts of gas production are broad.

2.4 Interim Hearing

Board Members J. D. Dilay, P.Eng. (Presiding Member) and B. T. McManus, Q.C., and Acting Board Member R. J. Willard, P.Eng., who considered Sunshine's and Total's interim shut-in applications, were assigned to consider AOSC's interim shut-in requests. On June 30, 2010, after considering the comments from interested parties, the Board decided to postpone the final hearing of the applications by Sunshine, Total, and Perpetual in order to first consider in a written hearing AOSC's interim shut-in submission and application. On July 9, 2010, the Board requested interested parties to provide annotated well logs for 23 wells in the Liege East area and 319 wells in the Liege West area.

With respect to Husky's intervention, the Board decided not to include in the interim hearing the question of the protection of bitumen in the Devonian section because Devonian bitumen had not been considered by the Board in previous bitumen conservation proceedings and expanding the hearing to include that issue would require time for parties to gather sufficient technical data and complete their analyses, which could cause a significant delay to the interim hearing. The Board concluded that such a review would best be done in a separate proceeding, noting that Husky had stated that it intended to submit an application for the shut-in of gas. The Board further decided that any gas requested to be shut in by Husky that was connected to the gas requested to be shut in by AOSC would likely be included in the interim hearing because the Board's conservation approach requires gas production to be considered on a pool basis.

On March 1, 2011, the Board issued a letter stating that it did not require any additional information for the interim hearing and closed the proceeding.

Those who participated in the interim hearing are listed in Appendix 4.

3 TEST FOR INTERIM SHUT-IN OF GAS

The Board addressed the test for considering an application for the interim shut-in of gas in *Decision 2009-61*. Specifically, while the tripartite test used in civil litigation may offer some general guidance for the Board, its strict application does not provide an appropriate basis for considering an interim shut-in application intended to protect the ultimate recovery of crude

bitumen. Further, an interim shut-in application does not require the Board to conduct an analysis of the balance of convenience between the parties, nor does it require that the likelihood of irreparable harm be conclusively established. The Board's focus is on the potential for a significant wasting of bitumen resources to occur as a result of gas production taking place during the time required to decide on an application for permanent shut-in. The Board will apply the above approach to this interim proceeding.

CNRL stated that while the Board has previously ruled that applications for interim shut-ins are not the place for detailed debate, there must be sufficient evidence for the Board to conclude that there is commercially recoverable bitumen in place and that further gas production will jeopardize the recovery of that bitumen. As previously stated in *Decision 2009-061*, the Board considers the appropriate determination to be whether the bitumen is potentially recoverable, not whether it is commercially recoverable.

4 ISSUES

The Board considers the issues for the interim shut-in requests set out in AOSC's application and submission to be

- communication between the gas and bitumen intervals,
- potential recoverability of the bitumen,
- effect of gas production on bitumen recovery by steam-assisted gravity drainage (SAGD),
- urgency for interim shut-in of gas, and
- need to shut in additional intervals.

5 VIEWS OF THE BOARD

Similar to the approach used for *Decision 2009-061*, this report does not have separate sections describing the views of the hearing participants because of the interim nature of the requested shut-in and the need to issue a timely decision.

5.1 Communication Between the Gas and Bitumen Intervals

5.1.1 Liege East Area

A portion of the Liege East area is within the northern study area of the Alberta Energy and Utilities Board (EUB; predecessor to the ERCB) Regional Geological Study[2] (RGS). According to the stratigraphic model for the northern study area, the sand units consist of, from bottom to top, the McMurray, Wabiskaw D, Wabiskaw C, and Wabiskaw A, while the shale units consist of the Wabiskaw D, Wabiskaw C, and Wabiskaw A. The Paleozoic section underlies the Wabiskaw and McMurray sands and shales.

[2] *EUB Report 2003-A: Athabasca Wabiskaw-McMurray Regional Study*, December 31, 2003.

The ERCB has designated two large Wabiskaw gas pools in the Liege East area: the Wabiskaw A Pool and the Wabiskaw O Pool, as well as several other Wabiskaw, McMurray, and Leduc gas pools. With respect to the Wabiskaw O Pool, the RGS interpreted that the gas pool consists of Wabiskaw A, C, and D sands. The RGS did not consider or update the geology south of Township 93, where currently the Wabiskaw C and D sand gas zones are classified by the ERCB as McMurray sands. The Board shut in gas production from the Wabiskaw A and O Pools on an interim basis in *Decision 2009-061*.

Of the 38 gas intervals requested to be shut in in the Liege East area, two intervals have already been included in *Interim Shut-in Order 09-003*. The ERCB interprets the remaining 36 intervals to represent 37 stratigraphic intervals. These intervals are currently in one of the following ERCB-defined pools: Liege Wabiskaw X or Y, Liege McMurray F, H, M, Q, R, BB, DD, or FF, Liege Undefined 040, 066, or 081, or Liege Leduc B, or are one of 20 intervals that have not yet been designated to pools by the ERCB.

With respect to these intervals, the Board notes the following:

- For the Wabiskaw A Sand in the Liege Wabiskaw X Pool, the Liege Undefined 040 Pool, and six intervals that have not yet been designated to pools by the ERCB (see Appendix 1), mapping by AOSC and updated mapping by the ERCB indicates that these intervals are part of the Wabiskaw A Pool. The ERCB's updated mapping of the pools was based on the presence of correlatable sands and similar fluid contacts. As stated in *Decision 2009-061*, the Board has concluded that gas in the Wabiskaw A Pool is in communication with the bitumen in the Wabiskaw A Sand. Therefore, the Board concludes that the gas in these intervals is also in communication with the bitumen in the Wabiskaw A Sand.

- For the Wabiskaw C Sand in the Liege McMurray F, H, M, Q, R, BB, DD, and FF Pools, the Liege Wabiskaw Y Pool, the Liege Undefined 066 Pool, and 10 intervals that have not yet been designated to pools by the ERCB (see Appendix 1), mapping by AOSC indicated that these intervals are part of the Wabiskaw O Pool. CNRL objected to four of the intervals being shut in based on its belief that there is no bitumen associated with the gas, the intervals are not part of the Wabiskaw O Pool, and the gas is separated from the Wabiskaw A Pool by the Wabiskaw A Shale. The ERCB's current pool orders for the Wabiskaw C Sand in the Liege East area are shown in Figure 1. The ERCB's updated mapping of the pools, based on the presence of correlatable sands and similar fluid contacts, the existence of gas at wells between these pools, and the ERCB's currently designated Wabiskaw O Pool, is in agreement with AOSC's mapping. This is further supported by pressure data that show 17 of the intervals encountered depleted initial pressures, including four intervals that CNRL objected to being shut in. The depleted initial pressures indicate that the intervals are connected to another pool. The Board acknowledges that it previously reviewed the four intervals that CNRL objected to being shut in and did not require them to be shut in, but the Board has now revised its interpretation. As stated in *Decision 2009-061*, the Board has concluded that gas in the Wabiskaw O Pool is associated with underlying Wabiskaw bitumen. Accordingly, the Board concludes that the gas in these intervals is also in communication with underlying bitumen.

- For the Wabiskaw D Sand in the 00/04-36-091-17W4/0 (4-36) and 00/09-10-092-17W4/0 (9-10) wells, AOSC interpreted the sand in the 4-36 well to be in a single-well pool and the sand in the 9-10 well to be in another pool, and both pools to be associated with underlying bitumen. The Board agrees with AOSC's mapping and concludes that the gas in these intervals is in communication with underlying Wabiskaw bitumen.

- For the Wabiskaw D Sand of the Undefined 081 Pool, AOSC, CNRL, and the ERCB interpret a single-well gas pool with underlying Wabiskaw D bitumen and no overlying Wabiskaw C Shale. Therefore, the Board concludes that the gas in this interval is in communication with the underlying Wabiskaw D bitumen and the overlying Wabiskaw C bitumen.

- For two Wabiskaw A Sand intervals that have not yet been designated to pools by the ERCB in the 00/03-12-093-17W4/0 well, CNRL interpreted there to be 0.9 m of Wabiskaw A Shale separating the gas from the underlying bitumen. Based on its review of well logs, the Board interprets that the shale thickness is less than 0.5 m. The RGS concluded that the Wabiskaw A Shale would be an effective barrier provided that it was 0.5 m or thicker. The Board considers this reasonable and concludes that the Wabiskaw A Shale in these intervals is not an effective barrier. While AOSC and CNRL did not map Wabiskaw A Sand gas for the well, with respect to the bitumen, both CNRL and AOSC interpreted underlying bitumen. The Board agrees with this interpretation and concludes that the gas in these intervals is in communication with underlying Wabiskaw bitumen.

- For the 00/13-09-092-18W4 well within the Liege Leduc B Pool, AOSC's view was that this well should not be allowed to produce due to the presence of Wabiskaw/McMurray gas and commingling practices in the area. CNRL's view was that the gas in this interval is segregated from the overlying Wabiskaw A Pool and is not in connection with the Wabiskaw O Pool, so it objected to this interval being shut in. The Board interprets a 9 m interbedded sand and shale sequence between the Leduc gas and the Wabiskaw bitumen. However, because the Board does not consider this shale to be a regionally sealing shale, it concludes that the gas in this interval is in communication with Wabiskaw bitumen.

5.1.1.1 Additional Intervals Not Requested to Be Shut in by AOSC

The Board's review has identified 55 additional intervals in 48 wells that it interprets to be in communication with bitumen. Of these intervals, 39 are currently designated as being in one of the following pools: Liege Wabiskaw BB, CC, DD, EE, or Q, Liege McMurray AA, F, H, J, M, N, T, or U, or Liege Leduc B, or Undefined 058 or 076. The ERCB has not yet designated the remaining 16 intervals to any pools. Based on AOSC mapping and updated ERCB mapping, the Board now interprets most of the pools and intervals to be part of the Wabiskaw O Pool (see Appendix 1). This is further supported by pressure data, which indicate that 26 of the intervals encountered depleted initial pressures. The Board concludes that the gas in these intervals is in communication with Wabiskaw bitumen.

With respect to the Wabiskaw D Sand in the Liege McMurray N and U Pools and two intervals in wells 00/6-23-91-17W4 (6-23) and 00/10-1-91-18W4 (10-1) that have not yet been designated to pools by the ERCB, AOSC interpreted several small gas pools that overlie bitumen. Based on the presence of correlatable sands and similar fluid contacts, the Board interprets the McMurray

N and U Pools to be in one common pool and the gas in the 6-23 and 10-1 wells to be in two separate pools that overlie bitumen. The Board concludes that the gas in these intervals is in communication with underlying Wabiskaw bitumen.

5.1.2 Liege West Area

The Liege West area is outside the area considered in the RGS. The Board considers the stratigraphic model for this area to consist of, from bottom to top, the Wabiskaw D Sand, Wabiskaw C Sand, Wabiskaw A Shale, and the Wabiskaw A Sand. The Paleozoic underlying the Wabiskaw sands and shale, consist of, from bottom to top, the Leduc, Lower Ireton, Grosmont A, Grosmont B, Grosmont C, Grosmont D, Upper Ireton and Nisku. These Devonian carbonates dip towards the west. The eastern edge is bound by a subcrop edge, where the Wabiskaw sands are deposited. The majority of the Devonian gas is along this subcrop edge.

