COALBED METHANE/ NATURAL GAS IN COAL MULTI-STAKEHOLDER ADVISORY COMMITTEE

Historical file combined in 2019

TERMS OF REFERENCE

BACKGROUND

While Natural Gas in Coal (also known as Coalbed Methane) development is well established in many other parts of world, the industry is in the early stages in Alberta. Consequently, the Department of Energy is leading a cross-government review and external consultation process to determine if improvements should be made to existing regulations and policies for the responsible development of Natural Gas in Coal (NGC). A pre-consultation was held with stakeholders September 12, 2003, and based on their input, a multi-stakeholder advisory committee (hereinafter called the "Committee") will be established to guide the process. Development of NGC will continue during the consultation process.

MISSION STATEMENT

Provide guidance on the overall NGC consultation process and submit findings and/or recommendations to the Assistant Deputy Minister (ADM) Sponsors' Committee regarding administrative, policy and/or regulatory enhancements for NGC development in Alberta.

PURPOSE

The purpose of the Committee is:

- To guide the consultation process.
- To determine which specific NGC issues will be addressed.
- To develop a consultation framework to ensure issues are adequately addressed, for example, establishing issue focussed working groups.
- To co-ordinate, consolidate, evaluate and submit recommendations to the ADM Sponsor Committee.

SCOPE

The scope of the Committee's work will include:

- Reviewing existing data relating to the development of NGC in Alberta.

- Considering issues raised at the pre-consultation.
- Developing working groups to focus on issues relating to NGC and report their findings back to the committee.
- Including input received from rural information sessions in the process.

The scope of the Committee's work will not include:

- Recommending changes to existing policy or regulations outside of the issues typically associated with NGC wells or projects.
- Recommending changes to Alberta's overall energy development philosophy.
- Surface use compensation issues.
- Recommending of changes outside the responsibility and/or jurisdiction of the Alberta government.

RESPONSIBILITIES

Responsibilities of the Committee

The Committee's responsibilities will include:

- Becoming informed about NGC issues in Alberta and pertinent policies and regulations through attendance at committee meetings and participation in other related activities as required.
- Participating in and attending meetings of the Committee, while listening to and respecting the opinions of their co-committee members.
- Establishing working groups to investigate, deliberate and draft solution alternatives and/or recommendations to address different sets of issues, including; determining working groups' structure and terms of reference; advising on composition; and assisting with recruitment of working group members.
- Assisting with consultative processes, including, for example:
    - Ensuring that some members of the Committee are present at consultative sessions held to obtain input from stakeholder groups and/or communities.
    - Engaging their own organizations, organizations within their sector or region, and people from other sectors or regions in becoming informed about NGC development and regulation, providing input to the work of the Committee and working groups.

- Promoting open and respectful exchanges of information, perspectives and knowledge pertinent to responsible development of NGC among Albertans, throughout the NGC consultation process.
- Coordinating, and providing oversight of, the work of the working groups, to enhance the timeliness and quality of recommendations developed.
- Fostering the development of agreement among members of the Committee, regarding issues to be addressed, using interest-based approaches to build agreement and resolve conflicts.
- Co-ordinating, consolidating, evaluating and submitting recommendations developed by different working groups in order to harmonize the recommendations made to the ADM Sponsors' Committee.

Responsibilities of Chair

The Chair, from Alberta Energy, will:

- Clarify the government's expectations of the Committee.
- Help ensure the Committee remains on topic with their discussions.
- Poll agreement when necessary.
- Participate in meetings as a Committee member.

Responsibilities of Alternate Chair

The Alternate, from Alberta Environment, will:

- In the absence of the Chair, assume the responsibilities of the Chair.
- Participate as a Committee member.

Responsibilities of Secretariat

The role of the Secretariat, from Alberta Energy, will:

- Provide necessary background information to the Committee to ensure an adequate understanding of existing policy, regulations and legislation regarding NGC development.
- Prepare and distribute minutes.
- Ensure Committee members receive meeting minutes and other supporting documentation in a timely manner.

CONFIDENTIALITY

All documents are considered to be under the custody and control of the government (Department of Energy), unless otherwise specified.

These documents are solely for the use of the committee and will be released after the committee's approval is given, unless otherwise specified.

All documents will be subject to access and privacy provisions of the *Freedom of Information & Protection of Privacy Act.*

STRUCTURE AND REPORTING OF THE COMMITTEE

Representation from the provincial government will include the ADMs from Energy, Environment, Alberta Agriculture, Food & Rural Development and representation from Sustainable Resource Development and the Energy and Utilities Board.

The balance of the Committee will be composed of non-provincial government stakeholders, totalling approximately 11 members.

Working groups will be established to address one or more of the particular issues relating to the development of NGC. The working groups will submit any recommendations they make to the Committee, who in turn will forward this information on to the ADM Sponsors' Committee.

The ADM Sponsors' Committee will review the recommendations and send them to the appropriate department or regulatory body for review and consideration.

TIMEFRAME

All recommendations will be forwarded to the ADM Sponsors' Committee by September 2005.

DISCUSSION PROCESS

Open participation is essential to the success of the Committee and its objectives. Committee members are asked to work together in a spirit of openness and co-operation, fostering the development of agreement among members regarding issues and options to be addressed and to move towards a position of consensus. Members are asked to share "the floor", allowing others to speak and be heard.

MEETINGS

Meeting will be scheduled on a monthly basis, with additional meetings scheduled as required.

APPENDIX A

Natural Gas In Coal Multi-Stakeholder Advisory Committee Invitees

Department of Energy (Chair)
Department of Environment (Alternate Chair)
Alberta Agriculture, Food & Rural Development
Alberta Energy and Utilities Board
Sustainable Resource Development
Alberta Association of Municipal Districts & Counties
Alberta Beef Producers
Alberta Environmental Network Society
Alberta Environmentally Sustainable Agriculture Committee
Alberta Surface Rights Federation
Butte Action Committee/Rimbey & District Clean Air People (1 member)
Canadian Association of Petroleum Landmen
Canadian Association of Petroleum Producers/Canadian Society for Unconventional Gas/Small Explorers and Producers Association of Canada (2 members)
Confederacy of Treaty Six First Nations
Freehold Petroleum & Natural Gas Owners Association
The Coal Association of Canada
Treaty 7 Tribal Council
Treaty 8 First Nations of Alberta

Coalbed Methane/
Natural Gas in Coal

Preliminary Findings

Prepared by
The CBM/NGC Multi-Stakeholder Advisory Committee

July 2005

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APPENDICES

1.0 Executive Summary and Recommendations

1.1. CBM/NGC Review

The Coalbed Methane/Natural Gas in Coal (CBM/NGC) Multi-Stakeholder Advisory Committee (MAC) was formed in November 2003 as part of a multi-phase review initiated by Alberta Energy (DOE) to determine if there are areas where the existing rules and regulations can be improved to handle the specific issues related to CBM/NGC. The review has involved multi-stakeholder and public consultation through a variety of methods, including public information sessions held across the province in the spring of 2004. Information from other jurisdictions and from Alberta CBM/NGC operations is also being researched. The ultimate objective is to ensure the economic benefits of CBM/NGC development are balanced with the protection of land, air and water resources.

1.2 Issues

The MAC is playing a key role in the CBM/NGC review. The purpose of the MAC is to:

- Guide the consultation process, including the development of a consultation framework to ensure issues are adequately addressed
- Determine the specific CBM/NGC issues to be addressed
- Coordinate, consolidate, evaluate and submit recommendations to the government

The MAC found a number of issues unique to CBM/NGC development, primarily dealing with water. Other issues impact all oil and gas development, but may be intensified by growing CBM/NGC development, with its potential for a high density of surface sites and associated cumulative impacts.

1.3 Purpose of the Preliminary Findings

This preliminary findings document is being distributed to share information and to seek input from stakeholders and members of the public before the recommendations are finalized. Comments and input were requested by September 30, 2005.

The MAC will review and evaluate the comments and input for incorporation into a final report. Once the final report has been prepared, the MAC will submit it to the Assistant Deputy Ministers Sponsors' Committee in the fourth quarter of 2005 and it will be distributed to the appropriate government departments and agencies for consideration and response. The final report will be posted on the DOE web site.

1.4 Recommendations

The MAC believes that all the recommendations in this document are important and should be implemented as quickly as possible. At the same time, the MAC acknowledges that there may not be sufficient resources to implement all the recommendations at once. Furthermore, there may be technical reasons or an existing initiative that might result in some recommendations being implemented

before others. As well, some recommendations may require considerable additional review and additional stakeholder consultation. This may also include the need for a transition period for companies to develop, learn and implement best practices on an industry-wide basis. Agencies and departments also need some flexibility in how they implement the recommendations.

Although the MAC believes that all the recommendations it is putting forward are important, to give some guidance in implementation, the following 10 recommendations are proposed for early action.

Top Ten Recommendations

Issue	#	Recommendation
Protecting the Environment	4.3.1	To protect the environment and minimize the cumulative impacts from CBM/NGC development, a government-led multi-stakeholder committee, such as that being set up under ASRD's Integrated Land Management Program if appropriate, should undertake the following sequentially: 1. Review integrated land management principles, policies and practices relating to CBM/NGC to ensure they maintain the integrity and function of the land, taking into account all uses. 2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM/NGC development. 3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas from the impacts of CBM/NGC development and make appropriate recommendations for the protection of these areas, taking into account all uses. 4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.
Approval Process to Protect Aquifers and Water Supplies	3.3.2	AENV and the EUB should develop a 'decision tree' approach for reviewing CBM/NGC applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should: ♦ Incorporate the threshold volume of produced non-saline water, below which the Code of Practice would apply (See Recommendation 3.3.1). ♦ Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas. It will be critical to know and understand those areas that may require special or additional attention from AENV. (See Recommendation 3.2.1) ♦ Ensure that applications for CBM/NGC wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies. ♦ Ensure appropriate compliance with the decision tree.

Issue	#	Recommendation
Project Based Planning and Disclosure	7.2.1	The EUB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow: ♦ Definition of intense project developments ♦ Full project disclosure ♦ Improved community consultation ♦ Enhanced impact assessment ♦ Review of mitigation measures
Improved Scientific Information	3.2.1	The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources: ♦ AENV should expand its current monitoring network and data management system, beginning in areas that could experience intense CBM/NGC development. ♦ AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM/NGC development. Coals containing non-saline water aquifers with potential CBM/NGC activity should be targeted. The inventory should include characteristics such as location, lateral extent, and porosity, as well as recharge rates and hydraulic connectivity between aquifers. ♦ The EUB and Alberta Geological Survey (AGS) should complete the Base of Groundwater Protection mapping project, beginning in areas that could experience intense CBM/NGC development. ♦ AENV and the EUB, together with industry, should investigate the potential for unintended effects of CBM/NGC development on surrounding aquifers. ♦ AENV should identify and characterize areas where CBM/NGC approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies and other water users. Maps of these areas should be made available to regulators, industry and stakeholders. ♦ Before drilling and production from a potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM/NGC operators should obtain baseline data, including gas and mineral content and other indicators of water quality, flow rate/yield and water levels. In lower risk cases and below the threshold volume, less information may be required. The data would be included in a public database subject to confidentiality provisions.
Methane Migration and Release	3.6.1	AENV and the EUB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM/NGC depressurization.
Best Practices for CBM/NGC	8.1.1	Industry, government and other stakeholders should work together to develop, document and implement best practices for CBM/NGC operations.

Issue	#	Recommendation
Information on Mannville Coals	5.2.1*	The DOE in consultation with stakeholders should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM/NGC wells in the Mannville formation for the purposes of acquiring information. This pilot-type program would provide and make public data on the economics, geological and technical aspects of drilling in formations with saline water, with data aggregated in cases where competitiveness would be jeopardized. **One group did not support this recommendation.*
Approval Process to Protect Aquifers and Water Supplies	3.3.5	AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM/NGC wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including: ♦ Testing for a variety of metals and other impurities, as well as total dissolved solids. ♦ Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file. (See Section 3.6 for discussion on methane migration and release.) ♦ Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.
Accessible Current Public Information and Communication	7.5.1	Industry, regulators and other stakeholders should increase the opportunity for dialogue, education and awareness of the public, surface and subsurface rights holders, leaseholders and industry on the possible impacts resulting from CBM/NGC development, and how the use of the land will be affected.
Drilling Fluids	3.4.2	The EUB and AENV should, in cooperation with other organizations such as the Alberta Research Council, investigate whether CBM/NGC drilling and completion practices such as using dugout water and untreated river water may affect aquifers, and review regulations to determine whether changes are needed. They should also consolidate and review studies regarding drilling and completion fluid constituents and their potential for deleterious effects.

Complete List of MAC CBM/NGC Recommendations

Issue	#	Recommendation
Water		
Improved Scientific Information	3.2.1	The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources: ♦ AENV should expand its current monitoring network and data management system, beginning in areas that could experience intense CBM/NGC development. ♦ AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM/NGC development. Coals containing non-saline water aquifers with potential CBM/NGC activity should be targeted. The inventory should include characteristics such as location, lateral extent, and porosity, as well as recharge rates and hydraulic connectivity between aquifers. ♦ The EUB and Alberta Geological Survey (AGS) should complete the Base of Groundwater Protection mapping project, beginning in areas that could experience intense CBM/NGC development. ♦ AENV and the EUB, together with industry, should investigate the potential for unintended effects of CBM/NGC development on surrounding aquifers. ♦ AENV should identify and characterize areas where CBM/NGC approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies and other water users. Maps of these areas should be made available to regulators, industry and stakeholders. ♦ Before drilling and production from a potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM/NGC operators should obtain baseline data, including gas and mineral content and other indicators of water quality, flow rate/yield and water levels. In lower risk cases and below the threshold volume, less information may be required. The data would be included in a public database subject to confidentiality provisions.
Approval Process to Protect Aquifers and Water Supplies	3.3.1	AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply. Threshold numbers should be developed for an individual well and on an areal basis. An interim threshold number should be determined and applied by AENV until the committee completes its work. AENV should also establish a Code of Practice with stakeholder input.
	3.3.2	AENV and the EUB should develop a 'decision tree' approach for reviewing CBM/NGC applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should: ♦ Incorporate the threshold volume of produced non-saline water, below

Issue	#	Recommendation
		which the Code of Practice would apply (See Recommendation 3.3.1)· ♦ Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas. It will be critical to know and understand those areas that may require special or additional attention from AENV. (See Recommendation 3.2.1) ♦ Ensure that applications for CBM/NGC wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies. ♦ Ensure appropriate compliance with the decision tree.
	3.3.3	AENV's Guidelines for Groundwater Diversion for CBM/NGC Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated. ♦ The guidelines should be reflected in the risk-based 'decision tree' process. ♦ To ensure consistency, minimum conditions for approvals should be standardized across the province, with additional site-specific conditions possible. ♦ The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project. ♦ A province-wide review of existing CBM/NGC wells should be undertaken to ensure all guidelines have been met.
	3.3.4	AENV should clarify and communicate the existing rules regarding how much drawdown is allowed during CBM/NGC depressurization in a confined non-saline aquifer to ensure aquifer protection.
	3.3.5	AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM/NGC wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including: ♦ Testing for a variety of metals and other impurities, as well as total dissolved solids. ♦ Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file. (See Section 3.6 for discussion on methane migration and release). ♦ Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.
	3.3.6	AENV and the EUB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.
Drilling Fluids	3.4.1	The EUB and AENV should communicate with CBM/NGC operators, drilling contractors and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's Guidelines for

Issue	#	Recommendation
		Groundwater Diversion for CBM/NGC Development (April 2004) (recommended for revision in Recommendation 3.3.3). Any company producing non-saline water from a CBM/NGC well without authority for a diversion above the threshold volumes should immediately stop operations and notify provincial regulators to initiate the authorization process.
	3.4.2	The EUB and AENV should, in cooperation with other organizations such as the Alberta Research Council, investigate whether CBM/NGC drilling and completion practices such as using dugout water and untreated river water may affect aquifers, and review regulations to determine whether changes are needed. They should also consolidate and review studies regarding drilling and completion fluid constituents and their potential for deleterious effects.
Promoting the Wise Use and Conservation of Water	3.5.1	AENV and the EUB, with stakeholder input, should: ♦ Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate. ♦ Establish criteria for the beneficial use of non-saline produced water. ♦ Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water and include them in the decision-tree approval process. ♦ Revisit authorized diversions of non-saline groundwater for industrial use when CBM/NGC developments create new sources of water in the area.
	3.5.2	AENV and the EUB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the EUB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision-tree approval process.
	3.5.3	AENV, the EUB and the DOE should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.
Methane Migration and Release	3.6.1	AENV and the EUB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM/NGC depressurization.
	3.6.2	Based on the results of the previous recommendation, AENV and the EUB should implement appropriate prevention, monitoring and mitigation measures to address methane migration or release, if necessary.
Surface/Air		
Land Management to Address Cumulative Impacts	4.2.1	The EUB should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM/NGC development.
Protecting the Environment	4.3.1	To protect the environment and minimize the cumulative impacts from CBM/NGC development, a government-led multi-stakeholder committee, such as that being set up under ASRD's Integrated Land Management Program if appropriate, should undertake the following sequentially: 1. Review integrated land management principles, policies and practices

Issue	#	Recommendation
		relating to CBM/NGC to ensure they maintain the integrity and function of the land, taking into account all uses. 2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM/NGC development. 3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas from the impacts of CBM/NGC development and make appropriate recommendations for the protection of these areas, taking into account all uses. 4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.
	4.3.2	Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM/NGC development.
Royalties		
Information on Mannville Coals	5.2.1*	The DOE in consultation with stakeholders should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM/NGC wells in the Mannville formation for the purposes of acquiring information. This pilot-type program would provide and make public data on the economics, geological and technical aspects of drilling in formations with saline water, with data aggregated in cases where competitiveness would be jeopardized. **One group did not support this recommendation.*
	5.2.2*	The Alberta and the federal governments should consider recognizing Canada's CBM/NGC potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five-year pilot-type drilling program for saline CBM/NGC wells in the Mannville formation for the purposes of acquiring information. **One group did not support this recommendation.*
	5.2.3*	The DOE in consultation with stakeholders should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM/NGC development to replace non-saline water for enhanced oil recovery and other industrial uses. **One group did not support this recommendation.*
Tenure		
Ownership Issues	6.2.1	The Alberta Government should make Crown lessees, freehold owners and industry aware of the risks and associated impacts of split title ownership.
	6.2.2	The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.
Acquiring New Natural Gas Rights in Shallow Zones	6.3.1	The DOE should review and clarify the criteria for Section 18 Notices of Non-Productivity (See Section 18 in the Petroleum and Natural Gas Tenure Regulation) and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to deeper rights reversion.

Issue	#	Recommendation
Holding Crown-Leased Natural Gas Rights	6.5.1	The DOE should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period. Also, companies would be charged an increased non-refundable acceptance fee to retain the lands for the second year. The DOE would require additional analysis and consultation on the amount of the fee.
Broad-Based CBM/NGC Issues		
Project Based Planning and Disclosure	7.2.1	The EUB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow: ♦ Definition of intense project developments ♦ Full project disclosure ♦ Improved community consultation ♦ Enhanced impact assessment ♦ Review of mitigation measures
Public Consultation Notification Distances	7.3.1	The EUB, AENV and ASRD with stakeholder input should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM/NGC development.
Enhanced Regulatory Coordination	7.4.1	The EUB, AENV and ASRD should improve the coordination of their CBM/NGC-related application and surveillance processes and develop electronic solutions to facilitate data exchange.
Accessible Current Public Information and Communication	7.5.1	Industry, regulators and other stakeholders should increase the opportunity for dialogue, education and awareness of the public, surface and subsurface rights holders, leaseholders and industry on the possible impacts resulting from CBM/NGC development, and how the use of the land will be affected.
	7.5.2	The EUB and AENV should consolidate CBM/NGC data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data. The availability of data should be subject to the normal provisions of confidentiality
	7.5.3	The EUB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM/NGC development.
	7.5.4	The EUB and the Department of Municipal Affairs along with other stakeholders should clarify and communicate the requirements, roles and responsibilities related to setbacks.
	7.5.5	Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM/NGC issues, including potential effects on water supply.
Review to Assess Progress	7.6.1	As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components: ♦ Annual reviews for three years to assess progress according to a

Issue	#	Recommendation
		monitoring plan. ♦ A second overall review in three years to assess: 1. The effectiveness of the recommendations, 2. New issues or information, and 3. An assessment as to whether additional recommendations may be needed.
Sufficient Resources	7.7.1	Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.
Best Practices Manual		
	8.1.1	Industry, government and other stakeholders should work together to develop, document and implement best practices for CBM/NGC operations.
	8.1.2	Regulators should review CBM/NGC activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere, e.g., Report entitled: Coal Bed Methane Best Management Practices - A Handbook, Western Governors' Association, 2004.
Non CBM/NGC Specific Issues		
Short-term noise	9.2.1	Industry, regulators and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the EUB's Guide 38.
Timing of Hearings	9.3.1	The EUB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.
Notification of Sales Results	9.4.1	The DOE should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current P&NG sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices and public libraries.
	9.4.2	The DOE should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.
Land Agents Accountability	9.5.1	The Alberta Government, including Human Resources and Employment, should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.
Wildlife	9.6.1	Industry should continue to consult with ASRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.
Caveats	9.7.1	The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.

2.0 Introduction

2.1 Current Rules Apply

Natural gas in coal (NGC or coalbed methane (CBM)) is in the early stages of development in Alberta. In Alberta, CBM/NGC is subject to the same drilling, production and operational rules and regulations as natural gas development. The DOE, Alberta Sustainable Resource Development (ASRD) and the Alberta Energy and Utilities Board (EUB) have stringent rules and regulations in place for all natural gas development. If non-saline groundwater is encountered, Alberta Environment (AENV) regulates its diversion, use and disposal under the *Water Act*. In addition, there are identified 'best practices' associated with CBM/NGC development that industry is developing and will be encouraged to adopt.

The public indicated that there is a lack of Alberta-based information about the potential impacts associated with CBM/NGC, especially in light of activities in other jurisdictions. The Alberta Department of Energy (DOE) has initiated a review to determine if there are areas where the regulations and rules can be improved to handle any issues specifically associated with CBM/NGC. The ultimate objective is to ensure that the economic benefits for Albertans of CBM/NGC development are balanced with the protection of land, air and water resources. In its review, the government is looking at the experience of other jurisdictions, data collected from Alberta operations, and input from Albertans. The review has involved multi-stakeholder and public consultation through a variety of methods, including public information sessions across the province in the spring of 2004.

2.2 MAC's Role

The Coalbed Methane/Natural Gas in Coal Multi-Stakeholder Advisory Committee (MAC) was formed in November 2003 as part of the CBM/NGC review. The MAC is playing a key role in the review.

The purpose of the MAC is to:

- Guide the consultation process, including the development of a consultation framework to ensure issues are adequately addressed
- Determine the specific CBM/NGC issues to be addressed
- Coordinate, consolidate, evaluate and submit recommendations to the government

The DOE invited a broad range of sectors to nominate representatives to participate on the MAC, representing their respective organizations or sectors. The MAC includes representation from environmental organizations, surface rights and mineral rights holders, agriculture, local government, the energy industry and provincial government departments including the Department of Energy, Alberta Environment; Agriculture, Food and Rural Development; ASRD; and the EUB. (See Appendix A for a list of MAC members and their affiliations.)

The MAC's primary focus has been to gain an understanding of the issues related to CBM/NGC and to put forward recommendations to further ensure its responsible development in Alberta. Issue-specific working groups were formed from a cross-section of stakeholder organizations to study water, surface and air

issues related to CBM/NGC. Royalty and tenure issues were also reviewed by working groups set up by the DOE with new stakeholder participants selected by the MAC. The MAC has used the input from its working groups, public feedback and expert information to develop recommendations to present to the Alberta government.

The MAC is not addressing other issues or possible changes to Alberta's overall energy development philosophy, surface use compensation, or changes outside the responsibility and/or jurisdiction of the Alberta government. During the course of its deliberations, the MAC came across a number of out-of-scope issues. These issues will be referred to other organizations who deal with them directly or who have a review or consultation underway. The issues are listed in Appendix B.

2.3 About this Document

This preliminary findings document reflects input from the working groups as well as feedback from the public at a series of public information sessions held across the province in the spring of 2004.

The MAC found a number of issues unique to CBM/NGC development, primarily dealing with water. Other issues impact all oil and gas development, but may be intensified by CBM/NGC development, with its potential for a higher than average density of surface sites and associated cumulative impacts.

The document is divided into sections reflecting the main issues identified: Water, Surface/Air, Tenure and Royalties. Section 7.0 addresses broad issues that do not fit into those categories exclusively. Section 8.0 describes an independent but complementary initiative undertaken by industry to develop a best practices manual that includes a number of suggestions referenced in this document. Section 9.0 addresses broader issues that are not specific to CBM/NGC, but have been brought to the attention of the committee.

Each section begins with an introduction that describes the current situation as well as some of the related issues. After the introduction, the title boxes in the left-hand margin indicate the broad subject of the recommendations, while the boxed recommendations are intended to be more specific in nature. In most cases, a description of the issue, the current related regulations, and some discussion precede each recommendation.

The MAC achieved consensus on almost all the recommendations presented in this document. If consensus could not be reached on a specific recommendation, the discussion is noted in the text, but no recommendation was made. There was an exception with respect to the section on royalties. One organization informed the MAC that they were, as a matter of principle, unable to consider or support any reduction in the level of royalties for CBM/NGC production. The recommendations in this section were supported by all other members of the MAC.

Acknowledging that all the recommendations have priority and should be implemented as quickly as possible, the MAC has tentatively identified the top 10 recommendations that should be considered for early action.

The MAC is seeking public input on the recommendations before they are finalized. Members of the public, the original working groups and other stakeholders are invited to submit their comments and input by September 30, 2005.

The MAC will review and evaluate the comments for incorporation into a final report. Once the final report has been prepared, the MAC will submit it to the Assistant Deputy Ministers Sponsors' Committee in the fourth quarter of 2005 and it will be distributed to the appropriate government departments and agencies for consideration and response. The final report will be posted on the DOE web site.

3.0 Water

3.1 Introduction

CBM/NGC development in other jurisdictions has been associated with a range of production characteristics and impacts that have garnered public attention in the past few years. The potential for impact on groundwater has been a serious concern expressed in Alberta.

In Alberta, conventional gas development has not generally been associated with non-saline groundwater (groundwater with 4,000 milligrams per litre or less of total dissolved solids). Conventional gas production has occurred at depths where only saline water is normally encountered.

CBM/NGC differs from conventional gas development in the production of water. Where a coal zone is water saturated, a certain amount of water -- the exact quantity has not been established – needs to be withdrawn in order to depressurize the reservoir and start gas production. This may create potential impacts on water well users, since coal seams containing water are considered aquifers in their own right and may be used for water wells. CBM/NGC wells typically produce higher volumes of water with less gas during their initial production period, compared to conventional gas wells. The volume of water usually decreases over time, while the volume of gas increases.

About 90 percent of the 3,575 CBM/NGC wells drilled by year-end 2004 and about the same percentage of CBM/NGC wells with production in Alberta to that date have been in dry coal seams – Horseshoe Canyon/Belly River coals. In the areas where these dry coals are produced, they are extremely under-pressured and not expected to be connected to any underground water source. They essentially produce little or no water.

The remaining 335 CBM/NGC wells in Alberta are targeting seams that usually contain water. These coals are more normally pressured and may be wet – saturated with non-saline water – and are sometimes used as a source of water supply. The relatively deep Mannville coals (240 wells) are in seams containing saline water. Currently, to produce gas from these coals, the saline water is co-produced to depressurize the coals and increase gas production. This saline water must be disposed of in deep disposal zones and isolated from all non-saline water sources. The shallower Ardley coals (58 wells) have very limited production showing a range of producing characteristics containing no water, slightly saline water or non-saline water at different locations. Currently, most of these wells are shut in awaiting the outcome of the MAC process, further review by AENV and EUB, or authorization under the *Water Act*. (See Appendix C for CBM/NGC well activity and production.)

The MAC has concluded that the continuing protection of aquifers, water bodies and non-saline water users by the provincial government is critical for the appropriate development of CBM/NGC, especially in coal zones containing non-saline groundwater. The MAC found that the risk to non-saline groundwater from deeper saline CBM/NGC and intermediate dry CBM/NGC development was low, but additional care and study are still required.

In general the MAC agreed that in advance of significant growth of non-saline water producing wells, the existing regulatory framework should be reviewed to ensure that it adequately protects Alberta's non-saline water resources from any unreasonable impact associated with CBM/NGC. The MAC supports the province's water strategy, *Water for Life*, and a number of recommendations in this section support initiatives already underway through this strategy. A majority of the recommendations on water issues are specific to CBM/NGC development.

Some MAC members expressed the view that CBM/NGC development would have the least potential impact on Alberta's non-saline water resources if it continues on its existing path, targeting 'dry' coals first, followed by those in zones with saline water, and only at a later date, zones with non-saline water. The rationale with such a sequential approach would be that by the time non-saline coals were targeted for development, there would be improved technology and more scientific information available to minimize impact. Other MAC members did not want any development at all in non-saline coals, while others held the view that it was appropriate to develop non-saline coals now.

3.2 Improved Scientific Information

As CBM/NGC development proceeds, there is a need for more scientific information to help understand how to protect Alberta's water resources. A complete analysis and understanding of all the water supplies in the province would be the ultimate objective.

The need is especially important for improved groundwater data in CBM/NGC development areas where aquifers could be affected or where produced water could affect regional non-saline water supplies. Information should be available on the geological setting, groundwater quality/quantity and hydraulic connectivity. An inventory of groundwater has been started by AENV but is not complete.

Under existing rules, information is collected separately by AENV, EUB and others, primarily operators. The EUB and AENV have an informal process to share information. AENV has already established a water monitoring and data management system that could provide the basis for a more extensive and comprehensive program. The EUB also has its own data management system.

The Base of Groundwater Protection (BGWP) has been partially mapped across the province by AENV. This information is used to comply with the EUB's well drilling and completion requirements. The BGWP data is in an Excel spreadsheet and provides data on a township basis. The first release was in 1993, and an update was issued in 1995. The goal of the project is to provide either a reference well, or a depth below ground level for all townships, so that operators can easily determine the BGWP for a specific well. However, in some areas of the province, no data is available or only a formation has been identified. In this situation, the operator has to request a specific depth for the well in question. Limited resources have delayed the completion of the database and Alberta Geological Survey (AGS) has been contracted to finish the project and handle requests where data is not yet available.

The MAC determined that the development of CBM/NGC provides a timely opportunity to move these information-gathering projects ahead. This is

especially true if they are focused first in areas most likely to have CBM/NGC wells potentially producing from non-saline water aquifers or aquifers hydraulically connected to non-saline aquifers.

One issue discussed by the MAC was that there is insufficient information about groundwater recharge rates in areas that could experience intense CBM/NGC development. This information will be critical to guide decisions on diversions.

A second issue was the incomplete set of data to determine potential impacts to hydraulically connected aquifers by CBM/NGC development. To gain a better understanding of how hydraulically connected aquifers react, information should be collected and analyzed, again starting with areas that could experience intense CBM/NGC development.

The MAC further determined that CBM/NGC operators also have an important role to play to help maintain the province's supply of non-saline water by collecting and submitting baseline water-related data. This information will help further the province's knowledge and understanding of Alberta's aquifers. Surface rights holders should cooperate with industry in obtaining this data.

Recommendation 3.2.1
The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources:

- AENV should expand its current monitoring network and data management system, beginning in areas that could experience intense CBM/NGC development.
- AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM/NGC development. Coals containing non-saline water aquifers with potential CBM/NGC activity should be targeted. The inventory should include characteristics such as location, lateral extent, and porosity, as well as recharge rates and hydraulic connectivity between aquifers.
- The EUB and Alberta Geological Survey (AGS) should complete the Base of Groundwater Protection mapping project, beginning in areas that could experience intense CBM/NGC development.
- AENV and the EUB, together with industry, should investigate the potential for unintended effects of CBM/NGC development on surrounding aquifers.
- AENV should identify and characterize areas where CBM/NGC approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies and other water users. Maps of these areas should be made available to regulators, industry and stakeholders.
- Before drilling and production from a potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM/NGC operators should obtain baseline data, including gas and mineral content and other indicators of water quality, flow rate/yield and water levels. In lower risk cases and below the threshold volume, less information may be required. The data would be included in a public database subject to confidentiality provisions.

3.3 Approval Process to Protect Aquifers and Water Supplies

Stakeholders have expressed concerns about the potential loss of good-quality groundwater and potential impacts on aquifers many kilometres away, even from CBM/NGC activity in dry coal seams.

Non-saline water diversion, use and disposal are administered by AENV, in accordance with the *Water Act*. The current Alberta Environment Guidelines for Groundwater Diversion for CBM/NGC Development (April 2004) are applied when produced water is expected to be non-saline. This would not include water condensation – the small amounts of non-saline water that come out of all natural gas as the pressure is reduced and the gas cooled.

A license is required for the diversion of non-saline groundwater (except for some exempted and household uses). To obtain a license, a preliminary groundwater assessment is required, including a field-verified survey of all existing water wells, springs and dugouts within a minimum 1.6 km radius of the proposed site, their normal flow rates/yield, and the purpose of the requested diversion. The field verified survey does not require qualitative or quantitative testing of the water wells.

The guidelines provide stringent requirements. The operator must submit evidence to demonstrate that the non-saline water diversion will not damage the source aquifer or other non-saline aquifers; will not impact local water supply; will not negatively impact the environment; and will be for a beneficial use.

Under Alberta's existing processes, the EUB also has a role in regulating some water aspects. The EUB regulates all produced water from CBM/NGC and other oil and gas activities, including the disposal of saline and non-saline produced water. The regulations address groundwater protection through requirements for well bore integrity (cemented casing through the zone of non-saline aquifers), and for the prevention of leaks and surface spills.

The EUB's legislation governing produced saline water requires that it be safely handled, stored and disposed by industry. Current EUB policy requires it be returned to below the BGWP. Disposal of produced saline water above the BGWP or on the surface of the land or surface water bodies is not allowed.

The MAC agreed that additional protection for non-saline aquifers could be provided by establishing appropriate production thresholds on both a well and an areal basis that would activate rigorous application requirements and processes.

The MAC also agreed that a more rigorous approval process may be unnecessary for developments with anticipated minimal impact on non-saline aquifers. In conjunction with the other non-saline water recommendations, a simpler approval process could be adopted for projects with non-saline water production below a minimum level.

