



EnCana Corporation

Applications for Three Well Licences
Suffield Field

August 25, 2009

ENERGY RESOURCES CONSERVATION BOARD

Decision 2009-051: EnCana Corporation, Applications for Three Well Licences, Suffield Field

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ENERGY RESOURCES CONSERVATION BOARD

Calgary Alberta

**ENCANA CORPORATION
APPLICATIONS FOR THREE WELL LICENCES
SUFFIELD FIELD**

**Decision 2009-051
Applications No. 1508544,
1508545, and 1508547**

1 DECISION

Having carefully considered all of the submissions, arguments, and evidence, the Energy Resources Conservation Board (ERCB/Board) hereby approves Applications No. 1508544, 1508545, and 1508547.

2 INTRODUCTION

2.1 Applications

EnCana Corporation (EnCana) applied, pursuant to Section 2.020 of the *Oil and Gas Conservation Regulations*, for licences to drill three vertical wells from surface locations in Legal Subdivision (LSD) 15 of Section 3, Township 16, Range 9, West of the 4th Meridian, LSD 1-10-16-9W4M, and LSD 15-10-16-9W4M. These wells would not encounter any hydrogen sulphide. The purpose of the wells is to obtain gas production from the Milk River, Medicine Hat, and Second White Speckled Shale Formations. The projected total depth of each well ranges from 650 to 663 metres (m). EnCana proposes to commingle production from all three formations in each wellbore. The proposed wells would be located about 8 kilometres (km) northeast of the Town of Ralston within Canadian Forces Base Suffield (Suffield Base) (see Figure 1).

The wells are proposed for an area of native prairie vegetation and would be located within 1.44 km of the western boundary of the Suffield Base in the experimental proving grounds (EPG) (see Appendix 2 for abbreviations used in this report). Military activities that occur in this area include live fire exercises and defence research and development.

EnCana currently has 8 shallow natural gas wells in each of the two subject sections. Another operator has an additional 10 surface locations (multiwell oil pads) in each section, bringing the total to 18 surface locations for each of these sections. Figure 2 identifies the locations of other oil and gas infrastructure in the area of interest (“the C7 Battery”).

2.2 Interventions

2.2.1 The Department of National Defence

The Department of National Defence (DND) objected to the proposed development and raised concerns related to the environmental sustainability and carrying capacity of the land and DND’s ability to use the Suffield Base for its intended purposes, principally military activities. DND argued that it has sole authority to allow access to and coordinate activities upon the Suffield Base.

2.2.2 AltaGas Holdings Incorporated

AltaGas Holding Incorporated (AltaGas) filed a submission on behalf of AltaGas Pipeline Partnership in support of the proposed development. AltaGas Pipeline Partnership owns the Suffield Pipeline System, which transports sweet natural gas from the Suffield Base to the TransCanada Pipelines mainline in Burstall, Saskatchewan. AltaGas provided a brief submission on February 4, 2009, in support of the proposed project, stating the Suffield Pipeline System would not require any expansion or modification to handle gas from the proposed wells. AltaGas filed no further evidence or argument. Specifically, it did not supply views related to the issues listed in Section 4 of this report.

2.3 Written Hearing

On December 19, 2008, the Board issued a Notice of Hearing with respect to EnCana's Applications No. 1508351, 1508544, 1508545, 1508546, and 1508547. On January 30, 2009, EnCana withdrew Applications No. 1508351 and 1508546. On January 29, 2009, EnCana and DND jointly requested that the Board proceed by means of a written process. The Board granted the request and issued a revised Notice of Hearing for Applications No. 1508544, 1508545, and 1508547 on January 30, 2009. The Board assigned Board Member B. T. McManus, Q.C. (Presiding Member) and Acting Board Members J. Gilmour, B.A., LL.B., and W. A. Warren, P.Eng., to hear the applications. The proceeding closed on May 27, 2009. Those who participated in the written proceedings are listed in [Appendix 1](#).

3 BACKGROUND

3.1 Suffield Base: A History of Shared Use

The lands constituting the Suffield Base were acquired in 1941 by the Federal Government through expropriation and purchase. The Government of Alberta retained title to most of the underlying mines and minerals. The militaries of Canada and Great Britain use the Suffield Base for live fire training exercises with a full range of military equipment. A portion of the Suffield Base is also used by Defence Research and Development Canada Suffield for scientific research and development activities related to military engineering, mobility systems and weapons system evaluation, as well as for activities related to chemical and biological warfare defence.

About 458 square kilometres of the Suffield Base along its eastern boundary form the Suffield National Wildlife Area (NWA). No military training takes place in this portion of the Suffield Base. The Suffield Base is home to more than 10 000 oil and gas wells and associated pipelines and infrastructure. The Prairie Farm Rehabilitation Agency also grazes cattle on some parts of the Suffield Base.

In 1975, the Governments of Canada and Alberta entered into a memorandum of agreement authorizing entry upon and use of the Suffield Base by Alberta or its assignees for the purpose of natural gas production (1975 MOA). Alberta then assigned its rights under the 1975 MOA to the Alberta Energy Company Ltd. (AEC). Those rights are now held by EnCana. These parties signed a similar MOA for oil production on the Suffield Base in 1977.

The 1975 MOA established a unique process for the regulation of gas production on the Suffield Base. It confirmed that the province of Alberta's laws for gas production would apply on the

Suffield Base and that the ERCB would be the primary provincial regulator. The 1975 MOA also provided that Alberta and its assignees would comply with all federal, provincial, and municipal laws applicable to access to, entry upon, and occupation and use of the Suffield Base.

The 1975 MOA describes the role of the Base Commander and his authority as it relates to access and the protection and safety of personnel and equipment on the Suffield Base. The 1975 MOA also created a committee called the Suffield Environmental Advisory Committee (SEAC), which comprises three representatives: one each from the provincial department of the environment, the federal department of the environment, and the ERCB. The 1975 MOA assigns the following tasks to SEAC:

- to provide advice and make recommendations to the Base Commander with respect to gas production and operations;
- to develop and update application forms and information requirements for development and reclamation approval applications;
- to conduct inspections of gas production sites and pipelines to ensure compliance with the 1975 MOA; and
- to report annually on its activities to Canada, Alberta, and the Base Commander.

The 1975 MOA remains in force and continues to govern access to and use of the Suffield Base for natural gas production by Alberta's assignees.

In 1999 Canada, Alberta and the AEC entered into a new agreement entitled the Partial Assignment Agreement. It established a new body called Suffield Industry Range Control (SIRC), whose job is to coordinate oil and gas activities on the Suffield Base.

3.2 Suffield Joint Review Panel

On January 27, 2009, a Joint Review Panel (JRP) comprising the Canadian Environmental Assessment Agency (CEAA) and the Alberta Energy and Utilities Board (EUB; predecessor to the ERCB) issued its final report on a proposed EnCana shallow gas infill project within the Suffield NWA. The project comprised 1275 wells and associated pipelines. The JRP recommended that the project not proceed until certain key requirements were met. It is important to note that the regulatory approval process for projects within the NWA is different from that for the rest of the Suffield Base because additional approvals under the *Wildlife Area Regulations* are required from the Suffield Base Commander.

3.3 Regulatory Framework for Gas Production on the Suffield Base

The 1975 MOA affirmed that the ERCB would regulate oil and gas activities on the Suffield Base in the same manner that it does elsewhere in the province. However, the 1975 MOA also delegated to the ERCB some of the authority of the Minister of the Environment pursuant to the *Land Surface Conservation and Reclamation Act*. One of the delegated powers was the authority to issue development and reclamation approvals. These approvals describe what steps would be taken to abandon and reclaim the well, pipeline, or facility described in the approval. Accordingly, two separate approval documents must be obtained to drill a well on the Suffield Base outside of the NWA, a development and reclamation approval and a well licence. Both processes are managed by the ERCB in accordance with the 1975 MOA.

The 1975 MOA requires SEAC to review and make recommendations to the Base Commander for all applications for wells, pipelines, and facilities that are

- within 300 feet of the normal high-water mark of a water body or water course,
- on a river floodplain,
- within a restrictive development zone, namely,
 - the South Saskatchewan River Bank Zone, and
 - Middle Sand Hills zone, or
- within 300 feet of the upper break of a coulee ravine or river valley.

Further, the Base Commander may request SEAC to review and make recommendations for applications that do not meet the above criteria. Section 12 of the 1975 MOA makes it clear that the Base Commander is bound by recommendations made by SEAC.

In 1976, the ERCB issued Development and Reclamation Approval No. 22, which covered the entire Suffield Base with the exception of the Middle Sand Hills Zone, the South Saskatchewan River Zone, and the Mixed Grasslands area.¹ In 1992, the ERCB issued Development and Reclamation Approval No. 22a, which updated the approval and reclamation processes for the Suffield Base.

While the ERCB is responsible for issuing development and reclamation approvals under the 1975 MOA, the Land Surface Reclamation Council was the body responsible for the signing of reclamation certificates pursuant to the *Land Surface Conservation and Reclamation Act*. That act was repealed and replaced by the *Environmental Protection and Enhancement Act*, and the Land Surface Reclamation Council no longer exists. Further, Section 134(f) of the *Environmental Protection and Enhancement Act* specifically excludes federal lands from provincial reclamation standards. As a result, the current reclamation standards on the Suffield Base are those specified in Development and Reclamation Approval No. 22a.

In 2006, the Base Commander and the oil and gas industry jointly developed an Application for Development Process for the consideration of new oil and gas applications on the Suffield Base. Under this process, applications are reviewed by the Base Commander prior to being forwarded to the ERCB. If the Base Commander has no objection, the application is forwarded to the ERCB as a routine application. If the Base Commander identifies a concern with the application, it is forwarded to the ERCB as a nonroutine application that the Board will consider in a public hearing.

Development and Reclamation Approval No. 22a applies to the three wells that are the subject of this proceeding. The well applications were not reviewed by SEAC, as they did not meet the criteria for mandatory review and the Base Commander did not request SEAC to review them.

3.3.1 Range Standing Orders and the 16 Disturbance Per Section Limit

On December 1, 2008, the Base Commander issued new Range Standing Orders (RSOs), Chapter 7: Oil and Gas Activity Protocols. Section 71 of Chapter 7 states:

¹ These areas are now almost entirely contained within the Suffield NWA.

Disturbances per Section. The maximum disturbance per section as currently defined by the Base is 16 surface locations (square miles) regardless of well/facility type (oil, gas, water, separator, sump, etc.). While a maximum of 16 surface locations may exist, a single wellhead can be re-entered. Additional well/facilities can be placed on existing pads with a one-time extension where the site can be no greater than 140 metres (1.96 hectares): the Base may consider other extensions on a case-by-case basis. The maximum disturbance may be reviewed by the BComd, based on the provision of scientific evidence demonstrating environmental and range sustainability.

The Base Commander also issued a draft *Guideline for Required Information for Consideration for Increasing the Number of Disturbances per Section at CFB Suffield to Greater than 16* (DND's Draft Guidelines).

EnCana's proposed wells are located on sections that already exceed the 16 disturbance per section (16 DPS) limit described in Chapter 7, Section 71, of the RSOs. EnCana did not seek approval from the Base Commander to exceed the 16 DPS limit in accordance with DND's Draft Guidelines.

4 ISSUES

The Board considers the issues respecting the applications to be

- Constitutional Question: Does the ERCB have jurisdiction to grant surface access to the Suffield Base to any party?
- ERCB jurisdiction to issue well licences on the Suffield Base
- Need for the wells
- Is approval of the wells in the public interest?

In reaching the determinations contained in this decision, the Board has considered all relevant materials constituting the record of this proceeding, including the evidence and argument provided by each party. References in this decision to specific parts of the record are intended to assist the reader in understanding the Board's reasoning relating to a particular matter and should not be taken as an indication that the Board did not consider all relevant portions of the record with respect to that matter.

5 CONSTITUTIONAL QUESTION

On February 3, 2009, DND filed a Notice of Constitutional Question, pursuant to the *Administrative Procedures and Jurisdiction Act*. DND asked the following constitutional question:

Whether the Energy Resources Conservation Board of Alberta has jurisdiction to grant surface access to Canadian Forces Base Suffield to any party.

EnCana responded to this question on February 10, 2009, stating that this matter had been addressed by the Board in a letter to the parties dated July 30, 2008, which stated:

Regarding the issue of surface access to the Suffield Block, the Board agrees with both parties that the ERCB has no jurisdiction to grant surface access to CFB Suffield to any party.²

EnCana stated that it agreed with this position.

The Board's view on this question has not changed. It therefore answers the constitutional question as follows: The ERCB has no jurisdiction to grant surface access to the Suffield Base to any party.

6 ERCB'S JURISDICTION TO ISSUE WELL LICENCES ON THE SUFFIELD BASE

6.1 Views of EnCana

EnCana argued that the authority of the Base Commander to issue RSOs was confined to the ambit of the enabling statutes. It stated that the statutory purpose underlying the RSOs was the administration of the armed forces and an army base and that the ability to issue RSOs did not equate to unlimited discretion. EnCana stated that any RSO that impinged upon the exclusive jurisdiction of the province to regulate natural resource recovery was invalid.