In the Liege West area, the ERCB has designated a large Wabiskaw pool, the Liege Wabiskaw H Pool (Wabiskaw H Pool), and two large Devonian pools, the Liege Grosmont A Pool (Grosmont A Pool) and the Liege Nisku-U Ireton-Gsmt A Pool (Nisku-Ireton-Grosmont Pool), as well as several other Wabiskaw, McMurray, and Devonian pools. As was the case in the Liege East area, the Wabiskaw C and D sands are currently classified by the ERCB as McMurray sands.
The ERCB interprets the 256 gas intervals requested to be shut in in the Liege West area to represent 266 stratigraphic intervals that are currently either in one of the following ERCB-defined pools: Liege Wabiskaw D, E, H, J, or U, Liege Undefined 036, Liege McMurray K, L, or CC, Liege Grosmont A, E, G, H, I, or J, or Liege Nisku-U Ireton-Gsmt A, or are one of 47 intervals that have not yet been designated to pools by the ERCB.

In considering these intervals, the Board has divided them into the following three categories:

- Wabiskaw intervals that may be in communication with directly underlying Wabiskaw bitumen,
- Devonian intervals that may be in communication with Wabiskaw bitumen because of connection with the Wabiskaw sands, and
- Wabiskaw intervals that may be in communication with Wabiskaw bitumen because of connection through the Devonian.

With respect to the Wabiskaw intervals that may be in communication with directly underlying Wabiskaw bitumen, the Board notes the following.

- Figure 2 in this decision report shows the current ERCB pool orders for the Wabiskaw H Pool and the nearby Wabiskaw A Pool. With respect to the Wabiskaw H Pool, AOSC interpreted that the gas is connected to the Wabiskaw A Pool, but the gas predominantly in Township 91-19W4M is in a separate pool. Perpetual's schematic section also showed that the Wabiskaw H Pool and the Wabiskaw A Pool are connected. CNRL's mapping showed that the eastern part of the Wabiskaw H Pool is connected to the Wabiskaw A Pool and that the gas in Township 91-19W4M is separate from the Wabiskaw H Pool. However, CNRL interpreted the western part of the Wabiskaw H Pool to be a series of Wabiskaw Undefined pools that are separated by Devonian highs and are not connected to the eastern part of the Wabiskaw H Pool. CNRL supported its interpretation with data indicating large pressure differences in the Wabiskaw Undefined pools and a structure map based on well data and

2-D seismic. The map indicated that the Wabiskaw Undefined sands were deposited between Devonian highs.

AOSC interpreted that the Wabiskaw H Pool and the gas in Township 91-19W4M are associated with underlying Wabiskaw bitumen and that due to the connection with the Wabiskaw A Pool, the Wabiskaw H Pool gas is also associated with bitumen that underlies the Wabiskaw A Pool. Perpetual also interpreted that the Wabiskaw H Pool is associated with underlying Wabiskaw bitumen. Similarly, CNRL interpreted the eastern part of the Wabiskaw H Pool and the gas in Township 91-19W4M to be associated with underlying Wabiskaw bitumen. However, CNRL interpreted that the gas in the Wabiskaw Undefined sands is not associated with underlying bitumen.

The Board notes the apparent agreement among the parties that the gas in the eastern part of the Wabiskaw H Pool is in communication with underlying Wabiskaw bitumen and the eastern portion of the pool is connected to the Wabiskaw A Pool. With respect to the gas in Township 91-19W4M, which includes the Wabiskaw J Pool, because of the presence of undepleted initial pressures in this area despite pressure depletion in the Wabiskaw H Pool, the Board agrees with the parties that the gas is not connected with the Wabiskaw H Pool but is associated with underlying bitumen. The Board does not agree with CNRL that the Wabiskaw Undefined pools are separate from the Wabiskaw A Sand of the Wabiskaw H Pool. CNRL's structural map did not consistently show that the Wabiskaw Undefined sands were separated by Paleozoic highs and there are instances where the Board interprets Wabiskaw gas sands where CNRL did not. The Board notes that none of the wells with large pressure differences referred to by CNRL are in the Wabiskaw H Pool. The Board interprets a continuous and correlatable Wabiskaw A Sand that is connected to the Wabiskaw H Pool. Therefore, the Board concludes that the gas in the Wabiskaw H Pool and the gas in Township 91-19W4M are in communication with Wabiskaw bitumen.

- For the Wabiskaw C Sand of the Liege McMurray CC and K Pools and seven intervals that have not yet been designated to pools by the ERCB, AOSC interpreted most of the gas to be in one large pool and three smaller gas pools, while CNRL interpreted a portion of the gas to be in two small pools. Based on the presence of correlatable sands and similar fluid contacts, the Board interprets the gas to be in one pool. Mapping by AOSC and CNRL indicated that there is bitumen underlying this gas pool. The Board agrees with this interpretation, and therefore concludes that the gas is in communication with underlying Wabiskaw bitumen.

- For the Wabiskaw D Sand of the Liege McMurray L Pool and five intervals that have not yet been designated to pools by the ERCB, AOSC interpreted most of the gas to be in two small pools, while CNRL interpreted a portion of the gas to be in one small pool. Based on the presence of correlatable sands and similar fluid contacts, the Board interprets the gas to be in one pool. CNRL's mapping indicated that there is Wabiskaw D Sand bitumen underlying the pool. The Board agrees with this interpretation, and therefore concludes that the gas is in communication with underlying bitumen.

With respect to the Devonian intervals that may be in communication with Wabiskaw bitumen because of connection with the Wabiskaw sands, AOSC and Husky interpreted the Devonian carbonates to have experienced extensive dissolution since they were exposed to surface weathering during early Cretaceous time. AOSC, Husky, and Perpetual were in apparent

agreement that this resulted in enhanced porosity of the carbonate units, creating communication across the units. Since the Wabiskaw sands sit on the carbonates and there are no vertical and lateral barriers between the units, these parties interpreted that the Wabiskaw sands and the carbonates form one continuous reservoir. AOSC, Husky, and Perpetual interpreted the Grosmont pools to be in communication with the overlying Wabiskaw H Pool. On the other hand, CNRL interpreted there to be sealing shales between each of the Devonian units. While the Grosmont C and D reservoirs may be in vertical communication with overlying Wabiskaw undefined sands, CNRL interpreted that the Wabiskaw undefined sands and the Grosmont C and D and Nisku reservoirs were not in communication with Wabiskaw bitumen. CNRL supported its interpretation with pressure data indicating that the Nisku reservoir was not in communication with the Grosmont D reservoir and that the Grosmont C reservoir was not in communication with the Grosmont A and B reservoirs.

With respect to the pressure data for the Nisku and Grosmont D reservoirs, the Board notes that most of the data were obtained before 1996, and the Board does not agree that the data indicate significant differences in pressure trends between the two reservoirs. Pressure data after 1996 are limited, and CNRL indicated that these data for the Nisku reservoir may have been affected by water disposal. With respect to the pressure data for the Grosmont C reservoir and that for the Grosmont A and B reservoirs, the Board notes that for the most part, the trends are similar except for nine Grosmont C wells in Townships 89 and 90, Range 21W4M. From CNRL's Paleozoic structure map for this area, there appears to be a structural low, with two wells, 00/04-28-089-20W4 and AA/11-31-089-20W4, that do not contain gas. This low is between the nine Grosmont C wells and the Grosmont A and B wells predominantly in Township 90-20W4M. The extra distance over which these two groups of wells could be connected, due to the non-reservoir area between them, may explain the difference in pressure trends, so the wells could still be in the same pool.

Considering the discussion in the preceding paragraphs, the Board recognizes that mapping of the gas in the Devonian section is very complicated. The Board notes that none of the parties submitted gas pay mapping for the Devonian section. As shown in Figure 3, the ERCB's current pooling includes two large Devonian pools: the Grosmont A and the Nisku-Ireton-Grosmont, whose boundaries overlap. Considering this overlap and the ERCB's interpretation that the dissolution of the unconformable surface could result in all the Devonian gas being in communication, for the purpose of this interim decision, the Board interprets one large Devonian gas pool that includes the Grosmont A, Nisku-Ireton-Grosmont, the Liege Grosmont E, G, H, I, and J, and 16 intervals that have not yet been designated to pools by the ERCB. The Board believes that in a large interconnected pool there could be sizable pressure gradients after significant gas production has occurred. The Board also interprets this large Devonian gas pool to be in communication with the Wabiskaw H Pool due to the lack of vertical barriers between the Devonian section and the Wabiskaw A Sand. Therefore, the Board interprets the Devonian gas to be in communication with Wabiskaw bitumen.

With respect to the Wabiskaw intervals that may be in communication with Wabiskaw bitumen because of connection through the Devonian, the Board notes the following.

- AOSC interpreted the Liege Wabiskaw D Pool to be in the same gas pool as the Wabiskaw A and Wabiskaw H Pools. CNRL interpreted the Wabiskaw D Pool as smaller Wabiskaw Undefined gas pools not connected to any bitumen due to Paleozoic highs that separate the

pools. The Board interprets the Wabiskaw D Pool and three intervals that have not yet been designated to pools by the ERCB to be in a common pool that is separate from the Wabiskaw H Pool but is connected to the underlying Devonian. This interpretation is based on the presence of wells between the Wabiskaw D Pool and the Wabiskaw H Pool that do not contain gas. With respect to CNRL's interpretation of several separate pools, the Board does agree that CNRL's Paleozoic map showed distinct highs that separate the Wabiskaw D Pool into smaller pools. Due to the connection between the Wabiskaw sand and the underlying carbonate units, the Board interprets the Wabiskaw D Pool to be in communication with the underlying Grosmont, which results in the gas being in communication with Wabiskaw bitumen.

- For the Wabiskaw A Sand of the Liege Undefined 036 Pool, Wabiskaw E, U, and V Pools and two intervals that have not yet been designated to pools by the ERCB, AOSC interpreted the gas to be in one pool, while CNRL interpreted the gas to be in two Wabiskaw Undefined pools. Based on the presence of correlatable sands, the Board agrees with AOSC's interpretation. Due to the connection between the Wabiskaw sand and the underlying carbonate units, the Board interprets these pools to be in communication with the underlying Grosmont, which results in the gas being in communication with Wabiskaw bitumen.

5.1.2.1 Additional Intervals Not Requested to Be Shut in by AOSC

The Board has identified 97 additional intervals in 82 wells that it interprets to be in communication with bitumen.

The following intervals are in pools that AOSC requested to be shut in but were not included on its shut-in list:

- 83 intervals that the Board interprets to be in the large Devonian pool,
- 4 intervals that the Board interprets to be in the McMurray K and CC gas pool,
- 2 intervals that the Board interprets to be in the Wabiskaw H Pool,
- 2 intervals that the Board interprets to be in the Wabiskaw A Sand gas in Township 91-19W4M, and
- 2 intervals that the Board interprets to be in the Liege Wabiskaw E Pool.