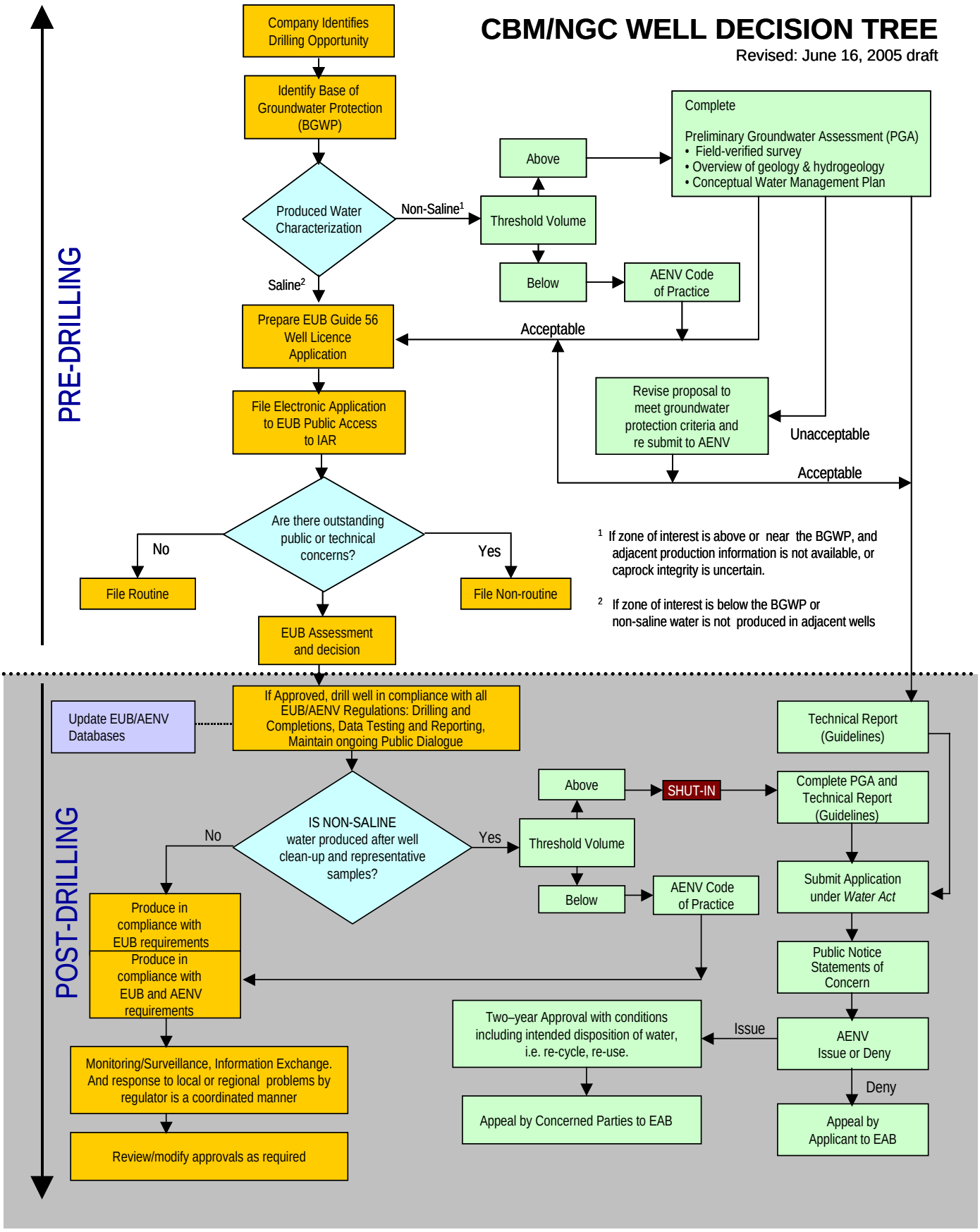
In this regard, the MAC discussed a few options. A subcommittee of the MAC suggested three volume levels, with the first level of one cubic metre (m^3) per month per well requiring limited approval, the second level from 1-30 m^3 per month per well requiring a more detailed process involving, for example, a 'Code of Practice', and volumes of 30 m^3 per month per well and above requiring more

rigorous approvals. A threshold of 104 m^3 per month, the amount allowed for households, was also suggested. Another suggestion was a simplified process below 30 m^3 per well per month per section, a 'Code of Practice' for volumes between 30 and 100 m^3 per well per month per section and a risk-based 'decision tree' process for volumes over 100 m^3 per month per section. There was no consensus reached on any of these suggestions. The MAC agreed that a technical review is needed to determine an appropriate threshold number both on an individual well basis and an areal basis.

Recommendation 3.3.1
AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply. Threshold numbers should be developed for an individual well and on an areal basis. An interim threshold number should be determined and applied by AENV until the committee completes its work. AENV should also establish a Code of Practice with stakeholder input.

The MAC supports strengthening the approval process for CBM/NGC to ensure the protection of aquifers and non-saline water supplies. A risk-based approach would target developments with the most significant potential impacts. The greater the risk of effects on aquifers, the greater the need is for the technical report which discusses the hydrogeological and environmental information and impact assessment as required by the AENV Guidelines for Groundwater Diversion for Coalbed Methane/Natural Gas in Coal Development (April 2004).

The following 'decision tree' is a draft concept, but outlines a possible process to identify and address concerns. It clearly identifies the actions operators would be required to take at every step, and situations where CBM/NGC development would not be allowed due to identified risk. It will provide for the gradual development of non-saline CBM/NGC activity, and allow for the gathering of scientific information to help guide activities in the future.


CBM/NGC WELL DECISION TREE
Revised: June 16, 2005 draft
PRE-DRILLING
Company Identifies Drilling Opportunity
Identify Base of Groundwater Protection (BGWP)
Produced Water Characterization
Non-Saline1
Saline2
Above
Threshold Volume
Below
Complete
Preliminary Groundwater Assessment (PGA)
• Field-verified survey
• Overview of geology & hydrogeology
• Conceptual Water Management Plan
AENV Code of Practice
Acceptable
Prepare EUB Guide 56 Well Licence Application
File Electronic Application to EUB Public Access to IAR
Revise proposal to meet groundwater protection criteria and re submit to AENV
Unacceptable
Acceptable
Are there outstanding public or technical concerns?
No
Yes
File Routine
File Non-routine
EUB Assessment and decision
1 If zone of interest is above or near the BGWP, and adjacent production information is not available, or caprock integrity is uncertain.
2 If zone of interest is below the BGWP or non-saline water is not produced in adjacent wells
POST-DRILLING
Update EUB/AENV Databases
If Approved, drill well in compliance with all EUB/AENV Regulations: Drilling and Completions, Data Testing and Reporting, Maintain ongoing Public Dialogue
Technical Report (Guidelines)
IS NON-SALINE water produced after well clean-up and representative samples?
No
Yes
Above
SHUT-IN
Complete PGA and Technical Report (Guidelines)
Threshold Volume
Below
AENV Code of Practice
Submit Application under Water Act
Produce in compliance with EUB requirements
Produce in compliance with EUB and AENV requirements
Public Notice Statements of Concern
Two–year Approval with conditions including intended disposition of water, i.e. re-cycle, re-use.
Issue
AENV Issue or Deny
Deny
Monitoring/Surveillance, Information Exchange. And response to local or regional problems by regulator is a coordinated manner
Appeal by Concerned Parties to EAB
Appeal by Applicant to EAB
Review/modify approvals as required

Recommendation 3.3.2
AENV and the EUB should develop a 'decision tree' approach for reviewing CBM/NGC applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should:

- Incorporate the threshold volume of produced non-saline water, below which the Code of Practice would apply (See Recommendation 3.3.1).
- Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas. It will be critical to know and understand those areas that may require special or additional attention from AENV. (See Recommendation 3.2.1).
- Ensure that applications for CBM/NGC wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies.
- Ensure appropriate compliance with the decision tree.

There is some limited activity in saline water producing coals, but not enough to indicate how the various coals can best be developed with the least possible impact. More activity could help provide this useful information. (A proposal for assistance in developing saline water producing coals appears in the Royalties Section 5.0.)

The MAC indicated that the existing AENV guidelines should be reviewed and enhanced to ensure the principles of protecting aquifers are clear and that minimum approval conditions are consistent across the province. This should not limit additional conditions being specified in certain situations.

Recommendation 3.3.3
AENV's Guidelines for Groundwater Diversion for CBM/NGC Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated.

- The guidelines should be reflected in the risk-based 'decision tree' process.
- To ensure consistency, minimum conditions for approvals should be standardized across the province, with additional site-specific conditions possible.
- The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project.
- A province-wide review of existing CBM/NGC wells should be undertaken to ensure all guidelines have been met.

Some stakeholders stated that the existing rules to protect non-saline aquifers were not sufficiently well known by most Albertans, and even some industry members. Under the existing rules, water levels are not allowed to drop below the top of a non-saline aquifer while water is being produced from an energy or a water well. The drawdown is permitted to the top of the aquifer. The amount of drawdown varies according to the type of aquifer and the location of the well in the aquifer, etc. but the top of that aquifer is not always identifiable. This practice

is science-based and recognized in sustainable resources management. The MAC agreed that these rules and their application to CBM/NGC should be clarified.

Recommendation 3.3.4
AENV should clarify and communicate the existing rules regarding how much drawdown is allowed during CBM/NGC depressurization in a confined non-saline aquifer to ensure aquifer protection.

The MAC determined that standard procedures for sampling and analyzing water from both energy and water wells are needed in order to provide meaningful, useful and consistent data.

Recommendation 3.3.5
AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM/NGC wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including:

- Testing for a variety of metals and other impurities, as well as total dissolved solids.
- Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file. (See Section 3.6 for discussion on methane migration and release).
- Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.

Some MAC members expressed concerns about household water wells and possible contamination from CBM/NGC operations. Industry has adopted water well testing as a best practice, but there is inconsistency in its application and no requirement by any regulatory body for water well testing. The EUB strongly encourages, but does not require, water well testing. The EUB recommends operators identify water wells and offer to test them whenever they are drilling oil and gas wells nearby.

Water well testing is a recurring issue for many surface rights holders that sometimes requires appropriate dispute resolution, even though operators are encouraged by the EUB to attempt to resolve issues with the surface rights holder.

Some MAC members wanted water well testing to be a requirement. They requested that the MAC consider a recommendation that all water wells within a 880 m radius of the proposed CBM/NGC well be tested before the CBM/NGC well is drilled, since there may exist a greater potential for methane migration with CBM/NGC wells compared to conventional wells. Wells should be tested for water quality, flow rate/yield and methane. This proposed recommendation did not achieve consensus. Neither was consensus achieved for a proposed recommendation by other MAC members to test water wells within 800 m of

CBM/NGC wells completed above the BGWP and expected to produce non-saline water based on evidence from other wells in the area.

Some stakeholders raised specific issues regarding drilling and completion practices for water and for energy wells, including drilling and completion fluids, well bore integrity and aquifer isolation, casing types, types of completion, and well operations and maintenance practices.

There are regulations, directives, guidelines and practices accepted by regulators regarding drilling and production practices of both water and energy wells. (See Appendix D.)

The MAC considers that there is a responsibility on the part of both operators and surface rights holders to ensure that their practices have the least impact on water supplies and aquifers. The MAC determined that these areas are currently regulated in detail, but a further technical review by experts in each field will ensure that the regulations provide consistent protection and incorporate the best available practices.

Recommendation 3.3.6
AENV and the EUB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.

3.4 Drilling Fluids

The drilling of any well, including water wells and CBM/NGC wells, involves the use of drilling fluids that provide lubrication and sealing as the well bore is drilled. Stakeholders wondered whether the use of untreated water from dugouts, sloughs or other such water bodies as a drilling fluid could introduce foreign substances such as bacteria into shallow aquifers. This issue is not specifically related to CBM/NGC drilling.

The *Environmental Protection and Enhancement Act* (EPEA) advises that no person shall release a substance into the environment that causes or may cause a significant adverse effect. The Water (Ministerial) Regulation instructs water well drillers not to use fluids or substances during drilling operations that may cause an adverse effect on the environment, human health, property or public safety. AENV currently specifies that water withdrawn from a water body should be disinfected (treated) prior to being used to drill water wells. Chlorinated water is an example of treated water.

There was discussion by the MAC about the possibility of immediately restricting all CBM/NGC well drillers to using drinking quality or treated water for drilling. The potential decrease in risk of bacteria being introduced into a well given various aquifer conditions was considered. As well, the potential impacts of requiring drinking quality water to be used for drilling in areas where agriculture users and municipalities are short of water were considered. No consensus was reached on whether immediate changes should be recommended.

The MAC heard from the EUB that there is no scientific evidence to demonstrate that current Alberta drilling fluid practices result in groundwater contamination. Some MAC members believed that there was not enough information to prove it one way or the other. The MAC agreed that the following recommendations should be adopted as a precautionary measure.

Recommendation 3.4.1
The EUB and AENV should communicate with CBM/NGC operators, drilling contractors and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's Guidelines for Groundwater Diversion for CBM/NGC Development (April 2004) (recommended for revision in Recommendation 3.3.3). Any company producing non-saline water from a CBM/NCG well without authority for a diversion above the threshold volumes should immediately stop operations and notify provincial regulators to initiate the authorization process.

Recommendation 3.4.2
The EUB and AENV should, in cooperation with other organizations such as the Alberta Research Council, investigate whether CBM/NGC drilling and completion practices such as using dugout water and untreated river water may affect aquifers, and review regulations to determine whether changes are needed. They should also consolidate and review studies regarding drilling and completion fluid constituents and their potential for deleterious effects.

3.5 Promoting the Wise Use and Conservation of Water

As surface water becomes scarce in some basins in the province, non-saline groundwater will become increasingly important, and CBM/NGC has the potential for increased water production, compared to conventional gas. Therefore, protecting the water wells, water supply and aquifers in the province is paramount, and conservation should be practiced wherever possible. This philosophy, expressed by many Albertans across the province, is potentially in conflict with the current practice of deep-well disposal of non-saline water produced from CBM/NGC activities.

The MAC, after reviewing the issues and considering the experience in other jurisdictions regarding the use of non-saline water for agriculture, came to agreement that the use of non-saline produced water for other applications should be encouraged, as long as there is minimal risk or perceived risk to land and animals. The use of non-saline produced water would be most desirable, followed by returning the water to its original aquifer or a lower quality aquifer. Deep well disposal should only be considered in the absence of any other viable option. The MAC agreed that it is important to establish policy and rules on produced water conservation – before significant non-saline water production occurs.

The MAC further considered it feasible that CBM/NGC development might create new sources of water for other industrial applications in the area. Some operations that use water may be able to switch to a lower quality water source.

The MAC agreed that regulators should require adjacent industrial projects using non-saline water to review their water source if new sources of lower quality water become available. Also, if an injection operation requires additional water, then new alternate sources of lower quality water must be considered.

Recommendation 3.5.1
AENV and the EUB, with stakeholder input, should:

- Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate.
- Establish criteria for the beneficial use of non-saline produced water.
- Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water and include them in the decision-tree approval process.
- Revisit authorized diversions of non-saline groundwater for industrial use when CBM/NGC developments create new sources of water in the area.

The MAC also agreed that the potential for treatment and use of water that is somewhat above 4,000 milligrams per litre of total dissolved solids should be investigated. In the future, marginally usable waters may become more valuable, particularly in fully allocated basins. Pending the results of this investigation, AENV and the EUB should review situations where saline and marginally saline water have a reasonable potential for re-use, such as oilfield injection. The strategy of treating and re-using produced water should be adopted with sound technical guidelines and concern for safety.

Recommendation 3.5.2
AENV and the EUB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the EUB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision-tree approval process.

Recommendation 3.5.3
AENV, the EUB and the DOE should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.

3.6 Methane Migration and Release

Some aquifers naturally contain methane and some water wells already produce associated methane. However, the public wants to be satisfied that methane will not migrate into local water supplies as a result of CBM/NGC development.

The process of depressurization of coal seams through water production liberates methane. If a water well is completed in a hydraulically connected aquifer, then depressurization could lead to a greater potential for methane release into the water well. Methane migration should not occur within the same aquifer if the pressure of the energy well is lower than water wells in the aquifer.

Some MAC members noted that this is not an issue in already underpressured dry coal zones, since aquifers would only be hydraulically connected if water is present in the coal zone. It was also noted that production from most deep saline CBM/NGC wells would not affect shallower aquifers that serve as non-saline water sources for Albertans.

AENV currently requires wells producing non-saline water not unreasonably interfere with any active water well in the vicinity. Such interference might include: decreasing flow, introducing foreign substances, and increasing the amount of methane, if any, that would be produced from the water well.

The MAC determined that the effects of depressurization need to be more clearly understood and negative impacts on water well users prevented. Any study on this issue should include: a review of relevant literature; the development of a sampling program with objectives and potential outcomes; the development of tracking methods such as isotopic and geochemical indicators; as well as 'pressure front' tracking. In addition, numerical simulation of potential vertical/horizontal flow should be included.

Recommendation 3.6.1
AENV and the EUB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM/NGC depressurization.

The MAC also agreed that once baseline data is available, as indicated in Recommendation 3.2.1, it should be possible to develop measures to reduce the likelihood of methane migration.

Recommendation 3.6.2
Based on the results of the previous recommendation, AENV and the EUB should implement appropriate prevention, monitoring and mitigation measures to address methane migration or release, if necessary.

4.0 Surface/Air

4.1 Introduction

Individual CBM/NGC wells in Alberta will vary significantly in size and equipment, depending upon whether they are 'dry' or 'wet' and whether they are evaluation or development wells.

The most abundant dry CBM/NGC wells have a smaller, lighter footprint than most other types of energy developments, similar to conventional shallow gas. These wells are usually drilled using 'minimal disturbance' techniques that do not remove the topsoil. When on production, this type of well only requires a small fenced area around the wellhead (typically 3 m x 3 m) and no developed road. Most of these wells are not accessed very often after initial drilling and completion and many can be monitored without driving onto the site. When these wells are in the early evaluation phase (pre-development) or when a low-pressure gathering system is not accessible, a larger footprint is required for an individual wellsite compressor. In most cases, this is not a permanent operating configuration, but some wells have been tested in this fashion for several months or more.

When CBM/NGC wells are wet and must produce water to produce gas, the footprint is larger. Many of these wells cannot be drilled using minimal disturbance methods and a larger location is required to handle the pumping equipment and, in some cases, wellsite tanks. Since most of these wells are currently in the evaluation phase, the produced water must be pumped out and piped or trucked away, possibly requiring a permanent road and other equipment, creating more surface impact than dry wells. At these temporary sites there may also be some wellsite compression. If successful, development wells would likely use less wellsite equipment (tanks, compressor) and the water would be collected and disposed of at a central facility, where compression would also occur.

For both dry and wet developments, a central compression facility will add to the cumulative project footprint. In typical dry developments, there is one facility per township (36 sections). Where existing compressor stations are being used, they may be expanded onsite, or additional booster sites may be added, further increasing the footprint. Although no successful wet development facilities are in operation today (only evaluation or pilot wells), additional equipment would be required for water separation, storage and disposal during the development stage.

For both wet and dry wells, directional, horizontal, and pad drilling techniques may be employed in some cases to reduce the cumulative surface imprint. A number of wells, both wet and dry, have been drilled in this manner and evaluation is ongoing to determine the optimal approach in different areas.

The pace of CBM/NGC development and the projections for significantly more wells over a broad land base of Alberta have resulted in members of the public bringing forward a variety of issues related to surface and air impacts.

While there are no surface or air issues that are specific or unique to CBM/NGC, the issues identified in this section may be intensified by growing CBM/NGC development.

Currently, surface and air impacts for CBM/NGC development are addressed through the following legislation:

- The *Environmental Protection and Enhancement Act* (EPEA) administered by AENV takes an integrated approach to the protection of air, land and water. EPEA contains numerous provisions regarding the release of substances into the environment and, for certain defined activities, an approval must be obtained from AENV.
- Under the *Energy Resources Conservation Act*, the EUB is required to review proposals for energy projects to ensure they are in the public interest, and have considered social, economic and environmental impacts. The EUB regulates the drilling, completion, operation and abandonment of all oil and gas wells.
- The Alberta Government uses a variety of legislation and management mechanisms to maintain the environmental integrity of public lands, while specifying the different levels and types of allowable use.

(See Appendix D for further description of relevant legislation.)

A particular concern expressed by some stakeholders was regarding activity in new areas not accustomed or suited to the pace, scale and density of CBM/NGC development. Future CBM/NGC development will likely occur in some areas that have had limited energy development to date, as well as in areas with larger and growing populations, and lands with special environmental, recreational or other sensitivities.

Some members of the public were concerned that CBM/NGC applications could result in surface locations of potentially 36 wells per section per pool. With an inter-well distance of 200 metres, and the calculated potential for nine wells per quarter section, the 36 well figure was extrapolated. Experience to date suggests that CBM/NGC development may require between one and eight wells per section per pool (or for a number of commingled pools together) for subsurface drainage and pressure depletion. This number is comparable to conventional oil well density and is lower than heavy oil well density.

The EUB has indicated that to clarify this matter, all reduced spacing holding approvals will now contain a clause specifying well density, and there is a plan to review existing approvals to ensure the clause is present, where appropriate.

While the EUB has so far identified over 100 CBM/NGC multi-well pools and over 52,000 conventional oil and gas pools throughout the province, the definition and areal extent of individual gas pools and their relationship with the potential number of surface well sites are not generally known by surface rights holders and others.

The MAC supported the right of surface rights holders to a quiet enjoyment of their land, although that right must be balanced with the right of industry to produce oil and gas, the right of present and future Albertans to a clean and safe

environment, and the benefit received by all Albertans from royalties, taxes and employment from energy development.

The MAC determined that CBM/NGC and other oil and gas operators should make a reasonable effort to mitigate activities that cause visibility issues, noise, traffic and dust, etc. Surface rights holders with their own land management objectives should be more informed about possible options for a surface location and ways to address other concerns. A Best Practices Manual (Section 8.0) will help address this gap.

Because CBM/NGC involves sweet, lean (no heavier hydrocarbon components) natural gas, there are fewer emissions than with oil, more hydrocarbon rich gas, or sour gas developments. Venting is not permitted by the EUB except in cases where the gas is not able to support stable combustion. This may occur when the gas flow rates are very low or intermittent or when the extracted gas cannot be ignited due to insufficient energy content. Low energy content can result from high levels of nitrogen being flowed back after nitrogen fracturing operations. In these cases, the gas may be vented initially but must be flared once it is capable of supporting combustion.

The topic of flaring and venting of CBM/NGC wells was referred to the Clean Air Strategic Alliance (CASA), a nonprofit association composed of stakeholders from three sectors – government, industry and non-government organizations such as health and environment groups. CASA's experienced Flaring and Venting Project Team reviewed all related information and established flaring and venting criteria for CBM/NGC wells. (See Appendix E for a copy of the CASA report.)

The MAC reviewed a number of issues dealing with potential production of water and drilling practices (Section 3.0). It recommended two approaches that relate to both surface and water: increased planning and notification, and the documentation and use of best practices by industry. These recommendations are addressed in Section 7.0 and Section 8.0, respectively. The key recommendations that impact surface issues are repeated here.

Recommendation 7.2.1
The EUB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow:

- Definition of intense project developments
- Full project disclosure
- Improved community consultation
- Enhanced impact assessment
- Review of mitigation measures

Recommendation 8.1.1
Industry, government and other stakeholders should work together to develop, document and implement best practices for CBM/NGC operations.

4.2 Land Management to Address Cumulative Impacts

Members of the public questioned whether continuing growth of CBM/NGC would bring an increasing number of wellsites, roads, pipelines, compressors and other equipment and their associated cumulative impact on private and public lands.

The Alberta Government's Integrated Land Management initiative will be a major implementation mechanism for the provincial Land Use Framework. The initiative includes a set of basic integrated land and resource management process principles that support a framework of operational planning, informed decision-making and land management tools. It will concentrate on public land and associated resources with a focus on managing the overall footprint, including industrial development and recreational activity.

Under existing rules, the EUB expects operators to coordinate development with other companies to minimize potential impacts. The EUB has specific requirements to address the proliferation of larger impact developments, such as sulphur recovery gas plants. The EUB also has legislative authority to declare common facilities and pipelines and to ultimately force sharing and cooperation. For smaller scale developments, the EUB can require additional reviews and condition or deny applications when options to reduce impacts have not been pursued. Surface rights holders also currently play a role in reducing surface impact, for example, by requesting companies use existing infrastructure.

The MAC agreed that land management planning, strategies and tools are required of both government and landowners to proactively maintain the land's usefulness and productivity. That concept is included in Section 7.0 as well as in the following recommendation.

Recommendation 4.2.1
The EUB should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM/NGC development.

4.3 Protecting the Environment

A healthy environment is critical to the quality of life for humans and wildlife. It provides ecological value, including watershed protection, healthy air, habitat diversity, natural vistas and recreational opportunities.

Under existing rules there are processes for identifying sensitive ecological and wildlife areas and operating conditions to minimize the effects of development. An example of such a process is the Natural Areas Program administered by Alberta Community Development that designates certain areas with special or sensitive natural landscapes or features for low-intensity recreation, nature appreciation and education. Some areas of the province have been identified by ASRD and AENV as requiring expanded assessments or additional development controls. The EUB has also recognized some sensitive areas in the province, such as the East Slopes, Zama-Hay Lakes and native grasslands, which trigger increased regulatory requirements and a higher level of assessment and cooperation.

The MAC considered the potential impact of additional CBM/NGC activity. Although CBM/NGC wells can be low impact individually compared to other oil and gas activity, there is the potential for significantly increased well density and infrastructure, and additional traffic for equipment maintenance. In such cases, CBM/NGC development may significantly affect the benefits and opportunities of a healthy environment in some areas.

The MAC determined that there should be an additional effort to identify sensitive areas that may be particularly impacted by CBM/NGC development.

Recommendation 4.3.1
To protect the environment and minimize the cumulative impacts from CBM/NGC development, a government-led multi-stakeholder committee, such as that being set up under ASRD's Integrated Land Management Program if appropriate, should undertake the following sequentially:

1. Review integrated land management principles, policies and practices relating to CBM/NGC to ensure they maintain the integrity and function of the land, taking into account all uses.
2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM/NGC development.
3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas from the impacts of CMB/NGC development and make appropriate recommendations for the protection of these areas, taking into account all uses.
4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.

The MAC also discussed the need for the science of remediation and/or reclamation to be improved. It considered the potential for reducing impact on existing and future potential CBM/NGC sites, as well as the potential for creating other opportunities that would otherwise not be available due to potential for negative impact. It was considered that an enhanced ability to remediate and to reclaim presented benefits for CBM/NGC producers, surface rights holders, various public groups, other industries, and Albertans in general.

Recommendation 4.3.2
Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM/NGC development.

5.0 Royalties

5.1 Introduction

The Alberta Geological Survey (AGS) estimates that there is about 514 trillion cubic feet (Tcf) of CBM/NGC in place in Alberta – almost double the known conventional gas in place currently booked for Alberta. AGS maps indicate a CBM/NGC resource potential of 57 Tcf in the Ardley, 71 Tcf in Horseshoe Canyon, 147 Tcf in Belly River and 239 Tcf in Mannville coal formations. The recoverable amount of this resource has not yet been determined.

The MAC reviewed the formations noted above. The coal formations that have attracted the most development to date from CBM/NGC operators have been the Horseshoe Canyon/Belly River and the Mannville. The Horseshoe Canyon/Belly River is predominantly shallow and dry, while the Mannville is deeper and is generally associated with large volumes of saline water. Although exploration activity began in both formations at roughly the same time, the Horseshoe Canyon/Belly River is the only coal seam where significant commercial development of CBM/NGC is taking place. There has been very limited development in the Ardley formation to date, although it is a future area of potential for non-saline CBM/NGC development.

All natural gas in Crown lands attracts royalties under the Natural Gas Royalty Regulation, 2002, regardless of the mineral source. Royalties are based on a number of specific business and economic principles. These principles are stated as follows:

- Albertans receive a fair share for the development of their resources;
- Alberta has the appropriate natural gas royalty regime in place for the responsible development of all sources of natural gas; and,
- Investors and developers receive appropriate reward and recognition for risks and uncertainty taken in developing the resource.

On about 19 per cent of Alberta's lands, mineral rights are held by the federal Crown within national parks and Aboriginal lands, by the national railway companies, by the successors in title to the Hudson's Bay Company and by the descendants of homesteaders through rights granted by the federal Crown before 1887. The people of Alberta receive benefits through payment of mineral tax by companies who are undertaking oil or gas development on freehold land under provincial jurisdiction. A higher percentage of checkerboard-patterned ownership of Crown and freehold mineral rights is located in potential CBM/NGC development areas in the southeast quadrant of Alberta.

The MAC reviewed the economics of CBM/NGC development to date, along with as much information as could be obtained on future potential development. In general, the MAC concluded that, based on the great similarity to other shallow gas wells in southeastern Alberta, the royalties currently applied to the Horseshoe Canyon/Belly River and other dry CBM/NGC developments appeared to be appropriate to the resource. Further, the MAC considered the difficulty in distinguishing between coal and sandstone sourced gas from the same well

perforated in rock columns that are a mix of both and determined it would be impractical to try to differentiate between the two sources for royalty purposes.

One organization informed the MAC that they were, as a matter of principle, unable to consider or support any reduction in the level of royalties for CBM/NGC production. The recommendations in this section were supported by all other members of the MAC.

5.2 Information on Mannville Coals

CBM/NGC operators have suggested that the cost of producing natural gas from water-bearing coal seams such as the Mannville is higher than the cost of other natural gas development. Industry has requested royalty acknowledgement of the additional associated costs of water handling and disposal related to CBM/NGC development.

The results of the economic analysis completed for the Mannville formations during this review were not conclusive. There is no clear-cut determination that this formation is or is not economically viable based on the current level of understanding. Without further drilling, many of the key parameters are still uncertain. However, some form of fiscal recognition appears reasonable to promote the drilling of more wells to acquire better knowledge of deep saline wet coal. In this context, CBM/NGC operators pointed to Alberta's past successes in encouraging the development of horizontal wells, oil sands, deep gas, and enhanced oil recovery.

The following recommendation, while it targets only the Mannville formation, is being put forward with the understanding that the recommendations to protect Alberta's non-saline water resources will be implemented. The spirit of the recommendation is to create a balance between providing some incentive to industry to gain information, while ensuring that development does not occur too rapidly.

Recommendation 5.2.1
The DOE in consultation with stakeholders should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM/NGC wells in the Mannville formation for the purposes of acquiring information. This pilot-type program would provide and make public data on the economics, geological and technical aspects of drilling in formations with saline water, with data aggregated in cases where competitiveness would be jeopardized.

The MAC also acknowledged that CBM/NGC development is not unique to Alberta, and therefore Alberta's royalties should not have to shoulder the entire burden of fiscal assistance to the industry. Other regions with CBM/NGC potential include British Columbia, Saskatchewan, Ontario, Nova Scotia, the Northwest Territories, Nunavit and the Yukon. Since the information gained from drilling in the Mannville formation would benefit these other regions, the federal government should also contribute to a fiscal program for developers.

In the United States, early development of CBM/NGC was assisted by a credit against federal income tax. British Columbia has already implemented a fiscal program to encourage CBM/NGC development. Alberta has consistently applied the existing gas royalty structure to all CBM/NGC wells and no changes have yet been made.

Recommendation 5.2.2
The Alberta and the federal governments should consider recognizing Canada's CBM/NGC potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five-year pilot-type drilling program for saline CBM/NGC wells in the Mannville formation for the purposes of acquiring information.

A royalty reduction program was also proposed to encourage the use of directional drilling and other technologies that reduce surface impact associated with shallow CBM/NGC activity and to promote the development of new technologies. This program was proposed to apply to other low productivity gas, not just CBM/NGC, and companies would not be able to take advantage of both royalty reduction programs simultaneously.

The MAC considered the potential benefit of reducing surface impact, and the potential financial risk to surface holders who receive income from a number of surface location and road leases. No consensus was reached on supporting the recommendation for a technology-related royalty reduction, with some members indicating that this was not an appropriate area for the government to spend taxpayers' dollars.

A further suggestion related to providing a royalty incentive for using saline rather than non-saline water for industrial uses such as enhanced oil recovery. This might aid in the more rapid development of saline water applications, and help protect and conserve the province's non-saline water resources.

Recommendation 5.2.3
The DOE in consultation with stakeholders should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM/NGC development to replace non-saline water for enhanced oil recovery and other industrial uses.

6.0 Tenure

6.1 Introduction

Tenure is the process by which companies are granted the right to explore for and develop oil and gas resources, in exchange for the value to Albertans, as owners of the resource, which flows from development in the form of royalties, bonus bid payments and rents.

The provincial Crown owns approximately 81 per cent of Alberta's mineral rights, which are managed by the DOE. The remaining 19 percent are owned as 'freehold' rights. Freehold mineral rights are held by the federal Crown within national parks and Aboriginal lands, by the national railway companies, by the successors in title to the Hudson's Bay Company and by the descendants of homesteaders through rights granted by the federal Crown before 1887. The result has been a checkerboard pattern of Crown and freehold rights in some parts of the province.

A company or individual wishing to acquire oil and gas rights can ask the DOE to make them available at a sale either through a license or a lease. Minimum and maximum areas are determined for the license or lease, depending on the region and the type of agreement.

After ensuring the requested rights are available for disposition, the DOE refers the request to the Crown Mineral Disposition Review Committee, which identifies any surface access restrictions before the sale takes place.

The MAC believes the existing tenure system can adequately accommodate CBM/NGC, although some changes could promote more orderly development. Two main tenure issues were identified in relation to CBM/NGC: ownership of CBM/NGC and administration of Crown agreements. The DOE will need to assess the overall impact of the recommendations on the industry, and in some cases undertake broader industry and stakeholder discussions through normal consultation processes, since tenure rules would ultimately apply to all conventional and unconventional oil and gas exploration and development.

6.2 Ownership Issues

On lands where the Crown owns all the minerals, the rights to CBM/NGC are acquired and belong to the owner of a petroleum and natural gas (PN&G) agreement. According to the *Mines and Minerals Act* (Section 67(2)), which applies only when the Crown owns the mineral rights, coal lessees do not have the right to recover natural gas from coal except for safety and conservation reasons. Where ownership is split, e.g., the Crown owns the coal rights and the P&NG rights are freehold, or vice versa, or two separate freehold owners exist, it is not clear who has ownership of the CBM/NGC.

There is currently no formal process to resolve this kind of issue. Conflicting owners may negotiate or ultimately look to the courts to resolve this issue. Freehold owners may not be aware of the potential significant risks related to this issue. Industry could also benefit from additional awareness about split ownership.

Ownership issues may also apply to in-situ coal gasification. During in-situ coal gasification, coal is converted to gas by burning part of the coal underground. Extracted gases can be used as fuel or chemical feedstock.

While CBM/NGC takes advantage of natural gas that would otherwise not be produced but leaves the coal intact, in-situ coal gasification requires transforming the coal – chemically altering it – to create the gas and therefore potentially affects the owners of both the coal rights and the natural gas rights. While the technology is still under development and not commercially available, now is an appropriate time to address split ownership issues.

Recommendation 6.2.1
The Alberta Government should make Crown lessees, freehold owners and industry aware of the risks and associated impacts of split title ownership.

A MAC member brought forward for discussion an issue related to the impact of drainage on mineral rights holders' adjacent lands caused by CBM/NGC development. The MAC also considered a recommendation to amend Crown leasing regulations so that Crown leases offsetting split-title lands retain the current spacing rules of one well per section and full fence line buffer zones until split-title ownership issues are resolved, but consensus was not achieved. There was no agreement by the MAC on recommendations to address these issues.

According to some MAC members, the checkerboard pattern of ownership in Alberta can create a higher level of uncertainty and a lengthier process if industry must acquire freehold as well as Crown rights, and negotiate with multiple parties. While this could possibly deter industry from developing plays, there are options in place to resolve ownership issues, including negotiation and the courts. No recommendations on this issue were put forward.

These issues, while out-of-scope for the MAC, should be addressed through the appropriate processes. A recommendation to strike a committee to resolve these issues did not achieve consensus by the MAC. There was agreement that the government could fill a useful role in providing facilitation to address these issues.

Recommendation 6.2.2
The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.

6.3 Acquiring New Natural Gas Rights in Shallow Zones

Some CBM/NGC developers would like the flexibility to acquire rights for specific (shallow) zones and not have to compete with those who are interested in conventional drilling or in deeper plays. Under the current posting policy, specific zones can only be posted if the intervening zones are leased. Posting for all rights or rights to the base of a certain zone might mean CBM/NGC developers would have to acquire more rights than they are targeting and thus would compete with conventional players.

Deeper Rights Reversion Zone Designations (DRRZDs) were introduced in 1981 as the primary means of defining the base of the zone for P&NG rights at the time of continuation. DRRZDs are also used in the disposition process for P&NG rights. Using a DRRZD would ensure the request encompasses a stratigraphic package of rights and not merely the coal zones. This is important since coal zones are often too small to be economically viable on their own and are difficult to segregate from interbedded sands.

Zone-specific postings would allow companies to acquire the specific rights for which they are interested. This would especially benefit smaller companies. Any proposal to shift to zone-specific postings would be on a 'go-forward' basis, and would not affect rights that have already been acquired. Companies would still be able to post multiple zones to disguise their intentions. Some industry members indicated that they would likely not exercise a zone-specific posting option.

Some surface rights holders believed that a shift to zone-specific posting would result in an increased number of agreements and the potential for more surface impact. However, the common practice of farming out may have the same effect as zone-specific posting. There is also the potential for the Crown to receive more bonuses and annual rent from zone-specific postings.

The MAC also considered whether or not the DOE should allow zone-specific postings using DRRZDs on a go-forward basis. It weighed the potential benefits of allowing greater access to resources, with potentially greater surface disturbances. No consensus was reached on a recommendation.

The MAC believes that if the Alberta Government wants to implement zone-specific postings, it should actively encourage multiple rights holders in a common area to share infrastructure wherever possible and cooperate with surface rights holders. The Best Practices Manual (Section 8.0) developed as part of the MAC process should contribute to reducing the footprint of multiple projects in a common area.