EnCana agreed with DND that the ERCB had the jurisdiction to grant the licences requested. It stated that the determination of the optimal number of wells per section fell squarely within the ERCB's jurisdiction to determine the best way to conserve the resource. It contended that the ERCB's statutory authority was not affected by the existence of the 1975 MOA or DND's 16 DPS policy.

EnCana stated that the 1975 MOA was evidence before the Board that the federal and provincial governments entered into an intergovernmental agreement to allow EnCana access to the Suffield Base to develop the province's resources. It argued that the outstanding issue relating to access was a matter for the Surface Rights Board or the courts to decide and did not affect the ability of the Board to rule upon the well licences.

EnCana stated that the test that the Board must apply when ruling on the three applications was whether they provided for the economic and efficient recovery of the resource and whether they were in the public interest after balancing economic, social, and environmental effects. EnCana argued that approval of the applied-for wells was in the public interest from an economic, social, and environmental perspective. It argued that the wells would have minimal associated environmental effects and contended that DND raised no concerns regarding the social effects of the project.

EnCana challenged DND's position that the military uses of the Suffield Base had primacy over oil and gas development. It noted that the 1975 MOA authorized entry and access to the Suffield Base on the basis that the terms and conditions of the agreement were compatible with the continued use of the Suffield Base for military purposes and that such dual use could be carried out with safety and efficiency. EnCana agreed that the Base Commander was authorized under the 1975 MOA to limit access where necessary to coordinate activities for safety purposes. It

² Letter from JP Mousseau, Counsel, to Lieutenant-Colonel Malcolm Bruce and Mr. S.T. Denstedt dated July 30, 2008.

emphasized that Section 8 of the 1975 MOA limited this authority to the safety of personnel and nothing else.

6.2 Views of DND

DND argued that EnCana was bound by the RSOs when operating on the Suffield Base because of the *Defence Controlled Access Area Regulations* and the terms of the 1975 MOA. DND argued that the only constraints on the Base Commander's authority to issue or enforce the RSOs were those imposed by the *Constitution Act, 1867*, and those imposed by military law or superior orders.

DND stated that the *Energy Resources Conservation Act* was a law of general application and applied to the Suffield Base as federal land to the extent that it was not inconsistent with federal law. DND conceded that the granting of well licences pursuant to that statute (regardless of proposed density or location) would not by itself offend federal law, as it would not permit access to the Suffield Base. However, DND asserted that the installation or construction of any well that would exceed the 16 DPS limit would be a violation of federal law. DND asserted that the ERCB had no jurisdiction to direct that the wells be constructed.

DND stated that the Board should not exercise its jurisdiction to grant the requested licences by considering only whether the proposed wells were required to achieve maximum incremental recovery of gas. DND argued that this would be an unduly narrow interpretation of the ERCB's public interest test and would not account for social or environmental issues. DND emphasized that its submissions in this hearing should be recognized as the federal Crown's position with respect to EnCana's entire infill drilling program.

DND suggested that it would not be offensive for the ERCB to consider ongoing federal initiatives in respect of environmental stewardship on the Suffield Base when exercising its own statutory authority under provincial legislation. In particular, DND urged the Board to consider the efforts and steps undertaken by the federal government to protect the environment on the Suffield Base so as to maintain it as a military asset. It suggested that the Board should give considerable weight to the current and future needs of the military in its consideration of the public interest. It noted that the ability of the Canadian Military to train and prepare its own and its allies' combat forces was inherently a matter of the broadest social importance. DND stated that any interference with that ability would negatively affect the public interest.

In conclusion, DND argued that the Board should dismiss the applications without prejudice to EnCana's ability to reapply or should grant the licences with a condition requiring EnCana to obtain the additional consent of the Base Commander through the Application for Development Process.

6.3 Findings of the Board

EnCana seeks three well licences to produce minerals leased to them by the province of Alberta. The Board agrees with both parties that it has the jurisdiction and authority to issue the requested licences if it determines that their approval is in the public interest. The ERCB's jurisdiction has two sources. First, the targeted minerals are provincially owned and are the appropriate subject of provincial laws relating to the production of provincially owned resources. Second, the ERCB's enabling legislation is law of general application, which continues to apply on federal lands in the absence of competing federal legislation.

The Board finds that the 16 DPS limit imposed by the RSOs is not, of itself, a constraint on the ERCB's authority to issue the well licences. However, the Board must consider whether the 16 DPS limit is warranted in these circumstances, as a part of the analysis mandated by Section 3 of the *Energy Resources Conservation Act*, which reads as follows:

- 3 Where by any other enactment the Board is charged with the conduct of a hearing, inquiry or other investigation in respect of a proposed energy resource project, it shall, in addition to any other matters it may or must consider in conducting the hearing, inquiry or investigation, give consideration to whether the project is in the public interest, having regard to the social and economic effects of the project and the effects of the project on the environment.

In *Decision 2003-101*,³ the Board described its public interest mandate as follows:

Consideration of the public interest is in essence a question of finding the appropriate balance between the benefits of the proposed project and the potential risks of the project to the public and the environment. Where the potential for risk outweighs the possibility of gain, the Board will find that the specific proposed project is contrary to the public interest.

As all projects may have some element of risk, a great deal of the Board's attention must be focused upon the level of risk and the ability and willingness of the applicant to mitigate or eliminate such risks. An applicant's ability to take the appropriate measures to deal with risk is therefore critical to the Board's final determination as to whether the project can be found to be in the public interest.

The Board finds that this description of its public interest obligation remains accurate. In this decision the Board must balance the benefits associated with the three proposed wells with their potential risks to the public and the environment. Given their unique setting within a military base used for large-scale, live fire exercises, the Board must also take into account the risk the wells pose to the future viability of ongoing military training in the application area and the implications to Canada if that viability is compromised.

7 NEED FOR THE WELLS

7.1 Views of EnCana

EnCana stated that the gas targeted by the three applications occurred in three stacked reservoir units: the Milk River Formation, the Medicine Hat Formation, and the Second White Speckled Shale Formation. EnCana explained that these formations had low permeability and were heterogeneous, with discontinuous lenses of permeable silt and very fine-grained sand stringers that stored the gas delivered to the wellbore. EnCana submitted that the tight, heterogeneous nature of all three formations limited drainage and required additional wells to effectively recover the gas resource.

EnCana stated that the reservoir parameters (net pay, effective porosity, and permeability) for each formation where the proposed wells would be located were generally the same. EnCana indicated that the volume of silt stringers in each formation throughout the C7 Battery area (see Figure 2) and the existing D6-D8 pilot (see Figure 1) was similar. However, the net pay thickness in the Milk River Formation was slightly thinner in the C7 Battery area, and the net pay thickness in Medicine Hat and the Second White Speckled Shale Formations was slightly thicker.

³ EUB *Decision 2003-101: Polaris Resources Ltd.*, December 16, 2003.

EnCana stated that the proposed infill wells were needed to recover trapped gas (gas not interconnected through the series of silt stringers). EnCana indicated the proposed infill wells were expected to produce for 20 to 40 years and that further infill drilling to 16 wells per section throughout the Suffield Base was required to recover the gas reserves in place. EnCana contended that production history from its infill drilling had shown that 16 wells per section resulted in the recovery of incremental gas that would not otherwise be produced by lesser well densities.

EnCana considered production decline analysis as the most appropriate method to estimate recoverable reserves because of the discontinuous and heterogeneous nature of the producing formations. EnCana submitted that reserves estimates based on decline analysis were sensitive to a number of different factors: initial production rate, decline rate, abandonment rate, and the decline exponent. The reserves estimates were most sensitive to the initial rate, the decline rate, and the decline exponent used. EnCana indicated that the longer the production history, the more accurate the reserves estimate from decline analysis.

EnCana stated that some interference occurred between the higher permeability lenses between original and infill wells, partially explaining why the original wells had higher productivity and recovery than newer wells. EnCana indicated that production reduced the pressure in these stringers, permitting gas in the lower permeability rock with higher pressure adjacent to the stringers to migrate into the stringer and move to the producing wells. EnCana indicated that this mechanism was unconventional and accounted for the long producing life of these shallow gas wells. EnCana stated that some of the same streaks and stringers would be contacted by adjacent existing wells. However, because of the tight, heterogeneous, and unconventional nature of the reservoir, interference and acceleration effects had not been seen to be a major factor and would only be expected to be seen in long-term production behaviour. EnCana submitted that the reserves expected to be recovered by the infill development net of any acceleration components were incremental reserves.

In correspondence to DND, EnCana submitted that it disagreed with the 16 DPS limit that applied cumulatively to all wells (oil and gas). EnCana indicated that there were significant differences in exploration for these two types of petroleum. EnCana stated that oil was found primarily in reservoirs or pools that were few and far between and that, once found, a high density of wells was used to drain a pool. EnCana stated that, in contrast, gas was found in tight formations across the Suffield Base, requiring many wells at regular intervals across the land to contact the gas and allow for better recovery. EnCana indicated that in some areas where oil had been exploited, well density already approached 70 wells per section and no further development would be allowed in those areas, directly impacting production rates for gas.

EnCana explained that it infill drilled the D6/D8 pilot area within the NWA (see Figure 1) to assess incremental recovery with a well density of 16 wells per section. EnCana submitted that evaluation of the D6/D8 pilot and buffer areas using decline analysis showed that the gas recovered at 8.25 wells per section was about 5.1 billion cubic feet (Bcf),⁴ whereas development at 16 wells per section resulted in recovery of 6.1 Bcf per section. EnCana indicated that this equated to an average incremental recovery of 124 million cubic feet (MMcf)⁴ per well and that

⁴ Gas volumes were expressed in the submissions primarily in imperial units and imperial units are being used in the report. The conversion factor to metric is 1 Bcf = 28.17 million cubic metres and 1 MMcf is 28.17 thousand cubic metres.

it was highly confident in this reserve estimate because of similar results from decline analysis, modelling, and independent analysis.

In addition to standard decline analysis techniques, EnCana submitted that it carried out a vintage analysis of the D6/D8 pilot area. EnCana indicated that vintage analysis used decline analysis to examine the performance of wells grouped by vintages or categories, such as the year in which they were drilled. EnCana indicated that vintage analysis concluded that the reserve estimate for infill wells was 161 MMcf per well.

EnCana submitted that in addition to decline analysis techniques and as an extension of the geological and conceptual model for this shallow gas deposit, a numerical simulator had been built and calibrated for the D6/D8 pilot area to support the recovery scenarios evaluated. EnCana stated that the results from the model indicated that the incremental recovery of the infill program would ultimately be 188 MMcf per well.

EnCana submitted that an independent assessment conducted by McDaniel & Associates Consultants Ltd. (McDaniel) assigned reserves of 151 MMcf to each infill well in the D6/D8 pilot, with an estimated resource recovery of 5.9 Bcf per section for that area. Without infill drilling, the estimated resource recovery at 6.5 wells per section was 4.15 Bcf per section.

EnCana assessed the performance of wells within the C7 Battery area by comparing the production performance of two areas: Sections 3 and 10 and Sections 1, 2, 11, and 12 immediately to the east with higher well densities. By comparing the estimated recovery in Sections 3 and 10 to that in Sections 1, 2, 11, and 12, EnCana estimated an incremental recovery of 0.89 Bcf per section, or an average of 148 MMcf per well. EnCana submitted that production periods used to establish the decline in the C7 Battery area analysis were following the major transitional effects from recently drilled wells, where a steady decline behaviour was established. EnCana submitted that a vintage analysis of the C7 Battery area yielded an incremental recovery of 129 MMcf per well.

EnCana submitted that the infill wells drilled in 2006 within the C7 Battery area had a relatively short production history and to date were still exhibiting predominantly exponential production decline behaviour. It stated that using an exponential decline with a conservative decline exponent of 0 would yield an incremental reserve estimate of 111 MMcf per well. However, based on the behaviour seen in the D6/D8 pilot and elsewhere on the Suffield Base, EnCana indicated that extrapolating the production using a decline exponent of 0.5 resulted in an incremental reservoir estimate of 140 MMcf per well.

In support of its incremental recovery estimate for the proposed infill wells, EnCana indicated that an independent assessment by McDaniel determined that additional infill wells drilled in the C7 Battery area, where the current well densities were at least 8 wells per section, would recover between 90 and 130 MMcf of incremental reserves.

EnCana summarized that the results of the D6/D8 and C7 Battery area pilot analyses, simulation model, vintage analysis, and McDaniel's assessments all supported EnCana's conclusion that additional wells would result in incremental recovery. EnCana estimated that the incremental recovery for the three proposed wells would be 148 MMcf per well. EnCana also pointed out that the JRP in the recent NWA project hearing agreed with EnCana that the balance of evidence indicated that it was reasonable to expect an incremental recovery that otherwise would not be

recovered by the pre-infill wells. EnCana submitted that if these three proposed infill wells were not drilled, about 450 MMcf of gas would be wasted.