In addition, the Board has identified the following pools that were not requested to be shut in by AOSC:

- Liege Wabiskaw L Pool—The Board interprets the Wabiskaw A Sand of the Liege Wabiskaw L Pool to be in communication with the underlying Grosmont and the gas to be in communication with Wabiskaw bitumen.

- Liege Undefined 033 Pool—For the Wabiskaw D Sand of the Liege Undefined 033 Pool, the Board agrees with CNRL's interpretation that the gas is in communication with underlying Wabiskaw bitumen.

5.2 Potential Recoverability of the Bitumen

5.2.1 Liege East Area

With respect to the gas intervals that the Board now interprets to be part of the Wabiskaw A and O Pools, the Board concluded in *Decision 2009-061* that the bitumen associated with these two gas pools is potentially recoverable. For the Wabiskaw A Pool, the Board concluded in *Decision 2009-061* that the underlying bitumen thickness was about 10 to 12 m, and the Board notes that AOSC's mapping submitted to this interim hearing indicated that there was up to 16 m of bitumen. For the Wabiskaw O Pool, the Board concluded in *Decision 2009-061* that the underlying bitumen had a thickness of 15 m or more and the Board notes that AOSC's mapping submitted to this interim hearing indicated a similar bitumen thickness. The Board considers AOSC's bitumen mapping to confirm the Board's previous conclusion in *Decision 2009-061* that the bitumen is potentially recoverable.

For the McMurray N and U Pools, AOSC interpreted these pools to be associated with up to 10 m of bitumen, while the Board interprets there to be up to 15 m of bitumen. Although the size of the bitumen deposit is small and may not be sufficient for a standalone project, the bitumen may be exploitable if it is developed along with Wabiskaw A bitumen in the area. For this interim decision, the Board considers the bitumen to be potentially recoverable.

For the Wabiskaw D Sand in the 00/04-36-091-17W4/0 and 00/09-10-092-17W4/0 wells, AOSC mapped 10 to 15 m of bitumen over a significant area. The Board agrees with this interpretation, and for this interim decision, the Board considers the bitumen to be potentially recoverable.

For the Wabiskaw D Sand of the Undefined 081 Pool, AOSC mapped up to 20 m of bitumen while CNRL mapped about 11 m of bitumen, and both mapped bitumen with a thickness of 10 m or greater over a significant area. The Board agrees with this interpretation, and for this interim decision, the Board considers the bitumen to be potentially recoverable.

5.2.2 Liege West Area

With respect to the bitumen in the Wabiskaw A Sand underlying the Wabiskaw H Pool, AOSC mapped a significant area in Townships 92 and 93, Range 19W4M with greater than 10 m of bitumen pay. CNRL acknowledged that the Wabiskaw A Sand contains significant accumulations of bitumen with thicknesses greater than 15 m being recorded. CNRL mapped the bitumen over a larger areal extent than AOSC, from Township 90 to Township 93, Range 19W4M. The Board agrees that there is a significant amount of bitumen underlying the Wabiskaw H Pool and considers the bitumen to be potentially recoverable.

In addition to the significant bitumen in the Wabiskaw A Sand, CNRL and AOSC mapped smaller accumulations of bitumen in the Wabiskaw C and D Sands. With respect to this bitumen:

- For the Wabiskaw C Sand of the McMurray K Pool, AOSC mapped about 10 m of bitumen, while CNRL mapped about 5 m of bitumen underlying the gas. The Board has reviewed the well logs and agrees with AOSC that there is about 10 m of bitumen.

- For the Wabiskaw D Sand of the Undefined 033 Pool, CNRL interpreted about 6 m of Wabiskaw bitumen, while the Board interprets there to be about 10 m of bitumen.

- For the Wabiskaw D Sand of the McMurray L Pool, CNRL interpreted about 4 m of bitumen underlying the pool, while the Board interprets there to be about 10 m of bitumen.

Although the size of the bitumen deposits associated with these pools is small and may not be sufficient for a standalone project, the bitumen may be exploitable if it is developed along with bitumen underlying the Wabiskaw H Pool. For this interim decision, the Board considers the bitumen to be potentially recoverable.

5.3 Effect of Gas Production on SAGD Bitumen Recovery

Based on the results of a model study, AOSC submitted that ongoing pressure decline would have a significant harmful effect on SAGD bitumen recovery. The following table summarizes the predictions of the model study.

	Predicted SAGD Bitumen Recovery Factor (%)	
Gas Cap Pressure (kPaa*)	10 years	15 years
950	43.0	52.7
400	38.7	47.5
350	36.9	45.6
250	31.9	40.5
150	24.1	31.9

* Kilopascals absolute.

CNRL did not comment on AOSC's model study.

Similar to *Decision 2009-061*, for the purpose of this interim decision, the Board will continue to rely on its previous conclusion that producing associated gas, and thereby reducing the reservoir pressure, presents an unacceptable risk to SAGD bitumen recovery.

5.4 Urgency for Interim Shut-in of Gas

AOSC submitted that ongoing natural gas production within the region of influence of its bitumen resources has resulted in pressure declining at a rate that places the bitumen at risk of sterilization prior to the Board's decision on AOSC's primary shut-in application. Therefore, AOSC requested interim shut in of gas production to prevent further waste of the bitumen resources.

AOSC stated that the pressure has dropped from an initial value of 925 kPaa to a value in the range of 400 kPaa. Although AOSC did not provide an estimate of the additional pressure drop that would occur if gas production continued until the final hearing is conducted and a decision is issued, the Board agrees that the current pressure is low and considers that even a small additional reduction in pressure would be significant. Therefore, as was the case in *Decision 2009-061*, the Board believes that there is sufficient urgency to justify ordering the interim shut-in of gas production.

5.5 Need to Shut in Additional Intervals

Due to the low pressure in the application area, the Board has determined that immediate action is required to mitigate future risk to bitumen recovery. The Board's conservation approach requires gas production to be dealt with on a pool basis. Accordingly, the Board considers it

necessary to shut in the additional intervals discussed in Sections 5.1.1.1 and 5.1.2.1. The Board notes that all of these intervals are included in the list of additional annotated well logs that it requested the parties to submit.

6 CONCLUSION

Based on its review of the evidence and recognizing the interim nature of this decision, the Board finds

- the gas in the pools described in the preceding portions of this report is in communication with Wabiskaw bitumen,
- the Wabiskaw bitumen is potentially recoverable,
- the continued production of gas from these pools presents an unacceptable risk to bitumen recovery,
- there is sufficient urgency to justify the interim shut-in of gas, and
- all the intervals listed in Appendices 1 and 2 need to be shut in.

Dated in Calgary, Alberta, on May 10, 2011.

ENERGY RESOURCES CONSERVATION BOARD

<original signed by>

J. D. Dilay, P.Eng.
Presiding Member

<original signed by>

B. T. McManus, Q.C.
Board Member

<original signed by>

R. J. Willard, P.Eng.
Acting Board Member

APPENDIX 1 LIEGE EAST SHUT-IN INTERVALS

Note that intervals not requested for shut-in by AOSC but shut in by the Board because they are in the same pools as the intervals requested for shut-in by AOSC or they are in contact with potentially recoverable bitumen are indicated by *.

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
LIEGE	LEDUC B	00/13-09-092-18W4/0	250.8	260.4	Leduc	CNRL	
		00/04-16-092-18W4/0*	256	263.3	Leduc	CNRL	
	MCMURRAY AA	00/05-32-091-17W4/0*	218.8	223	McMurray #1	CNRL	Part of the Wabiskaw O Pool
	MCMURRAY BB	00/09-10-092-17W4/0	209.2	212.5	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY DD	00/02-10-093-17W4/0	207.8	210.4	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY F	00/13-23-091-18W4/2	321.2	820	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/07-27-091-18W4/2	338	816	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/07-33-091-18W4/0*	225.8	230.5	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/07-04-092-18W4/2*	227	235	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/11-04-092-18W4/0*	230.2	235	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		02/10-05-092-18W4/0*	232.4	235	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/10-08-092-18W4/0*	226.5	231.5	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/07-09-092-18W4/0*	231.5	236	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/05-16-092-18W4/0*	225	232.8	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/06-17-092-18W4/0*	228.8	230	McMurray #1	CNRL	Part of the Wabiskaw O Pool
	MCMURRAY FF	00/12-13-092-17W4/2	279.2	391.7	McMurray	PERPETUAL	Part of the Wabiskaw O Pool
		00/08-14-092-17W4/0	259.9	397	McMurray	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY H	00/14-03-091-17W4/2*	208	212.8	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/14-04-091-17W4/0*	212.5	215	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/15-04-091-17W4/0	312	834	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/10-09-091-17W4/2*	207	212	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/11-10-091-17W4/0*	205.9	211.4	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/12-11-091-17W4/0*	204	207	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/03-15-091-17W4/2*	205.6	209.1	McMurray #1	CNRL	Part of the Wabiskaw O Pool
		00/07-16-091-17W4/0*	208.6	213	McMurray #1	CNRL	Part of the Wabiskaw O Pool
	MCMURRAY J	00/11-10-091-17W4/0*	213.8	214.7	McMurray #2	CNRL	Part of the Wabiskaw O Pool
	MCMURRAY M	00/08-27-091-16W4/2*	186	188	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/05-32-091-16W4/2*	264	421	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/07-34-091-16W4/0*	180.1	184.5	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/03-06-092-16W4/0*	273.3	322.6	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/07-09-092-16W4/2*	264	516	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		02/02-16-092-16W4/2*	223.1	269	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/03-20-092-16W4/2*	316	422	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
		00/15-01-092-17W4/0	200.2	204	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY N	00/16-15-091-16W4/0*	199.6	206.1	McMurray #2	PERPETUAL	
		00/09-22-091-16W4/2*	288	541	McMurray #2	PERPETUAL	
		00/08-27-091-16W4/2*	196.8	207	McMurray #2	PERPETUAL	
		00/07-34-091-16W4/0*	192.1	204	McMurray #2	PERPETUAL	