Some industry members are not able to acquire mineral rights for shallower zones because other companies hold mineral rights down to the base of the deepest productive or potentially productive zone. Zone specific retention might be an appropriate tool for returning mineral rights to the Crown for future disposition and opening up increased opportunities for CBM/NGC development. There was discussion by the MAC about implementing zone-specific retention on a go-forward basis for all new agreements issued after a specified date. Some surface rights holders raised the issue of the potential cumulative impacts associated with multiple mineral rights owners. No consensus was reached on a recommendation on zone-specific retention.

The DOE's ability to serve Section 18 Notices of Non-Productivity is a useful process in its own right. If lands and/or rights in an agreement are no longer considered productive, the DOE will serve a one-year notice (Section 18 in the Petroleum and Natural Gas Tenure Regulation). During this year, the lessee must prove the rights productive or the rights will revert to the Crown. The MAC supported the continuing use of this process.

Recommendation 6.3.1
The DOE should review and clarify the criteria for Section 18 Notices of Non-Productivity (See Section 18 in the Petroleum and Natural Gas Tenure Regulation) and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to deeper rights reversion.

Cumulative impacts resulting from multiple mineral rights ownership was a significant issue for some MAC members. This issue is addressed in Recommendation 7.2.1 on project-based planning found in Section 7.0.

6.4 Acquiring New Natural Gas Rights

There was a belief that industry might not be able to acquire sufficiently large blocks of Crown land to accommodate CBM/NGC development. However, the current maximum size (Plains - 15 sections, Northern - 32 sections, Foothills - 36 sections) was deemed to be adequate. Industry will continue to use alternative business arrangements to acquire the area of land they need. No recommendation was put forward.

6.5 Holding Crown-Leased Natural Gas Rights

When a lease reaches the end of its primary term, it expires unless the leaseholder can prove it is productive. If a lease or a spacing unit within the lease has not yet been proven productive, a short-term continuation may be granted. For a potentially productive lease, a one-year continuation may be granted.

Some stakeholders indicated they would like greater flexibility to be able to accommodate test wells, pilot projects and CBM/NGC plays requiring dewatering. A one-year continuation may not be sufficient to accommodate a dewatering phase.

Additional benefits of the recommendation would be to minimize the need for industry to drill at the end of an agreement's term simply to retain the rights. So industry should have sufficient time to plan and develop their CMB/NGC play in a more orderly manner.

Recommendation 6.5.1
The DOE should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period. Also, companies would be charged an increased non-refundable acceptance fee to retain the lands for the second year. The DOE would require additional analysis and consultation on the amount of the fee.

6.6 Developing a Unique CBM/NGC Agreement

The MAC discussed whether CBM/NGC development of Crown land minerals should use a unique agreement. One deterrent to using a unique CBM/NGC agreement would be the challenge of separating coal zones from adjacent sand zones. In addition, gas could migrate between zones, making it difficult to identify trespass situations and calculate royalties. Moreover, single coal zones may not be economically feasible to develop. Furthermore, zone-specific contiguous 'parcels' of rights described by DRRZDs accommodate CBM/NGC and therefore a unique agreement is not necessary. No recommendation was put forward.

6.7 Notification of Activity in Active and Future Coal Mining Areas

A coal rights holder could plan to develop a coal lease on a given property, while a P&NG rights holder on the same property may want to access the coal to develop CBM/NGC. Currently, there is a policy requirement for a P&NG lessee to notify a coal lessee of an intention to develop the resource within a mine permit or mine license area. Companies planning to bid are made aware of this restriction by means of an addendum to the public sales notice. This requirement, however, does not apply to potential coal development areas.

While this may be an issue in the future, so far no problems have occurred. The current process was believed to be adequate. No recommendation was put forward.

7.0 Broad-Based CBM/NGC Issues

7.1 Introduction

There were a number of issues identified by the MAC that were broad in nature and did not deal specifically with water, surface, air, royalty or tenure concerns – but were specific to CBM/NGC or were intensified by CBM/NGC development. The following recommendations address these broad-based issues.

7.2 Project Based Planning & Disclosure

Some landowners have indicated that they do not have sufficient understanding or knowledge of the full extent – and impact – of an energy development project. This is a special concern for developments with a large number of wells, pipelines and other facilities. Furthermore, it is difficult for interested parties to gauge the cumulative impacts of a project, since most applications deal with one well at a time and do not take into account other activities.

Under Alberta's existing guidelines, if a company files an application for a single well license and the well is part of an ongoing project, the company should explain how the well fits into the plan. The current EUB application process encourages, but does not require, project disclosure with potentially affected parties as part of the consultation process, as well as bundling of related applications.

The MAC considered it important to ensure that this process reflect the scale, pace and density of future CBM/NGC developments. These requirements might include expanded project-based planning, disclosure of future plans, focused land use management, cumulative impacts assessment over a broader area, and more community dialogue. Industry as well could benefit from more consistent use of good planning practices, more complete disclosure and increased industry coordination and cooperation.

The MAC has concluded that a more comprehensive and formalized project-based planning approach should be developed for CBM/NGC. This would provide a more complete understanding of the number of surface and subsurface locations, potential environmental and other impacts. In cases involving a large number of wells, high well density or sensitive areas, a more detailed assessment should be required.

Project-based planning should involve all stakeholders in the area, including subsurface rights holders, as well as surface rights holders and occupants. Involving subsurface rights owners in coordinated planning could also provide the forum to address issues such as sterilization and reduced recovery efficiency.

The EUB should provide guidelines about the areal extent for consultation. Opportunities for synergies with other industries could then be better explored and pre-consultation should be promoted.

It is important for surface rights holders as 'land managers' to have a better opportunity to participate in the planning process. This would improve their ability, for example, to request multiple user agreements on new or existing lease

roads, lease sites or pipeline corridors, where it makes sense and is technically feasible. They should also be better able to request other site locations on their property or a reduced number of access roads, in order to minimize surface impacts. These types of decisions could be made earlier and more effectively if project-based planning was in place.

Project-based planning would also improve the ability of regulators and stakeholders to balance the rate of subsurface recovery with surface impact. Project-based planning would benefit surface rights holders and industry by minimizing the need for multiple contacts and follow-up, since negotiations could be undertaken for more than a single well at a time.

Project-based planning may also reduce overall construction time and inconvenience. Industry would be provided with a more comprehensive approval, thereby reducing future regulatory risk.

Recommendation 7.2.1
The EUB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow:

- Definition of intense project developments
- Full project disclosure
- Improved community consultation
- Enhanced impact assessment
- Review of mitigation measures

7.3 Public Consultation Notification Distances

A number of issues related to consultation with surface rights holders was discussed by the MAC. The specified minimum distance for notification and consultation was identified as a concern by some stakeholders. They felt that the requirement for energy companies to consult with directly affected surface rights holders is too limiting in the case of CBM/NGC, which may have impacts on aquifers some distance away from a given development.

Under the EUB's Guide 56, a minimum 100 m distance for notification of and consultation with all affected stakeholders is used for situations deemed to have the lowest risk such as sweet gas wells. Much greater distances could be indicated for higher risk projects such as sour gas. The EUB further directs industry to understand local issues and expand consultation as appropriate. Companies must respond to all reasonable questions, attempt to address concerns from surface rights holders and occupants, and inform the EUB of all outstanding concerns, regardless of how far the concerned individual is situated from the project site.

The AENV consultation process applies whenever non-saline water production is involved. It requires a minimum preliminary groundwater assessment including a field-verified survey of all existing water wells, springs and dugouts within a minimum 1.6 km radius of the proposed site, their normal flow rate/yield, and the purpose of the requested diversion. A professional hydrogeological assessment of any unique local features is also undertaken to determine if the review should

be expanded. (For more information, see the Water Section, 3.0.) A formal non-saline water diversion application is subject to newspaper advertisement. Public statements of concern can be made by parties living a considerable distance from the project site.

The MAC discussed recommending an increase in both standard minimum distances for both the EUB and AENV, but agreed that the analysis to determine the most appropriate distance should be undertaken in a broader context of reviewing the entire consultation process.

Recommendation 7.3.1
The EUB, AENV and ASRD with stakeholder input should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM/NGC development.

7.4 Enhanced Regulatory Coordination

Stakeholders indicated that information does not flow quickly or easily enough between the various bodies that regulate natural gas, water and land use.

With the potential for more non-saline water issues resulting from CBM/NGC development, the timely sharing of information among regulatory bodies is important. A more coordinated, harmonized regulatory process along with a more integrated comprehensive planning process, would improve efficiency, as well as address issues such as cumulative surface impact and non-saline water diversions more effectively.

Recommendation 7.4.1
The EUB, AENV and ASRD should improve the coordination of their CBM/NGC-related application and surveillance processes and develop electronic solutions to facilitate data exchange.

7.5 Accessible Current Public Information and Communication

Many stakeholders stated that they are not adequately informed about CBM/NGC development and are, therefore, concerned about potential effects. They believe the public needs more timely, accessible information on CBM/NGC. Efforts to improve the flow of dialogue are already underway. Synergy Alberta, the umbrella organization for local groups to learn about and deal with energy-related issues, is an example of one initiative that has been implemented to help educate and empower local stakeholders.

Information on wells, production and facilities is available to the public, but is not easily accessible, with only a limited number of locations where the information can be obtained.

The MAC agreed that the public needs timely and easy access to information. It also agreed that industry and government need information to continue to improve the management of potential impacts associated with CBM/NGC development. Web sites, open houses and other activities all offer opportunities for information exchange and should also be fully utilized. Information should be more broadly available, e.g., in libraries, municipal offices and EUB field offices.

Recommendation 7.5.1
Industry, regulators and other stakeholders should increase the opportunity for dialogue, education and awareness of the public, surface and subsurface rights holders, leaseholders and industry on the possible impacts resulting from CBM/NGC development, and how the use of the land will be affected.

The MAC also noted that a comprehensive CBM/NGC public database would enhance transparency, provide open disclosure and help educate and inform members of the public who want to be involved.

Recommendation 7.5.2
The EUB and AENV should consolidate CBM/NGC data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data. The availability of data should be subject to the normal provisions of confidentiality.

A particular source of confusion for surface and subsurface rights holders and other members of the public is the EUB's reference to 'wells per section per pool' in spacing orders. This has led, in some cases, to the extrapolation of potential numbers of wells far beyond the expectations of regulators and industry. This has heightened concerns over the potential proliferation of wells. The MAC concluded that clarifying EUB references to 'wells per section per pool' and communicating it to surface rights holders and the public would help address concerns.

Recommendation 7.5.3
The EUB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM/NGC development.

The MAC identified that a specific concern for a number of stakeholders relates to a misunderstanding of setbacks. The EUB requires industry to place their facilities no closer than 100 m from structures intended for human accommodation. To address nuisance factors such as noise and scheduled workovers, municipalities can also impose their own setback restrictions associated with sour gas facilities, over and above EUB requirements. However, the municipality shall not approve a setback application that does not conform to EUB requirements, unless the EUB has provided written approval for a lesser setback distance at the request of a landowner or developer. In certain circumstances, the EUB may allow structures intended for human accommodation within 100 m of a sweet gas facility, but under no circumstances would there be any reduction in setback for a sour gas facility.

Some farmers would like the opportunity to put farm buildings and structures closer to a CBM/NGC well site than 100 m. There is a lack of consistency in how this type of request is being handled by local authorities.

Recommendation 7.5.4
The EUB and the Department of Municipal Affairs along with other stakeholders should clarify and communicate the requirements, roles and responsibilities related to setbacks.

The EUB, in response to recommendations from the public safety and sour gas initiative, has been preparing decision reports with the goal to better show how the public interest has been reflected in the decision. The MAC encourages the EUB to continue this helpful practice.

Finally, the MAC concluded that all of these efforts could be part of a broader communications initiative to share information about CBM/NGC and its potential impacts. The public consultation initiative that contributed input for this document is a good start, but a follow-up communication plan is needed to address some of the communication issues that were raised during this process.

Recommendation 7.5.5
Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM/NGC issues, including potential effects on water supply.

7.6 Review to Assess Progress

Implementation of all the recommended changes in this document in a timely manner will promote safe and orderly CBM/NGC development. To ensure accountability in the implementation of the recommendations as well as to ensure their effectiveness, reviews are required.

Recommendation 7.6.1
As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components:

- Annual reviews for three years to assess progress according to a monitoring plan.
- A second overall review in three years to assess:
  1. The effectiveness of the recommendations,
  2. New issues or information, and
  3. An assessment as to whether additional recommendations are needed.

7.7 Sufficient Resources

Some stakeholders expressed concerns that the government departments and agencies had good rules in place, but insufficient resources to enforce them.

The MAC recognized that the energy industry is changing and growing at a rapid pace. The growth of CBM/NGC development in the future will bring many new challenges. The MAC agreed that various government departments and agencies may need to address resourcing issues in order to be able to deal with these challenges, as well as to implement the recommendations outlined in this document.

Recommendation 7.7.1
Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.

8.0 Best Practices Manual

Best practices can be defined as: management practices or techniques recognized to be the most effective and practical means to develop the resource, while minimizing adverse environmental and other effects. However, not all these practices are being followed by all CBM/NGC operators. The MAC agrees that some current practices are highly effective and that all industry members should be encouraged to adopt them.

The 'Coal Bed Methane Best Management Practices - A Handbook, Western Governors' Association, 2004' was identified as an example of how industry members in the U.S. learned about best practices for their region. A similar best practices manual, based on Alberta's unique geography and legislation, would be useful. Industry has taken the initiative to begin developing such a manual in parallel with the MAC consultation process. This manual will complement regulations and provide expanded guidance to industry members.

The manual will benefit not only the companies themselves, but will also help educate surface and subsurface rights holders about practices they can anticipate when dealing with an energy company, as well as help them plan and manage their own property for the future. A best practices manual will allow surface and subsurface rights holders with concerns to compare the practices on their land with the leading edge practices of the day.

One example of a best practice would be for industry to approach other operators in the area to share facilities and infrastructure before an application is filed. Another best practice could be to post signage to notify residents of the timing and other details of local activities that might affect them. The best practices manual could also address unregulated issues such as visibility concerns. The ultimate outcome would be enhanced trust among all stakeholders and industry.

A draft best practices manual is being prepared by industry and will be submitted to the MAC for review. Once the manual has been finalized, it will be made available to all stakeholders through various government and industry web sites.

Recommendation 8.1.1
Industry, government and other stakeholders should work together to develop, document and implement best practices for CBM/NGC operations.

Recommendation 8.1.2
Regulators should review CBM/NGC activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere (e.g., Report entitled: Coal Bed Methane Best Management Practices - A Handbook, Western Governors' Association, 2004).

9.0 Non CBM/NGC Specific Issues

9.1 Introduction

There were a number of issues identified by the MAC that were broad in nature and did not deal specifically with water, surface, air, royalty or tenure concerns – nor were they specific to CBM/NGC development. The following recommendations address some of these issues.

The MAC also discussed the potential impact on property values resulting from CBM/NGC operations and the landowner's ability to use the land as collateral. Financial institutions may not be clear about the process of reclaiming the land. Currently, companies are liable for surface reclamation issues at upstream oil and gas sites for 25 years. The Oil and Gas Reclamation and Remediation Advisory Committee was established in June 2003 to suggest enhancements to Alberta Environment's reclamation program. Several recommendations relate to clarifying reclamation liability. The MAC is not putting forward any recommendations in this area.

9.2 Short-Term Noise

Some surface rights holders expressed frustration at not being able to quickly resolve a sudden noise problem. They are not aware of whom to call – or the process to deal with this kind of a situation.

There are many rules and regulations to control most kinds of noise, as outlined in the EUB's Guide 38. An existing ongoing committee addresses noise issues of a technical nature. However, short-term noise, such as the use of retarder brakes, is not regulated.

The MAC agreed that some guidelines for industry and procedures for surface rights holders would help resolve short-term noise issues more quickly. These guidelines should be included in industry's best practices manual (See Section 8.0). Industry must communicate these practices to its subcontractors, as well as any conditions negotiated with surface rights holders.

Recommendation 9.2.1
Industry, regulators and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the EUB's Guide 38.

9.3 Timing of Hearings

Some surface rights holders expressed a need for recognition of critical agricultural periods in the timing of EUB hearings. They want to be fully engaged in the process so as to have a fair opportunity to express their concerns.

Under the existing process in Alberta, the EUB considers the needs of all parties to ensure fairness in the scheduling of a hearing. This includes recognition of the importance of surface rights holders' activities, such as seeding, harvesting or calving, in setting hearing dates. The timing of various agricultural practices is different in different parts of the province, so location has to be factored in as well. The MAC agreed that the EUB should continue this practice.

Recommendation 9.3.1
The EUB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.

9.4 Notification of Sales Results

The results of mineral rights sales, while available to the public, are not produced in a user-friendly format. Some surface rights holders would like the opportunity to be proactive in tracking and managing the development of mineral rights under their land after the rights have been sold.

Recommendation 9.4.1
The DOE should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current P&NG sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices and public libraries.

Recommendation 9.4.2
The DOE should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.

9.5 Land Agents Accountability

The Canadian Association of Petroleum Landmen (CAPL) is a professional organization for people involved in all aspects of petroleum land management. There are several types of land agents:

1. Land agents, who must be licensed under the *Land Agents Licensing Act* if their responsibilities include obtaining surface interest in the land (e.g., wellsite) or taking documentation leading to the acquisition of a surface interest.
2. Geophysical permit agents, who are not licensed, obtain consent from surface rights holders and usually negotiate damage settlements for geophysical or seismic activity.
3. Freehold mineral leasing agents, who are not licensed, obtain sub-surface rights from freehold mineral rights holders.

The lack of professionalism on the part of some agents has resulted in mistrust, inconsistency and reduced protection for surface rights holders. Communications have been a major concern. For example, surface rights holders are not always notified that they have a minimum 48 hours to consider an offer prior to resuming negotiations with a company. Some of these issues have already been communicated directly to the EUB.

To enhance the professionalism of land agents, CAPL, the Canadian Association of Petroleum Producers, the Small Explorers and Producers Association of Canada, and the Alberta Association of Surface Land Agents have begun to develop a certification process. Land agents will be encouraged to be certified and to maintain their certification over the course of their active career. Education will be an important component of the certification process, including ethics and conflict resolution courses. Industry will be encouraged to hire certified land

agents and encourage their agents to use appropriate tools and techniques. The MAC supports this certification initiative and its implementation. No certification for the other types of agents is being considered at this time, and is beyond the scope of the MAC.

Recommendation 9.5.1
The Alberta Government, including Human Resources and Employment, should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.

9.6 Wildlife

It is also important that industry continue to consider critical periods for wildlife and minimize development-related disturbances to habitat. Continuing consultation by industry with ASRD on appropriate timing and development strategies will help reduce the impacts.

Recommendation 9.6.1
Industry should continue to consult with ASRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.

9.7 Caveats

The MAC was advised that the amendment or registration of caveats reflecting deep rights reversion on freehold owner leases was not allowed by Alberta Land Titles. As a result of this policy, any party interested in a freehold owner's mineral rights must spend time doing research to determine if there are any available deep rights, adding to the cost of doing business on freehold lands for the oil and gas industry. Until deep rights reversion on freehold leases becomes more commonplace, most industry operators may not go to the trouble of searching multiple caveats to identify those mineral rights that are subject to deep rights reversion or zone specific leases. Given the competitive nature of the CBM/NGC industry, the MAC supports the principle of a level playing field and increased transparency of information related to caveats.

Recommendation 9.7.1
The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.

Acronyms and Glossary of Terms

Acronyms:

ACD	Alberta Community Development
ADR	Appropriate Dispute Resolution
ASRD	Alberta Sustainable Resource Development
AENV	Alberta Environment
AGS	Alberta Geological Survey
BGWP	Base of Groundwater Protection
CAPL	Canadian Association of Petroleum Landmen
CASA	Clean Air Strategic Alliance
CBM/NGC	Coalbed Methane/Natural Gas in Coal
DOE	Department of Energy
DRRZDs	Deeper Rights Reversion Zone Designations
EAB	Environmental Appeals Board
EPEA	Environmental Protection and Enhancement Act
EUB	Alberta Energy and Utilities Board
FHOA	Freehold Owners Association
IOGC	Indian Oil and Gas Canada
MAC	Coalbed Methane/Natural Gas in Coal Multi-Stakeholder Advisory Committee
P&NG	Petroleum and Natural Gas

Glossary of Terms

(as used in the Preliminary Findings)

Abandonment: The permanent dismantlement of an oil or gas well or facility in the manner prescribed by the regulations including any measures required to ensure that the facility is left in a permanently safe and secure condition.

Appropriate Dispute Resolution (ADR): A term that reflects a number of alternatives or means to resolve conflicts between parties. It can include direct negotiations, facilitated sessions, mediations, or arbitration between conflicting parties, as well as the public hearing process. The EUB encourages conflicting parties to use available ADR options when conflict arises with respect to energy development.

Aquifer: As defined by the Alberta Government's *Water Act*, an underground water-bearing formation that is capable of yielding water.

Best practices: Management practices or techniques recognized to be the most effective and practical means to develop the resource, while minimizing adverse environmental and other effects.

Casing: A series of tubular pipes joined by threads and couplings that line a well bore to prevent water and rock from entering into the well bore.

Checkerboard: The configuration of freehold and Crown mineral ownership as a result of the Canadian Pacific Railway (CPR) Company grant. To subsidize the building of a trans-continental railway, the Dominion of Canada granted to the CPR a large area of land adjacent to the right-of-way. The grant, which included both surface and mineral rights, was for every odd-numbered section in each township except sections 11 and 29.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of organic matter without access to air.

Coal seam: Descriptive term for individual layers of coal found in the geological strata. It is also called a 'bed' in the coal industry.

Coal zone: A vertical extent of intermittent coal seams and intermingled shale or clay. The zone extends from the top of the uppermost seam to the bottom of the lowermost one.

Coalbed methane (CBM): Methane found in coal deposits. Also called Natural Gas in Coal (NGC).

Commingling (oil & gas): Mixing oil and or gas from two or more different pools in the same well bore.

Commingling (water): Mixing water from two or more **different** aquifers in the same well bore.

Conventional natural gas: Natural gas consisting of a mixture of hydrocarbon compounds, primarily methane, and small quantities of various non-hydrocarbons that exist in gaseous phase or in solution with crude oil in natural underground reservoirs.

Crown: Depending on jurisdiction, the Crown is either represented by the federal or Alberta government.

Crown Mineral Disposition Review Committee: An interdepartmental committee made up of representatives from provincial government departments and agencies. The committee reviews land parcels requested for mineral disposition to ensure the date (ecological reserves, grazing reserves, parks, historic sites, etc.) is current and the level of access is correct.

Deeper Rights Reversion Zone Designation (DRRZD): Identifies a zone by its name. As noted in ERCB Decision 95-10, historically, the name of the zone identified within type wells takes precedence over the depths identified in terms of utilizing a DRRZD. DRRZDs are used primarily for deeper rights reversion, but can also be used for other purposes such as offsets.

Drilling fluid: The circulating fluid (mud) used to bring drilling cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to

maintain the fluid at desired viscosities and weights. Some additives may be caustic, toxic, or acidic. Drilling fluids are also needed to complete water wells.

***Environmental Protection and Enhancement Act* (EPEA):** Provincial legislation that takes an integrated approach to the protection of Alberta's air, land, and water. One of the Act's cornerstones is the guarantee of public participation in decisions affecting the environment. Public involvement includes access to information, participation in environmental assessment and approval processes, and the right, when directly affected, to appeal certain decisions.

Footprint (also called environmental footprint): The impact of an organization, company or business entity in environmental terms (resource use, waste generation, physical environmental changes etc).

Formation: A designated subsurface layer that is composed of substantially the same kind of rock or rock types.

Fracturing: A method of improving the permeability of a reservoir by pumping fluids such as water or carbon dioxide, and nitrogen into the reservoir at sufficient pressure to crack or fracture the rock. It is also known as 'fracing'.

Freehold rights: Mineral rights not owned by the Crown in right of Alberta. These mineral rights may be owned by the Crown in right of Canada, by corporations or individuals.

Gas-in-place: The amount of gas in a reservoir at any time calculated at standard conditions. This includes recoverable and non-recoverable gas.

Groundwater: Water that occurs under the surface of the ground.

Initial gas in place: The volume of raw natural gas calculated or interpreted to exist in a reservoir before any volume has been produced.

In place: See 'Initial gas in place'

Landowner: See 'Surface rights holder'

Lessee: Defined in the *Mines and Minerals Act* as the holder according to the records of the Department of Energy of an agreement. The term 'lessees' may, therefore, refer to holders of leases or licenses or both, depending on the context in which it is used.

Methane: The most prevalent component of most natural gas produced in Alberta. Its chemical notation is CH_4 and it is the most common hydrocarbon gas.

Mineral rights: Entitlement, through ownership or a leasing arrangement, to produce and sell the minerals in a parcel of land.

Migration: Movement from one place to another.

Natural Gas in Coal: Methane found in coal deposits. It is also called Coalbed Methane (CBM).

Non-saline water: Fresh water with total dissolved solids content less than 4000 milligrams per litre. See also 'Saline groundwater'.

Operator: The company or individual responsible for managing an exploration, development, or production operation.

Pool: A natural underground reservoir containing an accumulation of oil or gas or both, separated or appearing to be separated from any other such accumulation.

Porosity: Open spaces within a rock that contain fluids such as water, oil, or natural gas.

Potentially productive: Used to refer to a well, a zone or a spacing unit that cannot be demonstrated at the required level of proof to be productive, but displays indications that it might be productive if further work were conducted.

Produced water: The water extracted from the subsurface along with produced oil and gas, including water from the reservoir, water that has been injected into the formation, and any chemicals added during the production/treatment process.

Reclamation: Process of restoring surface environment to acceptable pre-existing conditions.

Recompletion: A recompletion occurs when the producer re-enters a well to complete (i.e., perforate) a new formation in a previously completed well.

Remediation: Cleanup of an environmentally contaminated site.

Saline groundwater: Water that has total dissolved solids content exceeding 4000 milligrams per litre as defined in the Water (Ministerial) Regulation.

Section: An area one mile square or as close as the convergence of the meridians permit.

Sensitive areas: Lands or associated features requiring protection, including critical wildlife habitat, rare and endangered plant species, native prairies, areas prone to erosion or other geotechnical failure, or cultural heritage sites.

Split title: Where subsurface rights are owned by different parties, e.g., the Crown owns the coal rights and the P&NG rights are freehold, or vice versa, or two separate freehold owners exist.

Subsurface: Below the surface.

Subsurface rights holder: The owner or lessee of the mineral rights who has the right to explore for and produce oil, gas, and other minerals. The owner may be a freehold rights owner or the Crown.

Surface rights holder: The owner or lessee of the surface rights (the landowner) has control of the land's surface and the right to work it, in addition to any sand, gravel, peat, clay or marl which can be excavated by surface operations.

Total Dissolved Solids (TDS): A measure of concentration or how much substance is in a given sample.

Tenure: Term used to describe the system whereby mineral rights are managed by the Department of Energy and disposed to individuals and companies as agreements.

Township: A term used in the 'Alberta Township System'. Depending on the context in which it is used, it refers either to a six square mile area comprising 36 sections or to a row of townships spanning from north to south across Alberta. Township 1 lies at the southernmost boundary of Alberta and Township 126 lies at the northernmost boundary.

Unconfined aquifer: An aquifer containing water that is not under pressure. The water level in a well completed in an unconfined aquifer is the same as the water level (water table) outside the well.

Water Act: The Alberta *Water Act* protects the quality of water and manages its distribution. The legislation regulates all development and activities that might affect rivers, lakes, and groundwater.

Water quality: Refers to a set of chemical, physical, or biological characteristics that describe the condition of a river, stream, lake, or aquifer.

Water well: As defined in the *Water Act,* an opening in the ground, whether drilled or altered from its natural state, which is used for:

1. the production of groundwater for any purpose,
2. obtaining data on groundwater, or
3. recharging an underground formation from which groundwater can be recovered and includes any related equipment; buildings, structures and appurtenances.

Well density: The concentration of wells on the land surface (per unit area).

Well spacing: The distance between wells producing from the same reservoir. Spacing is often expressed in terms of area (e.g., 40-acre spacing) and is usually established by regulatory agencies.

Zone: Defined in the Petroleum and Natural Gas Regulation as a stratum or series of strata considered by the Minister to be a zone for the purposes of this Regulation. In many cases, zones may be geological formations or members but in some instances they are larger (geological groups) and include more than one formation (the Mannville zone, for instance, includes numerous formations).

Appendix A MAC Members

As of May 2005

Alberta Agriculture, Food and Rural Development	John Hermans James Wuite (alternate)
Alberta Association of Municipal Districts & Counties	Phyllis Kobasiuk Ken Hoppins (alternate)
Alberta Beef Producers	Gene Rawe
Alberta Energy	Mike Ekelund (chair) David Breakwell (alternate) Sharla Rauschning (alternate chair)
Alberta Environment	Bev Yee (co-chair) Nga de la Cruz (alternate)
The Pembina Institute (Alberta Environmental Network Society)	Mary Griffiths Tom Hegan (alternate)
Alberta Environmentally Sustainable Agriculture Council	Sharil Baumgardner
Alberta Surface Rights Federation	Tom Nahirniak Karl Zajes (alternate)
Alberta Sustainable Resource Development	Barry Cole Keith Beraska (alternate)
Butte Action Committee/Rimbey & District Clean Air People	Don Bester
Canadian Association of Petroleum Landmen	Deryl Hurl
Canadian Association of Petroleum Producers/ Canadian Society For Unconventional Gas/ Small Explorers And Producers Association of Canada	Mike Gatens
Canadian Association of Petroleum Producers/ Canadian Society For Unconventional Gas/ Small Explorers And Producers Association of Canada	John Squarek Dave Rushford (alternate)
The Coal Association of Canada	Robert Donick Allen Wright (alternate)
Energy and Utilities Board	Bob Willard Tom Byrnes (alternate)
Freehold Petroleum & Natural Gas Owners Association	Brad Murray Else Pedersen (alternate)
Others:	
Alberta Community Development -- Facilitator	Gene Roach
Alberta Energy -- Secretariat	Karen Henderson
Writer/Consultant	Sari Shernofsky

The MAC would like to express its appreciation to all the MAC members and alternates who participated at various points in the process, including those who took part in the early stages of the initiative. We also would like to take this opportunity to thank all the members of the working groups, who contributed so much time and effort into researching and understanding the issues and putting forward its own recommendations for MAC to consider. Lastly, we would like to thank all the members of the public who attended our public meetings and provided their input to the MAC. We have strived to develop a set of recommendations that reflects their concerns to the degree that it is within our mandate.

Appendix B Out-of-Scope Issues

The following issues were raised at public information sessions, by the working groups or by MAC members. They are considered out-of-scope for the MAC and will be referred to the appropriate organization. The MAC has no position on these issues.

Issue	***Referral Organization***
Compensation should reflect all costs, and may need to be higher with CBM/NGC	Surface Rights Board
Review period for long-term surface leases	Surface Rights Board
Compensation should reflect any increased number of pipelines	Surface Rights Board
Extending the 48-hour review period for landowners for CBM/NGC drilling	Land Agent Advisory Committee
Changes to existing regulations on linear assessment due to increased traffic load from CBM/NGC	Municipal Affairs
Net metering to allow individuals generating their own power to sell surplus power into the provincial grid	Electricity and Gas Division, Alberta Energy
Plugging seismic holes from bottom to top as part of the reclamation process	ASRD
Banks sometimes will not accept agricultural land used for energy activities as collateral for a loan because of reclamation concerns	Environmental Assurance, Alberta Environment and the EUB
Expanding ADR membership to include additional landowner groups and freehold owners	EUB
Longer term sustainability of the Orphan Well Fund through alternate funding such as royalties	EUB and Alberta Energy
Increased compensation for landowners because of the increased impact associated with horizontal/directional drilling	Surface Rights Board

Appendix C CBM/NGC Well Activity & Production Fact Sheet

All values to December 31, 2004

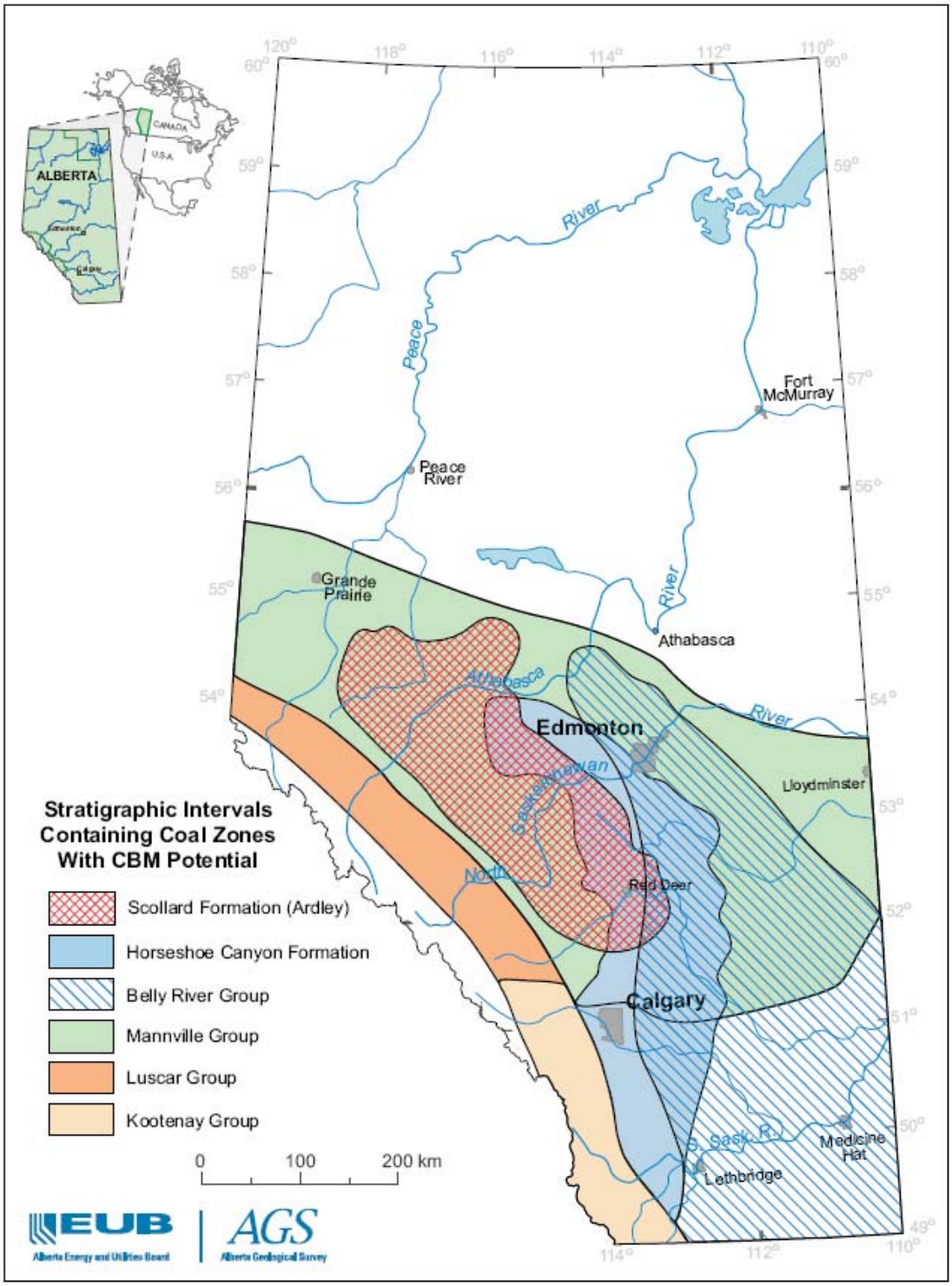
Coal Zone/Formation	Total Wells	Wells With Production	Cumulative Gas Production From Only Coals (10^6 m^3)	Cumulative Water Production From Only Coals (10^3 m^3)
Horseshoe Canyon & Belly River	3240	1560	657	62*
Mannville	240	127	79	548
Ardley	58	32	19	21
Kootenay	37	16	<1	<1
Total	3575	1735	755	631

* Most wells produced little or no water; 3 wells account for 24 X $10^3 m^3$ of the reported cumulative water production.