EnCana submitted that it was not technically feasible to recover the incremental reserves using directional or horizontal wells. It maintained that the ideal well subsurface spacing for development was 400 m. EnCana asserted that the proposed infill wells were not candidates for directional drilling because the zones were shallow (between 250 and 650 m) and stacked. EnCana studied the potential for directional drilling and concluded that directional drilling did not allow for the necessary subsurface spacing required to effectively drain the gas resource from all formations. EnCana indicated that, in particular, directional drilling did not provide for adequate wellbore spacing for the Milk River Formation, which was typically located at a depth of 300 m in this area.

7.2 Views of DND

In a letter dated July 15, 2005, to the ERCB, DND submitted that it was fully cognizant of the difference between subsurface drainage locations necessary to recover the resource and the associated surface facilities required to produce the resource. DND indicated that it did not dispute the reservoir engineering necessary to determine the optimum number of subsurface drainage points. DND added that it fully appreciated the need to capture all the resource, which was in the public interest, and not leave unrecovered reserves in place. Notwithstanding, DND stated that it was concerned about the associated surface disturbance and indicated that setting a threshold of 16 well surface locations per section was a fair compromise to accommodate capturing the resource, encouraging industry to be innovative with its technology and usage of the wellbores, and more important, protecting the environment.

DND further stated that a limit of 16 DPS applied to surface disturbances but not to pipelines and access roads at this time. DND stated that 16 DPS applied to all oil and gas operations and it was cumulative.

DND stated that using a disturbance-per-section limit as opposed to a well-per-section limit was a reasonable approach, because it would allow more than 16 wells on a section of land if multiple wells were located on one well pad or disturbance. DND stated that this would better accommodate overlapping exploitation of underlying oil and formations, since, for example, a formation that could be exploited from one pad using multiple vertical or slant wells would count as one disturbance, thereby allowing for additional wells for formations where vertical drilling was more practical. DND stated that competing surface well location disturbances would be managed on a first-come basis.

DND indicated that a disturbance-per-section limit may also encourage reclamation of wells that had reached the end of their productive life cycles, in order to make room for more wells. DND stated that EnCana and other operators did not, as a matter of general practice, remove wells and reclaim land when the wells reached the end of their productive life cycles.

7.3 Findings of the Board

The Board agrees with EnCana that the reservoir characteristics in Sections 3 and 10 are reasonably similar to the reservoir characteristics in the D6/D8 pilot area, as are the 4 sections directly offsetting to the east in the C7 Battery area. Therefore, EnCana's analysis of production

performance of these pilot areas is considered to be an appropriate analog for the expected reservoir performance of the three proposed infill wells.

The Board agrees with EnCana that production decline analysis is the most appropriate method to estimate recoverable reserves for the tight, heterogeneous shallow gas formations in question. Although production decline analysis is interpretive and will result in a range of recovery estimates, the Board considers EnCana's expected incremental recovery from the three proposed infill wells to be reasonable for the range of interpretations expected. The Board notes that DND has not disputed that the proposed infill wells will recover incremental gas reserves. The Board agrees with EnCana that incremental gas reserves will be recovered by drilling and producing the three proposed infill wells. Therefore, the drilling of the three proposed wells would achieve resource conservation. The impact that the three proposed infill wells will have on the environment and land use and the associated impact of exceeding a 16 DPS threshold are addressed in other sections of this report.

The Board observes that DND has not disputed EnCana's conclusion that 16 shallow gas wells per section is required to recover the gas reserves in place at the Suffield Base.

The Board agrees with EnCana that drilling infill wells directionally from existing well surface locations would not be as effective in contacting the trapped gas in these tight, heterogeneous reservoirs as vertical wells and would therefore result in reduced ultimate recovery. Therefore, the Board is satisfied that drilling vertical infill wells is necessary for optimal resource recovery in this instance.

As shown in Figure 2, Sections 3 and 10 of the C7 Battery area contain wells associated with both oil and gas development. The Board considers it feasible to minimize any further increase in the number of surface disturbances by directionally drilling wells for oil recovery from existing surface locations. In addition, the Board encourages drilling future shallow gas infill wells on existing surface locations of oil development wells to reduce the number of surface disturbances as defined by DND and to reduce associated environmental effects. EnCana's evidence did not speak to the feasibility of minimizing any further increase in the number of surface disturbances by drilling oil wells directionally from the same surface location or locating shallow gas infill wells within existing surface disturbances. However, the Board agrees with EnCana that the optimal spacing between shallow gas wells for gas recovery is 400 m, and the panel is satisfied that the proposed infill wells are appropriately located for recovery.

Neither DND nor EnCana attempted to quantify the impact that a 16 DPS limit would have on both oil and gas recovery. In areas of competing oil and gas development within the Suffield Base, the Board considers that imposing a limit of 16 wells or 16 disturbances per section could negatively impact the recovery of both oil and gas reserves. The panel encourages a cooperative approach to development between oil and gas developers to limit surface disturbances wherever possible. The Board notes that other methods of reducing surface disturbance should also be considered, such as sharing access and pipeline routes for both oil and gas development.

8 IS APPROVAL OF THE WELLS IN THE PUBLIC INTEREST?

8.1 Views of EnCana

8.1.1 Introduction

EnCana argued that DND's 16 DPS limit had no scientific or evidentiary basis. EnCana contended that the 16 DPS limit was imposed unilaterally and contended that this action was not consistent with the purpose and intent of the 1975 MOA.

EnCana questioned the validity of DND's Draft Guidelines for wells that exceed the 16 DPS limit. It noted that this document did not form part of the RSOs or any other document provided by DND as part of the consultation process for obtaining landowner consent. Further, EnCana stated that some of the conditions of the draft guidelines were not scientifically achievable. EnCana argued that the draft guidelines were inconsistent with the Government of Canada's *Framework for the Application of Precaution in Science-based Decision Making About Risk* because

- it is not decision-making that is rigorous, sound, and credible;
- the measures are not proportional to the potential severity of the risk being addressed and consistent with measures taken in similar circumstances; and
- it is not cost effective, with the goal of generating an overall net benefit for society at the least cost and being efficient in the choice of measures.

EnCana emphasized that it was committed to minimizing its footprint and impact on the ecosystem; however, it asserted that the conditions in DND's Draft Guidelines were not a reasonable, practical, cost-effective or a scientific approach to ensuring minimal environmental effects. EnCana argued that the Board should give no weight to the guidelines.

Instead of well density or surface disturbance limits, EnCana proposed cooperative actions through project design and mitigation strategies. EnCana disagreed with DND imposing its authority in determining how a provincial resource such as natural gas would be developed in an economic, efficient, and orderly manner. Rather, EnCana argued, the ERCB hearing process should determine the optimal number of wells, resource conservation matters, and issues of development impacts on the Suffield Base.

EnCana stated that it recognized its obligations under the 1975 MOA to conduct its natural gas operations in an environmentally responsible manner. EnCana acknowledged that this could mean a limit on well density, such as 16 wells per section. However, it noted that higher well densities above 16 wells per section might be required in other situations. EnCana concluded that a case-specific examination was necessary to determine the acceptability of a higher well density or total disturbance limit from both environmental and military perspectives.

EnCana acknowledged that it proposed a well density of 16 wells per section (i.e., 400 m spacing) in its long-range development plans for most of the shallow gas development areas of the Suffield Base. EnCana stated that the ERCB approved a holding application by EnCana with unlimited downhole well spacing over much of this same area. EnCana also observed that the ERCB and DND had approved other oil and gas batteries to be drilled at a surface density of 16 wells per section, or 400 m spacing.

EnCana argued that the 16 DPS limit was not relevant to this application, as it related only to the issue of access to the base, an issue over which the ERCB had no jurisdiction. EnCana contended that the Board must decide whether the applied-for well licences were necessary to conserve the resource.

8.1.2 Soils and Vegetation

EnCana noted that it had incorporated the principles of ERCB *Informational Letter (IL) 2002-01: Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas* in all of its activities on the Suffield Base. Specifically, EnCana stated that it avoided disturbing native prairie wherever possible and otherwise attempted to minimize disturbance and overall effects on the environment. EnCana noted that it conducted an environmental overview (EO) for new wells, pipelines, and access routes in order to be able to minimize disturbances. EnCana noted that the EO process determined the appropriate location for all facilities and identified mitigation measures to reduce the environmental effects of a development.

EnCana stated that its construction and operation practices were designed to minimize the effects on the environment. Specifically, EnCana did not strip soil from leases and minimized soil handling to the installation of the caisson and tie-in locations. EnCana calculated the direct disturbance associated with caissons to be 5 by 6 m by 1.5 m deep and for tie-in points another 5 by 6 m (30 m²). EnCana also stated that the direct disturbance associated with ploughed-in well tie-ins would be minimal, less than 1 m wide for the length of the tie-in (typically less than 250 m in length).

EnCana argued that DND had not filed any specific evidence to support its assertions that drilling programs had resulted in considerable disturbance and decreased range health on the prairie landscape at the Suffield Base and that increasing the amount of DPS would have a direct effect on the ability of the environment to sustain military operations. EnCana noted the results of various studies it had conducted on the Suffield Base and concluded that the use of minimal disturbance construction techniques would minimize environmental effects associated with the three proposed wells. EnCana stated that it would use minimal impact equipment, conduct construction activities during dry or frozen conditions, use existing access trails so only new local trails would be added, and use lower impact pipeline methods for local tie-ins. Furthermore, EnCana stated that these practices would reduce the environmental footprint of the development to ensure long-term sustainability of the land.

Given its estimate that the drilling of the three wells would result in a 0.1 per cent incremental increase in surface disturbance, EnCana did not foresee cumulative or landscape-level effects on soils and vegetation as a result of the three wells. Furthermore, EnCana cited findings of the JRP (see Section 3.2 of this report) that stated there would be no significant effects upon soils, vegetation, or native prairie, provided proposed mitigation and panel recommendations were implemented.

With respect to other site-specific environmental impacts on soil and vegetation, EnCana noted that while traffic required during construction was more intense than during the operational phase, it was important to note the timing and short duration of the construction activity. EnCana stated that construction would occur during dry or frozen conditions, outside of intensive military training periods. EnCana also noted that local access trails created to service the three new wells would have low traffic volumes during the operation phase, as it expected each of the three

proposed wells to require between 2 and 5 visits per year. However, the first year of production would require about 12 operations-related visits due to extra swabbing, production testing, and start-up processes needed for new wells. EnCana stated that it did not find any evidence to suggest that such traffic volumes at low trail-limited speeds would present a risk to increasing the occurrence of safety and maintenance incidents. EnCana also noted that it would continuously reclaim existing access trails as they became redundant.

EnCana stated that wet weather access had the potential to harm native prairie and, accordingly, well access in such conditions was prohibited. Furthermore, EnCana noted that on native prairie the consideration for shutdown or work modification would begin immediately and concurrently with significant precipitation or thawing events.

During the environmental assessment of its NWA Infill Development Project, EnCana assessed effects of infill drilling upon native prairie vegetation communities by sampling vegetation.⁵ EnCana stated that assessment of landscape-level effects on vegetation and soil using densities of 8 versus 16 wells did not show significant differences in measures of ground coverage by native plant species. It also observed that no consistent pattern in the condition of native grassland integrity was detected for well densities of 8 versus 16 wells. EnCana pointed out that the paired sampling completed randomly within five quarter sections of rangeland within and outside of the NWA concluded that recovery of native range appeared to occur as long as crested wheatgrass was not used in the reclamation seed mix.

Supplemental sampling of vegetation from well leases within the Koomati infill drilling area (see Figure 1) was also completed by EnCana. EnCana observed that results indicated that undesirable plant species were occurring more frequently adjacent to existing linear disturbances and past areas of cultivation. It also acknowledged that undesirable plant species occurred at recently disturbed sites, but added that effects were localized to the immediate area of caisson installation, bell holes, and plow lines. It was EnCana's experience that occupation of these sites by weedy species was relatively short lived. EnCana stated that later successional stages of revegetation would be accompanied by the proliferation of native species. EnCana concluded that the native prairie matrix would remain relatively intact and newly disturbed areas would recover with native plant species. EnCana stated that it used DND's prescribed native seed mixes for revegetation to minimize the establishment of non-native vegetation and to facilitate the recovery of disturbed areas.

EnCana responded to DND's evidence of disturbances to native prairie within the Koomati infill drilling area and other locations within the Suffield Base. EnCana stated that DND had not followed standard practices of environmental auditing when its sites were inspected. EnCana emphasized that these inspections occurred prior to EnCana's postconstruction cleanup. EnCana filed evidence of follow-up remedial actions and site cleanups at locations specified by DND. EnCana concluded that environmental effects of high-density infill development were of short duration, often within the natural range of variability, and that improved project design, environmental monitoring, and established reclamation practices would maintain the condition of native grassland ecosystems at the Suffield Base. EnCana concluded that the sustainability of

⁵ Vegetation Triangle Sampling Program—Detailed Methods and Results, Section 3, Appendix 3C; publicly available at <http://encana.com/suffieldeis/appendices/index.htm>.

Paired Pipeline Sampling—Detailed Methods and Results, Section 3, Appendix 3D; publicly available at <http://www.encana.com/suffieldeis/appendices/index.htm>.

native prairie would be maintained for military land use, as well as for extraction of oil and gas resources.