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	MCMURRAY Q	00/14-21-092-17W4/0	297.9	610	McMurray	PERPETUAL	Part of the Wabiskaw O Pool
		00/11-28-092-17W4/0	217.6	221.5	McMurray	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY R	00/03-04-093-17W4/0	216.5	219.3	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
	MCMURRAY T	00/06-23-091-17W4/2*	203	205.8	McMurray #1	CNRL	Part of the Wabiskaw O Pool
	MCMURRAY U	00/06-06-092-16W4/0*	228	229	L McMurray	PERPETUAL	
	WABISKAW BB	02/10-34-091-18W4/0*	229.2	232.8	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	WABISKAW CC	00/06-03-092-18W4/0*	230.9	234	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	WABISKAW DD	00/02-23-092-17W4/0*	204.4	212	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	WABISKAW EE	00/03-29-092-17W4/0*	222	229	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	WABISKAW Q	00/04-12-093-18W4/0*	225.8	232	Wabiskaw D	CNRL	Part of the Wabiskaw O Pool
	WABISKAW X	02/13-21-092-17W4/0	201.5	203.0	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	WABISKAW Y	00/11-31-093-17W4/0	231.5	233	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw O Pool
	UNDEFINED (040)	00/11-28-092-17W4/0	199.3	200.5	Wabiskaw	PERPETUAL	Part of the Wabiskaw A Pool
	UNDEFINED (058)	00/13-05-092-17W4/0*	223	231	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
		00/14-06-092-17W4/0*	231	234	McMurray #1	PERPETUAL	Part of the Wabiskaw O Pool
	UNDEFINED (066)	00/04-36-091-17W4/0	200	204.2	McMurray #1	CNRL	Part of the Wabiskaw O Pool
	UNDEFINED (076)	00/07-15-093-18W4/0*	242.7	244.5	McMurray	CNRL	Part of the Wabiskaw O Pool
	UNDEFINED (081)	02/13-21-092-17W4/0	234.5	235.5	Wabiskaw D	PERPETUAL	
	Not designated	00/07-09-091-17W4/0*	393.2	804.5	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/06-10-091-17W4/0*	304	773	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/03-15-091-17W4/0*	210	211.5	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/06-23-091-17W4/0*	211.8	212.3	Wabiskaw D	CNRL	
	Not designated	00/10-29-091-17W4/0*	219.7	220.5	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/07-31-091-17W4/0*	221	225.7	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/04-36-091-17W4/0	209.5	210	McMurray #2	CNRL	
	Not designated	00/10-01-091-18W4/0*	208.3	212	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/10-01-091-18W4/0*	217.3	218.2	Wabiskaw D	CNRL	
	Not designated	02/10-26-091-18W4/0*	222	224	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/07-27-091-18W4/2*	288.9	338	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/08-28-091-18W4/0*	225.8	226.8	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/09-10-092-17W4/0	189	190.4	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	Not designated	00/09-10-092-17W4/0	229	230.5	McMurray	PERPETUAL	
	Not designated	02/09-10-092-17W4/0	253	388	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	Not designated	00/06-16-092-17W4/0	198.2	199.8	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	Not designated	00/06-16-092-17W4/0	220	221	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/14-19-092-17W4/0	208.4	209.4	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	Not designated	00/14-19-092-17W4/0	231.5	232.8	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/14-19-092-17W4/0	235.6	236.6	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/04-26-092-17W4/0	204	205	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool
	Not designated	00/04-26-092-17W4/0	216	218	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/07-30-092-17W4/0	206.6	208.8	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	Not designated	00/07-30-092-17W4/0	229	230.2	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	02/06-10-092-18W4/0*	230.8	235	Wabiskaw C	CNRL	Part of the Wabiskaw O Pool
	Not designated	00/02-03-093-17W4/0	214	215	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/03-12-093-17W4/0	198	200	Wabiskaw A	PERPETUAL	
	Not designated	00/03-12-093-17W4/0	202	203	Wabiskaw A	PERPETUAL	
	Not designated	00/06-04-094-17W4/0*	229.9	231	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/12-11-094-17W4/0	231.8	233.2	Wabiskaw A	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	AA/14-31-094-17W4/0*	247	265	Wabiskaw C	SUNSHINE	Part of the Wabiskaw O Pool
	Not designated	AA/14-31-094-17W4/0*	270	270.5	Wabiskaw D	SUNSHINE	Part of the Wabiskaw O Pool
	Not designated	00/12-12-094-18W4/2	235.5	237.5	Wabiskaw C	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/12-12-094-18W4/2	242.6	243.4	Wabiskaw D	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	00/12-12-094-18W4/2	244	245.5	Wabiskaw D	PERPETUAL	Part of the Wabiskaw O Pool
	Not designated	AA/07-36-094-18W4/0*	269	269.5	Wabiskaw C	SUNSHINE	Part of the Wabiskaw O Pool

APPENDIX 2 LIEGE WEST SHUT-IN INTERVALS

Note that intervals not requested for shut-in by AOSC but shut in by the Board because they are in the same pools as the intervals requested for shut-in by AOSC or are in contact with potentially recoverable bitumen are indicated by*.