Number of CBM/NGC wells added in 2004: 2506

CBM/NGC well production in 2004: 600 X 10^6 m^3 (from only coals)

Map of Potential CBM/NGC Coal Zones (Source: EUB May 2005)



Appendix D Summary of Regulatory Requirements for CBM/NGC Activities – Alberta

All Acts, regulations and requirements that pertain to natural gas also pertain to CBM/NGC development in Alberta; therefore, knowledge of all Acts, regulations and requirements that pertain to natural gas is required in the development of CBM/NGC.

This table provides only a summary of the main areas of regulation. This summary is extracted from the current draft (June 2005) of the CBM/NGC Best Practices document that is being prepared for the MAC. Changes to this summary will be incorporated in the final MAC report.

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
Notifications and Consultations	Notification & consultation with landowners/ managers, public, mineral rights owners, etc.		• EUB Guide 56: Energy Development Application Guide • EUB Guide 60: Upstream Petroleum Industry Flaring Guide (plus updates) • EUB Guide 65: Resources Applications for Conventional Oil and Gas Reservoirs. • EUB Guide 71: Emergency Preparedness and Response Requirements for the Upstream Petroleum Industry
Mineral Tenure	Petroleum & Natural Gas Rights - provincial Crown lands	Petroleum & Natural Gas Rights (Alberta Energy)	• Mines and Minerals Act (Ch. M-17, RSA 2000) • Petroleum and Natural Gas Tenure Regulation (AR 263/97)
	Petroleum & Natural Gas Rights - provincial freehold lands	Petroleum & Natural Gas Rights (freehold mineral rights owner)	
	Petroleum & Natural Gas Rights on Indian lands	Permit or Lease (IOGC)	• Indian Oil and Gas Regulations (SOR/94-753). • Indian Oil and Gas Canada. 2001. Disposition of Oil and Gas Rights Policy.
Exploration	Geophysical operations on provincial lands	Exploration Approval (ASRD)	• Public Lands Act (Ch. P-40, RSA 2000) • Exploration Regulation (AR 214/98)
	Geophysical operation on Indian lands	Exploratory License (IOGC)	• Indian Oil and Gas Regulations (SOR/94-753). • Canadian Environmental Assessment Act (1992, c.37) • Indian Oil and Gas Canada. Information Letter IOGC IL-2000 How to Prepare the Environmental Assessment

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
			Required Pursuant to the Canadian Environmental Assessment Act
Well Spacing	Special drilling Spacing unit	Special Drilling Spacing Unit Order (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) • EUB Directive 65: Resources Applications for Conventional Oil and Gas Reservoirs
	Holding	Holding Approval (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) • EUB Directive 65: Resources Applications for Conventional Oil and Gas Reservoirs
Well Siting	Well location less than prescribed setback distances	Approval (EUB)	• Oil and Gas Conservation Regulations (AR 151/87)
	Municipal development (residential, agricultural, industrial) location less than prescribed setback distances	Approval (EUB)	• Subdivision and Development Regulation (AR 43/2002)
	Well siting on provincial private lands		AENV. 2003. Information Letter R&R/03-2. Siting an Upstream Oil and Gas Site in an Environmentally Sensitive Area on Private Land: Guidance for Private Land
Surface Rights	Surface rights on private lands for wellsites, facility sites, access roads and related developments	Surface Lease (landowner), or Right of Entry Order (SRB)	• Surface Rights Act (Ch. S-24, RSA 2000) • Surface Rights Act General Regulation (AR 189/2001) • Surface Rights Act Rules of Procedure and Practice (AR 190/2001)
	Surface rights on provincial Crown lands wellsites, pipelines, facility sites, access roads and related developments	Mineral Surface Lease (wellsite); License of Occupation (road); (ASRD)	• Public Lands Act (Ch. P-40, RSA 2000) • ASRD. 2004. Public Lands Operational Handbook. • ASRD. 2004. Area Operating Agreement Guidelines for Public Lands • ASRD. 2004. Instructions for Submission of Environmental Field Reports with Surface Disposition Applications under the Public Lands Act
	Surface rights on Indian lands for wellsites, pipelines, facility sites,	Surface Lease, Right-of-Way, or Right of Entry (IOGC)	• Indian Oil and Gas Act (R.S. 1985, c. I-7) • Indian Oil and Gas Regulations, 1995. (SOR/94-753) • Canadian Environmental Assessment Act (1992, c. 37) • Indian Oil and Gas Canada. Information Letter

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
	access roads and related developments		IOGC IL-2000 How to Prepare the Environmental Assessment Required Pursuant to the Canadian Environmental Assessment Act
Wellsite, Facility Site and Access Road Construction	Design and construction of wellsites, facility sites and related access roads.	Surface Lease Agreement with Owner/Occupant of Private Land OR Disposition from Manager of Public Lands	• EPEA (Ch.E-12, RSA 2000) • EUB Information Letter IL 2002-01: Principles for Minimizing Surface Disturbance in Native Prairie and Parkland Areas • EUB Information Letter IL 90-21: Oil and Gas Development – Rumsey Block • AENV. 2003. Information Letter R&R/03-07: Wellsite Construction: Guidelines for No-Strip and Reduced Disturbance. ASRD. 2004. Public Lands Operational Handbook
	Historical resources assessment and mitigation	Clearance (ACD)	• Historical Resources Act (Ch. H-9, RSA 2000)
	Watercourse Crossings	Notification (AENV)	• Water Act (Ch. W-3, RSA 2000) • Water (Ministerial) Regulation (AR 205/1998) • AENV. Code of Practice for Watercourse Crossings
	Activities in or around navigable waters	Clearance or Approval (Canadian Coast Guard)	• Navigable Waters Protection Act (R.S. 1985, C. N-22)
	Activities that may affect Species at Risk	(ASRD)	• Wildlife Act (Ch. W-10, RSA 2000) • Wildlife Regulation (AR 143/97)
	Activities in or near fish habitat	Letter of Advice or Authorization (Fisheries and Oceans Canada)	• Fisheries Act (R.S. 1985, c. F-14) • Fisheries and Oceans Canada. Policy for the Management of Fish Habitat • Species at Risk Act (2002, c. 29)
Well Drilling	Drill and complete a well on provincial lands	Well License (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) • EUB Guide 56: Energy Development Application Guide • EUB Bulletin 2005-04
	Drill and complete a well on Indian lands	Well License (IOGC)	• Indian Oil and Gas Regulations, 1995. (SOR/94-753)
	Drilling rig operations		• EUB Directive 036: Drilling Blowout Prevention Requirements and Procedures
	Surface Casing		• EUB Guide 8: Surface Casing Depth Minimum Requirements
	Casing Cementing		• EUB Guide 9: Casing Cementing Minimum Requirements
	Casing		• EUB Guide 10: Guide to Minimum Casing Design

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
			Requirements
	Drilling Waste Management		• EUB Guide 50: Drilling Waste Management • EUB Guide 70: Drilling Waste Disposal Inspection Manual
Well Completions	Commingling Production	Commingling Approval (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) EUB Directive 65: Resources Applications for Conventional Oil and Gas Reservoirs
	Service rig operations		• EUB Guide 37: Service Rig Inspection Manual
	Completing a well for water injection or disposal	Well License	• EUB Guide 51: Injection and Disposal Wells – Well Classifications, Completions, Logging and Testing Requirements
Well Testing	Venting and Flaring	Flaring Permit (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) • EUB Guide 60: Upstream Petroleum Industry Flaring Guide (plus updates) • AENV. 2004. Alberta Ambient Air Quality Objectives
	Pressure and Deliverability Testing		• EUB Guide 40: Pressure and Deliverability Testing Oil and Gas Wells – Minimum Requirements and Recommended Practices
CBM/NGC Wells – Produced Water Measurement	Determine Water Production at Gas Wells		• EUB Directive 004: Determination of Water Production at Gas Wells
	Reduction or exemption from well testing requirements (once every 12 months)	Approval (EUB)	• EUB Directive 004: Determination of Water Production at Gas Wells
Disposal Well	Complete and operate a disposal well on provincial lands	Ministerial Approval (AENV) Well License (EUB)	• Environmental Protection and Enhancement Act • Oil and Gas Conservation Regulations (AR 151/87) • EUB Guide 56: Energy Development Application Guide • EUB Guide 51: Injection and Disposal Wells – Well Classifications, Completions, Logging and Testing Requirements
	Complete and operate a disposal well on Indian lands	Approval (IOGC)	• Indian Oil and Gas Regulations, 1995 (SOR/94-753)
Well Integrity	Well Integrity Testing, Reporting and Repairs		• EUB Interim Directive ID 2003-01: 1) Isolation Packer Testing, Reporting and Repair Requirements; 2) Surface Casing Vent Flow / Gas Migration Testing, Reporting and Repair

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
			Requirement; 3) Casing Failure Reporting and Repair Requirements.
Groundwater	Withdraw non-saline water from CBM/NGC formation	Authorization (AENV) License (EUB)	• Water Act. (Ch. W-3, RSA 2000) • Water (Ministerial) Regulation (AR 205/1998) • Alberta Environment. 2004. Guidelines for Groundwater Diversion – For CBM/NGC Development. • Alberta Environment. 2003. Groundwater Evaluation Guideline (Information Required when Submitting an Application under the Water Act). • Oil and Gas Conservation Act (Ch. O-6, RSA 2000). • Oil and Gas Conservation Regulations (AR 151/1971). • EUB Guide 56: Energy Development Application Guide.
	Produce and dispose saline water from CBM/NGC formation	License (EUB)	• Oil and Gas Conservation Act (Ch. O-6, RSA 2000) • Oil and Gas Conservation Regulations (AR 151/1971) • EUB Guide 56: Energy Development Application Guide
	Discharge of non-saline groundwater	Approval (AENV)	• Environmental Protection and Enhancement Act • Surface Water Quality Guidelines for Use in Alberta, November 1999
	Drill a water well (e.g., for drilling operations; for CBM/NGC facility utility water)	Authorization (AENV)	• Water Act. (Ch. W-3, RSA 2000) • Water (Ministerial) Regulation (AR 205/1998) • AENV 2003. Groundwater Evaluation Guideline (Information required when submitting an application under the Water Act)
Production Facilities	Construct and operate a compression or pumping facility (≥ 75 kW)	Facility License (EUB)	• Oil and Gas Conservation Regulations (AR 151/87) • EUB Guide 56: Energy Development Application Guide • AENV. 2004. Alberta Ambient Air Quality Objectives • EUB Directive 017: Measurement Requirements for Upstream Oil and Gas Operations • EUB Interim Directive ID 99-8: Noise Control Directive • EUB Guide 38: Noise Control Directive – User Guide • EUB Guide 55: Storage Requirements for the Upstream Petroleum Industry

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
			• EUB Guide 58: Oilfield Waste Management Requirements for the Upstream Petroleum Industry • EUB Guide 71: Emergency Preparedness and Response Requirements for the Upstream Petroleum Industry
	Construct and operate a compressor station	Development Permit (local municipality)	• Municipal government (local authority)
	Construct and operate a compressor or pumping station, or sweet gas processing plant (emitting greater than 16 kg/hr NOx)	Registration (AENV)	• Environmental Protection and Enhancement Act (Ch.E-12, RSA 2000). • AENV – Code of Practice for Compressor and Pumping Stations and Sweet Gas Processing Plants
	Install a boiler or pressure vessel	Registration (Alberta Boilers Safety Association)	• Safety Codes Act (Ch. S-1, RSA 2000) • Boilers and Pressure Vessels Regulation (AR 227/75) • Design, Construction and Installation of Boilers and Pressure Vessels Regulation (AR 293/94)
	Install a pressure piping system.	Registration (Alberta Boilers Safety Association)	• Safety Codes Act (Ch. S-1, RSA 2000) • Boilers and Pressure Vessels Regulation (AR 227/75) • Design, Construction and Installation of Boilers and Pressure Vessels Regulation (AR 293/94)
	Install electrical systems		• Electrical Code Regulation (AR 145/2002)
	Install fire protection		• Fire Code Regulation (AR 52/98)
	Install buildings		• Building Code Regulation (AR 50/98)
	Production Operations		• EUB Guide 64: Facility Inspection Manual
	Install on-site power generating equipment	(EUB)	• EUB Guide 28: Applications for Power Plants, Substations and Transmission Lines
	Reporting emissions	(AENV) (Environment Canada)	• AENV – Terms and Conditions of Approval issued for production facility under EPEA • Environment Canada: National Pollutant Release Inventory
Pipelines	Construct and operate pipelines	Permit to Construct License to	• Pipeline Act (Ch. P-15, RSA 2000) • Pipeline Regulation (AR 91/2005)

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
		Operate (EUB)	• EUB Guide 56: Energy Development Application Guide • EUB Guide 66: Pipeline Inspection Manual • Canadian Standards Association Standard Z662: Oil and Gas Pipeline Systems • EPEA (Ch.E-12, RSA 2000) • AENV. Conservation & Reclamation Information Letter 94-5: Environmental Protection Guidelines for Pipelines • AENV Conservation & Reclamation Information Letter 01-04: Ploughed-in Pipelines
	Construct and operate pipelines with a length (in km) times outside diameter (in mm) with an index number of 2690 or greater – in White Area	Approval (AENV)	• EPEA (Ch.E-12, RSA 2000) • Activities Designation Regulation (AR 276/2003). • AENV. 1994. Guide for Pipelines: Pursuant to EPEA. ENV-66-P
	Pipelines - in the Green Area	(ASRD)	• Project-specific Environmental Field Report or a company's Area Operating Agreement
	Release greater than 1,000 m^3 of water from hydrostatic testing of a pipeline	Notification (AENV)	• Water Act. (Ch. W-3, RSA 2000). • Water (Ministerial) Regulation (AR 205/1998). • AENV Code of Practice for the Temporary Diversion of Water for Hydrostatic Testing of Pipelines
	Watercourse Crossings	Notification (AENV)	• Water Act (Ch. W-3, RSA 2000) • Water (Ministerial) Regulation (AR 205/1998) • AENV Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body
	Activities likely to alter or damage fish habitat	Authorization (Fisheries and Oceans Canada)	• Fisheries Act (Canada Ch. F-14) • Fisheries and Oceans Canada. Policy for the Management of Fish Habitat.
	Crossing navigable waters	Clearance Statement or Approval (Transport Canada - Canadian Coast Guard)	• Navigable Waters Protection Act (Canada Ch. N-22)
CBM/NGC	Spill response	Approval	• Oil and Gas Conservation Regulations (AR

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
Operations	contingency plans for saltwater disposal well or liquid pipeline	(EUB)	151/1971) • Pipeline Regulation (AR 91/2005) • EUB Guide 71: Emergency Preparedness and Response Requirements for the Upstream Petroleum Industry
Well Suspension	Suspend a CBM/NGC well	(EUB)	• Oil and Gas Conservation Act (Ch. O-6, RSA 2000) • Oil and Gas Conservation Regulations (AR 151/1971) • EUB Directive 013: Suspension Requirements for Wells
Well Abandonment	Abandon a well on provincial lands	(EUB)	• Oil and Gas Conservation Act (Ch. O-6, RSA 2000) • Oil and Gas Conservation Regulations (AR 151/1971) • EUB Guide 20: Well Abandonment Guide
	Abandon a well on Indian lands	Written Approval (IOGC)	• Indian Oil and Gas Regulations, 1995. (SOR/94-753)
Facility Decommission	Decommission a facility	(EUB, AENV)	• Oil and Gas Conservation Regulations (AR 151/1971) • Conservation and Reclamation Regulation (AR 215/1996) • EUB Information Letter IL 98-02: Suspension, Abandonment, Decontamination, and Surface Land Reclamation of Upstream Oil and Gas Facilities
Land Reclamation	Reclaim provincial public lands used for geophysical program	Letter of Clearance (ASRD)	• Public Lands Act (Ch. P-40, RSA 2000) • Exploration Regulation (AR 214/98)
	Reclaim surface lease on provincial private lands	Reclamation Certificate (AENV)	• EPEA (Ch.E-12, RSA 2000) • Conservation and Reclamation Regulation (AR 215/1996) • AENV. Information Letter R&R/03-11: Upstream Oil & Gas Reclamation & Remediation Program – Information for Landowners
	Reclaim surface lease on provincial public lands	Reclamation Certificate (ASRD)	• Public Lands Act (Ch. P-40, RSA 2000) • ASRD. 2004. Public Lands Operational Handbook
	Reclaim surface lease on Indian lands	(IOGC)	• Indian Oil and Gas Act. (R.S. 1985, c. I-7) • Indian Oil and Gas Regulations, 1995. (SOR/94-753)
Royalties		Governs management & disposition of	• Mines and Minerals Act • Natural Gas Royalty Regulation

Activity		Approvals or Authorizations Required (Regulatory Agency)	Legislation / Regulatory References
		rights in Crown-owned mines and minerals, including levying and collecting bonuses, rentals and royalties	

Appendix E

Flaring and Venting Recommendations
For Coal Bed Methane
Final Report

Prepared by the
Flaring and Venting Project Team
for the
Clean Air Strategic Alliance
Board of Directors

March 2005

Flaring and Venting Recommendations
For Coal Bed Methane
Final Report

ISBN 1-896250-40-8

By consensus, the CASA board of directors approved this report and the recommendations within at its March 17, 2005 meeting.

Download this report from the CASA Web site library at ***http://casahome.org***.

Acknowledgements

The Flaring and Venting Project Team gratefully acknowledges the commitment and support of the volunteers who generously provided their time and energy to this project.

About CASA

The Clean Air Strategic Alliance (CASA) is a non-profit association composed of stakeholders from three sectors – government, industry and non-government organizations such as health and environmental groups. All CASA groups and teams, including the board of directors, make decisions and recommendations by consensus. These recommendations are likely to be more innovative and longer lasting than those reached through traditional negotiation processes. CASA's vision is that the air will be odourless, tasteless, look clear and have no measurable short- or long-term adverse effects on people, animals or the environment.

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Contents

Glossary of Terms and Acronyms

CAPP: Canadian Association of Petroleum Producers

CBM: Coal bed methane

CSUG: Canadian Society for Unconventional Gas

EUB: Alberta Energy and Utilities Board

Flaring: Flaring is the burning of natural gas that cannot be economically conserved.

FVPT: Flaring and Venting Project Team

Guide 60: Refers to EUB *Guide 60*, June 1999 and *Guide 60: Updates and Clarifications*, February 2001. The EUB regulates upstream petroleum industry flaring and venting according to the methods outlined in this Guide.

MAC: Multi-Stakeholder Advisory Committee, a multi-agency group led by Alberta Energy, and co-chaired by Alberta Environment, charged with reviewing and making recommendations on CBM development in Alberta.

Mcf: Thousand cubic feet

MMscf/D: Million standard cubic feet per day

NGC: Natural gas from coal

SEPAC: Small Explorers and Producers Association of Canada

Tcf: Trillion cubic feet

Venting: Venting is the release of natural gases to the atmosphere where conservation or flaring is not practical due to gas volumes being too small or incapable of supporting combustion.

1. Introduction

Coal bed methane (CBM), also known as natural gas from coal (NGC), is showing promise as an important new source of energy in Alberta. It is estimated that there is over 550 Tcf of CBM in the province. Although there are not yet many CBM wells currently in commercial production, a large number of exploratory wells are being drilled, especially in the shallow coal deposits underlying the Calgary-Edmonton corridor east of Highway 2. There were an estimated 2400 wells province-wide by the end of 2004, producing over 100 MMscf/D of CBM.

CBM has been undergoing a review since 2003 by a Multi-stakeholder Advisory Committee (MAC) led by Alberta Energy and co-chaired by Alberta Environment.[1] In spring 2004, the MAC agreed that the CASA Flaring and Venting Project Team (FVPT) should develop recommendations for the regulation of flaring and venting associated with CBM development.

In June 2004, the CASA board of directors approved the addition of the following objective to the Terms of Reference for the Flaring and Venting Project Team:

> 10. Review information and develop recommendations for the regulation of flaring and venting associated with coal bed methane/natural gas from coal development.

Stakeholders from the Canadian Society for Unconventional Gas (CSUG), the industry association for CBM development, were subsequently invited to participate in this part of the team's work.

The project team's focus was around reducing the amount of gas that flared or vented before the well produces commercially viable volumes of gas. Once approved by the CASA board of directors, the recommendations will be provided to the Alberta Energy and Utilities Board (EUB) for inclusion in *Guide 60*.[2]

2. Existing Framework for Flaring and Venting of Coal Bed Methane

A. EUB Guide 60

The EUB regulates flaring and venting for gas wells through performance and reporting requirements, permits, and data collection, as detailed in *Guide 60*. Because no significant water is encountered, dry CBM wells are tested in a manner similar to conventional shallow gas wells, and the same rules and regulations apply.[3] *Guide 60* requirements are viewed by the project team as largely adequate for testing of dry CBM wells.

Due to the extended (over one year) dewatering period required for testing of wet CBM wells, especially during early evaluation and piloting, some believe that the extended duration tests and higher volume limits for these types of CBM test wells may, in the future, require some modification to *Guide 60*.

Venting is not permitted by the EUB except in cases where the gas is not able to support stable combustion. This may occur when the gas flow rates are very low or intermittent, or when the extracted gas cannot be ignited due to insufficient energy content. Low energy content can result

[1] For more information on the work of the MAC, see http://www.energy.gov.ab.ca/335.asp

[2] *Guide 60* (June 1999) and *Guide 60: Updates and Clarifications* (February 2001) may be viewed or downloaded at http://www.eub.gov.ab.ca/BBS/requirements/Flaring/default.htm.

[3] See section 3.8 of *Guide 60*: Well Test Flare Volumes and Approval Requirements

from high levels of nitrogen being flowed back after nitrogen fracturing operations. In these cases, the gas may be vented initially but must be flared once it is capable of supporting combustion.

B. Flaring and Venting Project Team Recommendations – September 2004

In September 2004, the CASA board of directors approved recommendations put forward by the FVPT regarding well test flare management. In addition to recommendations for improved pubic notification of well test flaring activities, the FVPT agreed that flaring and venting should only be conducted long enough to determine the economic viability of gas conservation and the data necessary to size the conservation equipment.

The FVPT did not reach agreement on the length of time that this would require. It was proposed and accepted that data be gathered that would allow the duration requirements of well tests to be assessed. Where warranted, extensions would be provided for an agreed to set of reasons. If an extension is needed for a specific well, reasons for the extension should be provided to the EUB.

The Flaring and Venting Project Team is to be reconvened in Q2 2005 to review the data and develop recommendations regarding the time limit for well testing, including reasons for extensions, for implementation no later than January 1, 2006.

3. Flaring and Venting for Coal Bed Methane in Alberta

There were several issues that the FVPT considered in its review of flaring and venting for CBM:

- The definition of wet and dry CBM
- The need for different requirements for flaring and venting of a) wet and b) dry CBM
- The need for more data or information with respect to certain matters
- Nitrogen injection and its impact on flaring and venting of CBM wells

These issues and corresponding recommendations are described below.

A. An Overview of Wet and Dry Coal Bed Methane in Alberta

Each CBM basin poses its own unique challenges. In some formations, the coal is dry and CBM can be extracted in the same way as conventional natural gas from shallow formations ("dry CBM"). In other formations, the coal must be dewatered to reduce the pressure and allow the gas to be extracted ("wet CBM").

Because CBM is predominantly clean-burning methane and contains no heavy hydrocarbons, the flares are similar to the flames that burn in home furnaces, except larger in scale. Neither sour gas nor heavy hydrocarbons are associated with Alberta's CBM and therefore do not complicate testing practices for these wells.

Currently, most CBM wells are found in one of the following three CBM formations in Alberta: Horseshoe Canyon, Mannville and Ardley (see Figure 1). Due to their flow characteristics, pressures and gas quality, "dry" Horseshoe Canyon wells are analogous to conventional shallow gas wells commonly found in Alberta and comprise about 90% of the CBM well activity to date, including several commercial wells. The Mannville and Ardley formations may be wet CBM wells that require extensive dewatering periods in the early exploration and pilot stages, and must be tested for long periods to evaluate their potential. No commercial wells exist in these latter areas at this time.

B. Recommendations for Dry CBM

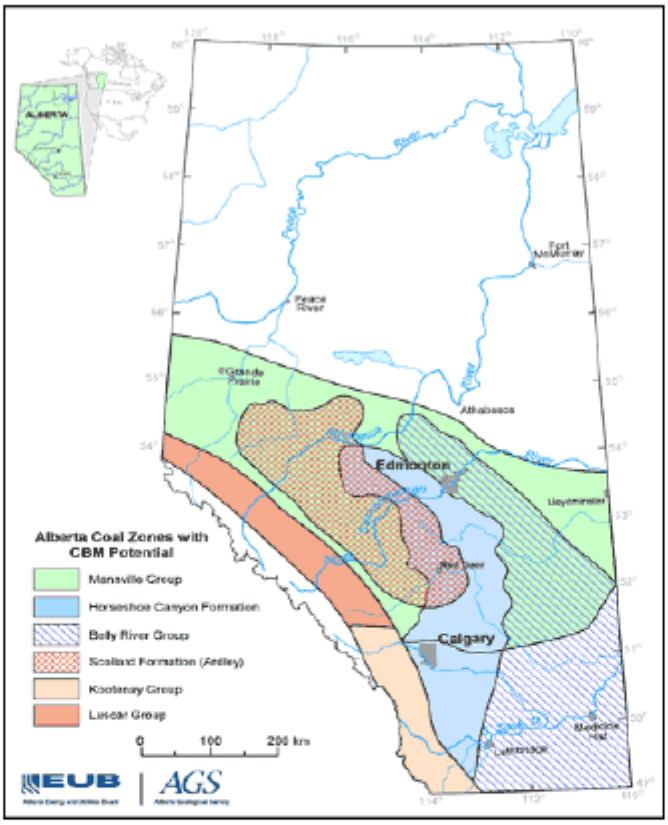

Figure 1: Alberta Coal Zones with CBM Potential (courtesy EUB)

The FVPT has classified dry CBM wells as CBM wells producing less than $1m^3$ of water per operating day.[4] As noted above, these wells are in most respects similar to conventional shallow gas wells in Alberta. Venting is not recommended and short-term flare tests with relatively small test volumes are the desired practice. Nonetheless, the FVPT agreed that additional data should be collected and that the FVPT should reconvene to review the data to determine if any additional recommendations are warranted in relation to the time period for flaring and venting of dry CBM wells.

[4] For all recommendations in this report, the water rate used to specify the difference between wet and dry CBM wells for the purposes of gas flaring or venting has no effect or relation to compliance with any requirements in the Water Act. CBM operators are required to follow the "Alberta Environment Guidelines for Groundwater Diversion for Coal bed Methane/Natural gas-in-coal Development - April 2004" whenever non-saline groundwater is anticipated to be encountered in their operations, regardless of the rate or volume of non-saline groundwater that may be produced.

Accordingly, the FVPT recommends the following:

1. The EUB, in partnership with CAPP and SEPAC, set up a program to collect one month of data on the flaring and venting associated with CBM wells producing less than $1m^3$ of water per operating day across the province. Data to be collected includes the duration of flaring and/or venting, volumes of gas flared and/or vented, and reasons if the flaring and/or venting extends longer than 72 hours.

2. The Flaring and Venting Project Team be reconvened in Q2 2005 to review the data and develop recommendations regarding the time period for flaring and venting associated with CBM wells producing less than $1m^3$ of water per operating day for implementation January 1, 2006.

3. Until January 1, 2006, for CBM wells producing less than $1m^3$ of water per operating day, flaring and venting (including clean up and testing) is limited to a total period of 120 hours for development wells and 720 hours for other wells (period is not necessarily consecutive, i.e. excludes shut-in time) per zone tested unless an extension has been specifically granted by the EUB.

4. If additional time for flaring or venting of CBM wells producing less than $1m^3$ of water per operating day is needed, the EUB must be contacted as soon as possible with the reasons for the extension, but not later than the end of the 120 or 720 hour period.

   Extensions may be granted:

   - To clean up the well bore in unique situations;
   - Where stabilized flow has not been reached; or
   - Where there have been mechanical problems with the well.

   After the well test, the well must be shut-in until gas conservation is implemented.

5. Existing flaring permit thresholds continue to apply as outlined in *Guide 60: Updates and Clarifications* available at http://www.eub.gov.ab.ca/bbs/products/guides/g60/g60-updates.pdf. This includes a permit threshold of 200 10^3m^3 for wells which are already tied in, 400 10^3m^3 for development wells, and 600 10^3m^3 for exploratory wells. These thresholds correspond to Tier 3, Tier 2, and Tier 1 as defined in *Guide 60* (see section 3.8.1, Feb 2001, *Guide 60: Updates and Clarifications*).

C. Recommendations for Wet CBM

The FVPT has classified wet CBM wells as CBM wells producing more than $1m^3$ of water per operating day.[5] Wet wells need dewatering that may take several months to determine if the well is commercial.

Accordingly, the FVPT recommends the following:

6. For CBM wells producing more than $1m^3$ of water per operating day, flaring or venting must cease (gas must be conserved) within 6 months of gas production for an individual well exceeding 100 10^3m^3 for any three-month period (approx. 1100 m^3/day). Shorter tie-in periods must be pursued whenever possible. Operators must notify the EUB as soon as gas

[5] See footnote 4

production exceeds 100 10^3m^3 for any three-month period at a CBM well producing more than $1m^3$ of water per operating day that is flaring or venting.

For CBM wells producing more than $1m^3$ of water per operating day that do not trigger the above (i.e. 100 10^3m^3 for any three-month period), flaring and venting is limited to the lesser of:

- a total period of 18 months, including the period to tie the well in, or
- a total volume of 400 103m3 for Tier 2 (development) wells or 600 10^3m^3 for Tier 1 (other) wells, per zone tested. Wells that are already tied-in would be treated as Tier 3 and allowed a maximum flare volume of 200 103m3.

7. If additional flare times or volumes are needed to test a CBM well producing more than $1m^3$ of water per operating day, the operator must make a written request for such to the EUB as early as possible and in no case later than the end of the 18 month or volume allowance flare or vent period. Any extension request must include the reasons for the extension. Extensions may be granted to allow for additional flare time or volume for reservoir evaluations or where other special circumstances warrant.

D. Nitrogen Injection and Flaring

Nitrogen gas is used by the industry to "fracture" dry CBM wells. It also makes up approximately 80% of the air that we breathe. Fracturing opens channels in the CBM formation that allow more gas to flow to the well. After fracturing the formation, the nitrogen must be flowed out of the well during a "clean-up" phase. Initially, the produced gas from the well cannot be flared because nitrogen levels reduce the energy content of the gas, rendering it incombustible. As the clean-up continues, nitrogen levels decrease, allowing ignition of the gas. The gas produced during the clean-up phase cannot be tied into sales gas pipelines because of the energy content and nitrogen concentration required by the purchase agreements specifications.

At this time, it is not known whether there are other economically feasible technologies that could be used for dry well clean-up or whether there are other technologies that can be used to remove nitrogen from dry CBM wells. One of the challenges is the continuous decline of nitrogen concentration in the gas stream as clean-up occurs.

The Flaring and Venting Project Team therefore recommends:

8. A literature review should be conducted by CAPP by May 31, 2005 to determine whether there are any methods other than flaring or venting to remove nitrogen from CBM wells.

9. Operators of wells negotiate to allow gas with higher nitrogen content to be delivered into pipelines.

4. Framework Review

In keeping with a previous recommendation regarding review of the entire flaring and venting framework in 2007, as approved by the CASA board of directors in September 2004, the FVPT recommends as follows:

10. The Flaring and Venting Project Team review the flaring and venting framework for Coal Bed Methane when it reconvenes in the first quarter of 2007.

Appendix A: Flaring and Venting Project Team Revised Terms of Reference

Flaring/Venting Project Team
Revised Terms of Reference

Purpose:

- To assess the performance and make recommendations regarding the Alberta solution gas flaring management framework.
- To develop recommendations to address a broader range of flaring and gas venting issues in Alberta.

Objectives:

1. Determine whether the solution gas flaring reduction targets for 2000 and 2001 have been met.
2. Determine, based on improved information, firm future reduction targets, time lines and threshold volumes for solution gas flaring.
3. Evaluate the royalty treatment of flared and vented gas and cost sharing programs and their implication for achieving future reduction targets.
4. Evaluate the approval process and determine if fixed term approvals are required.
5. Review performance requirements and efficiency standards, and determine the feasibility of combustion efficiency standards for all flares.
6. Assess research findings and their implication for management of flaring and venting.
7. Review information on gas venting and mitigation approaches and recommend a venting management framework, including short-term actions and long-term strategies.
8. Review and develop recommendations with regard to EUB Guide 60, and Guide 60 Updates and Clarifications document.
9. Develop recommendations for a strategy to respond to the issues associated with flaring and venting.
10. Review information and develop recommendations for the regulation of flaring and venting associated with coal bed methane/natural gas from coal development.

Note: Objectives 1-6 came from Section 6.0 of the CASA Flaring Project Team's 1998 report: *Management of Routine Solution Gas Flaring in Alberta*. To reflect the broader scope of the Flaring/Venting Project Team, objectives 3 and 6 have been expanded to include all flaring and venting, and objective 5 to include all flaring.

Context:

The Terms of Reference for this project team supports the objectives identified in CASA's *Business Plan 1999-2002*, fits well within the priorities, values, and expectations of the board, and is in accordance with the CASA vision for air quality.

Recommendations developed by the project team will reflect CASA's goals for air quality in Alberta, namely: 1) Protect the environment; 2) Optimize economic performance and efficiency; and 3) Seek continuous improvement.

Report to the CASA Board:
The Flaring and Venting Project Team will report to the CASA board of directors in September 2004, with an addendum to this report that will focus on recommendations relating to on Coal Bed Methane development to follow in November 2004.

Membership:
The Alberta Energy and Utilities Board

Alberta Department of Energy

Alberta Environment

Upstream Oil and Gas Industry, both heavy oil and conventional oil

Alberta Association of Municipal Districts and Counties

Prairie Acid Rain Coalition

Alberta Health and Wellness

Resident for Accountability in Power Industry Development

Small Explorers and Producers Association of Canada

Alberta Cattle Commission

Pembina Institute

Wild Rose Agricultural Producers

Canadian Association of Petroleum Producers

Appendix B: Flaring and Venting Project Team List of Members

Name	Organization Name
Karina Bodo	Alberta Health and Wellness
Michael Brown	Alberta Energy and Utilities Board (EUB)
Terri Carroll	Small Explorers & Producers Association of Canada (SEPAC)
Jeff Cormier	Alberta Department of Energy
Peter Davis	Government of BC, Oil and Gas Commission
Keith Denman	Clean Air Strategic Alliance
Gur Dhaliwal	Alberta Department of Energy
Randy Dobko	Alberta Environment
John Drinkwater	BP Canada
Bart Guyon	Alberta Association of Municipals Districts and Counties
Chris Hay	Imperial Oil/CPPI
Wayne Hillier	Husky Energy
Ahmed Idriss	Clean Air Strategic Alliance
Martha Kostuch	Bert Riggall Environmental Foundation & PARC
Alexander MacKenzie	Alberta Health and Wellness
John Parr	Canadian Natural Resources Limited
Ian Peace	Residents for Accountability in Power Industry Development (RAPID)
Mike Queenan (Alt)	Residents for Accountability in Power Industry Development (RAPID)
Barry Ranger	Small Explorers & Producers Association of Canada (SEPAC)
Doreen Rempel	MGV Energy Inc./CSUG
Michael Rodyniuk	Alberta Beef Producers
Chris Severson-Baker	Pembina Institute
Al Smandych	Alberta Energy and Utilities Board (EUB)
Ralph Smith	Wildrose Agricultural Producers
Jim Spangelo	Alberta Energy and Utilities Board (EUB)
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Progress Update

Coalbed Methane Multi-Stakeholder Advisory Committee (MAC) Recommendations

June 2007

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Executive Summary

The Coalbed Methane (CBM) Multi-Stakeholder Advisory Committee (MAC) was formed in November 2003 as part of a review and consultation initiated by the Department of Energy (DOE) on coalbed methane. The MAC's Final Report, released to the public in May 2006, contained 44 recommendations to improve existing rules and regulations related to CBM development or to identify areas for further study. Some of the identified issues were unique to CBM, but many others related to broader energy development and may also be linked with other initiatives already underway.