8.1.3 Water and Wetlands

EnCana calculated net water use for the three proposed wells to be 450 m³, including drilling and completion. EnCana estimated that water demands for operations and refracturing during the life of the wells would not exceed 170 m³. EnCana agreed to use recycled water, municipal water supply, and approved dug-out locations at Suffield Base, such as Beaver, Interface, Bayonet, and Telfer Lake, for drilling and operations. It confirmed that it would obtain appropriate licences for water withdrawal.

EnCana submitted the report prepared by Landwise (2008)⁶ for DND as evidence concerning local and regional effects on groundwater and wetlands. EnCana stated that it would adopt the recommendations in the Landwise report for responsible use of water and as a means of mitigating effects on groundwater and wetlands. EnCana stated that it would implement the mitigations for avoiding wetlands that were recommended in EnCana's EO of the C7 Battery. It also stated that the mitigations in its Western Canada Environmental Protection Plan would be implemented. EnCana stated that the three proposed wells would all be located outside of the 100 m setback distance from wetlands.

In its evidence, EnCana cited findings of the JRP for the NWA Infill Development Project⁷ that concluded that the effects of EnCana's water withdrawals for 1 200 wells were manageable. This was founded on the impact assessment of water supply and water use submitted by EnCana to the JRP.

EnCana stated that it would comply with ERCB *Directive 056: Energy Development Applications and Schedules*, which required an operator to maintain a distance of 100 m from water bodies unless it had acceptable measures in place to protect the water body during drilling and production operations and mitigate the consequences of a spill. Furthermore, EnCana would consult third-party biologists to evaluate the class of wetlands and the level or risk and potential effects that a facility might have on the environment. EnCana stated that it would choose environmental setbacks based on the merits of individual locations. It submitted that it would endeavour to route developments 100 m from all seasonal wetlands. However, EnCana argued that strict adherence to setback distances for wetlands could result in a greater surface disturbance and therefore some flexibility was justified. In the case of the three proposed wells, EnCana stated that it would maintain a 100 m setback distance from wetlands.

8.1.4 Wildlife

EnCana filed its three well applications with DND with supporting environmental information from its EO. EnCana stated that in 2006, its consultants conducted a wildlife and habitat survey in the areas of proposed infill drilling. During well site and pipeline surveys of the C7 Battery area, EnCana observed several wildlife species of concern, as identified by Alberta's *Wildlife Act* and Canada's *Species at Risk Act (SARA)* (i.e., Burrowing owl, Sprague's pipit, Baird's sparrow).

⁶ McNeil, R., and McNeil, J., 2008, *Groundwater, Wetland and Water Source Assessment for CFB Suffield: Final Report*, Public Works Canada and Department of National Defence Canada, 222 pp.

⁷ EUB-CEAA Joint Review Panel, *EUB Decision 2009-008: EnCana Shallow Gas Infill Development, Canadian Forces Base Suffield National Wildlife Area, Alberta*, 2009, p. 96.

However, EnCana stated that no active nests or burrows of Burrowing owls were found in either Section 3 or Section 10, the locations of the proposed wells. EnCana's consultants recommended use of a 500 m setback distance for proposed wells or pipeline rights-of-way relative to Burrowing owl nests.

EnCana was prepared to move well locations or delay construction if species of concern or their nests were observed during surveys. EnCana concluded from its EO that no wildlife issues were associated with drilling of the three wells. EnCana recognized that more than two years had passed since the proposed well sites had been surveyed for wildlife. It committed to complete an additional wildlife survey should the wells be approved. EnCana stated that these surveys would be completed prior to well site construction.

EnCana stated that critical wildlife habitat areas as defined by the *SARA* had not been formally designated within this area of the Suffield Base. Should critical habitat areas be declared legislatively in the future, EnCana stated it would review its options. According to EnCana, these options include obtaining a *SARA* permit from Environment Canada for its gas development activities.

EnCana stated it had completed a review of the literature and determined that traffic volumes and low travel speeds using grassland trails would not pose mortality risks to species at risk. Furthermore, EnCana would use existing roads to lower disturbance effects. EnCana stated that new access roads consisting of grassland trails of short distance would complete the necessary access to each well.

EnCana recognized the issue of snake mortality associated with road use at the Suffield Base. According to EnCana, risks of snake mortality would be low, given the locations of the wells. EnCana observed that well locations close to the western boundary of the Suffield Base were at a moderate distance from key snake habitats along the South Saskatchewan River Valley. EnCana concluded that the presence of snakes was expected to be lower than in other parts of the Suffield Base and mortality would be negligible. EnCana stated that it had implemented snake mitigations as part of its shallow gas development elsewhere at the Suffield Base, but it did not elaborate on those mitigations.

Wildlife surveys (e.g., point counts of birds) to assess the environmental effects of shallow gas development were also completed by EnCana for a regional study area that included much of the Suffield Base in support of EnCana's infill development program proposed for the NWA.⁸ EnCana concluded that effects of its infill development project in the NWA and cumulative effects of the project with other identified activities at the Suffield Base would have negligible effects upon wildlife and habitat.

EnCana stated that this assessment for the NWA was supported by 1) the small surface disturbance footprint of EnCana's development, 2) use of minimal disturbance methods of construction and operation, and 3) implementation of an environmental protection plan (EPP) for the NWA. EnCana noted that its environmental assessment of the NWA was based on winter drilling during frozen ground conditions as a further mitigation measure. It proposed mitigations of a similar nature for drilling the three wells inside the C7 Battery, including drilling during

⁸ EnCana, *2007 Environmental Impact Statement for EnCana Shallow Gas Infill Development in CFB Suffield National Wildlife Area*, Volume 3, Appendix 5J: Breeding Bird Survey.

either frozen or dry, non-frozen ground conditions. EnCana confirmed that it would use its EPP for these wells.

With respect to habitat fragmentation and sensory disturbance effects on wildlife, EnCana predicted that its three wells would have negligible effects because of the limited disturbance. EnCana also identified the potential effects of infill drilling on grassland birds as negligible, based on its past environmental assessment within the Suffield Base and the NWA. EnCana submitted evidence of multiyear point count surveys of birds, compared with baseline surveys conducted by the Canadian Wildlife Survey and work by Dillon Consultants for DND. These surveys were conducted at the Suffield Base and deemed by EnCana to be representative of site conditions and levels of effects for the proposed three wells.

EnCana provided as evidence research by Linnen (2008),⁹ who found that the occurrence and relative abundance of seven grassland bird species had been unaffected by minimal disturbance shallow gas development and trails. EnCana also cited the Great Sand Hills Regional Environmental Study Final Report (2007),¹⁰ which found that effects of gas wells, roads, and trails were positive for 7 of 14 bird species studied. The study concluded that these species occurred more frequently in proximity to shallow gas wells and access roads than in other habitats.

EnCana considered the results of the EO for the three wells, point count bird surveys on the Suffield Base the regional environmental assessment of vegetation, and range health studies from the literature. Combined with proposed mitigations, reclamation, and minimal disturbance construction, EnCana concluded that the environmental effects of the three-well project on wildlife and their habitats would be negligible. EnCana stated that its evidence and conclusions were applicable to much of the Suffield Base and the proposed wells of the C7 Battery. EnCana contended that the effects of infill drilling would not be detrimental to the sustainability of wildlife resources at the Suffield Base.

EnCana stated that under the terms of the 1975 MOA, it was not obligated to provide assessment information to DND for cumulative effects, including wildlife. Nevertheless, EnCana's evidence included supplemental information on the subject of cumulative environmental effects. As noted above, EnCana cited studies from the literature as supplemental information to support its views that both project effects and cumulative effects of infill drilling would be negligible. In particular, EnCana referred to landscape-scale assessments of vegetation, wildlife studies of grassland birds, point count surveys, and environmental assessments by DND on the Suffield Base. Some of these studies included lands within the C7 Battery, while others were not specific to the three well locations. The various study areas contained common native prairie ecosystems, wildlife, and plant species, with similar land uses.

EnCana argued that much of the regional assessment of vegetation¹¹ and the range health assessment¹² it used for its NWA Infill Development Project was applicable to its three well

⁹ Linnen, C. G., 2008, *Effects of Oil and Gas Development on Grassland Birds*, Petroleum Technology Alliance Canada, 25 pp.

¹⁰ Great Sand Hills Advisory Committee, 2007, *Great Sand Hills Regional Environmental Study: Final Report*, 232 pp.

¹¹ *Vegetation Triangle Sampling Program—Detailed Methods and Results*, Section 3, Appendix 3C; publicly available at <http://www.encana.com/suffieldeis/appendices/index.htm>.

Paired Pipeline Sampling—Detailed Methods and Results, Section 3, Appendix 3D; publicly available at <http://www.encana.com/suffieldeis/appendices/index.htm>.

applications to the ERCB. EnCana concluded that shallow gas development, whether at densities of 8 or 16 DPS, had similar negligible environmental effects on native grasslands. EnCana stated that land reclamation with native plant species would also be used to mitigate direct disturbances to wildlife habitat. EnCana observed that the range health of its infill development sites at Koomati was in variable condition. It noted that the disturbance area of leases (“workspace area”) had progressed rapidly towards recovery of native prairie condition. EnCana predicted that this trend would continue over time and concluded that disturbance areas of recently drilled well sites were generally in early stages of recovery.

EnCana stated that some species of grasslands birds increased in number and occurrence at the Suffield Base in areas of multiple land use with shallow gas development. EnCana referred to point count surveys for birds that indicated bird numbers were resilient even for areas of high surface disturbance (i.e., 30 per cent), such as in some military training areas. It pointed out that the C7 Battery area had experienced much lower surface disturbance (i.e., 5.5 per cent). EnCana predicted that significant declines in the numbers and distribution of birds from cumulative effects would not occur in the C7 Battery.

EnCana discounted effective habitat loss and fragmentation effects on wildlife from shallow gas developments. EnCana pointed out that access trails and pipeline rights-of-way were generally less than 2 m in width and contained similar vegetation species to adjacent native prairie.¹³ EnCana further stated that it had not identified decreases in habitat effectiveness and fragmentation under such conditions in the scientific literature. It maintained that this further supported its conclusion that significant cumulative effects on habitat or wildlife were not likely to occur.

EnCana noted that cumulative effects assessments of military activities within the military training area (MTA) had been completed by DND. EnCana observed that no significant cumulative effects had been identified. EnCana’s view was that cumulative environmental effects were generally within the natural range of variability at the Suffield Base and that significant cumulative environmental effects, including those on wildlife, had not occurred. Consequently, EnCana disagreed with DND’s maximum disturbance level policy. EnCana argued that DND had not demonstrated the presence of significant adverse environmental effects. EnCana submitted that it believed the general environmental condition of the MTA was in good health.

8.1.5 Reclamation

EnCana proposed monitoring of rangeland health to accompany its conceptual reclamation planning in the NWA. EnCana’s monitoring system was based upon Alberta Sustainable Resource Development’s rangeland health assessment. Preliminary measurement of range health from EnCana work areas on native prairie demonstrated an upward trend in the recovery of range health one to two years following construction. EnCana stated that the combined effects of a small disturbance footprint and successful construction and reclamation practices using native seed mixes would result in negligible cumulative effects on soils and vegetation during infill

¹² *EnCana’s Reply to Intervenor Submissions*, Appendix I: Koomati Site Monitoring. EnCana’s Shallow Gas Infill Development in the CFB Suffield National Wildlife Area.

¹³ *Supplemental Well Lease Vegetation Sampling and Analyses*, August 2008; publicly available at <http://www.encana.com/docs/suffieldeis/intervenor/appendix-g.pdf>.

development. EnCana contended that this conclusion was also relevant to the proposed three wells of the C7 Battery.

EnCana stated that final reclamation was not anticipated for 20 to 40 years after drilling. It explained that applications for reclamation certification would be submitted to SEAC and DND, with final authorization by the Base Commander. EnCana stated that it would conduct some postconstruction reclamation at each well site using similar criteria to those required by Alberta Environment for equivalent land capability.

EnCana stated that it would rely on reclamation to mitigate cumulative effects of surface disturbance on soils and vegetation. It proposed the use of native seed mixes as directed by DND to achieve a reclamation standard of “equivalent land capability.” EnCana cited SEAC’s recommendation that reclamation certification apply to significant areas of land rather than individual well sites.

EnCana concluded that there would be minimal environmental effects associated with the proposed development based on the use of minimal disturbance techniques, postconstruction site cleanup, effective reclamation techniques, and a follow-up inspection program.

8.1.6 Land Use and Military Training

EnCana stated that the applied-for wells would not materially impact the carrying capacity of the range to sustain military operations, primarily because of the small footprint related to the three wells and associated access trails and pipelines. It also noted that traffic from well operations would not substantially increase.

EnCana noted that DND provided no evidence to define the carrying capacity of the Suffield Base or to show that currently or proposed activities were at or exceeding that capacity. EnCana stated that it disagreed with DND’s statement that the carrying capacity of the Suffield Base was being “tested” such that military activities were affected. In support of its position, EnCana relied on DND’s environmental assessment, the Dillon report, which did not specifically consider oil and gas activities. EnCana noted that that report indicated that the carrying capacity of the lands was below target levels and was at a cautionary level. EnCana stated that this demonstrated that the Suffield Base’s carrying capacity was not being tested and that there was no evidence that the applied-for three wells would limit military activities.