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
LIEGE	GROSMONT A	00/05-29-091-20W4/0	236.5	244.3	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/03-30-091-20W4/0	231	248.2	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/10-31-091-20W4/0	226.5	251.7	Grosmont	PERPETUAL	Part of the large Devonian pool
		02/07-26-091-21W4/0	245	254.1	Grosmont C	CNRL	Part of the large Devonian pool
		00/06-36-091-21W4/0	245.1	257	Grosmont C	CNRL	Part of the large Devonian pool
		00/01-05-092-20W4/0	224	247.5	Grosmont C	CNRL	Part of the large Devonian pool
		00/07-06-092-20W4/0	219.2	251.8	Grosmont C	CNRL	Part of the large Devonian pool
		00/11-07-092-20W4/0	228	257.5	Grosmont C	CNRL	Part of the large Devonian pool
		00/11-08-092-20W4/0	215.5	243.23	Grosmont	CNRL	Part of the large Devonian pool
		00/10-18-092-20W4/0	229.5	258.8	Grosmont C	CNRL	Part of the large Devonian pool
		00/10-19-092-20W4/0	223	254.3	Grosmont C	CNRL	Part of the large Devonian pool
		00/02-20-092-20W4/0	224	246	Grosmont	CNRL	Part of the large Devonian pool
		00/11-22-092-20W4/0	214	243	Grosmont	CNRL	Part of the large Devonian pool
		00/07-28-092-20W4/0	212	245.6	Grosmont	CNRL	Part of the large Devonian pool
		00/06-29-092-20W4/0	214.6	241.9	Grosmont	CNRL	Part of the large Devonian pool
		00/06-31-092-20W4/0	231	262.5	Grosmont C	CNRL	Part of the large Devonian pool
		00/15-01-092-21W4/0	241.2	247.5	Grosmont	CNRL	Part of the large Devonian pool
		00/06-02-092-21W4/0	251.5	260.4	Grosmont C	CNRL	Part of the large Devonian pool
		00/07-09-092-21W4/0	270.5	282	Grosmont	CNRL	Part of the large Devonian pool
		00/06-10-092-21W4/0	251	271	Grosmont	CNRL	Part of the large Devonian pool
		00/11-12-092-21W4/0	247	269.1	Grosmont	CNRL	Part of the large Devonian pool
		00/06-13-092-21W4/0	250.5	270.9	Grosmont	CNRL	Part of the large Devonian pool
		00/10-14-092-21W4/0	241.8	263	Grosmont	CNRL	Part of the large Devonian pool
		00/07-15-092-21W4/0	241.8	265.2	Grosmont	CNRL	Part of the large Devonian pool
		00/01-16-092-21W4/2	265.8	282.2	Grosmont C	CNRL	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	GROSMONT A (cont'd)	00/07-17-092-21W4/0	260.36	261.35	Grosmont C	CNRL	Part of the large Devonian pool
		00/10-20-092-21W4/0	242.2	262	Grosmont C	CNRL	Part of the large Devonian pool
		00/10-21-092-21W4/0	249	272.6	Grosmont	CNRL	Part of the large Devonian pool
		00/10-22-092-21W4/0	246.5	265.9	Grosmont	CNRL	Part of the large Devonian pool
		00/07-24-092-21W4/0	226.6	256	Grosmont	CNRL	Part of the large Devonian pool
		00/06-26-092-21W4/0	244.3	279.3	Grosmont	CNRL	Part of the large Devonian pool
		00/05-27-092-21W4/0	238.4	262.3	Grosmont	CNRL	Part of the large Devonian pool
		00/10-32-092-21W4/0	258.5	286.7	Grosmont	CNRL	Part of the large Devonian pool
		00/06-35-092-21W4/0	245	275.8	Grosmont	CNRL	Part of the large Devonian pool
		00/06-36-092-22W4/0*	318	333	Grosmont C	TERCERO[1]	Part of the large Devonian pool
		00/06-03-093-20W4/0	237	240.2	Grosmont	CNRL	Part of the large Devonian pool
		00/11-08-093-20W4/0	229	256.3	Grosmont	CNRL	Part of the large Devonian pool
		00/06-29-093-20W4/0	289	314	Grosmont	CNRL	Part of the large Devonian pool
		00/05-31-093-20W4/0	332	363.4	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/06-01-093-21W4/0	233	269	Grosmont	CNRL	Part of the large Devonian pool
		00/02-02-093-21W4/3	241	278.7	Grosmont B&C	CNRL	Part of the large Devonian pool
		00/02-03-093-21W4/0	246.6	277	Grosmont B&C	CNRL	Part of the large Devonian pool
		00/03-04-093-21W4/0	254.5	282.3	Grosmont C	CNRL	Part of the large Devonian pool
		00/06-10-093-21W4/0	253	279.7	Grosmont	CNRL	Part of the large Devonian pool
		00/11-14-093-21W4/0*	270.1	295.9	Grosmont	IMPERIAL[2]	Part of the large Devonian pool
		00/16-33-093-21W4/0	359	391.1	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/15-35-093-21W4/0	356.2	390.8	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/08-02-093-22W4/0*	325	344.8	Grosmont C	TERCERO	Part of the large Devonian pool
		00/16-02-093-22W4/0*	342.9	349.2	Grosmont	TERCERO	Part of the large Devonian pool
		00/09-11-093-22W4/0*	342	355.6	Grosmont C	TERCERO	Part of the large Devonian pool
		00/15-11-093-22W4/0*	355	368.1	Grosmont C	TERCERO	Part of the large Devonian pool
		00/16-15-093-22W4/0*	381.9	392.9	Grosmont C	TERCERO	Part of the large Devonian pool
		00/06-23-093-22W4/0	388.3	411.7	Grosmont C	CNRL	Part of the large Devonian pool
		00/11-26-093-22W4/0	390	405.8	Grosmont	CNRL	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	GROSMONT A (cont'd)	00/07-28-093-22W4/0	414.5	427.9	Grosmont	CNRL	Part of the large Devonian pool
		00/14-35-093-22W4/0	415.4	429.3	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/07-06-094-20W4/0	355	386.5	Grosmont A&B	PERPETUAL	Part of the large Devonian pool
		00/04-01-094-21W4/0	369.3	392.7	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/10-02-094-21W4/0*	368.8	408.3	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/10-03-094-21W4/0	366	400.9	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		02/11-04-094-21W4/0	377.9	410	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/13-05-094-21W4/0	384	409.7	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/15-06-094-21W4/0	356.2	382.2	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		02/06-08-094-21W4/0	364	392.2	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/07-09-094-21W4/0	372	410.5	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/01-10-094-21W4/0*	368	406.7	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		02/10-10-094-21W4/0	359	400.8	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/06-11-094-21W4/0	339.5	383.9	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/07-15-094-21W4/0	383	415.6	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/10-17-094-21W4/0	377.3	394.1	Grosmont	PERPETUAL	Part of the large Devonian pool
		02/11-22-094-21W4/0	386.6	415.6	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/04-23-094-21W4/0	349.7	387.3	Grosmont AB&C	PERPETUAL	Part of the large Devonian pool
		00/11-29-094-21W4/0	469.4	489.5	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/10-01-094-22W4/0	403	430.2	Grosmont B&C	PERPETUAL	Part of the large Devonian pool
		00/04-02-094-22W4/0	411	433.8	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/05-03-094-22W4/0	393	419	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/07-09-094-22W4/0	418.2	445	Grosmont	CNRL	Part of the large Devonian pool
		00/07-19-094-22W4/0	462.5	472.7	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/11-21-094-22W4/0	481	491.2	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/11-22-094-22W4/0	466	474.3	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/14-23-094-22W4/0	467	484.2	Grosmont	PERPETUAL	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	GROSMONT A (cont'd)	00/10-08-095-21W4/0*	520.3	541.3	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/07-02-095-22W4/0*	507.5	526.6	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/07-21-095-22W4/0*	509.5	516.2	Grosmont	PERPETUAL	Part of the large Devonian pool
	GROSMONT E	00/07-19-090-19W4/0	244.5	257	Grosmont B	PERPETUAL	Part of the large Devonian pool
		00/04-30-090-19W4/0	240.4	250	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/06-25-090-20W4/0	238.5	255.5	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/10-29-090-20W4/0*	225.9	239.0	Grosmont C	BONAVISTA[3]	Part of the large Devonian pool
		00/14-34-090-20W4/0	231.0	259	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/01-35-090-20W4/0	240.5	259.1	Grosmont B	PERPETUAL	Part of the large Devonian pool
		00/04-35-090-20W4/0	245.6	256.6	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/04-07-091-19W4/0	233	248	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/06-01-091-20W4/0	229.8	240.1	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/07-02-091-20W4/2	229.5	242.8	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/11-03-091-20W4/0	225.9	242.6	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/11-07-091-20W4/0	230.3	253	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/12-17-091-20W4/0	230	255	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/06-18-091-20W4/0	229	254.1	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/01-19-091-20W4/0	225.3	258	Grosmont C	PERPETUAL	Part of the large Devonian pool
		00/16-12-091-21W4/0	233.8	250.8	Grosmont C	PERPETUAL	Part of the large Devonian pool
	GROSMONT G	00/13-13-090-19W4/0	231.0	241.6	Grosmont A	PERPETUAL	Part of the large Devonian pool
		00/10-21-090-19W4/0	236.9	249.8	Grosmont B	PERPETUAL	Part of the large Devonian pool
		00/10-22-090-19W4/0	237.5	245.3	Grosmont A	PERPETUAL	Part of the large Devonian pool
		00/06-27-090-19W4/0	231.6	241.0	Grosmont A	PERPETUAL	Part of the large Devonian pool
		00/06-28-090-19W4/0	237.0	244.5	Grosmont B	PERPETUAL	Part of the large Devonian pool
		00/06-35-090-19W4/0	231.5	238.5	Grosmont A	PERPETUAL	Part of the large Devonian pool
		00/11-10-091-19W4/0	242.7	249	Grosmont A	PERPETUAL	Part of the large Devonian pool
		00/10-16-091-19W4/2	251.5	260.5	Grosmont A	PERPETUAL	Part of the large Devonian pool
		02/02-22-091-19W4/0*	243.0	243.7	Grosmont A	PERPETUAL	Part of the large Devonian pool
	GROSMONT H	00/10-03-090-20W4/0	252	260.5	Grosmont C	BONAVISTA	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	GROSMONT I	00/10-10-092-19W4/0	266.5	270	Grosmont	PERPETUAL	Part of the large Devonian pool
		00/10-16-092-19W4/0	265.8	270	Grosmont	PERPETUAL	Part of the large Devonian pool
	GROSMONT J	00/02-05-092-19W4/0	251	256.3	Grosmont	PERPETUAL	Part of the large Devonian pool
	MCMURRAY CC	00/02-29-092-19W4/0	251.2	253	McMurray	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
	MCMURRAY K	00/02-26-091-19W4/0	233.5	236	McMurray #1	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
		02/06-35-091-19W4/0	237.5	239.4	McMurray #1	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
		00/06-01-092-19W4/0	238.3	239.1	McMurray #1	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
		00/06-02-092-19W4/0	240.3	241.3	McMurray #1	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
		00/10-16-092-19W4/0*	242.6	243.8	McMurray #1	PERPETUAL	The McMurray CC and K pools are interpreted to be one pool
	MCMURRAY L	00/06-02-092-19W4/0	249.8	253	McMurray #2	PERPETUAL	
		00/10-10-092-19W4/0	250	251.7	McMurray #2	PERPETUAL	
	NISKU-U IRETON-GSMT A	00/16-33-089-20W4/0*	245.8	266.5	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/10-34-089-20W4/0*	243.3	266.6	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/07-10-089-21W4/0*	257.1	270.5	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/11-11-089-21W4/0*	254	267.7	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/05-17-089-21W4/0*	230.8	237.8	Nisku	BONAVISTA	Part of the large Devonian pool
		00/05-17-089-21W4/0*	237.9	254.1	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/11-18-089-21W4/0*	234.9	244.9	Nisku	BONAVISTA	Part of the large Devonian pool
		00/11-18-089-21W4/0*	245	254.2	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/04-19-089-21W4/0*	236.3	250.9	Nisku	BONAVISTA	Part of the large Devonian pool
		00/04-19-089-21W4/0*	251	254.4	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/06-20-089-21W4/0*	219.2	223.4	Nisku	BONAVISTA	Part of the large Devonian pool
		00/06-20-089-21W4/0*	223.5	243.4	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/16-23-089-21W4/0*	242.6	254.1	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/14-24-089-21W4/0*	240.3	255.5	Grosmont D	BONAVISTA	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	NISKU-U IRETON-GSMT A (cont'd)	00/06-25-089-21W4/0*	243.2	260.3	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/11-26-089-21W4/0*	243.9	245.9	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/11-26-089-21W4/0*	246	258.2	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/16-34-089-21W4/0*	224	240.1	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/10-35-089-21W4/0*	231	246.9	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/10-11-089-22W4/0*	246.2	260.3	Nisku	BONAVISTA	Part of the large Devonian pool
		00/06-13-089-22W4/0*	240.3	259	Nisku	BONAVISTA	Part of the large Devonian pool
		00/07-14-089-22W4/0*	240.8	257	Nisku	BONAVISTA	Part of the large Devonian pool
		00/16-22-089-22W4/0*	241.5	257.9	Nisku	BONAVISTA	Part of the large Devonian pool
		02/10-23-089-22W4/0*	221.3	244.6	Nisku	BONAVISTA	Part of the large Devonian pool
		02/10-23-089-22W4/0*	244.7	246.7	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/03-24-089-22W4/0*	228.3	244.4	Nisku	BONAVISTA	Part of the large Devonian pool
		00/06-27-089-22W4/0*	242.3	257.8	Nisku	BONAVISTA	Part of the large Devonian pool
		00/07-28-089-22W4/0*	247.6	260.4	Nisku	BONAVISTA	Part of the large Devonian pool
		00/10-03-090-20W4/0	242.0	251.0	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/11-04-090-20W4/0*	247.2	267.3	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/11-09-090-20W4/0*	249.6	270.7	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/10-15-090-20W4/0*	244.5	253	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/10-17-090-20W4/0*	236.6	246.8	Grosmont D	BONAVISTA	Part of the large Devonian pool
		00/10-28-090-20W4/0*	232.0	236.1	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/10-29-090-20W4/0*	222.0	222.9	Grosmont D	BONAVISTA	Part of the large Devonian pool
		02/10-02-090-21W4/0	229.6	245.8	Grosmont D	CNRL	Part of the large Devonian pool
		00/10-08-090-21W4/0	229.5	256.7	U Ireton	CNRL	Part of the large Devonian pool
		00/06-14-090-21W4/0	224	241.5	Grosmont D	CNRL	Part of the large Devonian pool
		00/06-15-090-21W4/0	221	251	Grosmont D	CNRL	Part of the large Devonian pool
		00/10-17-090-21W4/0	230.0	257	Grosmont D	CNRL	Part of the large Devonian pool
		00/08-21-090-21W4/0	227.4	235	Grosmont D	CNRL	Part of the large Devonian pool
		00/10-22-090-21W4/0	219.8	248.9	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-26-090-21W4/0	238.7	254.0	Grosmont D	CNRL	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	NISKU-U IRETON-GSMT A (cont'd)	00/11-27-090-21W4/0	217.7	221.7	Grosmont D	CNRL	Part of the large Devonian pool
		00/09-28-090-21W4/0*	222.5	252.5	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-32-090-21W4/0	210.0	240.6	Grosmont D	CNRL	Part of the large Devonian pool
		00/06-33-090-21W4/0	218.5	250.5	Grosmont D	CNRL	Part of the large Devonian pool
		00/05-17-090-22W4/0	219.5	231	Nisku	BONAVISTA	Part of the large Devonian pool
		00/05-17-090-22W4/0*	231	236.5	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/11-18-090-22W4/0	239	257.8	Nisku	BONAVISTA	Part of the large Devonian pool
		00/03-19-090-22W4/0	245	251.5	Nisku	BONAVISTA	Part of the large Devonian pool
		00/03-19-090-22W4/0	251.5	259.5	U Ireton	BONAVISTA	Part of the large Devonian pool
		00/10-24-090-22W4/0	210	237	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-28-090-22W4/0	252.2	269.4	U Ireton	CNRL	Part of the large Devonian pool
		00/02-26-090-23W4/0*	247.8	264	Nisku	CNRL	Part of the large Devonian pool
		00/09-27-090-23W4/0*	256.5	272.9	Nisku	CNRL	Part of the large Devonian pool
		00/12-17-091-20W4/0	228.2	229.8	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/06-18-091-20W4/0	225.8	227.7	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/03-03-091-21W4/0	212.5	237.5	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-08-091-21W4/0	225.6	254	Grosmont D	CNRL	Part of the large Devonian pool
		00/16-12-091-21W4/0	229	232.5	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/11-13-091-21W4/0	226.8	233.3	Grosmont D	PERPETUAL	Part of the large Devonian pool
		00/07-14-091-21W4/0	228.5	246	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-18-091-21W4/0	257	279.2	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-24-091-21W4/0*	232.3	239.8	Grosmont D	CNRL	Part of the large Devonian pool
		02/07-26-091-21W4/0	239	245	Grosmont D	CNRL	Part of the large Devonian pool
		00/06-29-091-21W4/0	260.8	278.8	Grosmont D	CNRL	Part of the large Devonian pool
		00/10-32-091-21W4/0	252	270	Grosmont D	CNRL	Part of the large Devonian pool
		00/06-34-091-21W4/0*	256.1	263	Grosmont D	CNRL	Part of the large Devonian pool
		00/06-36-091-21W4/0	239	245	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-05-091-22W4/0	282.3	290.7	U Ireton	CNRL	Part of the large Devonian pool
		00/11-13-091-22W4/0	259.3	260.1	U Ireton	CNRL	Part of the large Devonian pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	NISKU-U IRETON-GSMT A (cont'd)	00/11-13-091-22W4/0	260.1	279.9	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-20-091-22W4/0*	291.3	298.5	U Ireton	TERCERO	Part of the large Devonian pool
		00/07-26-091-22W4/0	272.5	291.3	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-33-091-22W4/0*	287.4	305.4	Grosmont D	TERCERO	Part of the large Devonian pool
		00/11-10-091-23W4/0*	280.5	296.7	Nisku	CNRL	Part of the large Devonian pool
		00/10-24-091-23W4/0*	287.5	294.5	U Ireton	TERCERO	Part of the large Devonian pool
		00/10-24-091-23W4/0*	294.5	303.5	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-36-091-23W4/0*	296	315	U Ireton	TERCERO	Part of the large Devonian pool
		00/06-02-092-21W4/0	242	248.2	Grosmont D	CNRL	Part of the large Devonian pool
		00/12-04-092-21W4/0	267	268.8	Grosmont D	CNRL	Part of the large Devonian pool
		00/10-06-092-21W4/0	281	298	Grosmont D	CNRL	Part of the large Devonian pool
		00/11-08-092-21W4/0	272.8	274	Grosmont D	CNRL	Part of the large Devonian pool
		00/01-16-092-21W4/2	256.5	260.8	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-17-092-21W4/0	256	258	Grosmont D	CNRL	Part of the large Devonian pool
		00/07-05-092-22W4/0*	306.5	319.7	Grosmont D	TERCERO	Part of the large Devonian pool
		00/07-16-092-22W4/0*	296	319.7	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-17-092-22W4/0*	303	324.6	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-20-092-22W4/0*	323.5	345.4	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-21-092-22W4/0*	310.3	328.9	Grosmont D	TERCERO	Part of the large Devonian pool
		00/16-26-092-22W4/0*	303	313	Grosmont D	TERCERO	Part of the large Devonian pool
		00/12-29-092-22W4/0*	329.5	347	Grosmont D	TERCERO	Part of the large Devonian pool
		00/06-36-092-22W4/0*	309.9	313	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-11-092-23W4/0*	321.8	331.1	Grosmont D	TERCERO	Part of the large Devonian pool
		00/10-24-092-23W4/0*	334	355	Grosmont D	TERCERO	Part of the large Devonian pool
	WABISKAW D	00/11-07-091-20W4/0	218	224.4	Wabiskaw #1	PERPETUAL	
		00/12-17-091-20W4/0	219	227	Wabiskaw #1	PERPETUAL	
		00/06-18-091-20W4/0	217	225.8	Wabiskaw #1	PERPETUAL	
		02/07-20-091-20W4/0	301.3	467	Wabiskaw #1	PERPETUAL	
		00/11-28-091-20W4/0	224.9	228.6	Wabiskaw #1	PERPETUAL	