As of March 31, 2007, work had started on 36 of the 44 recommendations, including five recommendations that were completed. This is ahead of the schedule laid out in the government's news release issued on May 11, 2006, which stated that work would begin on 32 of the 44 recommendations during the 2006/07 fiscal year. The following table summarizes the status on recommendations at the end of the fiscal year:

5	Complete
31	Work started
5	Scheduled to start in 2007 or beyond
1	Reviewed and not actioned
2	Not accepted
44	Total recommendations

Work undertaken in the first year targeted higher priority issues related to water protection. Some of this work required extensive collaboration and coordination between ministries. Highlights include:

- Developed a new regulatory framework for water diversion,
- Mandatory water well testing offered for water wells within 600 meters of a CBM well, and
- Increased information gathering and expanded surveillance of groundwater and CBM well-produced water.

Some initial action was also taken in the areas of communication and reducing surface impacts associated with CBM development.

A multi-stakeholder group called the MAC II was formed in September 2006 in response to the recommendation for annual reviews for three years to assess progress related to the recommendations. MAC II stakeholder membership is identical to the MAC, although individual stakeholder representatives may differ (see Appendix B).

Non-government members of the MAC II were provided with an opportunity through a feedback questionnaire to give their views on progress and to review and provide comments on draft versions of the report. Generally, respondents were satisfied with the progress made. For the most part, they indicated that their expectations were either met or exceeded. They considered the first year of progress to represent a strong start in ensuring continued responsible CBM development in Alberta.

While some respondents were pleased with the rate of progress for all the recommendations, others highlighted a few areas where they had hoped for a more speedy implementation, for example, of water-related issues such as the development of a Code of Practice, groundwater mapping, thresholds for regulation of non-saline water diversions, and some land-use related issues. Water, and to lesser extent, land issues should continue to be priority items, according to respondents.

Most respondents believed that the MAC II process was both fair and effective in allowing members to review and monitor progress.

Generally, most MAC II members expressed support for the government's commitment to addressing the Final Report recommendations. They appreciated the government's efforts to keep them informed and updated on the many technical and non-technical issues related to CBM development in Alberta. They reiterated their belief that water-related issues were still considered the most important priority.

Background

The MAC was formed in November 2003 as part of a review and consultation initiated by the DOE on coalbed methane. The purpose of the review was to determine if the existing policy and regulations governing CBM development continue to balance economic benefits with protecting Alberta's water, air and land resources, and minimizing landowner impacts. The MAC's role was to consult with stakeholders and develop recommendations to enhance the rules and regulations associated with CBM development.

MAC members represented environmental and agricultural organizations, landowners, local governments, the energy industry, and provincial government departments and agencies. The departments of Agriculture, Food and Rural Development (now Agriculture and Food); Environment (AENV); Sustainable Resource Development (SRD); DOE and the Alberta Energy and Utilities Board (EUB) collaborated in this process.

The MAC's Final Report, released to the public in May 2006, contained 44 recommendations. Some of the identified issues were unique to CBM, but many others related to broader energy development and may also be linked with other initiatives already underway. The MAC acknowledged there may be insufficient resources to action all the recommendations at once and technical reasons why the outcomes from the completion of one recommendation may be needed before moving ahead with another. To assist government, the MAC proposed nine recommendations for early action. These early action recommendations formed the basis of a cross-ministry implementation strategy. The strategy addressed the MAC's recommendations using four key areas to guide and coordinate work, as well as to report on progress:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

Formation of the MAC II

One of the MAC's recommendations called for a multi-stakeholder group to review progress towards addressing the Final Report recommendations. Recommendation 7.6.1 stated:

> *As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components:*
> - *Annual reviews for three years to assess progress according to a monitoring plan.*
> - *A second overall review in three years to assess:*
>
> *1. The effectiveness of the recommendations,*
> *2. New issues or information, and*
> *3. An assessment as to whether additional recommendations may be needed.*

A multi-stakeholder group called the MAC II was formed in September 2006 to carry out this recommendation. Although this committee was initially envisioned as a 'pared down' version of the MAC, there was strong interest from all the stakeholder groups who participated on the MAC to continue to be involved, so MAC II stakeholder membership is identical to the MAC, although individual stakeholder representatives may differ.

The MAC II met three times since September 2006 to review and monitor the progress achieved related to the recommendations. At these meetings, an action plan providing status and specific timelines for each recommendation was provided. This action plan was updated on a continual basis. At the MAC II meetings, government representatives from the various involved departments were available to answer questions from members and provide supplemental background information.

This report is the first progress update on the Final Report recommendations. The progress update covers a 10-month period from May 2006, when the report was released, to March 31, 2007, the end of the government's fiscal year. The report is part of the MAC II's commitment to keep the public informed – one component of a number of communications activities being undertaken to inform Albertans about CBM.

The following sections contain progress highlights, as well as feedback from non-government members of the MAC II.

Progress Highlights

This section provides a high level summary of the key activities undertaken by various government departments, agencies and other groups in addressing the MAC's recommendations. Overall, progress has been made on 36 of the 44 recommendations, including all nine early action items. Work has been completed on five recommendations. Only two MAC recommendations related to royalty and tax incentives were not accepted by the Alberta Government. Another recommendation, to include additional mineral rights information in the Land Titles Registry, is not being actioned based on a subsequent review of the liability and limitations associated with disclosing such information by Service Alberta, the department responsible for the Land Titles Registry. Action on five remaining recommendations is scheduled to begin later in 2007 and beyond. The following discussion summarizes key 2006/07 activities in the four focus areas. Please see Appendix C for a complete list of recommendations and status updates.

1. Protecting Water Resources

Thirteen recommendations in the MAC's Final Report were related to the management of CBM development to protect surface and groundwater quality and supply through coordinated, risk-based processes. Work is underway on all 13 recommendations, including four early-action items.

Three-Tiered Process for Water Diversions

CBM development involving the production of non-saline water must comply with AENV's water diversion application process under the *Water Act*. Two recommendations (3.3.1, 3.3.2) focused on ways to improve or strengthen this process by adopting a risk-based decision tree. In response to these recommendations, AENV is developing a three-tier process to regulate non-saline produced water diversion. A key element of the system is the use of threshold water usage levels to determine whether an approval, a registration pursuant to a Code of Practice, or no authorization from AENV is required.

The following interim threshold levels developed by a sub-committee of the MAC will be used in the decision tree process until scientifically-based levels are determined:

1. **AENV approval** will be required for water diversions greater than 30 cubic metres (m^3) /month per well – or when the cumulative discharge of all CBM wells in a section of land exceeds 100 m^3/month.
2. **Registration under a Code of Practice** will be required for water discharges lower than 30 m^3/month and greater than 5 m^3/month.
3. **No authorization** will be required for water production volumes lower than 5 m^3/month, given its small volume.

Code of Practice

A Code of Practice is being developed in response to recommendation 3.3.1. Code of Practice concepts were discussed at a multi-stakeholder workshop held in December 2006. There was sufficient agreement on the concepts and endorsement to proceed with drafting the Code of Practice. A draft Code of Practice is expected to be completed by spring 2007.

Water Diversion Guidelines

The MAC indicated that the existing AENV guideline for water diversion should be reviewed and enhanced to ensure the principles of protecting aquifers are clear and minimum approval conditions are consistent across the province (recommendation 3.3.3). An updated version of the 2004 Guideline for CBM Water Diversion will be released with the Code of Practice for water diversion. Both the Guideline and Code of Practice will be revised again when the beneficial use policy(ies) and the scientifically derived threshold values are developed.

Drawdown Allowances

In support of an approval to divert water, companies must submit a field-verified survey of water wells, dugouts and springs within 1.6 km of the energy well. Information is also required about anticipated water production levels and the potential effects on adjacent water wells. In response to recommendation 3.3.4, drawdown allowances as a result of CBM depressurization will continue to be addressed as part of the AENV approval process.

Water Sampling

EUB Directive 44 issued in October 2006 addressed surveillance of potentially non-saline water production and accurate water sampling for all CBM wells completed above the Base of Groundwater Protection (BGWP) (recommendation 3.3.5). In these cases, the company must sample the water, investigate the source of the water and provide a mitigation plan. This may result in abandoning wet zones. Where a company wishes to continue to produce, AENV authorization is required. AENV is working with the EUB to use this data to ensure companies acquire the appropriate AENV authorization.

Beneficial Use of Produced Water

The MAC agreed that the potential for treatment and use of non-saline and marginally saline produced water should be investigated (recommendations 3.5.1, 3.5.2, 3.5.3). AENV, in partnership with the Alberta Energy Research Institute, PETAC and DOE, has initiated a study on beneficial use of produced water. The study, which is scheduled for completion by spring 2007, will provide:

- an estimate of produced water associated with energy development in the province;
- a review of legislation or policy relating to beneficial use in Alberta and adjoining provinces;
- a review of produced water management technologies; and
- a discussion on regulatory and civil risks associated with beneficial use of produced water.

The results of the study will be used in multi-stakeholder workshops on beneficial use of produced water, which will probably be held in the fall of 2007.

Drilling and Completion Practices

The MAC included recommendations in its Final Report to ensure the continued effectiveness of EUB requirements to protect aquifers and water wells (recommendations 3.3.7, 3.4.1 and 3.4.2). In January 2006, in advance of the final MAC report, the EUB issued Directive 27 on shallow fracturing, which initiated a multi-stakeholder technical committee to review current practices and information, and to advise on the need for new requirements. The committee retained the University of Calgary to review industry's technical evidence and provide a third-party assessment and estimate of fracturing propagation vertically and horizontally. The EUB imposed interim controls for shallow fracturing pending the conclusion of the review.

There have been ongoing literature reviews of the potential impacts from using untreated water for drilling and completion. While this work did not demonstrate any technical need for new requirements, a study by third party experts will commence in 2007/08, followed by the release of a public report. The EUB also updated Directive 36 in February 2006 to address non-toxic drilling and completion components.

Water Well Testing

Effective surveillance is an important component of a regulatory framework along with strong technical requirements and a risk-based application process. In this regard, AENV issued a provincial baseline water well testing standard in May 2006 (recommendations 3.3.5 and 3.3.6). Under the standard, companies wanting to drill shallow CBM wells must offer testing to landowners on any active water well within a 600-metre radius of new or recompleted CBM wells above the BGWP. These baseline tests must measure the water well's production capability, water quality (including bacteria) and the absence or presence of gas (including methane gas). Baseline testing requirements are regulated by the EUB according to Directive 35. Application audits show high industry compliance. Non-compliance will be enforced in accordance with EUB Directive 19. AENV is collecting the well testing results and compiling them in a database, which will eventually be available to the public.

The water well baseline testing standard requires operators to offer to sample water wells before work starts on drilling a CBM well. The water wells are sampled again only in situations where there is a complaint or other situation that suggests there may be an impact from CBM activity. A key MAC recommendation (3.3.6) was that a clear process for addressing water well complaints be developed and communicated to stakeholders. In response, AENV completed a fact sheet on the complaint process, which is posted on its website. Work is continuing with the EUB, SRD and the Farmers' Advocate to improve the government's response to all water well complaints, not only those involving CBM.

AENV released a gas sampling protocol in June 2006, which provided guidance to industry on gas sampling requirements for baseline testing (recommendation 3.3.5). AENV also retained the University of Calgary to conduct a study on the merits of free gas sampling versus dissolved gas sampling. The study is expected to be completed by spring 2007.

The government committed to review baseline data on a regular basis to ensure the water well baseline testing standard is working. To that end, a Scientific Review Panel was established in September 2006 to review the data and recommend areas for improving the baseline testing standard. A report summarizing the Scientific Review Panel's findings and recommendations is expected in December 2007. Outcomes from this review and information from the expanding databases will be used to further study the potential for methane migration or release to water wells as a result of CBM depressurization (recommendation 3.6.1).

The AENV and EUB have aligned their processes for baseline water well testing and conducted preliminary discussions on opportunities for data sharing. This continues the enhancement of coordination activities and is the first step in the development of electronic solutions to facilitate data exchange. Development of a large-scale, public, user-friendly database is a long-term goal (recommendation 3.3.6).

2. Enhancing Information and Knowledge

The MAC recognized that Alberta-based CBM water information can help guide the future actions of regulators and industry. Considerable effort has been made in the first year to address this category of MAC recommendations.

Mapping BGWP and Groundwater Inventory

Alberta's groundwater is not as well-defined as its surface water and the MAC recommended that BGWP mapping should be completed (recommendation 3.2.1). The BGWP database provides data on a township basis and is used, for example, by energy companies to comply with the EUB's resource well drilling and completion requirements.

Documenting groundwater quality, water volumes and depths of producing zones is a challenging process. However, the locations of some major aquifers in the province are generally well known, as a result of groundwater mapping initiatives such as the following:

- In the mid 1960s, the Alberta Research Council commenced a reconnaissance groundwater mapping program of the province. These maps provide information about geology, groundwater quality and quantity, and groundwater flow. The mapping was completed in the mid-1980s.
- In 1995, the Prairie Farm Rehabilitation Administration under Agriculture Canada initiated a more detailed groundwater mapping program in the agricultural areas of the province. Reports were prepared in conjunction with local municipalities.
- The Alberta Research Council, the Alberta Geological Survey (AGS) and AENV have prepared many mapping and groundwater assessment reports for local areas in the province (e.g., the Cold Lake – Beaver River Groundwater Study, and AENV's groundwater mapping project in the Canmore Corridor area of Alberta (2002)).
- In 2006, the Geological Survey of Canada completed a study of the hydrogeology of the Paskapoo formation, a major aquifer in central Alberta.

AENV has retained the AGS to update the BGWP database. The goal is to create a web-based tool that will provide users with the depth of the BGWP for any location in the province on a legal subdivision basis. This will help operators easily determine the BGWP for a specific well without having to contact the government. The AGS has completed its work and a public notice will be issued in the spring 2007. The updated BGWP database will be accessible to the public through a website maintained by the EUB.

In response to MAC recommendation 3.2.1, AENV initiated a project in the summer of 2006 in partnership with the EUB/AGS to increase the understanding of the shallow geology and the potential impacts from drawing water from Ardley coals on the water level of the overlying Paskapoo aquifer. Scheduled to be completed in two years, the project is being guided by a steering committee chaired by the AGS. The initial stage of the project involved gathering prior research and the data from hydrogeological/water well and geological/petroleum industry databases from which the stratigraphic framework will be constructed (i.e., AENV water well database). The project will provide information on groundwater quality and quantity in the Ardley and overlying Paskapoo formations and be used to evaluate the risk of CBM development to groundwater quality and quantity in the area (recommendation 3.6.1).

Another three-year study has been initiated to update information on the province's groundwater resources. The objective of the study is to use current information to classify, identify and delineate aquifers in the province. The first phase of the work involves consultation with experts in groundwater management from Alberta and other jurisdictions. A workshop is planned in the spring 2007 with these specialists to discuss an appropriate aquifer classification system. Once the classification system is finalized, groundwater mapping will commence, starting with the Edmonton-Calgary corridor.

To further expand available information, the EUB issued Directive 43 in December 2006, requiring geophysical logging behind surface casing for all new wells (recommendation 3.3.6). This additional geophysical knowledge will be particularly useful for future groundwater mapping exercises, such as those mentioned above. The information will also be useful in water well complaint assessments.

The EUB also identifies and tracks all CBM wells in EUB Bulletin 2007-05. The geology and well producing characteristics are analyzed to better understand the CBM resource, reserves, and its potential risk to water.

Water Well Monitoring

AENV maintains a province-wide groundwater observation well network to monitor groundwater levels and groundwater quality in aquifers that have a potential to be used for water supply purposes. This network consists of approximately 200 observation wells, ranging in depth from 60 to over 250 metres. In addition, groundwater is also monitored in the vicinity of reservoirs, rivers, lakes, dams and oil sand developments to determine impacts on local groundwater systems.

The MAC recommended AENV expand its provincial groundwater monitoring program (recommendation 3.2.1). In this regard, AENV has completed four new groundwater observation wells in the Ardley coal zone and three wells in the Rosebud area. AENV is continuing to work with industry and other organizations to identify suitable industry-owned observation water wells that could be donated to the province for incorporation into the provincial system. In the past year, approximately five wells from industry/other organizations have been donated.

In the summer of 2006, AENV completed a review of the provincial observation well system to identify observation wells in CBM activity areas that could be sampled. A total of 40 wells were identified as suitable for water and gas sampling. Approximately 30 of the wells were sampled by the end of February 2007. A report on the results of the sampling is expected to be completed by spring 2007. Work is continuing to identify which observation wells will be sampled during the next fiscal year.

CBM Review of Other Jurisdictions

Reviewing other jurisdictions as recommended by the MAC (recommendation 8.1.2) is a common feature of technical regulatory reviews. An example of this type of work is EUB Directive 27 on shallow fracturing, which included a full literature review of fracturing technology and a review of related regulatory practices in other jurisdictions. Additional reviews of the experiences, practices, and policies for CBM development in other

jurisdictions will take place on an ongoing basis by the EUB, AENV and others. Alberta will also host other jurisdictions in their endeavours to learn from our experiences.

3. Minimizing Surface Impacts

The MAC's recommendations on minimizing surface impacts range from activities associated with local improvements to looking at potentially major changes resulting from reviews of province-wide land use policy. There are a number of diverse activities that are advancing progress on recommendations in this area.

Integrated Land Management

Work is currently underway on Integrated Land Management (ILM), a priority government-led policy initiative addressing all types of access on public lands (recommendation 4.3.1). Six ILM multi-stakeholder working groups were established to provide direction on key components of the ILM process (principles, protocols, incentives, stewardship, governance, measures). Results were presented at an ILM Workshop held January 22 to 24, 2007. Final recommendations are expected to be completed by July 2007. An initiative to establish a pilot area in northeastern Alberta is also underway, but has been delayed pending the outcomes from the ILM Program and Land-use Framework. This pilot area is not in a region specifically targeting CBM, but there may be consequences for CBM operators.

Project-Based Planning

The EUB has initiated a 'land challenge' project for intense development, including CBM, in response to broad stakeholder feedback. The project is testing different ways of enhancing and promoting project-based planning and disclosure, early community engagement and other options to ensure appropriate development and land access. A series of pilots involving landowners, operators and local government is being conducted. The first two pilots addressed potential Horseshoe Canyon CBM development in two separate one-township blocks east of Carstairs and Innisfail. Recognition and inclusion of CBM in the land challenge project is the EUB response to MAC recommendations 7.2.1 and 7.3.1. It also contributes to recommendations 7.5.1 and 4.2.1, both of which focus on how to minimize surface impacts due to CBM development.

Addressing Cumulative Impacts

A new format for SRD Area Operating Agreements has been implemented and further work is being done on risk management, quality assurance and compliance. Approvals are being issued under the new format. A process for electronic submission of monthly status reports is currently being developed.

The MAC also recommended that the EUB, AENV and SRD review all of their regulatory processes to identify ways to minimize surface disturbance and reduce cumulative impacts associated with CBM development (recommendation 4.2.1). Early action taken on this recommendation is reflected in EUB Bulletin 2006-44, which introduced new rules on commingling of different pools in the same wellbore. These new rules will promote both appropriate resource conservation and reduced surface impacts, as commingling generally minimizes the number of wells needed to recover resources from multiple stacked intervals. The changes also decrease the regulatory requirement for segregated pool tests, further reducing the need for companies to access land during general operations.

Reclamation

The University of Calgary completed a study on Foothills fescue reclamation (recommendation 4.3.2), which called for improvements to the technology used for remediation and reclamation of land in sensitive areas. The report provides information and background on current and possible future reclamation criteria. The report also contains key findings that can assist industry in planning and reclamation methods for rough fescue grasslands. The report (Restoration of Rough Fescue (Festuca Campestris) Grassland on Pipelines in Southwestern Alberta) was printed in June 2006 - Publication No. T/121 - ISBN: 07785-4830-9 (Online Version) ISBN: 07785-4829-5 (Printed Version)

In addition, industry will continue to consult with SRD to minimize disturbance to wildlife habitat on a project-specific basis, as identified in recommendation 9.6.1.

Short-term Noise

The Canadian Association of Petroleum Producers (CAPP), along with stakeholder input, has developed a best practices manual for CBM. Many of the recommended practices focus on ways to reduce the environmental footprint of industry, such as ways to address short-term noise complaints (recommendation 9.2.1).

4. Communication and Consultation

The focus of these recommendations is to increase opportunities for dialogue and public awareness on possible impacts of CBM development so that Albertans are better informed and engaged. Of the 18 recommendations in this category, 11 are on schedule, five are complete, one is to start in 2009, and one will not be actioned.

Public Awareness

Government and industry have developed considerable Alberta-based CBM information, which is available on the DOE and EUB websites (recommendation 7.5.1). Albertans no longer need to access U.S. information which may not be relevant to Alberta's geology and regulatory framework. Examples of the type of information available include extensive CBM geological, water and resource work by the AGS (e.g., EUB/AGS Special Report 081: Water Chemistry of Coalbed Methane Reservoirs) and Alberta CBM activity tracking and annual reporting by the EUB (e.g., Bulletin 2007-05: 2006 Alberta Coalbed Methane Activity Summary and Well Locations).

Regulators, industry and associations have been very responsive to local groups' invitations to speak at meetings and at other events. AENV, in partnership with the EUB, the Farmers' Advocate and industry, led 13 community information sessions in June 2006 to provide information on water issues related to CBM production. The sessions were extremely well attended by landowners. Information sessions continue to be provided on a request basis. AENV is partnering with Agriculture and Food and the Prairie Farm Rehabilitation Association to develop water well maintenance training sessions for water well owners. The intent of the sessions is to increase public awareness of groundwater, of water well construction, and of the importance of water well maintenance. Two training sessions were delivered by the end of March 2007.

Timing Requests

Further to MAC recommendation 9.3.1, the EUB will continue its practice of considering the timing requests of surface rights holders or leaseholders during critical agricultural periods when scheduling hearings.

Industry Advice

EUB's Directive 27 summarizes the rules related to water protection. Consultation with companies involved numerous one-on-one discussions with operators to clarify requirements and confirm their understanding and commitment to comply with the directive (recommendation 3.4.1).

Split Title Ownership Information

The DOE posted new material on its website in December 2006 to provide stakeholders with information on the history of mineral ownership and freehold rights. The information also discusses issues pertaining to CBM ownership on split-title lands (recommendation 6.2.1).

In Decision 2007-024, the EUB confirmed that 28 CBM well licences and related approvals in split-title situations were properly issued to the natural gas holder. In its decision, the EUB acknowledge the ultimate authority on ownership of CBM belongs to the courts. (http://www.eub.ca/docs/documents/decisions/2007/2007-024.pdf)

Non-Productivity Notices

The DOE has also reviewed and validated the procedures and policy regarding the criteria for Section 18 Notices of Non-Productivity (recommendation 6.3.1) and is currently consulting within the department on the matter. If required, an external industry consultation to review and clarify non-productivity notices will take place toward the end of 2007.

Well Spacing Information

In response to recommendation 7.5.3, additional information is now available on EUB spacing rules, a common source of questions from the public. The EUB included a well density clause in its spacing/holding applications in the fall of 2005 which clarified an area of public concern. The EUB has also added an explanation on 'number of wells per section per pool' to its Frequently Asked Questions on spacing on its website

Setback Information

The issue of clarifying and communicating the requirements, roles and responsibilities related to setbacks (recommendation 7.5.4) has been referred to Municipal Affairs and Housing (MA&H) and the EUB, who are compiling a list of setbacks for CBM facilities and equipment. MA&H is also working with its Emergency Management Alberta and Public Safety Division to assist with Canadian Standards Association-recommended standards.

Mapping Tool

The DOE is developing an online mapping tool prototype to display the results of the most recent petroleum and natural gas sales data (recommendation 9.4.1). In addition, current instructions on the DOE's website on how to conduct an information search by land or by mineral agreement are under review for simplification opportunities (recommendation 9.4.2).

Land Agents

Human Resources and Employment (now Employment, Immigration and Industry) has drafted new regulations to provide more stringent standards of conduct, education and continuing competency requirements for land agents (recommendation 9.5.1).

The Canadian Association of Petroleum Landmen has also initiated a voluntary certification program for agents.

Land Titles Information

Recommendation 9.7.1., to include additional mineral rights information in the Land Titles Registry, was considered by Service Alberta. Based on a review of liability and limitations on disclosing such terms, Service Alberta decided that no changes would be implemented to the existing database.

Best Practices

The MAC identified a need to enhance industry practices that go beyond regulatory requirements (recommendation 8.1.1). To this end, with stakeholder input, the Canadian Association of Petroleum Producers (CAPP) developed a best practices manual for CBM. This manual was issued in May 2006 and is posted on CAPP's website (www.capp.ca). Workshops will be held at four locations in Alberta during May 2007 to communicate the best management practices to the public as well as to industry field personnel.

Other

The Final Report identified the need for sufficient financial and human resources to successfully address the recommendations (recommendation 7.7.1). The MAC also noted it would be impractical to begin work on all recommendations immediately. The government has placed a high priority on addressing recommendations through effective and efficient allocation of resources. This is demonstrated by work having commenced on 36 of the recommendations in the first year, rather than the 32 recommendations identified in the initial action plan released May 2006. The government will continue to evaluate progress and resource requirements to ensure appropriate levels of resources are available to action the recommendations.

Non-Government MAC II Members' Feedback

The following section reflects feedback from non-government MAC II members on the progress achieved to date in addressing the final recommendations. This feedback was gathered through the distribution of a questionnaire and subsequent comments on draft reports. The majority of non-government organizations submitted feedback questionnaires. However, not all the responses were provided in detail. The input from non-government members who provided a response is summarized below in the four main recommendation categories:

1. Protecting water resources
2. Enhancing information and knowledge
3. Minimizing surface impacts
4. Communication and consultation

The feedback is separated into two groups (see Appendix B):

1. feedback from non-industry members, such as landowner and environmental groups and
2. feedback from industry members, which includes energy industry associations members.

Protecting Water Resources

The Final Report of the MAC identified protecting water resources as a significant concern related to CBM development. Water-related recommendations include establishing a more rigorous regulatory process to address CBM operations that potentially pose a greater risk to non-saline water resources. The development of standard procedures and reporting requirements for sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected water wells is also important. Protection of water resources continues to be a major concern and a priority for all respondents.

Non-Industry Feedback

Respondents were pleased with the progress so far related to the actioning of water-related recommendations, but hoped that target dates for some recommendations could be moved ahead, for example developing a technical and scientific approach for the Code of Practice and thresholds associated with non-saline water situations, as well as recommendations related to the study of the potential for methane migration and possible impacts of CBM on surrounding aquifers.

Some respondents believed that lack of sufficient resources and/or the challenges of multi-department/agency coordination were responsible for the slower-than-desired progress in some areas. They encouraged government to look for ways to improve the work environment to foster more timely action. They recognized the hard work of AENV staff, but believed more resources are needed.

There was concern raised by one respondent that while major actions have been undertaken, some of the sub-recommendations do not appear to be completely addressed. One respondent raised their concern about lack of enforcement by the EUB, related to the requirement for water well monitoring by industry.

Industry Feedback
Generally, industry respondents were satisfied with the progress. One respondent noted that the government was either on schedule or ahead of schedule for the vast majority of recommendations. Other industry respondents had concerns about the completion schedules of some recommendations. For example, some of the recommendations are scheduled for completion in 2012, in particular, the groundwater inventory. It was suggested that this timeframe be moved up, if possible.

One respondent indicated that industry has some specific concerns regarding the effective conservation and management of Alberta's water resources. Those concerns include:

- In order to create a complete inventory of groundwater in the province, all water wells should be registered. If unregistered wells are excluded, the inventory cannot be complete.
- Well owners who have not registered their wells should not expect to be afforded the rights associated with registered wells.
- AENV's recent clarification regarding drawdown allowances (recommendation 3.3.4) and communication of the existing rules have been misleading. AENV needs to be clear that drawdown allowances apply to all water wells, not just to the wells belonging to industry.

It was noted by an industry representative that CBM is a minor player with regard to using water resources, but that it could serve as a catalyst to get more broad-based attention and action on water-related issues involving other water users.

Enhancing Information and Knowledge

The MAC indicated in its Final Report that more information and knowledge is required in order to ensure the continued responsible development of CBM in the province. For example, there was an 'umbrella' recommendation to improve scientific information about the province's water resources, including completion of a groundwater inventory and the BGWP mapping project, and obtaining baseline water data on quality and quantity in non-saline aquifers. As well, more scientific information is needed to develop a threshold volume of produced water below which a simplified Code of Practice will apply.

Non-Industry Feedback
While feedback on this topic was limited, there was a general sense that more effort was required to acquire information more quickly, for example:

- determining a technical and scientific approach for thresholds for a Code of Practice;
- groundwater mapping (especially in the Ardley zone);
- creating the public water well database; and
- creating the consolidated public CBM database.

Information needs to be gathered prior to any increase in CBM activity, according to one respondent.

Industry Feedback
One respondent believed that this category needs improvement on all fronts. Another respondent indicated that accurate data collection depends on incorporating data on water use by all parties. It is believed that there are over 400,000 unregistered water wells in the province today. These wells represent a significant withdrawal of water that remains unrecognized in the collection of data and will prevent the completion of an accurate groundwater inventory.

Minimizing Surface Impacts

Concern about surface impacts related to CBM operations in the MAC Final Report focused on recommendations that addressed the need to protect the environment and minimize cumulative impacts. For example, the MAC recommended that the CBM regulatory process promote project-based planning to manage potential long-term surface impacts.

Non-Industry Feedback
Some respondents indicated that some recommendations were moving along too slowly, especially those related to identifying sensitive areas, public lands and agricultural lands, as well as minimizing cumulative impacts. It was noted that it was not clear how much was being done with regard to agricultural lands other than addressing well spacing and reclamation issues. One respondent indicated that there needs to be immediate action to identify environmentally sensitive and threatened areas within regions of CBM activity, as well as baseline studies.

Suggestions were made to move up some of the milestone dates related to specific recommendations and to ensure that areas with CBM development are addressed more quickly under SRD's Integrated Land Management Program. It was also suggested that additional resources for SRD would help speed progress.

Industry Feedback
Industry respondents were generally satisfied with the progress of recommendations related to land use and surface impact. One respondent indicated that industry is not convinced that the current ILM process has recognized CBM concerns because no clear reference is provided in recent documentation. It was noted that the ILM process only addresses Crown lands and that CBM operations occur almost entirely on private lands. This respondent agreed with some non-industry respondents that this process is moving too slowly. The same respondent questioned whether the EUB's Land Challenge pilot project was a direct result of the MAC recommendations and believed that CBM was not the key rationale behind the choice of locations for the pilots.

Communication and Consultation

The MAC's Final Report addressed the need for enhanced communication and ongoing consultation on CBM-related topics with all stakeholders, including members of the public.

Non-Industry Feedback
Respondents highlighted the MAC II itself as a communication tool, noting that the MAC II process has been an effective forum for exchanging information and addressing concerns. It was noted that this report is one way to inform the public on CBM issues on an ongoing basis.

The recommendations relating to promoting communication and consultation need to be addressed more effectively, according to some respondents. One respondent requested more detail on the actions undertaken in the progress reports they receive. Another respondent noted that it was very important that landowners be kept abreast of Best Management Practices and what can be expected prior to development.

Industry Feedback
One industry respondent was pleased with the commitment of all MAC II members to communication and understanding during the MAC process, but indicated that improvement was needed on a number of fronts. It was noted that some stakeholder organizations were acting as catalysts for positive change, but there were other organizations that seemed unwilling to engage in meaningful exchanges. Another respondent believed that recommendations related to project-based planning and disclosure, public consultation notification distances, and accessible current public information and communication were very important issues that, once addressed, will go a long way toward improving public understanding of the oil and gas industry and interaction between all parties at the table.

Other Recommendations

A number of industry and non-industry respondents shared a concern about possible delays associated with some recommendations. One respondent believed that the slower progress than desired was likely due to the complexity of the recommendations, requiring greater coordination among the different government departments and agencies involved. Another respondent questioned whether the slower than desired progress was due to insufficient resources available in the government departments, and wondered whether recommendation 7.7.1 had been adequately addressed. This recommendation states:

> *Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.*

The MAC had understood that to address all the accepted recommendations in a timely manner would require additional resources for some departments and agencies. Possible staffing shortages for SRD and AENV were specifically mentioned.

Additional Comments

A number of respondents suggested undertaking actions that were not explicitly identified in the Final Report or associated with specific recommendations. These suggestions are considered to be out-of-scope with respect to the initiatives and work undertaken by the MAC II (see Appendix A).

Next Steps

This public progress summary report provides an update on the first year of addressing MAC Final Report recommendations related to CBM development in Alberta.

It reflects the ongoing commitment on behalf of the MAC II, government and industry to an open and transparent process. It is clear from the work completed and commitment to continue to address outstanding issues that all parties have placed a high priority on actioning the recommendations from the MAC process. The government anticipates there will continue to be a strong focus in the coming year on addressing water-related issues and the environmental impacts associated with CBM operations.

In an effort to continue to have an open and transparent process, further public updates will be provided as work continues to address the recommendations. The MAC II will continue to meet to monitor government and other stakeholder activities related to addressing the MAC's recommendations.

Appendix A Out-of-Scope Issues

Some examples of the out-of-scope suggestions identified by non-government MAC II members include:

- Report to the public on specific problem water issues once they have been resolved as a way of helping educate stakeholders.
- Expand water-related recommendations to encompass all water users, not just CBM developers.
- Expand activities related to water well testing, e.g., develop quality assurance/quality control measures and a process to handle water well complaints, as well as require operators to establish a 'monitoring water well' if there is no existing well to collect baseline water data.
- CAPP's Best Practices Manual should be reviewed and updated every few years and best practices should be enforced.

In addition, one MAC II member indicated there was a bias of information developed to address the split title ownership recommendation that was posted on the DOE web site. The purpose of the information was to make Crown lessees, freehold owners and industry aware of the risks and associated impacts associated with split title ownership. According to the respondent, the information presents the position of the Tenure Working Group, one component of the three-year CBM consultation and review. The respondent believed that this information as well as other issues were not adequately or fairly addressed because the Tenure Working Group did not include representation from freehold landowners.

Appendix B MAC II Membership

Non-Industry Members:

- Alberta Association of Municipal Districts & Counties (AAMD&C)
- Alberta Environmentally Sustainable Agriculture Council
- Alberta Surface Rights Federation
- Butte Action Committee
- Freehold Owners Association of Alberta
- The Pembina Institute
- Alberta Beef Producers

Industry Members:

- The Coal Association of Alberta
- Canadian Association of Petroleum Producers/Canadian Society for Unconventional Gas (CSUG)/Small Explorers and Producers Association of Canada (SEPAC) – *representing two members on the MAC II*
- Canadian Association of Petroleum Landmen

Provincial Government Members:

- Alberta Agriculture and Food
- Alberta Energy
- Alberta Energy and Utilities Board (EUB)
- Alberta Environment
- Alberta Sustainable Resource Development

Facilitator:

- Alberta Tourism, Parks, Recreation & Culture

5 - complete
31 - work started
5 - scheduled to start in late 2007 or beyond
1 – reviewed and not actioned
2 – not accepted
44 Total Recommendations

Appendix C: Progress Table
MAC Recommendations
As of March 31, 2007

NOTE: Early Action Items Indicated in Bold Face Type

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Protecting Water Resources					
3.3.1	AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold volume for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply.	2008	on schedule	• Adopted the interim threshold volumes developed by a subcommittee of MAC. • Stakeholder workshop held on December 14 to discuss the Code of Practice concepts. Process to review threshold limits also discussed at the workshop. • EUB Directive 44 (Oct. 31/06) increases the surveillance of produced water above BGWP and enhances produced water sampling and procedures	Directive 44 will ensure more accurate information is available to AENV and other EUB groups.

3.3.2 E	**AENV and the EUB should develop a 'decision tree' approach for reviewing CBM applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should:**				
3.3.2.1	Incorporate the threshold volume of produced non-saline water, below which the Code of Practice would apply (See Recommendation 3.3.1).	2008	on schedule	• Adopted the interim threshold volumes developed by a subcommittee of MAC. • Stakeholder workshop held Dec 14 to discuss Code concepts and the process to review threshold limits.	Draft Code of Practice expected to be completed in spring 2007
3.3.2.2	Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas.	2008	on schedule	• Ardley-Paskapoo groundwater study commenced. This study will look at the risks associated with CBM development. • Water-short areas identified through oilfield water injection study.	A workshop of groundwater experts will be held in spring 2007 to discuss aquifer characterization requirements for groundwater mapping of the Edmonton-Calgary corridor.