EnCana stated that the disturbances associated with the proposed wells should not interfere with flexibility in training or movement for military activities. It stated that there was no evidence contrary to this position. EnCana emphasized that the incremental footprint associated with the proposed wells and associated infrastructure was 0.1 per cent of the relevant sections of land. Further, it stated that the wells would be installed belowground in caissons, thereby minimizing the impact on the surface and military land usage. EnCana observed that no military live fire templates were conducted within 1 km of the Suffield Base boundary (in accordance with Annex A, Section 7, of the RSOs) and all three wells would be within 1.44 km of the western boundary. EnCana also pointed out that there was limited tracked vehicular traffic in this portion of the experimental proving ground (EPG), which made it unlikely that these wells would interfere with the selection of targeting locations. EnCana’s view was that the area in the vicinity of the proposed wells experienced lighter levels of activity because it was in the EPG rather than the MTA. Because of the proximity of these lands to the boundary, EnCana considered that they would likely not be affected by any increases in fire training.

EnCana stated that DND should rarely encounter poorly maintained caissons. EnCana's experience was that the risk of damaging a caisson to the point of stopping military activities was rare. EnCana stated that it was responsible, pursuant to the 1975 MOA, to maintain its infrastructure, including caissons. EnCana submitted that it had been extremely responsive to reports of poorly maintained caissons.

EnCana stated that the proposed three wells would not impact DND's ability to coordinate its activities and infrastructure because increased coordination of industry activities within the range training area (RTA) was SIRC's responsibility. EnCana stated that an increase in the DPS would not increase DND's workload in creating safety templates, which were the primary means of avoiding conflicts regarding safety and coordinating military and other land users' activities on the base. EnCana stated that templates were based on DND's activities, not industry's. EnCana noted that DND helped SIRC produce a monthly map showing out-of-bounds areas for the time period based on DND's anticipated activity. EnCana pointed out that all users must follow the boundaries and timelines set out in this monthly map. It stated that it endeavoured to be more active outside the May-to-October training period to avoid conflict. It noted that construction was planned outside these months whenever possible.

EnCana stated that the proposed wells would cause a very minor increase in traffic. However, because of the proposed mitigation measures, EnCana contended that the increase in traffic would have only an insignificant effect on the area. EnCana also noted that its current traffic activity was lower than in the past because of several regulatory changes and because of advances in drilling, well completion, and operational technology.

EnCana acknowledged that traffic during construction was more intense than during operations. However, it noted that construction would occur outside intensive military training periods. EnCana stated that access trails created for the proposed wells would have low traffic volumes during the wells' operation phase. It observed that these trails would be the only new access-based infrastructure and that it would continuously reclaim existing access trails as they became redundant.

EnCana stated that it was unaware of evidence suggesting that increased traffic from these wells would create a risk of increased safety and maintenance incidents. It noted that there had been no industry vehicle collisions with wildlife since January 2006.

EnCana disagreed that the proposed wells would result in a "noticeably increased burden" on the DND, because there should be no required increase in resources allocated by the DND to the oil and gas industry at the Suffield Base. EnCana pointed out that the industry was regulated by the province, SEAC advised the Base Commander on environmental issues, and SIRC managed activity coordination and "deconfliction."

EnCana also contended that the location of the proposed wells would reduce possible impacts. It noted that there was no public access or cattle grazing at the location of the proposed wells and that this location was within the EPG, which historically had fewer safety templated activities than the MTA.

EnCana stated that DND had a suite of protections against well abandonment liability. The 1975 MOA made Alberta and EnCana jointly and severally liable for damage resulting from shallow gas operations. As well, EnCana noted that the Orphan Well Fund would be available to DND should EnCana or Alberta be unavailable to meet their obligations there under.

8.2 Views of DND

8.2.1 Introduction

DND noted that oil and gas activity on the Suffield Base was relatively steady until 1998, when development began to sharply increase. DND stated that increased activity gave rise to new environmental issues on the base and strained the respective capacities of SEAC, SIRC and the Suffield Base personnel. DND cited two reports issued in 2003 and 2004 as the initial impetus for its greater involvement in monitoring oil and gas activities on the Suffield Base. The first report was issued by the Auditor General of Canada and addressed the environmental stewardship of military training and test areas. The second report was issued by SEAC for the 2003-2004 season. SEAC recommended a greater role for DND in the review and planning of development on the Suffield Base. Further, SEAC expressed concern about the lack of knowledge regarding cumulative environmental effects of high-density shallow gas developments in the NWA.

DND explained that it managed the Suffield Base through the Range Training Area Management System (RTAMS), which was augmented by specific initiatives, including the RSOs. DND stated that it was presently developing protocols that would allow the Base Commander at the Suffield Base to make informed decisions about environmental stewardship. It referred to these protocols as the Suffield Sustainability Management Plan (SSMP).

DND noted that it commissioned several environmental assessments of the Suffield Base, including an assessment of the impacts of formation level training that was conducted in 2006 (the Dillon Report). DND stated that the issue of the Suffield Base's carrying capacity was raised in these environmental assessments. Specifically, the Dillon Report recommended the establishment of thresholds that would allow DND to assess whether the condition of the land was deteriorating in high impact zones.

DND explained that the 16 DPS limit was imposed in December 2008 as a precautionary measure to protect the long-term viability of the base as a military asset until the SSMP was finalized. DND stated that this approach was consistent with the precautionary principle expressed at the 1992 United Nations Conference on Environment and Development. DND noted that the Privy Council of Canada issued a *Framework for the Application of Precaution in Science-based Decision Making About Risk*. Based on that framework, DND concluded that the decision to issue a 16 DPS limit was justified as a precautionary measure, given the uncertainty about the cumulative effects of increased oil and gas well density on the base.

DND stated that the Board should consider its submissions on this application to be a response to EnCana's entire infill drilling program. DND submitted that its position was based on the interests of environmental stewardship of native prairie grassland, which had been subject to mixed land uses and associated environmental impacts. DND stated that the environmental information submitted by EnCana for the applications was site and well specific and failed to assess the significance of each well within a broader land-use framework.

DND submitted that ERCB approval of EnCana's three-well application would not be in the public interest. DND attributed this to uncertainties regarding the sustainability of the prairie ecosystems at the Suffield Base and its capacity to maintain military training. DND requested the Board to deny the applications or to approve them subject to the condition that the applications

also require the approval of the Suffield Base Commander in a manner consistent to that currently in effect in the NWA.

8.2.2 Soils and Vegetation

DND submitted evidence of impacts on native plant species and soil that were attributed to infill development projects of EnCana within the Suffield Base. These impacts included vegetation damage, disruption of endangered plant species, removal of native prairie, establishment of persistent non-native plant species, soil erosion, soil rutting, compaction, spill contamination (e.g., drilling fluids), land spraying while drilling, and improper waste disposal. Based on DND's inspection and monitoring reports, DND disagreed with EnCana's assessment that low-impact construction methods had resulted in negligible effects on soils and vegetation. DND observed that present levels of oil and gas development had resulted in considerable disturbance and decreased range health at the Suffield Base. DND emphasized that these effects occurred despite the use of low-impact construction methods.

DND documented a number of environmental concerns raised by SEAC in past meetings and reclamation tours. These concerns were related to the proliferation of access trails, improper siting of some wells and pipelines, substandard surface conditions at some EnCana well sites, occurrence of non-native plant species, and inadequate reclamation at some sites.

DND noted that there were sensitive soils on the Suffield Base, including sandy soils, steep slopes (greater than 15 per cent), riparian areas, previously disturbed soils, and naturally erosion-prone areas. DND requested that the effects of operations in these areas be given specific consideration and that topsoil conservation be a priority for all activities on the Suffield Base. DND further observed that the RSOs stipulated specific plant control measures, such as mowing before seed set, to control invasive weeds and non-native species on well sites, pipelines, and access trails.

DND noted that the incremental destruction of native prairie resulted in habitat deletion for vegetation and would ultimately lead to reduced diversity and abundance of native vegetation species. DND stated that along with the imposition of linear and site-specific disturbances, a fragmented landscape was created, which may no longer be suitable for use by certain species. DND noted that non-native vegetation species tended to invade and proliferate within disturbances and encroach into and out-compete native vegetation along disturbance edges. DND submitted that high-intensity oil and gas drilling programs had resulted in considerable disturbance and decreased range health on the prairie landscape at the Suffield Base. DND stated that there was growing evidence to suggest that the imposition of a semipermanent to permanent network of disturbances (well leases, pipeline rights-of-way, access trails) had detrimental impacts on the structure and function of the ecosystem and its inhabitants.

DND noted that oil and gas activity had been limited to no more than 16 DPS because recent experiences at the Suffield Base had demonstrated that a higher concentration of disturbances caused significant adverse effects on the short-term and potentially long-term use of the property, especially for military purposes.

DND concluded that currently there was insufficient evidence to demonstrate that even a 16 DPS density was environmentally sustainable at the Suffield Base and that until scientific studies resolved this uncertainty, a precautionary approach was necessary to maintain the Suffield Base ecosystem for continued military use and to conserve Canada's natural prairie heritage.

8.2.3 Water and Wetlands

DND submitted the Landwise (2008) report as evidence of baseline environmental effects on groundwater and wetlands. DND noted that the primary aquifer for groundwater supply at the Suffield Base was identified as the Lethbridge Valley Pre-glacial Channel. The Landwise report estimated the inflow and diversion of water from this aquifer to be fully allocated. Based on the estimated water budget of the aquifer, DND was concerned that sufficient water supply for the needs of the Suffield Base might not exist. The Landwise report also concluded that high allocation of aquifer waters could contribute to reduced discharges of groundwater to wetlands and other adverse environmental effects. DND referred to recommendations of the Landwise report that called for development of a water management plan in a multistakeholder process at the Suffield Base.

DND stated that potential impacts on wetlands were a consideration in establishment of its maximum disturbance threshold. DND listed five potential impacts on wetlands and sensitive terrain from five sources:

- alteration of amount and direction of water flow into wetlands,
- use of water affecting surface and groundwater levels,
- siltation and erosion,
- soil and water contamination, and
- encroachment of wetland buffers.

DND stated that potential impacts on wetlands and sensitive terrain included but were not limited to siltation of water and erosion of bed or shore of water bodies and contamination of soil and water.

DND stated that the RSOs directed oil and gas operators to adhere to a 100 m setback distance from wetlands at all times.¹⁴ The DND guidelines for wetlands made provisions for exceptions to the 100 m distance on a case-by-case basis. DND stated that such exceptions could only be approved by the Base Commander following the submission of a special application by operators and consultation with third-party experts.

8.2.4 Wildlife

DND stated that the Suffield Base was nationally important because it contained a large block of intact native prairie grasslands in which the diversity of native plants and wildlife species had not declined. DND noted that the Suffield Base was home to several plants and wildlife found only in native grasslands and listed as species at risk both provincially and federally. DND observed that native prairie ecosystems had become one of the most endangered habitats in western Canada, with about 6 per cent of its original extent remaining. DND attributed this decline to urbanization, industrial development, and agricultural land uses.

DND stated that oil and gas development at the Suffield Base had resulted in the loss and degradation of native prairie, which, in turn, had affected wildlife by means of habitat loss, fragmentation effects, and sensory disturbance. DND provided evidence of disturbances to native

¹⁴ DND, 2006, Director General, *Environment Recommendations on Wetland Buffer Setback Distances for CFB Suffield*, in Range Standing Orders Annex X, Appendix 6.

prairie from its environmental audit of EnCana's Koomati Infill Development Project (DND, 2006).¹⁵ Environmental effects from EnCana's high density drilling (16 wells per section) were identified in the DND audit of Koomati, although their significance to wildlife was not discussed.

DND stated that its environmental inspections and monitoring reports from 2007 and 2008 provided evidence of the effects of infill drilling on the Suffield Base. DND submitted that based on these reports, on-site environmental effects from shallow gas development included contaminant releases—such as hydrocarbons, produced water, and hydraulic fluids—removal of native prairie, and rutting damage to soil and vegetation. DND noted that data from the EPG were included in the report. The inspection results revealed that about 870 wells in the EPG were inspected in 2008. DND concluded that all of the wells would require vegetation monitoring, 500 wells had greater than 10 per cent bare soil, about 150 wells had miscellaneous environmental issues, and 100 wells had excess access trails and roads. DND did not specify how such effects might impact wildlife species or habitats.

DND's evidence included correspondence from SEAC to EnCana that raised concerns about environmental effects of infill development upon the wildlife at the Suffield Base. In that correspondence, SEAC cited various examples from the literature of environmental effects on wildlife. Artificial perches were found to alter the size and shape of territories for grassland birds (Harrison, 1977).¹⁶ Increased perching sites were detrimental to ground nesting birds by increasing the rate of nest parasitism and predation by cowbirds (Davis, 1994).¹⁷ DND acknowledged that EnCana proposed its three wells for belowground installation in caissons. However, DND noted that aboveground signage, access markings, etc., were typically used to identify wells, travel routes, and other infrastructure.