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	WABISKAW D (cont'd)	00/05-29-091-20W4/0	220	225.5	Wabiskaw #1	PERPETUAL	
		00/03-30-091-20W4/0	224.3	228.3	Wabiskaw #1	PERPETUAL	
		00/01-32-091-20W4/0	311	497	Wabiskaw #1	PERPETUAL	
		00/06-33-091-20W4/0	282	515	Wabiskaw #1	PERPETUAL	
		00/16-12-091-21W4/0	217	220	Wabiskaw #1	PERPETUAL	
		00/11-13-091-21W4/0	219.5	223.8	Wabiskaw #1	PERPETUAL	
		00/07-14-091-21W4/0	224.9	227	Wabiskaw #1	CNRL	
		00/11-24-091-21W4/0	225.9	229.3	Wabiskaw #1	CNRL	
		02/07-26-091-21W4/0	234	237	Wabiskaw #1	CNRL	
	WABISKAW E	02/07-20-090-21W4/0	226.8	234.8	Wabiskaw	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	WABISKAW H	00/07-14-091-19W4/2	299	431	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/16-15-091-19W4/0	309.0	474.6	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		02/02-22-091-19W4/0	213.4	215.3	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/07-22-091-19W4/0	308	521	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/11-23-091-19W4/0	292.5	611	Wabiskaw #1	CNRL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		02/05-25-091-19W4/0	354.5	548.0	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/02-26-091-19W4/0	212.5	216.4	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/06-35-091-19W4/0	281.3	378.0	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		02/06-35-091-19W4/0	218	222	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/06-01-092-19W4/0	217.5	218.7	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/06-02-092-19W4/0	220.8	223.6	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	WABISKAW H (cont'd)	00/06-08-092-19W4/0	226.8	227.7	Wabiskaw #1	PERPETUAL	
		00/04-09-092-19W4/0	223.9	226	Wabiskaw #1	PERPETUAL	
		00/10-10-092-19W4/0	222	224	Wabiskaw #1	PERPETUAL	
		00/10-16-092-19W4/0	222.8	224.3	Wabiskaw #1	PERPETUAL	
		00/11-17-092-19W4/0	302.9	761	Wabiskaw #1	CNRL	
		00/16-18-092-19W4/0	337.6	619	Wabiskaw #1	CNRL	
		00/08-19-092-19W4/2	315.5	700.7	Wabiskaw #1	CNRL	
		00/06-20-092-19W4/2	308	739	Wabiskaw #1	CNRL	
		00/05-28-092-19W4/0	284.2	491.7	Wabiskaw #1	PERPETUAL	
		00/02-29-092-19W4/0	228.5	235	Wabiskaw #1	PERPETUAL	
		00/11-30-092-19W4/0	222	225.5	Wabiskaw #1	PERPETUAL	
		00/08-31-092-19W4/2	298.6	306.8	Wabiskaw #1	PERPETUAL	
		00/05-32-092-19W4/0	300.4	355.7	Wabiskaw #1	PERPETUAL	
		00/06-33-092-19W4/2	284.5	454	Wabiskaw #1	PERPETUAL	
		00/11-08-092-20W4/0	210.9	215.4	Wabiskaw #1	CNRL	
		00/10-18-092-20W4/0	220	229.5	Wabiskaw #1	CNRL	
		00/10-19-092-20W4/0	214.7	222	Wabiskaw #1	CNRL	
		00/02-20-092-20W4/2	212	223.5	Wabiskaw #1	CNRL	
		00/11-22-092-20W4/0	201.5	213.5	Wabiskaw #1	CNRL	
		00/04-24-092-20W4/0	213	217	Wabiskaw #1	CNRL	
		00/13-25-092-20W4/0	216.6	222.3	Wabiskaw #1	CNRL	
		00/15-26-092-20W4/0	292	712	Wabiskaw #1	CNRL	
		00/07-28-092-20W4/0	204	211.5	Wabiskaw #1	CNRL	
		00/06-29-092-20W4/0	205.4	213.4	Wabiskaw #1	CNRL	
		00/06-31-092-20W4/0	223.8	230.5	Wabiskaw #1	CNRL	
		00/09-34-092-20W4/2	291	816	Wabiskaw #1	CNRL	
		00/05-36-092-20W4/0	218.4	224.7	Wabiskaw #1	PERPETUAL	
		00/06-02-092-21W4/0	239.5	242	Wabiskaw #1	CNRL	

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	WABISKAW H (cont'd)	00/12-04-092-21W4/0	256.5	258.1	Wabiskaw #1	CNRL	
		00/11-08-092-21W4/0	261.5	263.3	Wabiskaw #1	CNRL	
		00/07-09-092-21W4/0	259.5	261.2	Wabiskaw #1	CNRL	
		00/11-12-092-21W4/0	239.5	244.5	Wabiskaw #1	CNRL	
		00/06-13-092-21W4/0	240.5	247.5	Wabiskaw #1	CNRL	
		00/10-14-092-21W4/0	236	241	Wabiskaw #1	CNRL	
		00/07-15-092-21W4/0	238.2	241	Wabiskaw #1	CNRL	
		00/07-17-092-21W4/0	246.5	250.3	Wabiskaw #1	CNRL	
		00/10-20-092-21W4/0	235.5	237	Wabiskaw #1	CNRL	
		00/10-21-092-21W4/0	246.5	247.8	Wabiskaw #1	CNRL	
		00/10-22-092-21W4/0	238	241	Wabiskaw #1	CNRL	
		00/12-23-092-21W4/0	239.6	244.1	Wabiskaw #1	CNRL	
		00/11-36-092-21W4/0	229.5	233	Wabiskaw #1	CNRL	
		00/14-03-093-19W4/0*	213.1	215.4	Wabiskaw #1	PERPETUAL	
		00/10-04-093-19W4/0*	212.1	215.2	Wabiskaw #1	PERPETUAL	
		00/11-06-093-19W4/2	223.5	227	Wabiskaw #1	PERPETUAL	
		00/03-01-093-20W4/2	316.0	603.7	Wabiskaw #1	PERPETUAL	
		00/06-03-093-20W4/0	217	224	Wabiskaw #1	CNRL	
	WABISKAW J	00/11-12-091-19W4/0	202.8	206	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
		00/11-12-091-19W4/2*	202.5	206.5	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	WABISKAW L	00/14-24-089-21W4/2*	228.3	230	Wabiskaw A	BONAVISTA	
	WABISKAW U	00/10-22-090-21W4/0	214.2	215.5	Wabiskaw #1	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	WABISKAW V	00/10-22-090-21W4/0*	216.5	218.8	Wabiskaw #2	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	UNDEFINED (033)	00/14-03-093-19W4/0*	247.3	248.2	Wabiskaw D	PERPETUAL	
	UNDEFINED (036)	00/09-28-090-21W4/0	217.4	222.0	Wabiskaw #1	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools