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*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.3.2.3	Ensure that applications for CBM wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies.	2009	complete	Any water diversion already requires an aquifer study. An updated version of the 2004 Guideline for CBM water diversion will be released with the Code of Practice.	
3.3.2.4	Ensure appropriate compliance with the decision tree.	2008	to start in late 2007 or beyond	Activity to be coordinated with the EUB produced water surveillance.	
3.3.3	AENV's Guidelines for Groundwater Diversion for CBM Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated.				
3.3.3.1	The guidelines should be reflected in the risk-based decision tree process.	2008	on schedule	The guideline will be updated once the Code of Practice and beneficial use policy is finalized. Interim threshold values will reflect qualitative risk.	
3.3.3.2	To ensure consistency, minimum conditions for approvals should be standardized across the province with additional site-specific conditions possible.	2008	on schedule	Interim threshold value will be used to determine when an approval is required. Site-specific conditions will be considered in the approval process.	All Water Act approvals already have standardized minimum conditions.
3.3.3.3	The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project.	2008	on schedule	• Baseline water well testing tied to CBM well licensing process • Site-specific conditions will be considered in the approval process	
3.3.3.4	A province-wide review of existing CBM wells should be undertaken to ensure all guidelines have been met.	Ongoing	on schedule	EUB surveillance and audit processes enhanced.	
3.3.5 E	**AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis, and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including:**				
3.3.5.1	Testing for a variety of metals and other impurities, as well as total dissolved solids.	2007	on schedule	• Scientific Review Panel established to review baseline-testing standard. First panel meeting was held Dec 8.	Next meeting scheduled for early spring 2007.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.3.5.2	Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file.	2007	on schedule	• Gas sampling incorporated in baseline water well testing standard. • Gas sampling protocol completed Aug 2006 by AENV. • U of C study on merits of "free" versus "dissolved" gas sampling to be completed in spring 2007. • Scientific Review Panel established to review gas sampling protocol.	(See Section 3.6 for discussion on methane migration and release).
3.3.5.3	Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.	2008	on schedule	To be addressed in beneficial use policy.	
3.3.6	AENV should develop a water well testing program as follows:				
3.3.6.1	CBM operators should be required to offer baseline testing (as described in 3.3.5) of all nearby water wells within a specified distance of a proposed CBM well to be completed above the BGWP. (No consensus reached on an appropriate distance or depth of completion.)	2006	complete	• Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by the EUB, effective May 1, 2006. • Scientific Panel established to review Standard.	
3.3.6.2	The information from the baseline testing should be filed by operators in an open, public registry to enhance understanding of Alberta's groundwater system.	ongoing	on schedule	• Template developed and interim spreadsheet available to capture initial data. Data entry is ongoing.	Work on a publicly-accessible system is continuing.
3.3.6.3	A clear process to address water well complaints should be developed and communicated to water well owners, surface rights holders and other stakeholders.	2007	on schedule	• Complaint number (1-800-222-6514) is posted on AENV website under "Emergency Numbers". • Complaint process communicated in June CBM public information sessions. • Complaints process fact sheet prepared and posted on AENV website.	Complaint Fact Sheet posted at: https://www.alberta.ca/water-for-life-strategy.aspx Discussions will continue with the EUB, SRD and Farmers' Advocate to enhance response to water well complaints.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.3.7	AENV and the EUB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; fracturing; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.	2010	on schedule	• The EUB issued Directive 27 (Jan. 31/06) imposing constraints on shallow fracturing. • A multi-stakeholder technical review committee has been established and continues to meet. • Interim controls have been implemented. • EUB issued an update to Directive 36 (Feb 06) to address non-toxic components. • EUB initiated a one-year field surveillance program specific to CBM in fall 2005 to monitor compliance to identify if there are other areas requiring short term reviews and change. • A CBM control well system is in place to collect segregated data specific to production from coals.	Early action is targeting higher risk components.
3.4.2 E	**The EUB and AENV should, in cooperation with other organizations such as the ARC, investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers, and review regulations to determine whether changes are needed.**	**2007**	on schedule	An element of 3.3.7	A third party review will be conducted in 2007 and a public report prepared. Past reviews have shown no potential for impact.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.5.1	AENV and the EUB, with stakeholder input, should: • Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate. • Establish criteria for the beneficial use of non-saline produced water. • Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water, and include them in the decision-tree approval process. • Revisit authorized diversions of non-saline groundwater for industrial use when CBM developments create new sources of water in the area.	2008	on schedule	AENV in partnership with PTAC, AERI, EUB and Alberta Energy, conducting a study that will review beneficial use policy issues in other jurisdictions and identify beneficial use opportunities.	Information from the study will be used as a resource for multi-stakeholder workshops to be held in fall 2007 to discuss beneficial use of produced water.
3.5.2	AENV and the EUB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the EUB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision tree approval process.	2008	on schedule	AENV in partnership with PTAC, AERI, EUB and Alberta Energy, conducting a study that will review beneficial use policy issues in other jurisdictions and identify beneficial use opportunities.	Information from the study will be used as a resource for multi-stakeholder workshops to be held in fall 2007 to discuss beneficial use of produced water.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.5.3	AENV, the EUB, and Alberta Energy (AE) should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.	ongoing	to start in late 2007 or beyond	• Water Innovation Forum held June 06 showcasing new produced water management technology and ideas. • AENV in partnership with PTAC, AERI, EUB and Alberta Energy, conducting a study that will review beneficial use policy issues in other jurisdictions and identify beneficial use opportunities. • Promoting and encouraging use of available funding opportunities such as the Environment Enhancement Fund to focus on produced water management technology, innovation and efficiency.	Information from the beneficial use of produced water study will be used as a resource for multi-stakeholder workshops to be held in fall 2007
3.6.1 E	**AENV and the EUB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM depressurization.**	2009	on schedule	• AENV complaint response to water well complaints is being enhanced. • Provincial groundwater monitoring system being enhanced.	• Additional information is being gathered (Directive 35 and Directive 44) to support a future study • Data to date does not show a provincial problem
3.6.2	Based on the results of the previous recommendation, AENV and the EUB should implement appropriate prevention, monitoring, and mitigation measures to address methane migration or release, if necessary.	2010	to start in late 2007 or beyond	• AENV complaint response to water well complaints is being enhanced. • Provincial groundwater monitoring system being enhanced. • EUB continues to review and enhance CBM well construction requirements.	
5.2.3 **	AE, in consultation with stakeholders, should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	2008	on schedule	• AENV in partnership with PTAC and Alberta Energy will be conducting a study that will review beneficial use policy issues in other jurisdictions and identify beneficial use opportunities. • Results of the study are expected in spring 2007.	The study will be used in fiscal tool discussions with stakeholders.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Enhancing Information and Knowledge					
3.2.1 E	**The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources:**				
3.2.1.1	Alberta Environment should expand its current monitoring network and data management systems.	2007 & Ongoing	on schedule	• Up to seven new observation wells will be added to the provincial observation well system by spring 2007. • Approximately 40 monitoring wells in the current provincial observation well network were scheduled for enhanced sampling. To the end of February 2007, about 30 of the wells were sampled.	A report on the results of observation well monitoring is expected in spring 2007.
3.2.1.2	AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM development.	2012	on schedule	• AGS, in partnership with AENV and the GSC has initiated the mapping project for the Ardley coal zone area. • EUB issued Directive 43 (Nov. 1/06) requiring shallow logging which will provide additional information on shallow geology to assist mapping.	
3.2.1.3	The Energy and Utilities Board (EUB) and AGS should complete the Base of Groundwater Protection mapping project.	2007	complete	The AGS has completed updating the Base of Groundwater Protection database and a public notice will be issued in spring 2007.	Base of Groundwater Protection database to be posted on EUB website.
3.2.1.4	AENV and the EUB, with industry, should investigate the potential for unintended effects of CBM development on surrounding aquifers.	2011	on schedule	Provincial groundwater monitoring system being enhanced to provide information on any regional groundwater impacts.	There are many current activities that provide insights into the potential effects of CBM activities on aquifers, such as: • Installation of additional monitoring wells • Enhanced monitoring of wells in the provincial observation well system • Enhancement of investigative tools such as isotopes.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.2.1.5	AENV should identify and characterize areas where CBM approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies, and other water users. Maps of these areas should be made available to regulators, industry, and stakeholders.	ongoing	on schedule	• Water short areas identified through oilfield water injection study. • Groundwater mapping of the Ardley coal zone commenced.	
3.2.1.6	Before drilling and production from a potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM operators should obtain baseline data; including gas and mineral content and other indicators of water quality, flow rate/yield, and water levels.	2006	complete	• Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by the EUB - effective May 1, 2006. • Protocol for gas sampling finalized in August 2006. Scientific Panel established to review standard.	
5.2.1 (non-consensus)	AE, in consultation with stakeholders, should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
5.2.2 **	The Alberta and the federal governments should consider recognizing Canada's CBM potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five year pilot-type drilling program for saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
6.5.1	AE should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	2010	on schedule	• Internal consultation initiated. • Extension history for CBM reviewed. Evaluating merits of amending regulations given experience and knowledge acquired in developing CBM resources to date and non-specificity to all mineral rights.	
7.4.1	The EUB, AENV, and ASRD should improve the coordination of their CBM related application and surveillance processes, and develop electronic solutions to facilitate data exchange.	2011	on schedule	Alignment of AENV and EUB processes for baseline testing (coordinated guideline and directive). Preliminary discussions on opportunities for data sharing commenced.	Expect a series of enhancements over this time period.
8.1.2	Regulators should review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	ongoing	on schedule	EUB Directive 27 on shallow fracturing included a review of other jurisdictions.	Additional reviews will be conducted on a topic basis
Minimizing Surface Impacts					
4.2.1	The EUB, AENV, and Sustainable Resource Development (SRD) should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	2009	on schedule	Bulletin 2006-44 on commingling was issued December 15.	

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
4.3.1 E	**To protect the environment and minimize the cumulative impacts from CBM development, a government-led multi-stakeholder committee, such as that being set up under SRD Integrated Land Management (ILM) Program, if appropriate, should undertake the following sequentially:** **1. Review integrated land management principles, policies, and practices relating to CBM to ensure they maintain the integrity and function of the land, taking into account all uses.** **2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM development.** **3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas and make appropriate recommendations for the protection of these areas,** **4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.**	2011	on schedule	• Northeast Alberta ILM initiative underway with initial meeting among stakeholders March 22. Scoping and Terms of Reference meeting held June 7. • Six ILM Project multi-stakeholder working groups established to provide direction on key components of the ILM process (principles, protocols, incentives, stewardship, governance, measures). • Results were presented at ILM Workshop Jan 22-24. Final report expected spring of 2007.	The Northeast Alberta ILM initiative has been delayed pending outcomes from the ILM Program and the Land-use Framework.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
4.3.2	Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM development.	2011	on schedule	• An SRD-sponsored study was completed by the U of C on foothills fescue reclamation. Implementation of study recommendations is being reviewed. • Draft revised Forested Green Area Reclamation Criteria released for review and comments.	https://www.alberta.ca/land-conservation-and-reclamation.aspx
7.2.1 E	**The EUB and AENV should work with stakeholders to review the application processes for intense CBM developments to enhance and promote project-based planning and disclosure. This would allow:** • **Definition of intense project developments.** • **Full project disclosure.** • **Improved community consultation.** • **Enhanced impact assessment.** • **Review of mitigation measures**.	2010	on schedule	• EUB conducting expanded consultation with community and industry in several locations related to intense energy development projects, including CBM. • New format for SRD Area Operating Agreements has been developed and approvals are being issued under the new format. • Further work is being done on risk management, quality assurance, and compliance. • Process for electronic submission of monthly status reports currently being developed.	
9.2.1	Industry, regulators, and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the EUB's Guide 38.	ongoing	on schedule	CAPP's NGC/CBM Best Practices, developed with stakeholder input, was distributed to MAC members and posted to CAPP's website.	
9.6.1	Industry should continue to consult with SRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.	ongoing	on schedule	SRD's requirement for wildlife protection plans in certain situations remains. Consultation with SRD by industry on a project specific basis is ongoing.	

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Communication and Consultation					
3.3.4	AENV should clarify and communicate the existing rules regarding how much drawdown is allowed during CBM/ depressurization in a confined, non-saline aquifer to ensure aquifer protection.	2007	complete	Stakeholders made aware of rules at CBM info sessions.	
3.4.1	The EUB and AENV should communicate with CBM operators, drilling contractors, and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's updated Guidelines for Groundwater Diversion for CBM/NGC Development.	ongoing ongoing	complete on schedule	EUB Directive 27 summarized rules related to water protection. This stimulated numerous one-on-one discussions with companies to clarify requirements and confirm commitment to comply. EUB Directive 44 establishes enhanced surveillance of all produced water from wells with perforations above BGWP and establishes the compliance processes associated with water production above BGWP (all oil and gas wells).	
6.2.1	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	2006	complete	Material posted to Department of Energy's website on December 22, 2006.	
6.2.2	The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.	2008	to start in late 2007 or beyond		Preliminary work will begin in late 2007 to assess government's role.
6.3.1	AE should review and clarify the criteria for Section 18 Notices of Non-Productivity and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to deeper rights reversion.	2010	on schedule	Procedures and policy for Section 18 process reviewed and validated. Energy inter – Business Unit consultations underway.	Energy inter-Business Unit consultations expected to be completed in spring 2007.

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
7.3.1	The EUB, AENV, and SRD, with stakeholder input, should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM development.	2010	to start in late 2007 or beyond	EUB Directive 35 will gather information on the potential impacts on offset parties.	This technical information will be assessed to determine if changes are required to drilling and completion notification. Work on 7.2.1 will assess alternative ways to receive public input to projects.
7.5.1 E	**Industry, regulators, and other stakeholders should increase the opportunity for dialogue, education, and awareness of the public, surface and subsurface rights holders, leaseholders, and industry on the possible impacts resulting from CBM development, and how the use of the land will be affected.**	ongoing	on schedule	• Increasing number of presentations being made by regulators. • CAPP's NGC/CBM Best Management Practices issued to MAC & posted to CAPP's website. • AENV, EUB, Farmers' Advocate & CSUG held public information sessions on groundwater & CBM in June 06. • CSUG Conference Nov. 06 included sessions on stakeholder issues. • Numerous industry reps. attended & participated in Synergy Alberta conference October 2006 where stakeholder issues were discussed. • CERI, CAPP, CSUG & Alberta Economic Development collaborated on "Socio-Economic Impact of Horseshoe Canyon CBM Development in Alberta" report, released & presented at CSUG conference.	PTAC collaborated with CSUG & others on an Unconventional Gas Technology Roadmap to identify research & applied technology needs for unconventional gas, including CBM. The report addresses technologies relating to environmental and stakeholder impacts, and extraction technologies. PTAC is hosting an unconventional gas workshop in spring 2007 to set priorities for unconventional gas research and innovation to be attended by industry, environmental, research, academic and government stakeholders.

E denotes early action as identified in the Coalbed Methane/Natural Gas in Coal Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
7.5.2	The EUB and AENV should consolidate CBM data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data.	2012	to start in late 2007 or beyond		A single, fully integrated, user friendly CBM/water computer system is a long term initiative. Scoping of the project is to start in 2010. Prior to that there will be a series of data program enhancements as the CBM and water databases grow, including information exchanges amongst regulators to support other recommendations. An example of this is the EUB identification and tracking of all CBM wells in EUB Bulletin 2007-05 .
7.5.3	The EUB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	2007	complete	• The EUB included a well density clause in its spacing/holding applications effective the fall 2005 to avoid misunderstanding of the number of wells approved. • FAQ was added to the Q & As on the EUB spacing initiative website.	
7.5.4	The EUB and Municipal Affairs, along with other stakeholders, should clarify and communicate the requirements, roles, and responsibilities related to setbacks.	2012	on schedule	• Municipal Affairs & EUB are compiling a list of setbacks for CBM facilities and equipment. • MA contacting Emergency Management Alberta and Public Safety Division to assist with Canadian Standards Association recommended standards.	
7.5.5	Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM issues, including potential effects on water supply.	2007	on schedule	AENV's Groundwater and CBM public information sessions conducted at 13 locations across Alberta in June. Public information fact sheets produced to coincide with sessions. A cross-Ministry communications team has been established and will meet on a regular basis.	

E denotes early action as identified in the Coalbed Methane/Natural Gas in Coal Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Target Completion Date	Status	Action Taken	Comments
7.6.1	As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components: • Annual reviews for three years to assess progress according to a monitoring plan. • A second overall review in three years to assess: 1. The effectiveness of the recommendations, 2. New issues or information, and 3. An assessment as to whether additional recommendations may be needed.	2010	on schedule	• Multi-stakeholder Advisory Committee established. Meetings held Sept. 2006, Dec. 2006 and Mar. 2007. • Action Plan and progress reports updated and reported to MAC II. • Report templates reviewed by MAC II. • Preparation of public update was compiled based on MAC II feedback and review.	
8.1.1 E	**Industry, government, and other stakeholders should work together to develop, document, and implement best practices for CBM operations.**	2007	complete	CAPP's NGC/CBM Best Practices, developed with stakeholder input, distributed to MAC members and posted to CAPP's website.	www.capp.ca
9.3.1	The EUB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	2007	complete	EUB commits to maintain its current practices.	
9.4.1	AE should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	2008	on schedule	Prototype development near completion.	A demonstration to the Tenure Advisory Committee was completed and comments are being addressed.

E denotes early action as identified in the Coalbed Methane/Natural Gas in Coal Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
9.4.2	AE should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.	2008	on schedule	Current instructions on AE's website under review for simplification opportunities.	Extensive instructions currently reside on the website.
9.5.1	The Alberta Government, including Human Resources and Employment (HRE) should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.	2011	on schedule	• Revised Land Agents Licensing Act regulations, which include more stringent standards of conduct for land agents and education and continuing competency requirements, have been prepared for Cabinet Policy Committee for review at the earliest possible date. • CAPL initiated a voluntary certification program to maintain/improve land agent standards. CAPL will be informing all Alberta land agents of their initiative.	Olds College, together with Alberta's energy sector, has established Canada's first ever Chair of Energy Industry Studies to raise the level of professional practice of Alberta's land agent sector. A Call for Nominations was posted in the Edmonton Journal on January 26, 2007.
9.7.1	The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.	2007	reviewed, no action	Service Alberta advised that Land Titles Registry cannot require leaseholders to disclose lease terms and is not the vehicle to adjudicate or solve this issue.	
Other					
7.7.1	Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.	ongoing		See all other recommendations for implementation details.	

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E denotes early action as identified in the Coalbed Methane/Natural Gas in Coal Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Progress Update – Year 2

Coalbed Methane Multi-Stakeholder Advisory Committee (MAC) Recommendations

May 2008

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Executive Summary

The Coalbed Methane (CBM) Multi-Stakeholder Advisory Committee (MAC) was formed in November 2003 as part of a review and consultation initiated by the Department of Energy (DOE). The MAC's Final Report, released to the public in May 2006, contained 44 recommendations to improve existing rules and regulations related to CBM development or to identify areas for further study. Some of the identified issues were unique to CBM, but many others were related to broader energy development and may also be linked with other initiatives already underway.

This report is the second public update on the progress achieved in addressing the Final Report recommendations. As of March 31, 2008, work had started on (and/or been completed on) all of the recommendations except for 7.5.2, which is scheduled to start in 2009 or later. Five recommendations were completed in the second year, bringing the total completed to ten.

The majority of recommendations pertain to water protection and improving information. Progress has been made in several areas. Examples include:

- Enhanced water well testing and analysis,
- Initiation of a groundwater inventory project,
- Completion of updates to the Base of Groundwater Protection database, and
- Improved access to and sharing of information with stakeholders and the public.

The government acknowledges that ten recommendations are behind the original schedule established in 2006. The government recognizes the importance of these recommendations and has taken steps to minimize the associated risk with any delays. A number of key initiatives are expected to be completed in 2008 to assist in addressing these recommendations. Work continues to ensure that a detailed and thorough analysis is completed.

Similar to last year, non-government members of the MAC II were provided an opportunity through a feedback questionnaire to give their opinions on the progress and to provide comments on draft versions of the report. In general, respondents were very satisfied with the MAC II process and believed it helped ensure the accountability of government in carrying out the MAC's recommendations. Other comments suggested that the process has been effective in providing a feedback mechanism, creating a good opportunity for all stakeholders to discuss progress and collaborate on issues, as well as an opportunity for stakeholders to identify issues and areas where progress has been slow. Some respondents commented that the style and format of the process has worked well, especially the clear documentation and department updates.

Most respondents did note with concern that some of the recommendations were falling behind schedule, particularly those recommendations related to scientific undertakings and information gathering (some water related recommendations). However, they acknowledged that ten recommendations were complete and a number of key reports were expected in 2008.

The MAC II members also emphasized the need for government to ensure sufficient resources and completion of undertakings according to the original timelines.

Government remains committed to addressing the MAC recommendations. CBM is an important resource that holds considerable potential for Albertans. The ongoing work of the MAC II, government, and industry will help to ensure that CBM continues to be developed in a safe and responsible manner.

Background

The MAC was formed in November 2003 as part of a review and consultation initiated by the DOE on CBM. The purpose of the review was to determine if the existing policy and regulations governing CBM development continue to balance economic benefits with protecting Alberta's water, air and land resources, and minimizing landowner impacts. The MAC's role was to consult with stakeholders and develop recommendations to enhance the rules and regulations associated with CBM development.

MAC members represented environmental and agricultural organizations, landowners, local governments, the energy industry, and provincial government departments and agencies. The departments of Agriculture, Food and Rural Development (now Agriculture and Rural Development); Environment (AENV); Sustainable Resource Development (SRD); DOE and the Alberta Energy Resources Conservation Board (ERCB, formerly the EUB) collaborated in this process.

The MAC's Final Report, released to the public in May 2006, contained 44 recommendations. Some of the identified issues were unique to CBM, but many others related to broader energy development and may also be linked with other initiatives already underway. The MAC acknowledged there might be insufficient resources to take action on all the recommendations at once and technical reasons why the outcomes from the completion of one recommendation may be needed before moving ahead with another. To assist government, the MAC proposed nine recommendations for early action. These early action recommendations formed the basis of a cross-ministry implementation strategy. The strategy addressed the MAC's recommendations using four key areas to guide and coordinate work, as well as to report on progress:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

Only two MAC recommendations, related to royalty and tax incentives, were not accepted by the Alberta government. Another recommendation, to include additional mineral rights information in the Land Titles Registry, is not being actioned based on a subsequent review of the liability and limitations associated with disclosing such information by Service Alberta, the department responsible for the Land Titles Registry.

Formation of the MAC II

One of the MAC recommendations called for a multi-stakeholder group to review progress towards addressing the Final Report recommendations. Recommendation 7.6.1 stated:

> *As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components:*
> - *Annual reviews for three years to assess progress according to a monitoring plan.*
> - *A second overall review in three years to assess:*
>   1. *The effectiveness of the recommendations,*
>   2. *New issues or information, and*
>   3. *An assessment as to whether additional recommendations may be needed.*

A multi-stakeholder group called the MAC II was formed in September 2006 to carry out this recommendation. The MAC II stakeholder membership is identical to the MAC, although individual stakeholder representatives may differ.

During the first year the MAC II met three times to review and monitor the progress achieved related to the recommendations. At the meetings, an action plan providing status and specific timelines for each recommendation was provided. This action plan was updated on a continual basis. Government representatives from the various involved departments were available to answer questions from members and provide supplemental background information. A Progress Update report was released publicly in June 2007, which highlighted the progress achieved in addressing the Final Report recommendations. The Progress Update report covered the period from when the Final Report was released in May 2006 to March 31, 2007 (the end of the government's fiscal year).

A similar process was used during the second year which covered the period April 1, 2007 to March 31, 2008. In preparation of the second annual Progress Update report, the MAC II met three times to review updates and provide feedback. This report is part of the MAC II's commitment to keep the public informed – one component of a number of communications activities being undertaken to inform Albertans about CBM.

The following sections contain progress highlights, as well as feedback from non-government members of the MAC II.

Progress Highlights

This section provides a high level summary of the key activities undertaken by various government departments, agencies and other groups in addressing the MAC's recommendations. It focuses on work undertaken during the second year of addressing the recommendations. While this section may reference some initiatives from the first year, please see Appendix B for a complete list of recommendations, status updates, and activities undertaken during the first year.

Overall, progress has been made on all but one of the 42 accepted recommendations, including all nine early action items. Work on recommendation 7.5.2 (ERCB and AENV should consolidate CBM data in a publicly accessible and user-friendly database) is scheduled to start in 2009 or later.

Five recommendations were completed in year two, bringing the total number of completed recommendations to ten, as follows:

Completed in Year One:
Recommendation 3.3.4 – AENV should clarify and communicate the existing rules regarding how much drawdown is allowed during CBM depressurization in a confined, non-saline aquifer to ensure aquifer protection.
Recommendation 6.2.1 – The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.
Recommendation 7.5.3 - The ERCB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.
Recommendation 8.1.1 - Industry, government, and other stakeholders should work together to develop, document, and implement best practices for CBM operations.
Recommendation 9.3.1 - The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.

Completed in Year Two:
Recommendation 5.2.3 – AE, in consultation with stakeholders, should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.
Recommendation 6.3.1 - AE should review and clarify the criteria for Section 18 Notices of Non-Productivity and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to deeper rights reversion.
Recommendation 6.5.1 – AE should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.
Recommendation 9.4.1 – AE should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.
Recommendation 9.4.2 - AE should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.

The government recognizes that ten recommendations are now behind the original schedule established in 2006 (including three of the nine early action items). The majority of recommendations that are behind schedule are related to water resources. Efforts are being made to ensure the timely delivery of work associated with these recommendations. In addition, the increased available information on CBM in Alberta, such as from the water well testing program, shows lower risk from CBM production than had originally been anticipated. Current regulatory processes and requirements in place have also required greater due diligence by industry and, in many cases, precluded CBM production in higher risk areas until the necessary information is available to address the issues raised by the MAC. The government remains committed to addressing the recommendations through a detailed and thorough review process.

The following discussion summarizes key 2007-08 activities in the four main focus areas.

1. Protecting Water Resources

Thirteen recommendations in the MAC's Final Report were related to the management of CBM development to protect surface and groundwater quality and supply through coordinated, risk-based processes. Work is underway on all 13 recommendations - five recommendations are on schedule, seven recommendations are behind schedule, and one recommendation is complete.

Regulation of Water Production

CBM development involving the production of non-saline water must comply with AENV's water diversion application process under the *Water Act.* Two recommendations (3.3.1, 3.3.2) focused on ways to improve or strengthen this process by adopting a risk-based decision tree. In response to these recommendations, AENV is developing a three-tiered process to regulate non-saline produced water diversions. A key element of the system is the use of threshold water usage levels to determine whether an approval, a registration pursuant to a Code of Practice, or no authorization from AENV is required.

The following interim threshold levels developed by a sub-committee of the MAC will be used in the decision tree process until scientifically-based levels are determined:

1. AENV approval will be required for water diversions greater than 30 cubic metres (m^3) /month per well – or when the cumulative discharge of all CBM wells in a section of land exceeds 100 m^3/month.
2. Registration under a Code of Practice will be required for water discharges lower than 30 m^3/month and greater than 5 m^3/month.
3. No authorization will be required for water production volumes lower than 5 m^3/month, given the small volume.

The Code of Practice was under development for most of 2007-08 and a draft version will be available for public review and feedback in the 2008-09 year. The Code of Practice and associated regulation changes are anticipated to be implemented by the end of 2008. The

existing guideline for CBM Water Production will be amended to reflect the three-tired process and is scheduled for completion at the same time as the Code of Practice.

Background information is currently being collected through groundwater inventory and monitoring projects (see Sub-section 2: Enhancing Information and Knowledge) to provide the necessary information for the development of scientifically based threshold levels.

Water Sampling

ERCB Directive 44, issued in October 2006, addressed surveillance of potential non-saline water production and water sampling procedures and analysis for all wells completed above the Base of Groundwater Protection (BGWP) (recommendation 3.3.5). For these wells, the company must segregate and sample the water, investigate the source of the water and provide a mitigation plan. This may result in abandoning wet zones for CBM production. Where a company wishes to continue to produce, AENV authorization is required. AENV is working with the ERCB to use this data to ensure companies acquire the appropriate AENV authorization. Additional staff resources have been allocated in year two to support this important surveillance function. To date, companies are deciding to abandon wet zones and not pursue diversion applications through AENV.

Drilling and Completion Practices

The MAC included recommendations in its Final Report to ensure the continued effectiveness of ERCB requirements to protect aquifers and water wells (recommendations 3.3.7, 3.4.1 and 3.4.2). In January 2006, in advance of the final MAC report, the ERCB issued Directive 27 on shallow fracturing, which initiated a multi-stakeholder technical committee to review current practices and information, and to advise on the need for new requirements. The committee is continuing its work and has retained the University of Calgary to review industry's technical evidence and provide a third-party assessment and estimate of fracturing propagation vertically and horizontally. The ERCB has imposed interim controls for shallow fracturing pending the conclusion of the review.

While there is an absence of field evidence or supporting technical literature to demonstrate any problems, another review by the University of Calgary is underway to address public apprehension in using untreated water for drilling and completion of wells (recommendation 3.4.2). The review will be concluded in 2009.

Water Well Testing

Effective surveillance is an important component of a regulatory framework along with strong technical requirements and a risk-based application process. In this regard, AENV issued a provincial baseline water well testing standard in May 2006 (recommendations 3.3.5 and 3.3.6). Under the standard, companies wanting to drill shallow CBM wells must offer testing to landowners on any active water well within a 600 metre radius of new or recompleted CBM wells above the BGWP. If no wells exist within the 600 metre radius, then one well must be tested within a radius of 800 metres.

These baseline tests must measure the water well's production capability, water quality (including routine potability and bacteriological parameters) and the absence or presence of

gas (including methane gas). Baseline testing requirements are regulated by the ERCB according to Directive 35.

Application audits show high industry compliance. Non-compliance will be enforced in accordance with ERCB Directive 19. AENV is collecting and compiling the well testing results in a database and has conducted several refinements over the past year in an effort to make the database available to the public in 2008-09. The development of a large-scale, public, user-friendly data base is the long term goal.

There have been approximately 4,550 baseline water well tests since May 2006. The testing program continues to gather information and will provide further incremental input into the growing groundwater information available in Alberta.

The government committed to review baseline data on a regular basis to ensure the water well baseline testing standard is working. To that end, a Science Review Panel comprising of five experts in the fields of hydrogeology and isotope geochemistry was established in September 2006 to review the data and recommend areas for improving the baseline testing standard. The panel interacted continuously throughout 2007-08 and convened on three occasions to discuss the baseline standard. The panel is currently preparing a report that summarizes their findings and recommendations, and the report is expected to be submitted to the government in spring 2008. Outcomes from this review and information from the expanding database will be used to further study the potential for methane migration or release to water wells as a result of CBM depressurization (recommendation 3.6.1).

Evaluation of water sampling procedures continued outside the Science Panel review process this year, with completion of a study on the merits of free gas sampling versus dissolved gas sampling conducted by the University of Calgary. The report was completed in spring 2007 and identifies areas for future research.

Water Well Complaint Process

Work is continuing to improve the government's response to all water well complaints, not only those involving CBM. A water well training workshop was held for AENV and SRD staff this year to increase their knowledge of water well issues and more training is planned for the upcoming year. In addition, further improvements to AENV's internal procedures for handling water well complaints were committed to this year by initiating the development of a new water well complaint manual for staff.

AENV commissioned the Alberta Research Council in 2007-08 to conduct an independent review of four water well complaints allegedly linked to CBM activity. The results show the wells were not likely to have been adversely affected by CBM activity but rather that the quality issues were predominantly due to naturally occurring methane. Other quality issues were associated with poor well construction and maintenance.

Beneficial Use of Produced Water
The MAC agreed that the potential for treatment and use of non-saline and marginally saline produced water should be investigated (recommendations 3.5.1, 3.5.2, 3.5.3). AENV, in partnership with the Alberta Energy Research Institute, ERCB, Petroleum Technology Alliance Canada (PTAC) and DOE completed two scoping studies on beneficial use of produced water in 2007, one on high total dissolved solids (TDS) waters (June 2007) and the other on low TDS waters (August 2007). The reports are available at www.ptac.org/. The reports provide information on the quantity and quality of produced water disposal in the province for all energy developments and identify further actions that are required to increase beneficial use of produced water. It was noted in the reports that very little produced water from CBM activities has occurred to date.

The results of the study on the beneficial use of produced water, along with other relevant information, will be presented to multi-stakeholder workshops which will likely be held in the fall of 2008.

Fiscal Tools for Saline Water
In response to recommendation 5.2.3, the above mentioned scoping study, "Produced Water Beneficial Re-Use – High TDS Waters", was undertaken. The report concluded that fiscal tools, including royalties and tax incentives, are not the appropriate mechanism to encourage the use of saline water from CBM development at this time. Any future work in this area will be directed by the Alberta Water Council.

Also, the government conducted a thorough review of Alberta's royalty and tax regimes related to oilsands, conventional oil and gas, and CBM in 2007. This review process included extensive stakeholder consultation and culminated with a new royalty framework announced by Premier Stelmach on October 25, 2007, which did not include new fiscal incentives to encourage the use of saline water.

Methane Gas Migration
Government regulators under recommendation 3.6.1 are investigating the potential for methane migration or release to water wells as a result of CBM depressurization. Data gathered under the baseline water well testing and groundwater inventory projects will provide useful information in this regard. In addition, AENV commissioned a groundwater consultant this year to provide background information on gas migration potential in relation to CBM activities in Alberta. The report is expected to be completed in 2008.

2. Enhancing Information and Knowledge

The MAC recognized that Alberta-based CBM water information can help guide the future actions of regulators and industry. Considerable effort has been made in the second year to address this category of MAC recommendations. There are six recommendations in this category with three on schedule, one complete, two not accepted, and none behind schedule.

Mapping BGWP and Groundwater Inventory

Alberta's groundwater is not as well-defined as its surface water and the MAC recommended that the BGWP mapping should be updated (recommendation 3.2.1). Groundwater mapping, especially in areas with shallow water-wet CBM potential, should be conducted in greater resolution (recommendation 3.2.1). This work complements the direction by the Alberta Water Council to conduct province-wide groundwater mapping.

The BGWP database provides depths where non-saline water is expected to occur. This information is used by energy companies, for example, to comply with the ERCB's resource well drilling and completion requirements to protect non-saline water.

The Alberta Geological Survey (AGS) was retained by AENV to update the BGWP database. An updated BGWP database was completed in year two with greater resolution (one legal subdivision (LSD) versus the previous one township (TWP)) and more consistent technical criteria. ERCB Bulletin 2007-10 publicly announced the new BGWP database in 2007-08. The BGWP is available on either the ERCB or AGS website.

In response to MAC recommendation 3.2.1, AENV initiated a project in the summer of 2006 in partnership with the ERCB and the AGS to increase the understanding of the shallow geology and the potential impacts from drawing water from Ardley coals on the water level of the overlying Paskapoo aquifer. The initial stage of the project involved gathering prior research and the data from hydrogeological/water well and geological/petroleum industry databases from which the stratigraphic framework will be constructed. The project will provide information on groundwater quality and quantity in the Ardley and overlying Paskapoo formations and be used to evaluate the risk of CBM development to groundwater quality and quantity in the area (recommendation 3.6.1). This project is scheduled to be completed by summer 2008.

The Edmonton-Calgary Corridor (ECC) project was initiated in 2007-08 to provide an inventory of aquifers and groundwater resources within this highly populated and developed region. AENV hired three new staff this year and they were placed in the AGS to be specifically dedicated to this project. Extensive airborne geophysical surveys were conducted in the fall of 2007 over large parts of the project area to gather valuable groundwater information. The project is scheduled to be completed in 2011.

To further expand available information, the ERCB issued Directive 43 in December 2006, requiring geophysical logging behind surface casing for all new wells (recommendation 3.3.6). This additional geophysical knowledge is being used in year two to support groundwater mapping and water well complaint assessments.

The ERCB also identifies and tracks all CBM wells in ERCB Bulletin 2007-05. The geology and well producing characteristics are analyzed to better understand the CBM resource, reserves, and its potential risk to water.