DND submitted that it agreed with SEAC that

- linear disturbances, such as access trails and pipeline rights-of-way, were contributors to environmental effects;
- breeding territories and abundance of ground nesting grassland birds were negatively affected by decreased patch sizes of habitat (Ashenhurst and Hannon, 2003);¹⁸
- research from CFB Suffield indicated that bird fledglings attracted to pipeline rights-of-way experienced mortality from slow-moving vehicle traffic (Dale *et al.*, 1999);¹⁹ and
- other research from CFB Suffield had documented wildlife attraction to rights-of-way and their vulnerability to mortality from increased predation and vehicle traffic. Affected wildlife

¹⁵ DND, 2006, *Audit of EnCana's Koomati Minimal Disturbance Shallow Gas Infill Program*, unpublished memorandum and report contained in Reply Evidence Tendered by the Attorney General of Canada, Volumes V and VI, February 2009.

¹⁶ Harrison, 1977, *Perch Height Selection of Grassland Birds*, *Wilson Bull.* 89: 105-115.

¹⁷ Davis, 1994, *Cowbird Parasitism, Predation and Host Selection in Fragmented Grassland of Southwestern Manitoba*, M.Sc. Thesis, University of Manitoba.

¹⁸ Ashenhurst, A. R., and Hannon, S. J., 2008, *Effects of Seismic Lines on the Abundance of Breeding Birds in the Kendall Island Bird Sanctuary, Northwest Territories, Canada*, 2003 Proceedings of 22nd Annual Meeting Society of Canadian Ornithologists, Saskatoon.

¹⁹ Dale, B. C., Taylor, P. S., and Goossen, J. P., 1999, *Avifauna Component Report, Canadian Forces Base Suffield National Wildlife Area Wildlife Inventory*, Can. Wildlife Ser., unpubl. report, Edmonton, p. 1616.

included the Burrowing owl, Long-billed curlew, Grouse, Partridge, Meadowlark, Longspurs, Kangaroo rat, Olive-backed pocket mouse, and snakes.²⁰

DND cited human activity as a cause of environmental effects on pronghorn antelope. Adverse effects included behaviour disruption, displacement from habitat, and reduced foraging of antelope.

DND identified several potential risks from the proposed wells to rare or endangered wildlife and plant species at the Suffield Base, including incidental mortality, destruction of residences, disruption of breeding patterns, and the alteration or destruction of critical habitats. However, DND did not list which species could potentially be affected.

DND cited examples of surface disturbances that contributed to cumulative effects on wildlife. Research of Linnen (2008) indicated that edge effects of anthropogenic disturbance were poorly defined but varied according to edge types and distances to the edges. DND submitted that edge effects could include avoidance behaviour in birds due to decreased reproductive success, increased predators or nest parasites, changes to fine-scale habitat and food resources, and increased intensity of traffic and human disturbance. DND stated its agreement with Linnen (2008), who documented avoidance behaviour in four grassland bird species in proximity to minimal disturbance shallow gas development. Linnen further documented that Chestnut-collared longspurs, Sprague's pipits, and Baird's sparrows avoided areas near traditionally constructed oil wells and access. DND agreed with Linnen's conclusion that the decreased relative abundance and frequency of occurrence of these species were statistically significant with proximity to oil wells and access compared to interior habitats. Avoidance distances ranged from 100 to 400 m and were species specific. Linnen acknowledged that his work on edge effects was constrained by the short time span of the sampling and limited geographical extent of the research. Linnen also suggested that by completing his field research prior to the mowing of oil and gas sites for weeds, the edge effects he observed may have been minimized (e.g., minimal change to vegetation structure along edges).

DND did not identify cumulative effects thresholds for wildlife or other ecosystem components as a result of multiple land-use activities. Uncertainty regarding such cumulative effects thresholds was stated as a knowledge gap requiring further scientific studies. DND did not provide comments refuting EnCana's environmental views of infill development. Neither did DND conduct an independent assessment of the proposed project or of cumulative effects upon wildlife.

DND submitted supplementary information (Dillon, 2006)²¹ from a cumulative effects assessment completed in support of formation-level military training within the MTA. That report recommended that cumulative effects from formation-level training upon wildlife and habitat should be managed by monitoring programs, mitigation measures, and adaptive

²⁰ Ibid.

Reynolds, H. W., Barry, S. J., and Kiliaan, H. P. L., 1999, *Small Mammal Component Report, Canadian Forces Base Suffield National Wildlife Area Wildlife Inventory*, Can. Wildlife Ser., unpubl. report, Edmonton, p. 140.
Banasch, U., and Barry, S. J., 1998, *Raptor Component Report, Canadian Forces Base Suffield National Wildlife Area Wildlife Inventory*, Can. Wildlife Ser., unpubl. report, Edmonton, p. 161.
Didiuk, A. B., 1999, *Reptile and Amphibian Component Report, Canadian Forces Base Suffield National Wildlife Area Wildlife Inventory*, Can. Wildlife Ser., unpubl. report, Edmonton, p. 69.

²¹ Dillon Consulting Ltd., 2006, *CFB Suffield Environmental Assessment of Expanded Formation Level Training Final Report*, Defence Construction Canada, Ralston, 254 pp.

management of military training. The report attributed a decline of some bird species to the cumulative effects of military training and stated that additional assessment of cumulative effects from oil and gas activity was also warranted.

DND also submitted evidence from a carrying capacity appraisal of the Suffield Base (Dillon, 2006).²² The study was confined to the geographical area of the MTA. Wildlife habitats were sampled for disturbance and sensitivity with consideration of land uses by the military and by oil and gas development. The report advised with caution that projected levels of training would not likely exceed the carrying capacity of the MTA. Nevertheless, the report recognized various data limitations and recommended that any increase of human activity would require rigorous environmental monitoring to ensure that ecosystem damage did not occur.

DND submitted a third cumulative effects assessment of its contemporary operating environment at the Suffield Base (Dillon, 2006).²³ This study evaluated preliminary monitoring data and cumulative effects of repeated and localized training around infrastructure installations from the LIRI training area (an area within the MTA). It did not monitor for effects from oil and gas activity. The assessment included species at risk and range health surveys at all locations. The report identified impacts as a result of military training on soils and vegetation that would require mitigation and remediation. Since oil and gas activities had not been assessed for their impacts, the report concluded that additional assessment of cumulative effects was justified.

DND submitted that the presence of knowledge gaps regarding threshold levels for disturbances, carrying capacities, etc., related to the cumulative effects of oil and gas activity was sufficient to warrant the implementation of precautionary measures for land management. DND stated that it was justified in implementing a 16 DPS limit as a precautionary approach until such time as the knowledge gaps and uncertainties were addressed by improved scientific information. DND submitted that the maximum disturbance limit it placed on oil and gas activity was a precaution to prevent significant or long-term effects on wildlife and maintain the capacity of the land for military use.

8.2.5 Reclamation

DND stated that the level of reclamation of abandoned oil and gas wells on Suffield Base was low. It added that it was not EnCana's practice to formally abandon uneconomic wells at the Suffield Base. DND noted that in 2005 only a handful of the approximately 900 abandoned oil and gas wells on the Suffield Base had been reclaimed. Both DND and EnCana identified additional uncertainty concerning the future reclamation criteria and certification process to be used at the Suffield Base. DND stated that the reclamation certification process had not been fully established. It expected that DND staff would conduct inspections and review applications for certification similar to the process of Alberta Environment.

8.2.6 Land Use and Military Training

DND emphasized that CFB Suffield's mission was to be a military training ground for Canada and its allies and it must therefore sustain viable military operations now and in the future. DND

²² Dillon Consulting Ltd., 2006, *Carrying Capacity Appraisal Final Report*, Defence Construction Canada, Ralston, 361 pp.

²³ Dillon Consulting Ltd., 2006, *Contemporary Operating Environment Cumulative Effects Assessment Study Report #1: Establishing a Baseline for Monitoring*, 58 pp.

submitted that oil and gas activity must be compatible with military uses. DND further stated that the Canadian Forces must maintain a degree of strategic flexibility in order to meet future, as yet unforeseen, military threats. DND stated that for these reasons, the health of the RTA was essential and must be maintained.

DND submitted that its ability to fulfill its mission was limited by the land's carrying capacity. DND stated that increasing levels of oil and gas development created the risk that the Suffield Base's carrying capacity would be exceeded and the range would become unsustainable. DND submitted that because oil and gas infrastructure was relatively permanent, other more transitory and flexible uses would need to be modified, resulting in a transition away from the role of supporting military training.

DND further stated that its recent experiences demonstrated that a higher concentration of disturbances caused significant adverse effects to short-term and potentially long-term use of the Suffield Base, especially for military purposes. DND submitted that it was prudent to constrain and regulate the level of land use and allow increases in use only if supported by rigorous research, proven mitigation, and thorough monitoring, due to the uncertainty of the land's carrying capacity and the application of the precautionary approach. DND stressed that the 16 DPS limit was designed to ensure that no irreversible harm occurred to the RTA such that it could not be used for military purposes.

DND acknowledged that a single well might not have a significant impact on military activities. However, DND submitted that each of the proposed wells, which are located in the RTA, would restrict the ability of DND to fulfill its mission. Specifically, DND stated that military activity would have to be modified as a result of the applied-for wells because of certain effects of the wells.

DND stated that the following effects would occur as a result of the approval of the proposed wells and of a general increase in the DPS beyond the current limit of 16.

DND noted that the proposed wells were to be located on the RTA, a dangerous area because of weapons use. DND stated that as the amount or use of weapons increased, the "military carrying capacity" of the base would be "stressed." DND submitted that planned formation level training (involving over 5000 troops) would increase live fire training. DND submitted that increasing the DPS at the same time that training intensity increased would impact the carrying capacity of the environment and result in a decrease in the military activities in the RTA.

DND stated that sufficient land was needed for operations to meet the base's mission. It noted that new weapons were being developed that would increase the size of the danger areas because of their greater range. DND argued that these new "capabilities" increased the need for unrestricted RTA use. DND stated that increasing the DPS would decrease the military's ability to use new "systems" in the RTA.

DND stated that the addition of the three wells would increase the DPS, which in turn would increase the chance of damage to the wells and associated infrastructure by munitions and military equipment. DND noted that this would create risk to personnel and equipment used to respond to such incidents. DND observed that such incidents would disrupt and delay military training and would lead to environmental damage. DND also stated that proposed new aviation units would require increased coordination to safely operate in areas of high oil and gas disturbances. DND observed that this coordination would require increased staff. DND

submitted that the amount and location of unexploded ordinances (UXOs) is unknown. It argued that approval of the three wells would increase the density of “disturbances” and therefore increase the risk of encountering these UXOs, with possible hazardous consequences.

DND submitted that new infill wells would be located on flats and hilltops, the same locations required for firing and for targets. DND stated that increasing the DPS would result in a decrease in the ability to maneuver troops for fire position and realistic targets.

DND stated that troops avoided crossing caissons, thereby diminishing the realism of training because poorly maintained caissons were a hazard to vehicles and tracked vehicles could not turn on caissons. DND argued that an increase in DPS/caissons would mean increased interference in military training.

DND stated that trails associated with the oil and gas infrastructure interfered with movement of non-tracked vehicles. It noted that crossing these trails was problematic for wheeled vehicles and interfered with navigation. DND stated that more wells required more access trails and caused the deepening and degradation of existing trails. DND submitted that this, in turn, increased the risk to vehicles and ground troops, particularly at night.

DND stated that increased infrastructure from increased DPS resulted in decreased movement and safety of soldiers at night. DND also noted that an increase in the number of pipelines would result in a decrease in military trenching, including tank ditches.

DND stated that an increase in the number of heavy vehicles would result in decreased road lifespan, which would have a negative impact on safety as roads degraded more quickly. It noted that increased access to water points and sumps would create a strain on roads not “funded” or maintained by industry. DND observed that operational stresses would be created because of the short time allowed for maintenance between training events. DND concluded that diminished road conditions would also result in increased response time for emergencies.

DND also stated that increased number of heavy vehicles would result in increased road hazards and accidents because of congestion, dust, etc. It noted that the increase in numbers of workers and vehicles would necessitate greater policing of the range. Further, DND submitted that new individuals and companies accessing the Suffield Base because of increased DPS would be unfamiliar with the area and operational safety protocols on the base. DND concluded that this would lead to increased safety concerns and make increased mitigation necessary.

DND noted that the Suffield Base provided first response for incidents on the base. It also stated that Range Control and Military Police (MPs) were responsible for traffic enforcement and MPs for accident investigation. DND submitted that increased traffic associated with increased DPS would result in an increase in incidents. DND submitted that this would, in turn, increase the work for base personnel, taking them away from their primary duties.

8.3 Findings of the Board

8.3.1 Introduction

As stated in Section 6.3, the Board must decide whether application of the 16 DPS limit developed by DND is appropriate in these circumstances. To make this determination, the Board

must consider if approval of the proposed wells is in the public interest, having regard to their environmental, social, and economic impacts.

While the parties filed volumes of evidence relating to environmental impacts, only a small proportion of that evidence related specifically to the project area. Much of the evidence filed by EnCana in support of the application was initially prepared for the JRP for EnCana's Infill Development Project within the NWA. Likewise, the majority of environmental evidence filed by DND was not specifically related to the project or the project's likely effects.