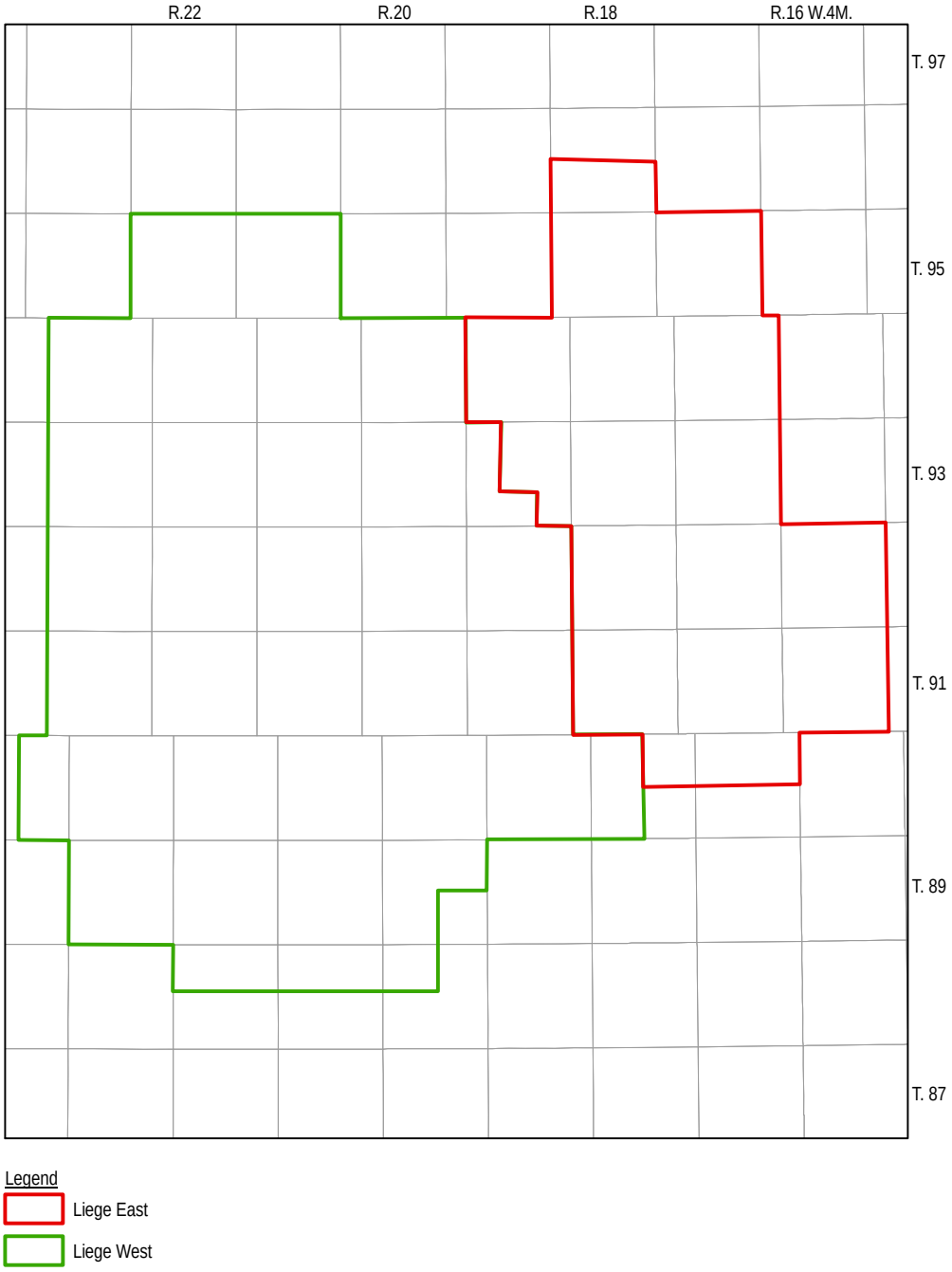
Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	Not designated	00/15-34-088-22W4/0*	253.5	256.5	Nisku	CENOVUS[4]	Part of the large Devonian pool
	Not designated	00/06-25-089-21W4/0*	230.5	233	Wabiskaw A	BONAVISTA	Part of the Wabiskaw L Pool
	Not designated	00/11-22-090-20W4/0*	233.5	234.2	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/06-25-090-20W4/0	231.0	232.0	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/06-27-090-20W4/0*	230.5	231.0	McMurray #1	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/10-08-090-21W4/0*	326.0	332.0	Grosmont B	CNRL	Part of the large Devonian pool
	Not designated	00/10-17-090-21W4/0*	226.0	228.0	Wabiskaw A	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	Not designated	00/11-27-090-21W4/0	211.3	217.0	Wabiskaw A	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	Not designated	00/06-33-090-21W4/0	215.5	218.5	Wabiskaw A	CNRL	Part of the Wabiskaw A Sand gas pool containing the Wabiskaw E, U, V and Undefined 036 pools
	Not designated	00/05-18-090-22W4/0	237	364	Nisku	SHELL[5]	Part of the large Devonian pool
	Not designated	00/04-07-091-19W4/0	225	226.5	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/13-11-091-19W4/0	219.4	221.2	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/11-12-091-19W4/2*	232	243	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/04-13-091-19W4/0	203.4	206.4	Wabiskaw A	MIDWAY[6]	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/10-16-091-19W4/2	218.5	219.5	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/10-16-091-19W4/2	237.0	237.8	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/02-26-091-19W4/0	240.8	241.2	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	02/01-27-091-19W4/0*	302.5	359.6	Grosmont A	CNRL	Part of the large Devonian pool
	Not designated	02/01-27-091-19W4/2	243.7	247.1	Wabiskaw A	CNRL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/13-28-091-19W4/2	248.3	248.7	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/13-28-091-19W4/2	262.7	269.5	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	02/08-32-091-19W4/2	229.5	231	Wabiskaw #1	PERPETUAL	Part of the Wabiskaw H Pool
	Not designated	02/08-32-091-19W4/2	247.2	249.1	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	02/06-35-091-19W4/0*	239.0	242.0	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	Not designated	02/06-35-091-19W4/0*	245.0	246.0	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	02/06-35-091-19W4/0	246.7	249.7	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	00/07-02-091-20W4/2	221.0	222.0	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/10-07-091-20W4/0	336.3	491.0	Wabiskaw A	PERPETUAL	Part of the Wabiskaw D Pool
	Not designated	00/10-01-091-21W4/0	226.0	244.0	Wabiskaw A	CNRL	Part of the Wabiskaw D Pool
	Not designated	00/10-01-091-21W4/0	247.0	250.0	Grosmont C	CNRL	Part of the large Devonian pool
	Not designated	00/06-34-091-21W4/0	246.4	249.0	Wabiskaw A	CNRL	Part of the Wabiskaw H Pool
	Not designated	00/06-34-091-21W4/0	249.0	258.0	Grosmont D	CNRL	Part of the large Devonian pool
	Not designated	00/06-36-091-21W4/0	235	237.8	Wabiskaw #1	CNRL	Part of the Wabiskaw D Pool
	Not designated	00/16-03-091-23W4/0*	237.8	316.3	Grosmont D	SHELL	Part of the large Devonian pool
	Not designated	00/06-01-092-19W4/0*	219.5	252	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/06-01-092-19W4/0	268.2	270	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/06-02-092-19W4/0	267	293	Grosmont	PERPETUAL	Part of the large Devonian pool
	Not designated	00/07-03-092-19W4/0	232.5	233.2	Wabiskaw A	PERPETUAL	Part of the Wabiskaw A Sand gas pool in Township 91-19W4
	Not designated	00/07-03-092-19W4/0	251.7	252	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/07-03-092-19W4/0	261.3	261.6	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	00/02-05-092-19W4/0	224	226.5	Wabiskaw A	PERPETUAL	Part of the Wabiskaw H Pool
	Not designated	00/02-05-092-19W4/0	242	245	Wabiskaw D	PERPETUAL	Part of the McMurray L Pool
	Not designated	00/06-08-092-19W4/0	243.8	244.9	Wabiskaw C	PERPETUAL	Part of the combined McMurray CC and K pool
	Not designated	00/06-08-092-19W4/0	253	254.8	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/06-08-092-19W4/0*	287	292	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/04-09-092-19W4/0	253.5	287.0	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/04-11-092-19W4/0	266.5	267.3	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/04-11-092-19W4/0*	263.6	294	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/12-18-092-19W4/0	219.3	221.2	Wabiskaw A	CNRL	Part of the Wabiskaw H Pool
	Not designated	00/12-18-092-19W4/0*	245.5	246.7	Grosmont A	CNRL	Part of the large Devonian pool
	Not designated	00/03-27-092-19W4/2	216.9	218.1	Wabiskaw A	PERPETUAL	Part of the Wabiskaw H Pool

Field Name	Pool Name	Well ID	Pay Top Depth (TVD)	Pay Base Depth (TVD)	Stratigraphic Interval	Licensee	Comments
	Not designated	00/03-27-092-19W4/2*	319	375.5	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/02-29-092-19W4/0	261.2	267	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/07-29-092-19W4/0	343.3	502	Wabiskaw A	PERPETUAL	Part of the Wabiskaw H Pool
	Not designated	00/11-07-092-20W4/0	222.3	228	Grosmont C	CNRL	Part of the large Devonian pool
	Not designated	00/08-23-092-20W4/0	660.9	869.3	Wabiskaw A	CNRL	Part of the Wabiskaw H Pool
	Not designated	00/04-24-092-20W4/0	241.3	245.4	Grosmont A	CNRL	Part of the large Devonian pool
	Not designated	00/13-25-092-20W4/0	233.9	240	Grosmont C	CNRL	Part of the large Devonian pool
	Not designated	00/15-01-092-21W4/0	231.3	235.1	Wabiskaw A	CNRL	Part of the Wabiskaw H Pool
	Not designated	00/11-08-092-21W4/0*	278	288	Grosmont C	CNRL	Part of the large Devonian pool
	Not designated	00/01-16-092-21W4/0*	371	377	Grosmont A	CNRL	Part of the large Devonian pool
	Not designated	00/11-06-093-19W4/2*	258	301	Grosmont A	PERPETUAL	Part of the large Devonian pool
	Not designated	00/01-02-093-20W4/0	325.2	575.8	Wabiskaw A	PERPETUAL	Part of the Wabiskaw H Pool
	Not designated	00/09-10-093-20W4/0	221.6	226.3	Grosmont B	CNRL	Part of the large Devonian pool
	Not designated	00/02-14-093-20W4/0	235.0	242.2	Grosmont B	CNRL	Part of the large Devonian pool
	Not designated	00/11-14-093-21W4/0	266.5	270.0	Wabiskaw #1	IMPERIAL	Part of the large Devonian pool
	Not designated	00/15-15-093-22W4/0*	383.2	385.5	Grosmont D	TERCERO	Part of the large Devonian pool

[1] Tercero Resources Company
[2] Imperial Oil Resources Limited
[3] Bonavista Energy Corporation
[4] Cenovus Energy Inc.
[5] Shell Canada Ltd.
[6] Midway Energy Ltd.

APPENDIX 3 LIEGE EAST/WEST LOCATION MAP



APPENDIX 4 HEARING PARTICIPANTS

Principals and Representatives
(Abbreviations used in report)

Athabasca Oil Sands Corp. (AOSC)
- R. W. Block, Q.C.
- S. Svarte
- I. Atkinson

Canadian Natural Resources Limited (CNRL)
- P. J. McGovern
- D. Hebert
- J. Urdaneta

Husky Oil Operations Limited (Husky)
- R. W. Block, Q.C.
- T. Peper
- S. Anderson

Perpetual Energy Operating Corp. (Perpetual)
- G. S. Fitch
- L. Martinuzzi, P.Eng.

Sunshine Oilsands Ltd. (Sunshine)
- R. W. Block, Q.C.
- D. Brown, P.Eng.

Energy Resources Conservation Board staff
- G. D. Perkins, Board Counsel
- D. Burns, Board Counsel
- G. W. Dilay, P.Eng.
- T. Hurst
- B. Law, P.Eng.
- E. Wo, P.Geol.