Groundwater Monitoring
AENV maintains a province-wide groundwater observation well network to monitor groundwater levels and groundwater quality in aquifers that have a potential to be used for water supply purposes. This network consists of approximately 200 observation wells, ranging in depth from 60 to over 250 metres. In addition, groundwater is also monitored in the vicinity of reservoirs, rivers, lakes, dams and oil sand developments to determine impacts on local groundwater systems.

The MAC recommended that AENV expand its provincial groundwater monitoring program (recommendation 3.2.1.1). In this regard, AENV successfully met its commitment to complete five new groundwater observation wells. AENV continues to work with industry and other organizations to identify suitable industry-owned observation water wells that could be donated to the province for incorporation into the provincial system. It is anticipated that the network will be further expanded in the 2008-09 year.

There was also positive acknowledgement that the groundwater mapping project is now underway. An evaluation of the data gathered from 40 of the monitoring wells on the network in 2006-07 was completed by the University of Calgary in spring 2007, including gas sampling results. The number of wells sampled over 2007-08 was reduced from 50 to 30 due to temporary staffing constraints, which have since been rectified with the hiring and training of new AENV staff. A second sampling trailer was built in 2007-08 and is expected to be deployed for 2008-09's sampling target of 50 wells. A similar report is expected from the University of Calgary in spring 2008 capturing 2007-08 sampling data.

CBM Review of Other Jurisdictions
Reviewing CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere is a practice often utilized by the Alberta government. For example, in spring 2007, AENV invited a guest speaker from the Wyoming Department of Environmental Quality to share experiences on CBM development and groundwater monitoring in that state with Alberta government staff.

One Year Mineral Lease Continuations
In response to recommendation 6.5.1, the DOE completed a review of the history of Alberta CBM production and an investigation of methods used by industry for mineral lease continuations. The review of the data and information supported the position that the current regulation, which allows for a one year continuation, is sufficient. In addition, there have been very few requests from industry for an additional one year continuation under Section 17. The conclusion that no changes to the existing Section 17 regulation are required at this time was also agreed to by the Petroleum and Natural Gas (P&NG) Tenure Industry Advisory Committee.

3. Minimizing Surface Impacts

The MAC's recommendations on minimizing surface impacts range from activities associated with local improvements to looking at potentially major changes resulting from reviews of

province-wide land use policy. There are a number of diverse activities that are advancing progress on recommendations in this area. All six recommendations in this section are on schedule.

Integrated Land Management

Work is currently underway on Integrated Land Management (ILM), a priority government-led policy initiative addressing all types of access on public lands (recommendation 4.3.1). Six multi-stakeholder working groups provided direction on key components of the proposed ILM program (principles, protocols, incentives, stewardship, governance, and measures). Interim results were presented at an ILM Workshop held January 22 to 24, 2007. Final recommendations were completed by July 2007.

A potential location has been identified for a project that will demonstrate the Integrated Land Management and Area Operating Agreement processes in a CBM area and key stakeholders are being contacted. More details on the area and project details will become available in the near future.

Project-Based Planning

The ERCB has initiated a pilot project for intense development, including CBM, in response to broad stakeholder feedback. The project is testing different ways of enhancing and promoting project-based planning and disclosure, early community engagement and other options to ensure appropriate development and land access. A series of pilot projects involving landowners, operators and local government is being conducted. The first two pilots addressed potential Horseshoe Canyon CBM development in two separate one-township blocks east of Carstairs and Innisfail. Year two efforts saw the public reports on the early pilots posted on the ERCB website and the findings applied by the participating CBM operators in areas of development beyond the pilot boundaries. Future pilots are being investigated to study reducing impacts on more environmentally sensitive lands and areas involving wet Mannville CBM. Recognition and inclusion of CBM in the land challenge project is the ERCB response to MAC recommendations 7.2.1 and 7.3.1. It also contributes to recommendations 7.5.1 and 4.2.1, both of which focus on how to minimize surface impacts due to CBM development.

Addressing Cumulative Impacts

A new format for SRD Area Operating Agreements (AOA) has been implemented and further work is being done on risk management, quality assurance and compliance. Approvals are being issued under the new format. A process for electronic submission of monthly status reports is currently being developed. The AOA process is being re-evaluated to reflect other changes occurring in the regulatory approval process.

The MAC also recommended that the ERCB, AENV and SRD review all of their regulatory processes to identify ways to minimize surface disturbance and reduce cumulative impacts associated with CBM development (recommendation 4.2.1). Early action taken on this recommendation is reflected in ERCB Bulletin 2006-44, which introduced new rules on commingling of different pools in the same wellbore. These new rules will promote both appropriate resource conservation and reduced surface impacts, as commingling generally

minimizes the number of wells needed to recover resources from multiple stacked intervals. The changes also decrease the regulatory requirement for segregated pool tests, further reducing the need for companies to access land during general operations.

Reclamation
The University of Calgary completed a study on Foothills fescue reclamation (recommendation 4.3.2), which called for improvements to the technology used for remediation and reclamation of land in sensitive areas. The report provides information and background on current and possible future reclamation criteria. The report also contains key findings that can assist industry in planning and reclamation methods for rough fescue grasslands. The report was titled,Restoration of Rough Fescue (Festuca Campestris) Grassland on Pipelines in Southwestern Alberta.

Gap analysis was completed for reclamation and revegetation issues for prairie landscapes. Recommendations have led to the creation of the Foothills Restoration Forum, an initiative to bring researchers and the public together to discuss native prairie use and restoration issues. Boreal gap analysis will be completed by the spring of 2008. Draft criteria were presented at practitioners' workshop in February 2008 with implementation expected in summer 2009. Initiatives to revise the reclamation criteria for both grasslands and peat-lands are underway with expectations that these be finalized in 2009.

In addition, industry will continue to consult with SRD to minimize disturbance to wildlife habitat on a project-specific basis, as identified in recommendation 9.6.1. SRD consults and develops guidelines on a continuous basis as part of their day-to-day operations.

4. Communication and Consultation

The focus of these recommendations is to increase opportunities for dialogue and public awareness on possible impacts of CBM development so that Albertans are better informed and engaged. Of the 18 recommendations in this category, eight are complete, five are on schedule, three are behind schedule, one is to start in 2009, and one was reviewed and will not be actioned.

Public Awareness
Government and industry have developed considerable Alberta-based CBM information, which is available on the DOE, ERCB, AGS and AENV websites (recommendation 7.5.1). Examples of the type of information available include extensive CBM geological, water and resource work by the AGS (e.g., ERCB/AGS Special Report 081: Water Chemistry of Coalbed Methane Reservoirs) and Alberta CBM activity tracking and annual reporting by the ERCB (e.g., Bulletin 2007-05: 2006 Alberta Coalbed Methane Activity Summary and Well Locations). The department continues to review website information and incorporate updates where appropriate.

Water Well Education
AENV initiated a water well education program in partnership with Alberta Agriculture and Rural Development, Prairie Farm Rehabilitation Administration and local municipalities aimed at educating rural well owners on topics such as siting, construction, operation and maintenance. Approximately ten workshops were conduced in early 2008 and a similar number is scheduled for the spring. The workshops have been very well attended and received. Ongoing work continues to expand and improve the program into the future.

Split-Title Facilitation
As part of the government's new royalty framework the DOE will initiate a review in late 2008 of the freehold mineral rights tax program to ensure it is fulfilling its intended objectives. A second phase of the review will determine a course of action to address recommendation 6.2.2 (i.e., establishing a process to facilitate parties coming together to work towards the resolution of split-title issues).

Non-Productivity Notices
The DOE has also reviewed and validated the procedures and policy regarding the criteria for Section 18 Notices of Non-Productivity (recommendation 6.3.1) and determined that no changes are required. It was concluded that serving more Section 18 notices will not substantially increase the amount of rights for CBM plays which are generally found in shallower zones.

Setback Information
The issue of clarifying and communicating the requirements, roles and responsibilities related to setbacks (recommendation 7.5.4) has been referred to Municipal Affairs (MA). Following the conclusion of other related initiatives, MA will work with the ERCB and others to address this issue.

Mapping Tools
The DOE has developed an online mapping tool to display the results of the most recent P&NG sales and oil sands sales data (recommendation 9.4.1). In addition, the mapping tool will also provide information on existing P&NG and oil sands agreements. The mapping tool is found on DOE's website. Summary and detailed user manuals are part of the online Help functionality.

To make it easier for the public to find the information they need about the deposition and use of Alberta's mineral resources (recommendation 9.4.2), DOE's website has been revised to include quick links from all web pages under the "Our Business" tab to search services, interactive maps and related manuals. In addition, a detailed, step-by-step instruction manual for the interactive maps was updated on March 2, 2007 and can be found on Alberta Energy's website.

Surface Land Agents
On November 30, 2007 several amendments to the Land Agents Licensing Regulation came into effect. The changes to the regulation and related policies will improve the

professionalism of land agents, make them more accountable, enhance their training, and ensure their continuous development. A consolidated copy of the regulation can be found at http://www.alberta.ca.

The amendments were a result of an extensive public review of the regulation over the past few years (recommendation 9.5.1). Valuable input from land agents, interest groups, associations and other government departments was considered in the development of the amendments. The Land Agents Advisory Committee was very instrumental in analyzing the input and providing recommendations to the Registrar.

The Canadian Association of Petroleum Landmen Surface Land designation program is in place for its members.

Other

The MAC Final Report identified the need for sufficient financial and human resources to successfully address the recommendations (recommendation 7.7.1). The MAC also noted it would be impractical to begin work on all recommendations immediately. The government has placed a high priority on addressing recommendations through effective and efficient allocation of resources. The government will continue to evaluate progress and resource requirements to ensure appropriate levels of resources are available to action the recommendations.

The MAC II received information about the problem of clubroot, a disease of canola, mustard and other crops in the cabbage family. It was noted that this issue is not specific to oil and gas activities and out of scope for the MAC II. The MAC II was informed of the actions being taken to address clubroot and the MAC II was supportive of the efforts of the other committees.

A few years ago, SRD in conjunction with AENV undertook an initiative on “Weed Awareness for Reclamation”. This initiative promoted good practices to prevent the spread of disease, such as clubroot and other invasive species. Weed Awareness for Reclamation stressed the importance for all industrial operators to clean machinery completely before moving to a new site and to be aware of the potential for weed and disease transfer between sites. This requirement can become part of the approval process for any SRD approvals. In addition, Agriculture and Rural Development has created a clubroot management plan (including best practices), which is posted on their website at https://www.alberta.ca/agriculture-and-forestry.aspx

Agriculture and Rural Development has also developed a practice guide for machinery cleaning (entitled “Best Management Practices for Disinfesting Farm Machinery and Equipment to Prevent the Spread of Clubroot between Canola Fields”).

Non-Government MAC II Members' Feedback

The following section reflects feedback from non-government MAC II members on the progress achieved to date in addressing the Final Report recommendations. This feedback was gathered through the distribution of a questionnaire and subsequent comments on draft reports. The input from non-government members who provided a response is summarized below in the following categories:

1. Protecting water resources
2. Enhancing information and knowledge
3. Minimizing surface impacts
4. Communication and consultation
5. Other recommendations
6. Comments about the MAC II process

The feedback is separated into two groups:

1. Feedback from non-industry members, such as landowner and environmental groups and
2. Feedback from the industry, which includes energy industry association members.

Protecting Water Resources

The MAC's Final Report identified protection of water resources as a significant concern related to CBM development. Water-related recommendations include establishing a more rigorous regulatory process to address CBM operations that potentially pose a risk to non-saline water resources. The development of standard procedures and reporting requirements for sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected water wells is also important. Protection of water resources continues to be a major concern and a priority for all respondents.

Non-Industry Feedback

While stating that overall the progress has been good, respondents were generally less pleased with progress this past year compared to the previous year, noting a growing number of recommendations were behind schedule, for example, well monitoring and sampling for water related information. Some respondents said they were disappointed that five of AENV's new observation wells had to be decommissioned in 2007 due to construction problems, since there were so few wells to begin with. Another issue identified was AENV reducing the number of monitoring wells from 50 to 30, which was suggested by the respondent that it may be due to lack of staff or funding.

The ERCB was acknowledged for its commitment to implementing a number of MAC recommendations: Directive 43, for logging shallow groundwater, and Directive 44 for reporting produced non-saline water above a threshold of 5 cubic metres per month (m^3/month). Failure to comply with the latter is now a "High Risk Enforcement Action", although one respondent questioned whether enforcement has been stringent enough.

Industry Feedback
Industry noted that while the commitment of the government at the Deputy Minister level has been strong, many AENV undertakings are a year behind and some undertakings have yet to be initiated, for example, the finalization of the water decision tree and the completion of beneficial use guidelines, regulatory frameworks and legislation. Industry expressed disappointment in the progress made to date on these undertakings and that seven recommendations are behind schedule in this area. One specific example noted was the delay in the provision of the Code of Practice to support the interim threshold (which could change). The lack of action on some recommendations has restricted the collection of necessary information for other recommendations.

Industry did note that AENV has established protocols for dealing with public water well complaints and the timeframes for investigations have improved significantly. Industry also expressed surprise that only five of the ten new observation wells were usable and were disappointed that the other five were abandoned.

Enhancing Information and Knowledge

The MAC indicated in its Final Report that more information and knowledge are required in order to ensure the continued responsible development of CBM in the province. For example, there was an 'umbrella' recommendation to improve scientific information about the province's water resources, including completion of a groundwater inventory and the BGWP mapping project, and obtaining baseline water data on quality and quantity in non-saline aquifers. As well, more scientific information is needed to develop a threshold volume of produced water below which a simplified Code of Practice will apply.

Non-Industry Feedback
The non-industry sector had little to comment on this category, but noted that AENV appears to be making progress in completing the mapping of the province's aquifers.

Industry Feedback
One respondent indicated that if the proper scientific work is completed and acted upon, Alberta will have one of the best regulatory frameworks for CBM development in the world. However, there was concern expressed that a number of projects related to gathering scientific information have been delayed. This delay is affecting the interim measures that were put in place until standards based on scientific information are developed.

Some examples of delayed projects were: the scientifically-based threshold water withdrawal number for the water decision tree process; technical work to review drilling and completion practices related to groundwater protection; and scientific work to determine offset water well testing and radius standards.

Industry expressed disappointment with the fact that the threshold issue is behind two years and that this delay continues to cause extensive and unnecessary costs to industry. There is also concern that the delay will result in unrealistic expectations of operators.

However, it was recognized that a study on gas movement and its impacts will be available to the MAC II members in spring 2008. Industry encouraged a stronger commitment to completing the scientific work, along with the development of a regulatory framework based upon the resulting sound scientific principles.

Minimizing Surface Impacts

Concern about surface impacts related to CBM operations in the MAC Final Report focused on recommendations that addressed the need to protect the environment and minimize cumulative impacts. For example, the MAC recommended that the CBM regulatory process promote project-based planning to manage potential long-term surface impacts.

Non-Industry Feedback

It was noted that a study conducted by SRD on the reclamation of Foothills fescue was useful, but the report on the Rumsey area, which lies in a CBM area, will be more useful in addressing recommendation 4.3.2.

There was concern expressed about some recommendations related to land use and surface impacts being stalled. SRD was encouraged to take action on recommendation 4.3.1 to protect the environment and minimize impacts from CBM development. It was noted that the department appears to be waiting for the implementation of its Integrated Land Management (ILM) Program, but an alternate approach should be considered, since this was considered a priority recommendation by the MAC. In addition, the MAC recommended baseline studies to be completed in areas where the ILM process may not be adequate, but this work does not yet seem to be underway.

It was noted that the ERCB has shown considerable commitment in implementing pilot projects to help reduce cumulative impacts of CBM development. One respondent indicated that strong legislation was needed to ensure that surface disturbances are reclaimed to the same condition as before industry activity.

Industry Feedback

There was limited industry feedback in this category. One member noted that there should be acknowledgement from government that because companies are required to drill many observation or control wells, surface disturbance is greater.

Communication and Consultation

The MAC Final Report addressed the need for enhanced communication and ongoing consultation on CBM-related topics with all stakeholders, including members of the public.

Non-Industry Feedback

One respondent believed that the government response to recommendation 9.5.1, which was reviewed in 2007 and determined that no action was required, was inadequate. This recommendation related to the Land Titles Office ensuring transparency of information on a certificate of title to mineral rights. There was also concern expressed that the government should update its information related to Recommendation 6.2.1 (completed in 2006 - to make

the public aware of the risks and associated impacts of split-title ownership) to reflect a recent ERCB decision.

Other respondents noted that the reporting and communication process with the MAC II was effective, commendable, is probably helping to maintain work on the recommendations, and allows members to inform stakeholders when progress has been too slow.

Regarding communication with the public, it was noted that the ERCB has issued several new directives that require companies to provide information about non-saline groundwater.

There was concern expressed about the lack of regulation governing agents dealing with freehold rights in Alberta.

A new concern was raised regarding clubroot, a very long lasting soil-borne disease that can devastate canola crops, and is easily transportable on soil particles. Not only does the disease reduce productivity, once the land is inflicted, canola production is restricted by law to a maximum frequency of one crop every 5 to 7 years, depending on individual county laws. While CBM operations are not the only potential transporter of this disease, the intensity of CBM operations in canola-growing areas is a concern.

Industry Feedback
Industry felt the MAC process provides an opportunity to provide accurate information and knowledge exchange among stakeholders, including various government departments and agencies. Industry was pleased with the planned rural community outreach sessions intended to discuss water well testing and water well risks.

One respondent indicated that there might be a significant communication challenge once scientifically-based standards replace interim measures that have been in place for a while. For example, it may take significant effort for AENV to educate the public to move the regulatory framework to one based on sound scientific principles.

Other Recommendations

Both industry and non-industry respondents continued to share a concern about delays in addressing some recommendations. It was acknowledged the delays may be due to insufficient resources in some government departments. The need for sufficient resources was identified in recommendation 7.7.1 which states:

> *Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.*

MAC II members confirmed the need for government to commit to ensuring sufficient resources and delivering on the original timelines to complete the scientific undertakings. This needs to be followed by a timely revision of regulations to match the outcomes of the scientific work.

Comments on MAC II Process

MAC II members were asked about the effectiveness of the MAC II process and whether it has met their expectations.

Non-Industry Feedback

In general, non-industry members were satisfied with the level of information provided to MAC II members. Survey respondents believed that process has been effective, since there is a built-in reporting mechanism for government, as well as an opportunity for stakeholders to identify issues and areas where progress has been slow. This has been of core importance to the MAC II, helping to ensure that the government stays focused on addressing the recommendations. One respondent expressed frustration that issues deemed out-of-scope by MAC continue to be considered out-of-scope.

Industry Feedback

Industry members were generally in agreement that the MAC II process has been effective in providing a feedback mechanism, creating a good opportunity for all stakeholders to discuss progress and collaborate on issues. The style and format of the process has worked well, especially the clear documentation and department updates. There was concern expressed about the need to keep discussion more focused on the recommendations and avoid out-of-scope issues. Receiving material well in advance of the meetings was requested in order to have sufficient time to thoroughly review all the documents. The renewed commitment by AENV and completion of a number of key reports/initiatives were anticipated in the remainder of 2008.

Summary of Feedback

Respondents in general were very satisfied with the MAC II process, and believed it helped ensure the accountability of government in carrying out the MAC's recommendations. They did comment that some of the recommendations were falling behind schedule, particularly those recommendations related to scientific undertakings and information gathering. However, they acknowledged that ten recommendations were completed and a number of key reports were expected in 2008.

Next Steps

This public progress summary report provides an update on the second year of addressing the MAC Final Report recommendations related to CBM development in Alberta.

It reflects the ongoing commitment on behalf of the MAC II, government and industry to an open and transparent process. It is clear from the work completed and commitment to continue to address outstanding issues that all parties have placed a high priority on actioning the recommendations from the MAC process. The government anticipates there will continue to be a strong focus in the coming year on addressing water-related issues and the environmental impacts associated with CBM operations.

In an effort to continue to have an open and transparent process, further public updates will be provided as work continues to address the recommendations. The MAC II will continue to meet to monitor government and other stakeholder activities related to addressing the MAC's recommendations.

Acronyms and Glossary of Terms

Acronyms:

AENV	Alberta Environment
AERI	Alberta Energy Research Institute
AGS	Alberta Geological Survey
AOA	Area Operating Agreements
BGWP	Base of Groundwater Protection
CAPL	Canadian Association of Petroleum Landmen
CAPP	Canadian Association of Petroleum Producers
CBM	Coalbed Methane
CoP	Code of Practice
DOE	Alberta Department of Energy (also AE – Alberta Energy)
ERCB	Energy Resources Conservation Board (formerly the EUB: the Alberta Energy and Utilities Board
GSC	Geological Survey of Canada
ILM	Integrated Land Management
MAC	Coalbed Methane Multi-Stakeholder Advisory Committee
PTAC	Petroleum Technology Alliance Canada
P&NG	Petroleum and Natural Gas
SRD	Alberta Sustainable Resource Development

Glossary of Terms:

Abandonment: The permanent dismantlement of an oil or gas well or facility in the manner prescribed by the regulations including any measures required to ensure that the facility is left in a permanently safe and secure condition.

Appropriate Dispute Resolution (ADR): A term that reflects a number of alternatives or means to resolve conflicts between parties. It can include direct negotiations, facilitated sessions, mediations, or arbitration between conflicting parties, as well as the public hearing process. The ERCB encourages conflicting parties to use available ADR options when conflict arises with respect to energy development.

Aquifer: As defined by the Alberta Government's Water Act, an underground water-bearing formation that is capable of yielding water.

Best practices: Management practices or techniques recognized to be the most effective and practical means to develop the resource, while minimizing adverse environmental and other effects.

Casing: A series of tubular pipes joined by threads and couplings that line a well bore to prevent water and rock from entering into the well bore. In oil and gas wells is also used for drilling control and wellbore integrity.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of organic matter without access to air.

Coal seam: Descriptive term for individual layers of coal found in the geological strata. It is also called a 'bed' in the coal industry.

Coal zone: A vertical extent of intermittent coal seams and intermingled shale or clay. The zone extends from the top of the uppermost seam to the bottom of the lowermost one.

Coalbed methane (CBM): Methane found in coal deposits.

Commingling (oil & gas): Mixing oil and or gas from two or more different pools in the same well bore.

Commingling (water): Mixing water from two or more different aquifers in the same well bore.

Conventional natural gas: Natural gas consisting of a mixture of hydrocarbon compounds, primarily methane, and small quantities of various non-hydrocarbons that exist in gaseous phase or in solution with crude oil in natural underground reservoirs.

Crown: Depending on jurisdiction, the Crown is either represented by the federal or Alberta government.

Drilling fluid: The circulating fluid (mud) used to bring drilling cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to maintain the fluid at desired viscosities and weights. Drilling fluids are also needed to complete water wells.

Formation: A designated subsurface layer that is composed of substantially the same kind of rock or rock types.

Fracturing: A method of improving the permeability of a reservoir by pumping fluids such as water or carbon dioxide, and nitrogen into the reservoir at sufficient pressure to crack or fracture the rock. It is also known as 'fracing'.

Freehold rights: Mineral rights not owned by the Crown in right of Alberta. These mineral rights may be owned by the Crown in right of Canada, by corporations or individuals.

Groundwater: Water that occurs under the surface of the ground.

Initial gas in place: The volume of raw natural gas calculated or interpreted to exist in a reservoir before any volume has been produced**.**

Landowner: See 'Surface rights holder'

Lessee: Defined in the Mines and Minerals Act as the holder according to the records of the Department of Energy of an agreement. The term 'lessees' may, therefore, refer to holders of leases or licences or both, depending on the context in which it is used.

Methane: The most prevalent component of most natural gas produced in Alberta. Its chemical notation is CH_4 and it is the most common hydrocarbon gas.

Mineral rights: Entitlement, through ownership or a leasing arrangement, to produce and sell the minerals in a parcel of land**.**

Migration: Movement from one place to another**.**

Non-saline water: Water with total dissolved solids content less than 4000 milligrams per litre (mg/L). See also 'Saline groundwater'**.**

Operator: The company or individual responsible for managing an exploration, development, or production operation.

Pool: A natural underground reservoir containing an accumulation of oil or gas or both, separated or appearing to be separated from any other such accumulation.

Produced water: The water extracted from the subsurface along with produced oil and gas, including water from the reservoir, water that has been injected into the formation, and any chemicals added during the production/treatment process.

Reclamation: Process of restoring surface environment to acceptable pre-existing conditions.

Recompletion: A recompletion occurs when the producer re-enters a well to complete (i.e., perforate) a new formation in a previously completed well.

Remediation: Cleanup of an environmentally contaminated site.

Saline groundwater: Water that has total dissolved solids content exceeding 4000 mg/L as defined in the Water (Ministerial) Regulation.

Section: An area one mile square or as close as the convergence of the meridians permit.

Sensitive areas: Lands or associated features requiring protection, including critical wildlife habitat, rare and endangered plant species, native prairies, areas prone to erosion or other geotechnical failure, or cultural heritage sites.

Split title: Where subsurface rights are owned by different parties, e.g., the Crown owns the coal rights and the P&NG rights are freehold, or vice versa, or two separate freehold owners exist.

Subsurface: Below the surface.

Subsurface rights holder: The owner or lessee of the mineral rights who has the right to explore for and produce oil, gas, and other minerals. The owner may be a freehold rights owner or the Crown.

Surface rights holder: The owner or lessee of the surface rights (the landowner) has control of the land's surface and the right to work it, in addition to any sand, gravel, peat, clay or marl which can be excavated by surface operations.

Total Dissolved Solids (TDS): A measure of concentration or how much substance is dissolved in a given sample.

Tenure: Term used to describe the system whereby mineral rights are managed by the Department of Energy and disposed to individuals and companies as agreements**.**

Township: A term used in the 'Alberta Township System'. Depending on the context in which it is used, it refers either to a six square mile area comprising 36 sections or to a row of townships spanning from north to south across Alberta. Township 1 lies at the southernmost boundary of Alberta and Township 126 lies at the northernmost boundary.

Unconfined aquifer: An aquifer containing water that is not under pressure. The water level in a well completed in an unconfined aquifer is the same as the water level (water table) outside the well.

Water Act: The Alberta Water Act protects the quality of water and manages its distribution. The legislation regulates all development and activities that might affect rivers, lakes, and groundwater.

Water quality: Refers to a set of chemical, physical, or biological characteristics that describe the condition of a river, stream, lake, or aquifer.

Water well: As defined in the Water Act, an opening in the ground, whether drilled or altered from its natural state, which is used for:

1. the production of groundwater for any purpose,
2. obtaining data on groundwater, or
3. recharging an underground formation from which groundwater can be recovered and includes any related equipment; buildings, structures and appurtenances.

Well density: The concentration of wells on the land surface (per unit area).

Well spacing: The distance between wells producing from the same reservoir with additional separation from lease lines of different ownership. Spacing is often expressed in terms of area (e.g., 40-acre spacing) and is usually established by regulatory agencies.

Zone: Defined in the Petroleum and Natural Gas Regulation as a stratum or series of strata considered by the Minister to be a zone for the purposes of this Regulation. In many cases, zones may be geological formations or members but in some instances they are larger (geological groups) and include more than one formation (the Mannville zone, for instance, includes numerous formations).

Appendix A MAC II Membership

Non-Industry Members:

- Alberta Association of Municipal Districts & Counties (AAMD&C)
- Alberta Environmentally Sustainable Agriculture Council
- Alberta Surface Rights Federation
- Butte Action Committee
- Freehold Owners Association of Alberta
- The Pembina Institute
- Alberta Beef Producers

Industry Members:

- The Coal Association of Alberta
- Canadian Association of Petroleum Producers/Canadian Society for Unconventional Gas (CSUG)/Small Explorers and Producers Association of Canada (SEPAC) – representing two members on the MAC II
- Canadian Association of Petroleum Landmen

Provincial Government Members:

- Alberta Agriculture and Rural Development
- Alberta Energy
- Alberta Energy Resources Conservation Board
- Alberta Environment
- Alberta Sustainable Resource Development

Facilitator:

- Alberta Culture and Community Spirit

10 - complete
21 - on schedule
10 - behind schedule
1 - reviewed and not actioned
2 - not accepted
44 Total Recommendations

Appendix B: Progress Table
MAC Recommendations
As of March 31, 2008

Note: Early Action Items Indicated in Bold Face Type

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Protecting Water Resources					
3.3.1	AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold volume for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply.	2008	behind schedule	ARC report on developing a scientifically based threshold volume completed in March '06. Interim threshold volumes developed by a sub-committee of MAC have been adopted. Stakeholder workshop held Dec. 14/'06 to discuss CoP concepts. Process to review threshold limits also discussed at the workshop. Background information being collected (mapping, monitoring) to provide the necessary information for development of scientifically based threshold volumes.	
			behind schedule	CoP and associated regulation changes are currently being drafted and will be completed by the end of '08. ERCB Directive 44 (Oct. 31'06) increases the surveillance of produced water for all wells with perforations above BGWP and enhances produced water sampling and procedures to provide more accurate information available to AENV. Monthly surveillance is identifying all wells producing water above BGWP. These are followed up with companies to	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				ensure accurate measurement and reporting, segregated water analysis is conducted and production plans established with links to AENV. Where water production occurs operators are choosing to abandon the wet zones in accordance with ERCB requirements. Audits are assisting operators to follow better water testing and reporting procedures.	
3.3.2E	**AENV and the ERCB should develop a 'decision tree' approach for reviewing CBM applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should:**				
3.3.2.1	Incorporate the threshold volume of produced non-saline water, below which the Code of Practice (CoP) would apply (See Recommendation 3.3.1).	2008	behind schedule	CoP and associated regulation changes are currently being drafted and will be completed by the end of '08. Interim threshold value to be used for draft CoP until scientifically based rate is determined.	
3.3.2.2	Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas.	2008	on schedule	Ardley Coal Zone identified as the general area of greatest risk. AGS-AENV Ardley Project initiated in '06 to refine higher risk areas along this zone. To be completed by Q2 '08. A workshop of groundwater experts was held in June '07 to discuss aquifer characterization requirements for groundwater mapping of the Edmonton-Calgary corridor (ECC). ECC Project will also help refine higher risk areas. ECC project to be completed in '11.	
3.3.2.3	Ensure that applications for CBM wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies.	2009	on schedule	Any water diversion already requires an aquifer study. An updated version of the 2004 Guideline for CBM water diversion will be released with the CoP. Ardley project results may identify areas for accelerated aquifer studies required in support of CBM groundwater diversion	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				applications. Ardley project to be completed by Q2 '08. No large CBM related groundwater diversions to date.	
3.3.2.4	Ensure appropriate compliance with the decision tree.	2008	on schedule	Activity to be coordinated with the ERCB production water surveillance. Directive 44 in place.	
3.3.3	AENV's Guidelines for Groundwater Diversion for CBM Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated.				
3.3.3.1	The guidelines should be reflected in the risk-based decision tree process.	2008	behind schedule	The updated Guideline will be released when the CoP is implemented by the end of '08. Later, when a beneficial use policy is completed, the guideline and CoP will be re-examined. Interim threshold values will reflect qualitative risk.	
3.3.3.2	To ensure consistency, minimum conditions for approvals should be standardized across the province with additional site-specific conditions possible.	2008	on schedule	Interim threshold value will be used to determine when an approval is required. Site-specific conditions will be considered in the approval process.	All Water Act approvals already have standardized minimum conditions.
3.3.3.3	The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project.	2008	on schedule	Baseline water well testing tied to CBM well licensing process. Baseline testing will be identified in CoP and Guideline and will be re-visited upon development of scientifically-based threshold volume. Site-specific conditions will be considered in the approval process.	
3.3.3.4	A province-wide review of existing CBM wells should be undertaken to ensure all guidelines have been met.	ongoing	on schedule	ERCB surveillance and audit processes enhanced.	
3.3.5 E	**AENV and the ERCB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis, and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including:**				
3.3.5.1	Testing for a variety of metals and other impurities, as well as total dissolved solids.	2007	on schedule and ongoing	AENV reviewed its sampling protocol for wells in the provincial network (2007/08). Report completed by U of C in spring '07 made recommendations for future	Science Panel will provide recommendations on BWWT (baseline water well testing) standard by spring '08.

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				sampling procedures. AENV has adopted recommended sampling procedures for wells in the provincial network.	
3.3.5.2	Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file (See Section 3.6 for discussion on methane migration and release).	2007	on schedule and ongoing	Gas sampling requirements included in baseline water well testing (BWWT) standard. Protocol for gas sampling completed in August ’06 by AENV under BWWT standard. U of C study on merits of "free" versus "dissolved" gas sampling completed in spring ’07.	Science Panel established to review BWWT standard, including gas sampling protocol. Panel to provide recommendations by spring ’08. The Standard for BWWT will be revised based on Science Panel recommendations.
3.3.5.3	Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.	2008	delayed pending data	Insufficient volumes of non-saline water produced to date to be tested or used for consumptive purposes.	
3.3.6	AENV should develop a water well testing program as follows:				
3.3.6.1	CBM operators should be required to offer baseline testing (as described in 3.3.5) of all nearby water wells within a specified distance of a proposed CBM well to be completed above the Base of Groundwater Protection. (No consensus was reached on an appropriate distance or depth of completion.)	2006	complete 2006	Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by ERCB May 1, ’06.	Science Panel established to review standard. Companies are showing they are receptive to reasonable requests to test water wells in situations not covered by AENV policy. Standard may be revised based on Science Panel recommendations.
3.3.6.2	The information from the baseline testing should be filed by operators in an open, public registry to enhance understanding of Alberta's groundwater system.	ongoing	on schedule	Template developed and interim spreadsheet available to capture initial data. Work on a publicly accessible system is continuing. An online tool is expected to be accessible in mid ’08.	
3.3.6.3	A clear process to address water well complaints should be developed and communicated to water well owners, surface rights holders and other stakeholders.	2007	complete 2007 – with work ongoing	Complaint number (1-800-222-6514) is posted on the AENV website under "Emergency Numbers". Complaint process communicated in June ’06 CBM public information sessions. Training of AENV staff on water well issues is on-going. Internal manual being developed by AENV to ensure consistency.	Complaints process fact sheet prepared and posted on AENV website

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
3.3.7	AENV and the ERCB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; fracturing; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.	2010	on schedule	The ERCB issued Directive 27 (Jan. 31'06) imposing constraints on shallow fracturing. A multi-stakeholder technical review committee has been established and continues to meet. Interim controls have been implemented. The ERCB issued an update to Directive 36 (Feb.'06) to address non-toxic components. Action is targeting higher risk components. The ERCB initiated a one-year field surveillance program specific to CBM in fall '05 to monitor compliance to identify if there are other areas requiring short-term reviews and change. Inspections showed consistent operational compliance with industry standards for both conventional gas and CBM development. A CBM control well system is in place to collect segregated data specific to production from coals.	
3.4.2 E	**The ERCB and AENV should, in cooperation with other organizations such as the ARC, investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers, and review regulations to determine whether changes are needed.**	2007	behind schedule	An element of 3.3.7. A third party review initiated (microbiologist and hydrogeologist) with a public report expected in mid '08. Previous reviews have shown no potential for impact.	
3.5.1	AENV and the ERCB, with stakeholder input, should: Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate. Establish criteria for the beneficial use of non-saline produced water. Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water, and include them in the decision-tree approval process.	2008	behind schedule	Two scoping studies undertaken by AENV, PTAC, AERI and DOE, one on high total dissolved solids (TDS) (June '07 and one on low TDS (August '07). The reports can be found at www.ptac.org Meeting to be held with MAC II in Q3 '08 to present information from the study and other work completed regarding beneficial use of produced water.	Information from the study will be used as a resource for multi-stakeholder workshops held in spring '08 to discuss beneficial use of produced water.