Both parties addressed the issue of cumulative environmental effects associated with the project. The ERCB does not normally require assessment of cumulative effects of wildlife or other receptors for single-well applications. In the Board's view, the evidence filed by the parties on this issue was conflicting and inconclusive. For this reason, the Board has given cumulative environmental effects general consideration when weighing the evidence and making its decision to approve the wells.

8.3.2 Soils and Vegetation

The Suffield Base is home to rare plants, some of which are *SARA*-listed species. In support of its environmental overview, EnCana conducted a rare plant survey in 2006 that identified two species of concern within the C7 Battery.

EnCana must comply with strict federal and provincial requirements regarding plant species of concern. The Board considers that adherence to these requirements provides the necessary protection to plant species of concern, including those that are *SARA*-listed. The Board notes EnCana's recognition that should species of concern be identified, additional mitigation may be required, including the need to change the site of a well, which would require a new application to the ERCB. Given the time that has elapsed since the original survey was conducted and the fact that occurrence of certain rare plant species can change with climatic conditions, the Board expects that EnCana will resurvey the three well sites for rare plants prior to construction.

The Board understands that the issue of invasive plant species is a material concern that underlies the management of effects on vegetation at Suffield Base. Information on the prevalence of invasive plant species was drawn from the regional vegetation sampling programs conducted by EnCana for the NWA Infill Development Project, as well as from information cited by EnCana and DND in the hearing.

The Board recognizes that the adverse ecological effects of non-native plant species are more easily managed at individual well sites by the implementation of weed control measures, as noted in EnCana's EPP. In this respect, the Board is satisfied that the steps proposed by EnCana to control the spread of non-native species for the three proposed wells are satisfactory.

DND argued that the results of its environmental audits in the Koomati area and on the rest of the Suffield Base demonstrated that the environmental impacts associated with drilling and operating shallow gas wells are greater than that described by EnCana. The Board finds that some of the concerns, i.e., drill cuttings or mud left on lease, identified by DND may be attributed to the timing of the audits. The Board accepts that it is EnCana's practice to address these concerns and is satisfied that these were temporary delays in cleanup, which were addressed appropriately.

Of greater concern to the Board are the instances of vegetation damage and soil rutting and erosion documented by DND at EnCana sites. These concerns are directly attributable to the use of multiple access routes to a single location and difficulties of identifying and following approved access trails on open prairie. The Board understands that trail rutting and braiding have a significant effect on the native prairie landscape and can impact local vegetation and wildlife habitat.

The Board understands that EnCana will access the three proposed wells by way of new local access trails connecting to the existing access network. The Board further understands that these trails will be used infrequently (up to 17 visits a year in the first year and then 5 to 6 visits in subsequent years). To address the potential risk of vegetation damage and soil rutting and erosion arising from access routes to the proposed wells, the Board expects EnCana to strictly adhere to the single local access routes proposed and to monitor their use for compliance. The Board also expects EnCana to undertake timely site reclamation for access locations where soil or vegetation damage has occurred.

A related concern is rutting, compaction, admixture, and other damage to the native prairie environment caused by activities carried out in wet conditions. EnCana acknowledged this concern and has stated that wet weather access is prohibited on the Suffield Base. Furthermore, EnCana noted that on native prairie the consideration for shutdown or work modification will begin immediately and concurrently with significant precipitation or thawing events. The Board considers any rutting to be detrimental to the native prairie ecosystem and finds the prohibition of activities in wet conditions to be an effective and appropriate response to this concern. However, the Board notes that EnCana's EPP as it relates to wet weather access is not entirely consistent with these measures. Specifically, it states that contingency measures will be initiated once indicators, including those that allow for soil degradation, have occurred (e.g., rutting of topsoil to the extent that admixing may occur). To avoid any potential confusion between these two standards, the Board expects that EnCana will update its EPP to reflect the prohibition of wet weather operations on the Suffield Base.

EnCana identified potential construction-related soil issues that are anticipated but did not include a site-specific soil assessment as a part of its application. The Board expects that EnCana will undertake site-specific soil assessments and have consideration for this information when evaluating the three well sites and their related access trails.

The Board accepts EnCana's calculation that the direct surface disturbance footprint in Sections 3 and 10 is 6.9 per cent per section. The Board also accepts that the addition of the proposed wells will have an incremental increase on the direct surface disturbance footprint in Sections 3 and 10 of about 0.1 per cent. However, the Board recognizes that these calculations did not account for secondary disturbance or indirect effects of invasive plant species, edge effects associated with project disturbances, or the combined presence of oil and gas development with military training in the C7 Battery.

Even though the Board is of the view that the evidence regarding indirect disturbance and edge effects was inconclusive, the Board has had regard for these factors in its assessment of the effects of the three wells on the native prairie ecosystem. The Board finds that even when factors such as indirect disturbance, edge effects, and future environmental effects of other land users (e.g., military training) are accounted for, the likelihood of risk posed to the native prairie

ecosystem in Sections 3 and 10 is minimal because the incremental increase in disturbance caused by the three wells is so small.

Having regard for the foregoing, the Board finds that the three proposed wells will have a low impact on native prairie grassland ecosystems. The Board considers that the impacts associated with the three wells and access routes will be effectively mitigated by the best practices proposed by EnCana in its application and EPP.

8.3.3 Water and Wetlands

The Board observes that the amount of water required for drilling and operating the proposed wells is minimal (about 650 m³). EnCana has identified several potential sources for this water, including the municipal water supply, recycled water, and withdrawals from approved dugouts. Given the amount of water proposed and the sources identified, the Board finds that the water supply will be adequate for the three wells proposed.

Volumes of water required for future multiwell drilling programs and production operations in combination with other water demands are of potential concern at Suffield Base due to effects on the local and regional water tables. The Board observes that when implemented, the JRP recommendation for DND to develop a water management plan for the NWA will benefit regional groundwater resources.

Regarding wetland conservation, the Board relies upon EnCana's commitment to locate the three wells using a 100 m setback distance between the well centre and the edge of wetlands, so that no disturbance or encroachment of wetlands will result. This is consistent with ERCB *Directive 056* and the DND guidelines for wetlands. In the Board's view, adherence to the 100 m setback will avoid unnecessary impacts to proximal wetlands.

8.3.4 Wildlife

The environmental overview of the C7 Battery prepared by Tera Consultants in 2006 is the only specific evidence regarding the project's effects on wildlife. This report acknowledged the presence of a number of wildlife species of concern, including Burrowing owls, Sprague's pipits, and Baird's sparrows, within the C7 Battery. However, no related nests or burrows were identified in that project area. EnCana recognized that the wildlife survey was conducted well in advance of when construction might occur and committed to resurvey the area for wildlife prior to construction. EnCana recognized that the presence of a listed species proximal to the proposed well sites could result in delays to the project or the need to amend the licences if a well site needed to be moved.

Given the time that has elapsed since the original survey was conducted, the Board agrees that the three well sites must be resurveyed for wildlife prior to any well site preparation. Specifically, the Board understands that EnCana will resurvey the three well sites for the wildlife species of concern listed in Table C2 of the Tera report, as well as for any new species of concern that have been identified since the report was completed. The Board has relied upon EnCana's commitment to resurvey the three well sites for wildlife species of concern in making its decision to approve the subject applications.

The Board notes that EnCana is also obligated to comply with federal and provincial legislation regarding wildlife species of concern and their habitat. The Board considers that these

requirements provide the necessary protection to such species and their habitat. The Board accepts that EnCana has the necessary internal controls and systems as part of its EPP to ensure compliance with these requirements.

DND raised the following specific concerns regarding the impact of the proposed wells on wildlife:

- incidental mortality,
- destruction of residences,
- disruption of breeding patterns, and
- alteration or destruction of critical habitats.

EnCana proposes to drill these wells using low-impact construction methods during frozen or dry non-frozen ground condition. The Board also understands that EnCana will implement an on-site environmental monitoring plan during the well site construction and drilling phases of each well. Once on production, access to these wells will be relatively infrequent and limited to specified access trails. The Board considers that these measures in conjunction with the resurvey of the well sites for rare plants and wildlife will effectively mitigate the concerns identified by DND.

While EnCana did not identify specific mitigations for snake mortality within its EPP, the Board considers the best practices identified by EnCana in its application for the covering of caissons, along with routine maintenance inspections, will reduce accidental trapping and mortality of snakes during construction and operation of wells. Likewise, the Board considers that adherence to specified access trails and posted speed limits will also effectively mitigate the minimal wildlife impacts associated with the proposed wells.

Taking into account the construction and operation practices proposed by EnCana and its commitment to resurvey the well sites for wildlife prior to construction, the Board does not find the adverse effects on wildlife from the three wells to be significant. In part, this is due to the limited areal extent of the effects and their potential reversibility by proposed mitigations.

8.3.5 Reclamation

Both parties acknowledge that there is a regulatory gap on the Suffield Base with respect to reclamation and have been working towards the cooperative establishment of reclamation standards. While the parties stated their expectation that the reclamation processes eventually established for the Suffield Base will be similar to those applied by Alberta Environment elsewhere in Alberta, it is clear that DND and EnCana have different opinions regarding the ultimate standard of reclamation on the base. While the JRP did not decide which standard should apply for the NWA, it did make the following recommendation in its final report:

Recommendation 11 – The Suffield Environmental Advisory Committee, working closely with the Department of National Defence and in consultation with other parties, develop standards for reclamation for the NWA based on the 1995 Alberta Standard as amended, Canada Parks Council’s restoration objectives, and EnCana’s proposed rangeland functionality assessment protocol.²⁴

One of the methods proposed by EnCana to mitigate the impacts of the proposed wells on the native prairie ecosystem is timely and effective reclamation. The Board understands that

²⁴ *EUB Decision 2009-008/CEAA Reference No. 05-07-15620*, p. 174.

EnCana's reclamation process begins immediately after the well has been drilled and the site has been cleaned up. In this phase, EnCana will seed disturbed areas using DND's prescribed native seed mixes to minimize the establishment of non-native vegetation and facilitate early recovery. EnCana will then review reclamation progress on the site throughout its life through an inspection process and will take the necessary steps to address arising issues. Final reclamation will occur following the well's abandonment.

The Board recognizes that it remains uncertain whether EnCana will be able to return disturbed lands to their predisturbance condition and state of ecosystem function within reasonable time frames because range health monitoring was only recently introduced on the Suffield Base. Nevertheless, the Board considers that the reclamation approach proposed by EnCana in concert with regular inspections and ongoing monitoring by EnCana, DND, and SEAC are reasonable and effective measures of adaptively managing this uncertainty until such time that the reclamation processes and standards for the Suffield Base are finalized and implemented.

8.3.6 Land Use and Military Training

The Board understands DND's concerns with respect to the impact of oil and gas operations on military land use and training to be threefold:

- DND has specific safety and operational concerns related to the drilling of the proposed wells.
- DND has general concerns regarding the impacts of high-density infill drilling on military operations.
- DND is concerned about the overall sustainability of the base as a military asset should the combined environmental effects of oil and gas production and military training render the base unsuitable for military training.

While DND generally acknowledged that a single well may not have a significant impact on military training, it argued that any additional disturbances in Sections 3 and 10 increase the chance of a direct strike on or damage to a wellhead or other oil and gas infrastructure by munitions or by men and equipment on maneuvers. It contended that such an event raises safety concerns for personnel and equipment and necessitates the disruption and delay in military training to respond to the safety consequences. DND also noted that the caissons and access trails associated with the proposed wells represent a risk to personnel and equipment, especially when travelling at night.

The Board notes that Section 8 of the 1975 MOA authorizes the Base Commander to issue orders and instructions relating to the location and engineering design of all well structures and facilities, if required, for the purposes of protection and safety of personnel and equipment on the base. As the Base Commander has not, to the Board's knowledge, ordered the relocation of any of the proposed wells, pursuant to Section 8 of the 1975 MOA, the Board infers that their current locations do not pose a risk to the safety of personnel or equipment on the Suffield Base.

DND also commented generally on the impact of high-density drilling throughout the Suffield Base on military operations. An overriding concern expressed in this regard was that an increase in oil- and gas-related disturbances per section will reduce the military's ability to safely and effectively use the Suffield Base for training with existing and future technologies. Other

concerns raised were increased traffic and the strain on military personnel associated with coordinating military activities on an increasingly busy and crowded landscape.

The Board appreciates that increased oil and gas activity on the Suffield Base has generated challenges for the Suffield Base and its Base Commanders. However, the Board notes that the 1975 MOA recognized that the dual use of the Suffield Base by the military and the oil and gas industry could be carried out with safety and efficiency. The Board does not agree with DND that the only solution to its concerns regarding the impact of increased well density on military operations is the implementation of the 16 DPS limit. To the contrary, the Board considers that a better solution may be achieved through the cooperation of the parties, as described in greater detail in Section 10.