APPENDIX 5 LIEGE POOL ORDERS

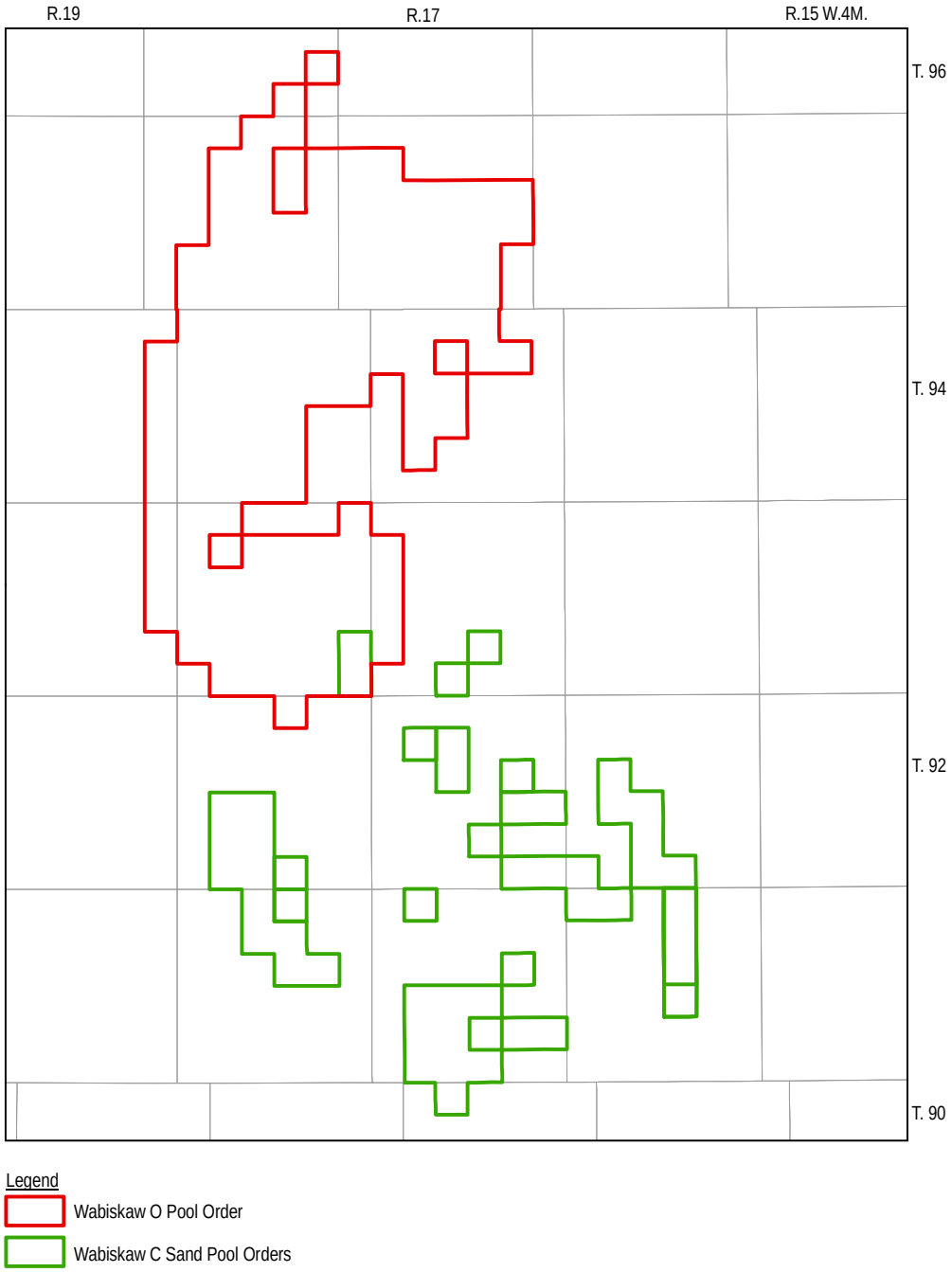


Figure 1. Wabiskaw O Pool and C Sand Pool Orders

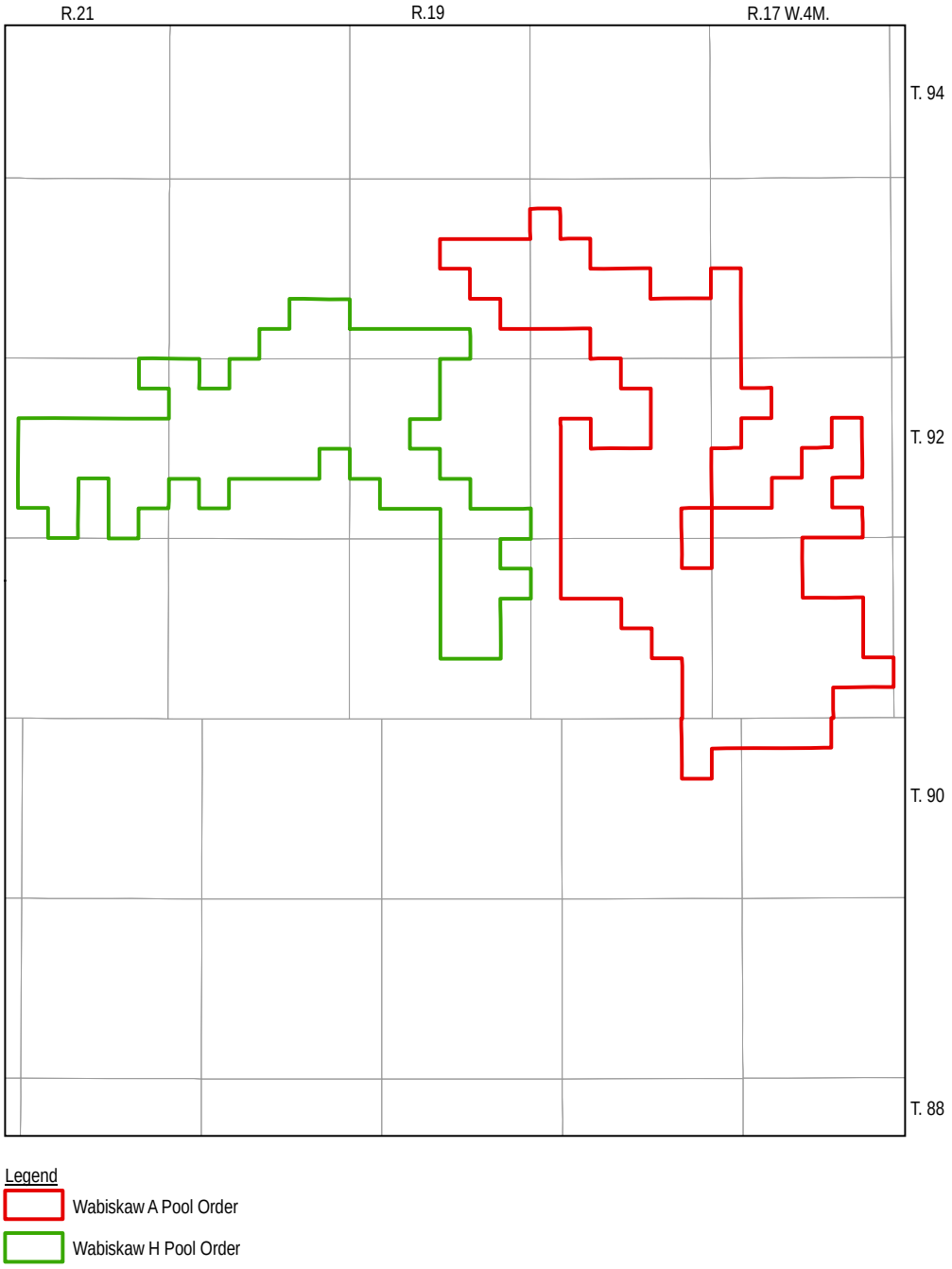


Figure 2. Wabiskaw A and H Pool Orders

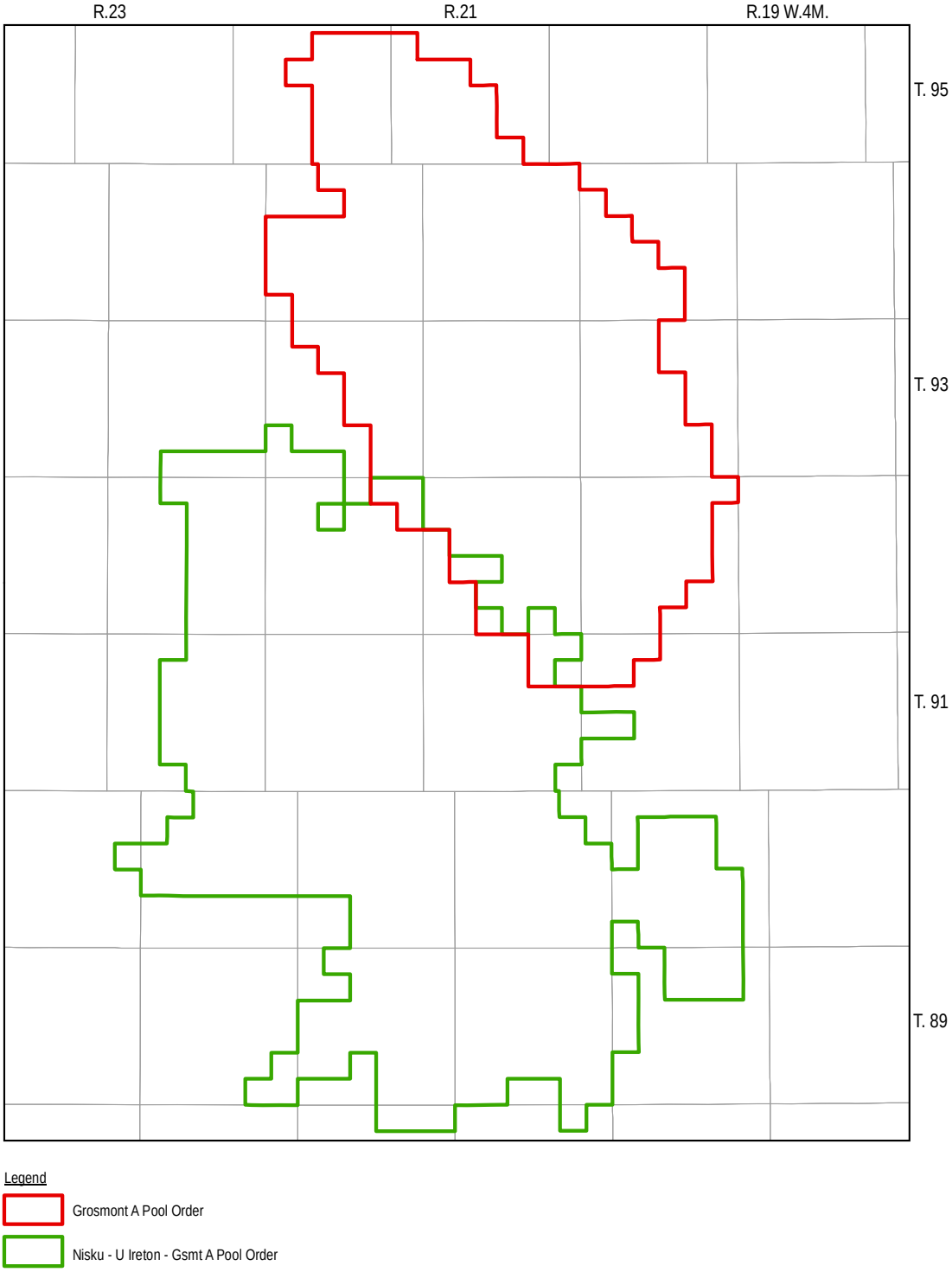


Figure 3. Grosmont A and Nisku-U Ireton-Gsmt A Pool Orders