Regarding DND's concern about environmental sustainability, the ERCB is satisfied that, for the reasons provided earlier, the impact of the proposed wells on the native prairie ecosystem will be minimal and that their approval will not have a material impact on the carrying capacity for the Suffield Base. The Board emphasizes that this decision is confined to the three well applications before it. In future applications, the Board must consider the evidence then filed. In this respect the Board believes that a finalized SSMP with scientifically based development thresholds for the Suffield Base would be invaluable. The Board strongly recommends that DND complete the SSMP as soon as possible.

9 CONCLUSION

Regarding the constitutional question raised by DND, the Board finds that it has no jurisdiction to grant surface access to Canadian Forces Base Suffield to any party. The Board is satisfied, however, that it has the necessary jurisdiction and authority to issue the well licences in question if it determines that approval is in the public interest, having regard to their social, economic, and environmental effects.

The Board finds that approval of the wells will enable EnCana to maximize recovery of gas reserves in the subject sections. The Board has specifically considered whether the 16 DPS limit developed by DND is warranted in the circumstances. The Board understands that this limit reflects a precautionary approach to oil and gas development on the Suffield Base to ensure that its shared use remains viable. It is the Board's understanding that such an approach may be warranted where evidence suggests that an activity may pose a risk to the environment. The precautionary principle mandates that steps to protect the environment should not be postponed until the certainty of the risk to the environment is demonstrated.

Having weighed the evidence in this proceeding, the Board is satisfied that the environmental risks posed by approval of the three wells are minimal and can be mitigated effectively by EnCana fulfilling the commitments made in its application. The Board also finds that approval of the three wells will not impair the sustainability of the Suffield Base for future operations. The Board concludes that approval of the three applied-for wells is in the public interest.

10 FUTURE APPLICATIONS ON THE SUFFIELD BASE

It is the Board's view that future conflicts regarding development on the Suffield Base may be resolvable through the processes contemplated by the 1975 MOA. When issues of environmental

concern arise in the future, the Board strongly recommends that the Base Commander avail himself of advice from SEAC, pursuant to Section 12(7) of the 1975 MOA. The Board is of the view that this approach provides an efficient and effective process for resolving environmental concerns associated with applications for development on the Suffield Base. Likewise, and as noted in Section 8.3.6 of this decision, the Base Commander is clearly authorized to order the relocation or redesign of wells, pipeline, or facilities for the protection and safety of personnel and equipment.

While the Board is prepared, and in fact obligated, to rule on future contested applications on the Suffield Base, it is of the view that decisions derived through consensus of the parties are often more acceptable than those imposed by an independent decision-maker. Accordingly, the Board strongly recommends that EnCana and DND reengage in a dispute resolution process to resolve the outstanding issues between them. The Board considers that this process would be most effective if it involved SEAC and representatives from the ERCB.

From the Board's perspective, the following issues could be efficiently resolved through a cooperative process:

- clarification of expectations and requirements for DND's guidelines for exceeding the 16 DPS limit;
- development of guidelines or protocols for project execution on native prairie, including setbacks for wildlife and wetlands, water use, well location, etc.;
- development of well-siting location guidelines or protocols to minimize impacts on military operations;
- development of guidelines or protocols for the management of undesirable weeds and invasive plant species;
- development of a detailed road and access trail map for the Suffield Base that clearly shows all approved access roads and trails;
- agreement on a process for surveillance, monitoring, and compliance; and
- finalization of the reclamation process for the Suffield Base (with SEAC).

The Board considers that reengagement in a dispute resolution process could be of significant value to both parties. The Board also considers that the development of effective guidelines and practices in this process could be incorporated directly into the SSMP. In the Board's view, cooperative resolution of these issues will provide greater certainty to both parties regarding their ongoing operations and will ultimately benefit Albertans and all Canadians alike.

The Board is prepared to work with all of the necessary parties to ensure that a renewed dispute resolution process is successful.

Dated in Calgary, Alberta, on August 25, 2009.

ENERGY RESOURCES CONSERVATION BOARD

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Presiding Member

<original signed by>

J. Gilmour, B.A., LL.B.
Acting Board Member

<original signed by>

W. A. Warren, P.Eng.
Acting Board Member

APPENDIX 1 HEARING PARTICIPANTS

Principals and Representatives (Abbreviations used in report)

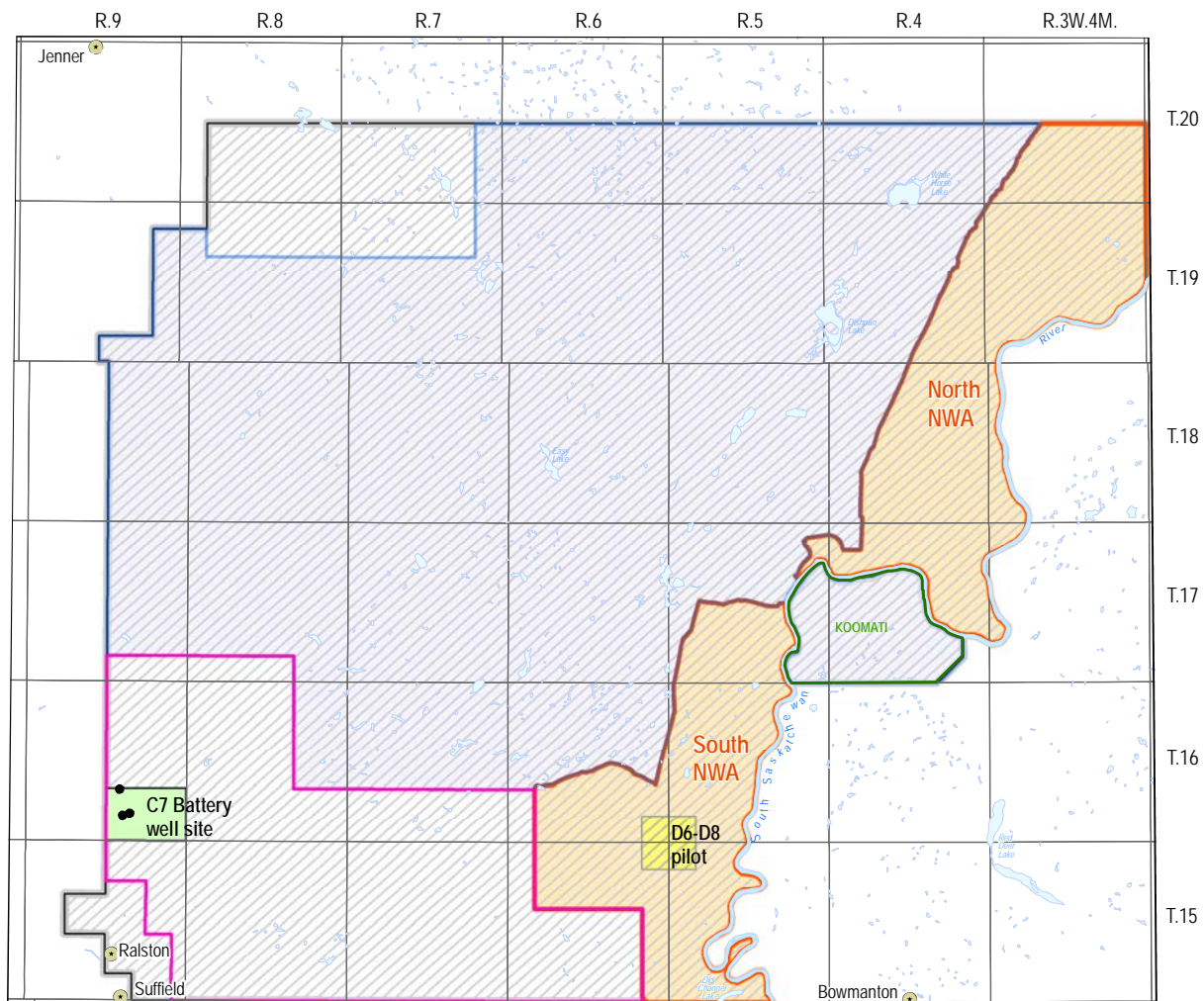
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APPENDIX 2 ABBREVIATIONS

1975 MOA	1975 Memorandum of Agreement
DND	Department of National Defence
DPS	Disturbances per section
EO	Environmental overview (formally known as Environmental Overview and Soils Handling Requirements for the Proposed EnCana Oil & Gas Partnership Suffield C-7 Battery Well Sites, Pipeline Tie-ins and Access Roads. Prepared by Tera Environmental Consultants, July 2006)
EPG	Experimental proving ground
EPP	Environmental protection plan (formally known as EnCana Corporation – General Environmental Protection Plan for Access Road, Lease Site and Pipeline Construction in Western Canada)
JRP	Joint Review Panel
MTA	Military training area or maneuver training area
NWA	National Wildlife Area
RSOs	Range Standing Orders
RTA	Range training area
RTAMS	Range Training Area Management System
SARA	Species at Risk Act
SEAC	Suffield Environmental Advisory Committee
SIRC	Suffield Industry Range Control
SSMP	Suffield Sustainability Management Plan

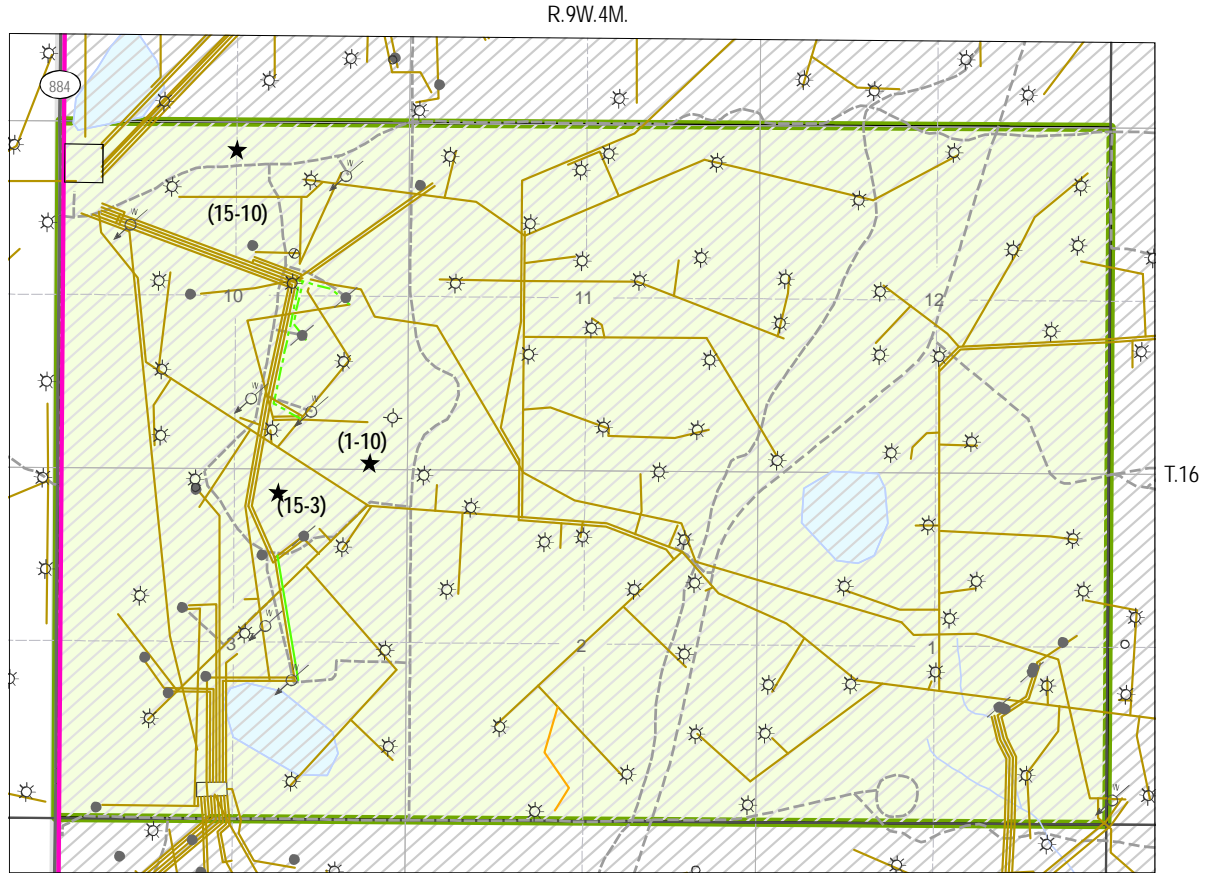


Legend

- | | | |
|--|-------------------|-----------------------------|
| Lake/river/water body | NWA boundary | Military training area |
| Suffield Base boundary | Pilot project | Experimental proving ground |
| Hamlet/village | Battery well site | Koomati area |
| Proposed wells
(ERCB Applications No.
1508544, 1508545, and 1508547) | | |



Figure 1. Suffield Base



Legend

- | | | |
|--|------------------------|-------------------------------------|
| Lake/river/wet body | Roads
Gravel/trail | Surface well locations
Abandoned |
| Suffield Base boundary | Paved | Drilled and cased |
| Experimental proving ground | Pipelines
Abandoned | Gas |
| C7 Battery well site | Discontinued | Injection |
| Facility area | Operating | Observation |
| Proposed wells
(ERCB Applications No.1508544,
1508545, and 150847) | Permitted | Oil |
| | | Suspended oil |

Figure 2. C7 Battery