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
	Revisit authorized diversions of non-saline groundwater for industrial use when CBM developments create new sources of water in the area.			Regulators have been approached by a number of parties proposing tests of other uses within or between industries. Where appropriate, having regard for waste management and environmental protection, approvals will be small scale pilots.	
3.5.2	AENV and the ERCB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the ERCB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision tree approval process.	2008	behind schedule	Two scoping studies undertaken by AENV, PTAC, AERI and DOE, one on high total dissolved solids (TDS) (June ′07 and one on low TDS (August ’07). The reports can be found at www.ptac.org Meeting to be held with MAC II in Q3 ′08 to present study information and other work on beneficial use of produced water.	
3.5.3	AENV, the ERCB, and AE should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.	Ongoing (Align with PTAC)	on schedule	Water Innovation Forums held Jun ‘06 and Jun ’07 showcasing new produced water management technology and ideas. Report on Cost-Benefit Analysis of Treating Saline Groundwater (AMEC) completed in March ’07. Promoting and encouraging use of funding opportunities such as Environment Enhancement Fund to focus on produced water management technology, innovation and efficiency.	
3.6.1 E	**AENV and the ERCB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM depressurization.**	2009	on schedule	AENV complaint response to water well complaints is being enhanced. Provincial groundwater monitoring system is being enhanced. AENV has commissioned a consultant to provide background information on gas migration potential with a report by spring ’08. Additional information is being gathered (Directive 35 and Directive 44) to support a future study.	Data to date does not show a provincial problem.
3.6.2	Based on the results of the previous	2010	on schedule	AENV response to water well complaints	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
	recommendation, AENV and the ERCB should implement appropriate prevention, monitoring, and mitigation measures to address methane migration or release, if necessary.			is being enhanced. Provincial groundwater monitoring system is being enhanced. ERCB continues to review and enhance CBM well construction requirements.	
5.2.3**	AE, in consultation with stakeholders, should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	2008	complete 2008	A scoping study "Produced Water Beneficial Re-Use – High TDS Waters" by AENV, PTAC, AERI and DOE was released in August' 07. The study found there is insufficient data regarding characterization of the produced water and that fiscal tools are not the appropriate mechanism at this time. After extensive consultation this conclusion was agreed to by the Royalty Review Panel.	The report can be found at www.ptac.org
Enhancing information and knowledge					
3.2.1E	**The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources:**				
3.2.1.1	AENV should expand its current monitoring network and data management systems.	2007 & ongoing	on schedule	AENV successfully met its obligation to complete five new groundwater observation wells The network will be further expanded with the addition of approximately three to five more wells by 2008. Approximately 40 monitoring wells in the current provincial observation well network were sampled for gas and water analysis by March '07. The number of wells to be sampled for 2007/08 was reduced from 50 to 30 due to the loss of key staff resources. New staff has been hired and are currently being trained. A second dedicated sampling trailer is in the final stages of being built and will be ready for spring '08. AENV anticipates another 50 wells will be sampled in 2008/09.	
3.2.1.2	AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM development.	2012	on schedule	AGS, in partnership with AENV and GSC, will complete the Ardley Coal Zone project by Q2'08. AENV partnered with the AGS to initiate a province-wide long-term GW mapping program starting with Calgary to Edmonton corridor. Long-term	ERCB issued Directive 43 (Nov. 1 '06) requiring shallow logging which will provide additional information on shallow geology to assist mapping.

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				commitment and funding to the program is key to the partnership.	
3.2.1.3	The ERCB and AGS should complete the Base of Groundwater Protection mapping project.	2007	complete 2007	The AGS has completed the updating of the BGWP database. ERCB Bulletin 2007-10 on the BGWP database, was posted on the ERCB website.	
3.2.1.4	AENV and the ERCB, with industry, should investigate the potential for unintended effects of CBM development on surrounding aquifers.	2011	on schedule	Provincial groundwater monitoring system is being enhanced to provide information on regional groundwater impacts. The AGS-AENV Ardley project is designed to identify potential risks of CBM development in the Ardley area and will be complete by Q2'08. AENV has contracted a consultant to prepare a scientific report on the potential for gas migration and other unintended effects of CBM development. The report is to be completed by April '08.	There are many current activities that provide insights into the potential effects of CBM activities on aquifers, such as: - Installation of additional monitoring wells - Enhanced monitoring of wells in the provincial observation well system - Increased use of investigative tools such as isotope analysis.
3.2.1.5	AENV should identify and characterize areas where CBM approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies, and other water users. Maps of these areas should be made available to regulators, industry, and stakeholders.	ongoing	on schedule	Water short areas identified through oilfield water injection study. AGS-AENV Ardley Project and Edmonton-Calgary Corridor Project will identify high risk areas which will help inform policy on where requirements need to be more rigorous. Ardley Project to be completed by Q2 '08. ECC Project to be completed in '11.	
3.2.1.6	Before drilling and production from a potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM operators should obtain baseline data; including gas and mineral content and other indicators of water quality, flow rate/yield, and water levels.	2006	complete 2006	Standard for BWWT for CBM operations implemented by the ERCB – effective May 1, '06. Protocol for gas sampling finalized in Aug '06.	Standard may be revised based on Science Panel recommendations (see 3.3.5). Requirements for collection of baseline data for non-saline water diversions will be specified in Code of Practice (CoP) and Guideline (see 3.3.1). Panel expected to complete report in spring '08.
5.2.1 (non-consensus)	AE, in consultation with stakeholders, should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM wells in the Mannville		not accepted		

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
	formation for the purposes of acquiring information.				
5.2.2**	The Alberta and the federal governments should consider recognizing Canada's CBM potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five year pilot-type drilling program for saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
6.5.1	AE should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	2010	complete 2007	Internal consultation completed. Extension history for CBM reviewed. Based on both the technical review and the lack of requests for more time outside current continuation legislation, there is no need for a second year under Section 17. P&NG Tenure Industry Advisory Committee agreed at their May 17, '07 meeting.	
7.4.1	The ERCB, AENV, and SRD should improve the coordination of their CBM related application and surveillance processes, and develop electronic solutions to facilitate data exchange.	2011	on schedule	Alberta Environment and EUB Agreement to Strengthen Groundwater Protection" was issued on December 20, 2007. In association with this agreement, the ERCB and AENV developed a memorandum of understanding to enhance collaboration for the protection and management of groundwater with respect to the energy sector.	Expect a series of enhancements over this time period.
8.1.2	Regulators should review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	ongoing	on schedule	ERCB Directive 27 on shallow fracturing included a review of other jurisdictions.	Additional reviews will be conducted on a topic basis.
Minimizing Surface Impacts					
4.2.1	The ERCB, AENV, and SRD should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	2009	on schedule	Bulletin 2006-38 on commingling was issued December 16, 2006. Part of activities underway in 7.2.1.	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
4.3.1 E	**To protect the environment and minimize the cumulative impacts from CBM development, a government-led multi-stakeholder committee, such as that being set up under SRD Integrated Land Management (ILM) Program, if appropriate, should undertake the following sequentially:** **1. Review integrated land management principles, policies, and practices relating to CBM to ensure they maintain the integrity and function of the land, taking into account all uses.** **2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM development.** **3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas and make appropriate recommendations for the protection of these areas. Implementation in their process.** **4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.**	2011	ongoing and in development	SRD is currently looking for a new location for an ILM pilot. The key for this new pilot is that it be part of the AOA process to link ILM with the disposition approval process. From May'06 to July'07 six multi-stakeholder working groups (addressing principles, protocols, incentives, stewardship, governance, measures for an ILM Program) contributed to the development of recommendations towards an ILM Program. Interim results were presented at an ILM Workshop Jan 22-24th, '07 with final results reviewed at a workshop on July 31,'07. All working group recommendations have been evaluated by government and an ILM Program plan developed. The ILM Program plan will be rolled out in 2008-09.	
4.3.2	Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM development.	2011	on schedule	An SRD-sponsored study was completed by the U of C on foothills fescue reclamation. Implementation of study recommendations is being reviewed. Draft revised Forested Green Area Reclamation Criteria released for review and comments. Gap analysis was completed for reclamation and revegetation issues for prairie landscapes. Recommendations	The reclamation information is at https://www.alberta.ca/land-reclamation-remediation.aspx

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				have led to the creation of the Foothills Restoration Forum and initiative to bring researchers and public together to discuss native prairie use and restoration issues. Boreal gap analysis will be completed by spring '08.Draft criteria will be presented at a practitioners' workshop in Feb. '08 with implementation expected summer '09.	
7.2.1E	**The ERCB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow:** ♦ **Definition of intense project developments.** ♦ **Full project disclosure** ♦ **Improved community consultation.** ♦ **Enhanced impact assessment.** ♦ **Review of mitigation measures**	2010	on schedule	ERCB conducting a series of pilots with expanded consultation with community and industry in several locations. Reports on initial ERCB-led pilots on website. Next pilots may target more environmentally sensitive areas or wet coals. New format for SRD Area Operating Agreements was developed and approvals are being issued under the new format. Further work is being done on risk management, quality assurance and compliance. Process for electronic submission of monthly status reports currently being developed.	
9.2.1	Industry, regulators, and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the ERCB's Guide 38.	ongoing	on schedule	CAPP's NGC/CBM Best Practices, developed with stakeholder input, was distributed to MAC members and posted to CAPP's website.	New BMP will be reviewed every few years to ensure practices are current and reflect any new issues.
9.6.1	Industry should continue to consult with SRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.	ongoing	on schedule	SRD's requirement for wildlife protection plans in certain situations remains. Consultation with SRD by industry on a project specific basis as well as development of guidelines to assist in reduction of disturbance is ongoing.	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Communication and Consultation					
3.3.4	AENV should clarify and communicate the existing rules regarding how much drawdown is allowed during CBM/ depressurization in a confined, non-saline aquifer to ensure aquifer protection.	2007	complete 2006	AENV has clarified drawdown rules at MAC meetings and at CBM info sessions in spring '06. Stakeholders were made aware of rules at CBM information sessions. Drawdown requirements already considered in approval reviews.	The policy will be communicated in the revised guideline when it is released in '08.
3.4.1	The ERCB and AENV should communicate with CBM operators, drilling contractors, and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's updated Guidelines for Groundwater Diversion for CBM/NGC Development.	ongoing ongoing	complete 2007 on schedule	ERCB Directive 27 summarized rules related to water protection. This stimulated numerous one-on-one discussions with companies to clarify requirements and confirm commitment to comply. ERCB Directive 44 establishes enhanced surveillance of all produced water from wells with perforations above BGWP and establishes the compliance processes associated with water production above BGWP (all oil & gas wells).	
6.2.1	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	2006	complete 2006	Material posted to DOE's website on December 22, 2006.	
6.2.2	The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.	2008	behind schedule	As part of the new royalty framework, a multi-stakeholder committee will be established in Q3 of '08 to review the freehold mineral rights tax program to ensure it is fulfilling its intended objective. The committee will also discuss how to address recommendation 6.2.2.	
6.3.1	AE should review and clarify the criteria for Section 18 Notices of Non-Productivity and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to deeper rights reversion.	2010	complete 2007	The extension history for CBM was reviewed. Serving more Section 18 notices will not release shallow rights (which CBM producers requested.)-Based on the technical review and the lack of requests for more time outside current continuation legislation, there is no need for a second	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				year under Section 17. P&NG Tenure Industry Advisory Committee agreed at May 17, '07 meeting.	
7.3.1	The ERCB, AENV, and SRD, with stakeholder input, should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM development.	2010	on schedule	The requirements of ERCB Directive 35: Baseline Water Well Testing Requirement for Coalbed Methane Wells Completed Above the Base of Groundwater Protection, issued on May 8, 2006, include expanded notification and water well testing opportunities for landowners with water wells in the vicinity of shallow CBM wells.	
7.5.1 E	**Industry, regulators, and other stakeholders should increase the opportunity for dialogue, education, and awareness of the public, surface and subsurface rights holders, leaseholders, and industry on the possible impacts resulting from CBM development, and how the use of the land will be affected.**	ongoing	on schedule	Increasing number of presentations are being made by regulators. CAPP's NGC/CBM Best Management Practices issued to MAC & posted to CAPP's website. AENV, ERCB, Farmers' Advocate & CSUG held public information sessions on groundwater & CBM in June '06. CSUG Conference Nov. '06 included sessions on stakeholder issues. Numerous industry reps. attended & participated in Synergy Alberta conference October 2006 and October 2007 where stakeholder issues were discussed. CERI, CAPP, CSUG & Alberta Economic Development collaborated on "Socio-Economic Impact of Horseshoe Canyon CBM Development in Alberta" report, released & presented at CSUG conference.	AENV and ERCB will partner to produce a joint provincial CBM/water report including results by year end '08.

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
7.5.2	The ERCB and AENV should consolidate CBM/NGC data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data. The availability of data should be subject to the normal provisions of confidentiality.	2012	on schedule		
7.5.3	The ERCB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	2007	complete 2007	The ERCB included a well density clause in spacing/holding applications effective fall 2005 to avoid misunderstanding of the number of wells approved. FAQ was added to the Q & A's on the ERCB spacing initiative website.	
7.5.4	The ERCB and Municipal Affairs, along with other stakeholders, should clarify and communicate the requirements, roles, and responsibilities related to setbacks.	2012	behind schedule – on hold	Requirements, roles and responsibilities related to setbacks will be impacted by the Land Use Framework (LUF). MA, in consultation with ERCB, will look at the approved LUF for policies relating to resource planning, municipal planning and how these will be coordinated.	
7.5.5	Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM issues, including potential effects on water supply.	2007 (and ongoing)	on schedule	AENV's Groundwater and CBM public information sessions were conducted at 13 locations across Alberta in June '06 Public info Fact Sheets were produced to coincide with sessions. In 2007/08 fiscal period, AENV is working in partnership with organizations including PFRA, Alberta Agriculture and various municipalities to provide rural Albertans with knowledge and support to properly construct, site and maintain their water wells. A water well education program is underway with over 15 workshops delivered over March/April '08.	
7.6.1	As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the	2010	on schedule	Multi-stakeholder advisory committee (MAC II) was established by Ministerial Order. First year meetings were held	

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
	Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components: Annual reviews for three years to assess progress according to a monitoring plan. A second overall review in three years to assess: - The effectiveness of the recommendations, - New issues or information, and - An assessment as to whether additional recommendations may be needed.			Sept.'06, Dec'06 and Mar. 2'07. Public report on status of recommendations for first year was released June '07. Second year meetings were held on October 31, '07, Jan. 23 '08 and April 11 '08.	
8.1.1 E	**Industry, government, and other stakeholders should work together to develop, document, and implement best practices for CBM operations.**	2007	complete 2006	CAPP's NGC/CBM Best Management Practices (BMP), developed with stakeholder input, was distributed to MAC members and posted to CAPP's website. CAPP hosted four public information session in May 2007 to educate stakeholders about the BMP document.	New BMP will be reviewed every few years to ensure practices are current and reflect any new issues.
9.3.1	The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	2007	complete - ongoing commitment	ERCB commits to maintain its current practices.	
9.4.1	AE should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	2008	complete	The DOE has developed an online mapping tool to display the results of the most recent P&NG sales and oil sands sales data. In addition, the mapping tool will also provide information on existing P&NG and oil sands agreements.	The mapping tool is found at https://www.alberta.ca/ interactive-energy-maps.aspx and click on "Sales Results Map". Summary and detailed user manuals are part of the online Help functionality.
9.4.2	AE should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.	2008	complete 2007	To make it easier for the public to find the information they need, Alberta Energy's website has been revised to include quick links from all web pages under the "Our Business" tab to search services, interactive maps and related manuals. In addition, a detailed, step-by-step instruction manual for interactive maps.	The links are found in the left hand menu under "Services" https://www.alberta.ca/alberta-energy-online-services.aspx

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
9.5.1	The Alberta Government, including Human Resources and Employment (HRE) should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.	2011	behind schedule - on hold	The Land Agents Licensing Regulation was amended November 30 '07. The amendments include post-secondary education entry requirements, improved licensing procedures, continuing competency and more stringent standards of conduct. CAPL's Professional Surface Land designation program is in place for its members. The Canadian Association of Geophysical Contractors (Alberta) has applied under the Professions and Occupations Associations Registration Act for self regulation. If approved, the regulation would include the regulation of seismic permit agents.	A copy of the regulation can be found at http://www.qp.gov.ab.ca/
9.7.1	The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.	2007	reviewed - no action	Service Alberta advised that Land Titles Registry cannot require leaseholders to disclose lease terms and is not the vehicle to adjudicate or solve this issue.	
Other					
7.7.1	Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.	ongoing		See all other recommendations for implementation details.	

Progress Update – Year 3

Coalbed Methane Multi-Stakeholder Advisory Committee (MAC) Recommendations

November 2009

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Executive Summary

A Multi-Stakeholder Advisory Committee (MAC) was originally formed in November 2003 as part of a review and consultation initiated by the Department of Energy (DOE) to address public concerns associated with coalbed methane (CBM) development in Alberta. The MAC's Final Report (Final Report), released to the public in May 2006, contained 44 recommendations to improve existing rules and regulations related to CBM development in Alberta and identified areas for further study.

The government did not accept two of the recommendations related to royalties and taxes, leaving 42 recommendations to be addressed. The 42 recommendations covered four main areas:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

While some of these recommendations were specific to CBM, many were related to broader energy development issues, such as potential impacts on land and water. Due to the broad scope of the recommendations, a number of government departments and agencies were involved in this cross-ministry initiative. These included the DOE, the Energy Resources Conservation Board (ERCB), Environment (AENV), Sustainable Resource Development (SRD), and Agriculture and Rural Development.

The MAC II was formed in September 2006 to undertake annual reviews for three years to assess progress on implementation of the recommendations. Over the past three years, MAC II members, that included representation from environmental organizations, landowners, agriculture, local government, the energy industry and provincial government departments, have contributed to the development of the annual progress update reports. Members' insights and knowledge were a critical part of the process and the government acknowledges their efforts and commitment. Through this combined effort, significant progress has been achieved.

As of August 15, 2009, progress has been made on all 42 accepted recommendations in the Final Report, including all nine recommendations that had been identified as early action items. A total of 29 recommendations have now been completed, six are on schedule, six are behind schedule and one was reviewed and not actioned. Several of the outstanding recommendations are scheduled for completion by the end of 2009.

In support of the 42 accepted recommendations, a large number of: reports; new or amended directives; guidelines; processes and best management practices; forums; studies; and monitoring programs, have been completed over the last three years or are currently under development. A list of completed recommendations, reports and other deliverables that address the recommendations are provided in the Progress Highlights section of this report.

In year three of the MAC II review, a new status category, 'addressed under other broader government initiatives' was introduced. The purpose of this status was to recognize that some of the Final Report recommendations which were not specific to CBM (e.g. general energy development and groundwater issues) could better be addressed through other broader cross-ministry initiatives such as the Provincial Energy Strategy, Water for Life, Land-use Framework and Integrated Land Management program (for more detail on these initiatives, see pages 6 and 7). A number of these initiatives commenced after the establishment of the MAC in 2003.

These other broader government initiatives target energy, land, and water issues, and have the resourcing, budget and priority to address the MAC recommendations in these areas. In total, five recommendations are being addressed in this manner (see page 6). Progress on these issues will continue to be reported on the appropriate government website. Progress on outstanding MAC Final Report recommendations will continue to be reported on DOE's website.

It is important to recognize that there has been significant development of CBM in Alberta since the MAC was established in 2003, with approximately 19,000 CBM wells being completed, licensed, or tested for CBM over this period. Also, there has been extensive testing of offset water wells, the implementation of enhanced regulatory controls, and the completion of a number of CBM-related reports and studies. All of these activities have greatly increased knowledge and understanding of the resource and the associated risks. Some issues over which there was initial concern have not materialized. For example, very little production of non-saline water has occurred with CBM due to most development to date being in "dry" coals that produce little or no water. Alberta's responsive regulatory framework and policies have helped to ensure that the development of this resource occurs in a responsible manner.

As with previous years, non-government members of the MAC II were provided an opportunity to submit their opinions on the MAC II process through a feedback questionnaire and to provide their input on draft versions of the third annual progress update report. Their feedback has been included in Section 4 of this report. Overall, respondents generally were very satisfied with the MAC II process, believed it helped ensure the accountability of government in carrying out the MAC's recommendations and strongly believed the government had demonstrated its commitment in implementing the recommendations.

Although the MAC II process concludes upon the public release of the third annual progress update report, ongoing work related to the outstanding recommendations and other evolving issues will ensure that CBM in Alberta continues to be developed in a responsible and appropriate manner.

ADDENDUM
Additional Completed Final Report Recommendation

Recommendation 3.4.2
Since this report was reviewed by the MAC II, recommendation #3.4.2 (to investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers) has been completed with the release of ERCB report 2009-C: "Risk to Water Wells of Pathogens in Drilling Fluids". The report can be found on the ERCB website at http://www.ercb.ca. The total number of completed recommendations is now thirty; six are on schedule, five are behind schedule and one was reviewed and not actioned.

Background

Coalbed methane (CBM - also known as natural gas in coal, or natural gas from coal), is natural gas (methane) that is attached (or "adsorbed") to coal seams, rather than trapped in the pore space of rock like most conventional natural gas. It is generally considered a sweet gas, as it does not contain much hydrogen sulphide. Presently, CBM represents about six percent of total natural gas production in Alberta.

The CBM Multi-Stakeholder Advisory Committee

In September 2003, the Department of Energy (DOE) held a pre-consultation with stakeholders to help identify possible issues relating to CBM development. The purpose of DOE's review was to determine if the existing policy and regulations governing CBM development continue to provide a balance between economic benefits and protecting Alberta's water, air, and land resources, and minimizing landowner impacts.

As a direct result of feedback received from the pre-consultation stakeholders, the Coalbed Methane/Natural Gas in Coal Multi-stakeholder Advisory Committee (MAC) was formed in November 2003. The MAC's role was to consult with stakeholders and develop recommendations to ensure that the rules and regulations pertaining to CBM development result in the continued responsible development of CBM.

MAC members represented environmental and agricultural organizations, landowners, local governments, the energy industry, and provincial government departments and agencies. The departments of Agriculture, Food and Rural Development (now Agriculture and Rural Development); Environment (AENV); Sustainable Resource Development (SRD); DOE and the Energy Resources Conservation Board (ERCB, formerly the Energy & Utilities Board) also collaborated in this process.

From the beginning, the MAC wanted to ensure an open and transparent process which included input from stakeholders. Four working groups (surface/air, water, royalty and tenure) with membership from a cross-section of stakeholders were established to provide information and recommendations to the MAC.

Eight information sessions were held in spring 2004 to provide information on CBM, local development, provincial regulations and the consultation process, as well as to create opportunities for members of the public and stakeholder groups to provide input on issues related to CBM development. Feedback was included in the MAC Preliminary Findings which was released for public comment in July 2005. Over 1,000 Albertans participated in the consultation process, either as a member of one of the working groups or as a member of the MAC, through participation at the information sessions or by providing feedback on the Preliminary Findings.

The MAC Final Report, released to the public in May 2006, contained 44 recommendations. Some of the recommendations identified issues that were unique to CBM, but many others related to broader energy development. These recommendations are listed in the attached Progress Table (Appendix B).

The MAC II

The MAC II was formed in September 2006 based on MAC recommendation 7.6.1, which called for the formation of a multi-stakeholder group to review progress in addressing the MAC Final Report recommendations. Recommendation 7.6.1 states:

> *As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components:*
> - *Annual reviews for three years to assess progress according to a monitoring plan.*
> - *A second overall review in three years to assess:*
>   1. *The effectiveness of the recommendations,*
>   2. *New issues or information, and*
>   3. *An assessment as to whether additional recommendations may be needed.*

MAC II stakeholder membership was identical to the MAC, although individual stakeholder representatives differed in some cases. See Appendix A – MAC II membership for a complete list of participating organizations and government departments.

To review and monitor the progress achieved on the recommendations, the MAC II met eight times over the review period: three times during both the first and second years and twice in the third year. At each meeting, an action plan providing status and specific timelines for each recommendation was provided. This action plan was updated on a continual basis. E-mails were used to inform MAC II members of developments between meetings and feedback on the process was obtained both verbally and in writing.

Progress update reports were released as follows:

- First Progress Update Report was released in June 2007 and covered the period May 2006 to March 31, 2007 (the end of the government's fiscal year).
- Second Progress Update Report was released in July 2008 and covered activities over the period April 1, 2007 to March 31, 2008.
- Third Progress Update Report was released in November 2009, and covered the period April 1, 2008 to August 15, 2009.

This third and final report progress update is a result of the MAC II's commitment to keep the public informed and is one component of a number of communications activities being undertaken to inform Albertans about CBM.

Developments since the MAC Final Report

The MAC Final Report recommendations were developed based on the information available at the time of its release. Since that time, industry has gained experience in producing CBM in Alberta and there is a better understanding of the potential development impacts to resources such as water, land, and air.

It is important to recognize that there has been significant development of CBM in Alberta since the MAC was established in 2003, with approximately 19,000 CBM wells being completed, licensed, or tested for CBM over this period. Also, there has been extensive testing of offset water wells, the implementation of enhanced regulatory controls, and the completion of a number of CBM related reports and studies. This has greatly increased knowledge and understanding of the resource and the associated risks.

Some issues over which there was initial concern have not materialized. For example, very little production of non-saline water has occurred with CBM due to most CBM development to date being in "dry" coals in the Horseshoe Canyon coal zone that produce little or no water, or commingled sands and coals production, which do not produce much water.

Some of the outcomes from the MAC Final Report recommendations may differ from what was originally envisioned by the MAC. Reasons for this include: better understanding of the resource; new technologies which enhance production from unconventional gas sources such as CBM; policy and regulatory changes to ensure continued responsible development of CBM; and, ongoing communication with stakeholders through websites, meetings, workshops and other venues to share information on issues related to CBM development.

Since most of the MAC Final Report recommendations are not specific to CBM, there are opportunities to align these recommendations with other broader government processes or reviews. Examples of these include the Provincial Energy Strategy, Water for Life, the Land-use Framework and the Integrated Land Management program.

Progress Highlights

This section provides a high level summary of the key activities undertaken by various government departments, agencies and other groups in addressing issues identified during the MAC consultation process and in response to the MAC Final Report recommendations. Please see Appendix B – Progress Table for a complete list of recommendations, status updates, and activities undertaken.

Of the original 44 MAC recommendations, the government did not accept two of the recommendations related to royalties and taxes. However, it should be noted that in January 2009, the Government of Alberta implemented its new royalty framework. The new royalty framework is based on price and production levels that impact the royalty calculated for low productivity wells such as CBM. As of August 15, 2009, progress has been made on all 42 accepted recommendations in the Final Report, including all nine recommendations identified as early action items. A total of 29 recommendations have now been completed, six are on schedule, six are behind schedule and one was reviewed and not actioned. Several of the outstanding recommendations are scheduled for completion by the end of 2009.

In year three, 14 recommendations were completed and five recommendations were considered to be addressed under other broader government initiatives, bringing the total number of completed recommendations to 29, as follows:

Completed Recommendations

Year of Completion	Description of Recommendation	Recom. #
2006/07	Clarify and communicate the existing rules regarding how much drawdown is allowed during CBM depressurization in a confined, non-saline aquifer to ensure aquifer protection.	3.3.4
2006/07	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	6.2.1
2006/07	Create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	7.5.3
2006/07	Industry, government, and other stakeholders should work together to develop, document, and implement best practices for CBM operations.	8.1.1
2006/07	The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	9.3.1
2007/08	In consultation with stakeholders, the government should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	5.2.3
2007/08	Review and clarify the criteria for Section 18 Notices of Non-	6.3.1

	Productivity and aggressively serve these notices. Section 18 notices on existing agreements should continue to be subject to deeper rights reversion.	
2007/08	Consider allowing companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	6.5.1
2007/08	Review the full range of paper to electronic options of notification and work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	9.4.1
2007/08	Provide instructions on the government website on the process for conducting an information search by land or by mineral agreement.	9.4.2
2008/09	Develop standard procedures and reporting requirements for sampling, analysis and monitoring water for CBM wells and potentially affected non-saline water wells.	3.3.5
2008/09	Communicate current and future requirements to protect non-saline aquifers.	3.4.1
2008/09	Promote the development or application of new technology to take advantage of saline and marginally saline produced water.	3.5.3
2008/09	Investigate the potential for methane migration or release to water wells as a result of CBM depressurization.	3.6.1
2008/09	Review regulatory processes to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	4.2.1
2008/09	Improve the science and technology for remediation and reclamation of land in sensitive areas that could be impacted by CBM development.	4.3.2
2008/09	The government should facilitate parties coming together to work toward resolution of split-title ownership issues.	6.2.2
2008/09	Review the application processes for intense CBM developments to enhance and promote project-based planning and disclosure.	7.2.1
2008/09	Review all guidelines relating to public input opportunities and notification.	7.3.1
2008/09	Consolidate CBM data in a publicly accessible and user-friendly database.	7.5.2
2008/09	Develop and implement a communication plan to provide better information on CBM issues.	7.5.5
2008/09	Review implementation of the final report recommendations.	7.6.1
2008/09	Review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	8.1.2
2008/09	Industry and ERCB should develop and communicate practices and procedures to quickly deal with short-term noise complaints.	9.2.1

The following recommendations are 'addressed under other broader government initiatives'		
2008/09	Review and provide appropriate recommendations to protect the environment and minimize the cumulative impacts from CBM development.	4.3.1
2008/09	Improve coordination of CBM-related application and surveillance processes and develop electronic solutions to facilitate data exchange.	7.4.1
2008/09	Industry and ERCB should increase opportunities for dialogue, education and awareness on possible impacts from CBM development.	7.5.1
2008/09	Government should ensure sufficient resources are available to implement the Final Report recommendations effectively and efficiently.	7.7.1
2008/09	Industry and SRD should continue to consult with each other on minimizing disturbances to wildlife habitat and scheduling activities to address critical wildlife periods.	9.6.1

Broader government initiatives

In year three of the MAC II, a new status category, 'addressed under other broader government initiatives', was introduced. The purpose of this status was to recognize that some of the Final Report recommendations were not specific to CBM (e.g. general energy development and groundwater issues) and could be better addressed through other cross-ministry initiatives that commenced after the establishment of the MAC, such as the Provincial Energy Strategy, the renewed Water for Life, Land-use Framework and Integrated Land Management program (for more detail on these initiatives, see below).

These other broader government initiatives focus on energy, land, and water issues, and have the resourcing, budget and priority to address the MAC recommendations in this category. In total, five recommendations fall into this category (see above).

Provincial Energy Strategy (PES): In December 2008, the Department of Energy (DOE) announced the PES, which will help chart the course of Alberta's energy future. This strategy is a long-term action plan for Alberta to achieve clean energy production, wise energy use and sustained economic prosperity.

The PES recognizes the potential for unconventional gas, such as CBM, to extend production of natural gas in Alberta well into the future. The potential for production from tight gas and shale gas in Alberta is also significant. The PES identifies the need to find methods to develop and use fossil fuels in an environmentally responsible way, to properly account for cumulative effects to the environment and greenhouse gas emissions, as well as investing in energy infrastructure, including policy development and energy research. These will all have an impact on how

unconventional gas (including CBM) will be developed in Alberta.

Land-use Framework (LUF): Announced in December 2008, the LUF is a comprehensive strategy to better manage public and private lands and natural resources to achieve long-term economic, environmental and social goals for the province. The LUF identifies a provincial vision and outcomes for land use on both public and private land. The strategy outlines a regional planning and decision-making framework that reflects provincial goals and priorities and incorporates cumulative effects management.

The LUF considers various ways in which the same land base may be used (e.g., for resource development, recreational purposes and housing) and how the land can be utilized in the most effective way possible. Incorporating land use management and decision-making processes will result in better management of conventional and unconventional gas development. As well, it will balance the needs of various stakeholders by taking into consideration their concerns at the regional land use planning stage. Development of the two top priority regional plans has been initiated with the creation of Regional Advisory Council for both the Lower Athabasca and the South Saskatchewan Plans.

Integrated Land Management (ILM) Program: As mentioned above, Alberta's LUF sets out an approach to manage public and private lands and natural resources to achieve Alberta's long-term economic, environmental and social goals. ILM is an approach to help promote responsible use of provincial public land by influencing land-user behaviour, improving stewardship, and encouraging users of the land to reduce their impact to the land. For example, the ILM Program will ensure meaningful opportunities are available to address the needs and concerns of stakeholders (such as companies, industries, recreationists, environmentalists and the government) before and during resource development. This is one of the elements under the "Efficient Use of Land" strategy in the LUF.

Water for Life: The renewed Water for Life strategy, announced in November 2008, confirmed and updated the original strategy, which has guided management of Alberta's water resources since 2003. As with the original strategy, the renewed Water for Life strategy is based on three outcomes: safe, secure drinking water supply; healthy aquatic ecosystems; and reliable, quality water supplies for a sustainable economy. Each outcome will be achieved through knowledge and research, partnerships and water conservation. A key part of Water for Life is the understanding and protection of Alberta's groundwater, which was one of the focuses of the MAC Final Report. The need for improved understanding of Alberta's groundwater resources is emphasized in the renewed strategy.

Discussion on Outcomes

When the MAC Final Report was released in 2006, four key areas were used to guide and coordinate work, as well as to report on progress:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

A summary of the work completed by government is provided below for each of the key areas. Each summary includes reports and other deliverables (new or amended directives, guidelines, processes and best management practices; forums; studies; and monitoring programs) that have been completed over the last three years or are currently under development. Updates on the status of individual recommendations can be found in Appendix B – Progress Table.

The following discussion summarizes key activities completed for each of the four main areas listed above:

1. Protecting Water Resources

Conventional gas production in the province has typically occurred at depths where only saline water (i.e. water with greater than 4,000 milligrams per litre of total dissolved solids) is encountered, but both conventional and unconventional gas (such as CBM) can occur in shallow zones with non-saline water.

Having a healthy and sustainable water supply is critical for Alberta's environment, communities and economic well-being. At the earliest stages of the consultation, stakeholders identified protection of water resources as one of the key areas of concern.

Part of this concern was based on CBM development in other jurisdictions where the geology and regulatory framework differ from those in Alberta. When the MAC started its review in 2003, there was little data on how CBM development could potentially impact Alberta's water resources, particularly groundwater.

It is important to recognize that the level and type of CBM development anticipated at the beginning of the MAC process has, to date, not occurred. Most CBM production has occurred in the Horseshoe Canyon area which has minimal associated water production. There has been little CBM development in areas where non-saline water may be encountered, such as in the shallow Ardley coal zone in parts of west-central Alberta.

1.1 Objectives

In order to ensure water resources and, in particular, groundwater, would be appropriately protected during CBM development, a key objective was to improve available scientific information on Alberta's water resources. Another objective was to ensure aquifers and water

supplies were protected through the application of appropriate policy and regulations. Confirming appropriate sources of drilling fluids was an important objective, as was promoting the wise use and conservation of water. Finally, the MAC identified the need to investigate the potential for CBM migration and release.

1.2 Deliverables

The MAC Final Report included 13 recommendations specifically on water. Of these, four are complete, three are on schedule and six are behind schedule. A list of reports and other deliverables related to protecting water resources is provided below:

- **Simplified Regulatory Process for CBM Non-saline Water Production:** While this deliverable remains behind schedule, ERCB and AENV continue to work collaboratively to finalize a one-window simplified process (code of practice or similar approach) for lower risk groundwater diversions below the interim threshold volume that was established in 2006 by a sub-committee of the MAC. A draft process is expected to be available for consultation later in 2009.

- **Guidelines for Groundwater Diversion for Coalbed Methane/Natural Gas in Coal Development:** Introduced in 2004 by AENV, the guidelines specify the requirements to obtain authorization to divert non-saline water for CBM production. The guidelines will be updated to compliment the simplified regulatory process for smaller, lower risk non-saline water diversion; a draft will be released later in 2009 for consultation.

- **Water Well Complaint Process:** Government continues to improve its response to all water well complaints. The 1-800-222-6514 Environment Hotline number was communicated to the public at CBM information sessions held in spring 2006. Water well training workshops were held for AENV and ERCB staff to increase their knowledge of water well issues and improve the complaint process. An independent review by the Alberta Research Council in 2008 of four water well complaints handled by AENV showed the wells in question were likely not adversely affected by CBM activity.

- **Beneficial Use of Produced Water:** Two scoping studies on the beneficial use of produced water were undertaken to look at the potential for treatment and use of non-saline and marginally saline produced water. The studies noted that, to date, there has been very little produced water from CBM activities. The reports are available on the Petroleum Technology Alliance Canada (PTAC)'s website at www.ptac.org/. The negligible volume of non-saline water produced to date has precluded the development of a comprehensive beneficial use policy; however, general beneficial use considerations will be included in the revised Groundwater Diversion Guidelines to be released later in 2009 for consultation.

- **Water Innovation Forums:** Since 2005, PTAC has held annual one-day industry events where industry can sponsor speakers who have been working on innovative water conservation and use technology. Further information on the forums can be found on the PTAC website at www.ptac.org/.

- **Water well monitoring:** AENV has added 25 wells to the provincial Groundwater Observation Well Network (GOWN) since 2007, bringing the total number of sites up to 216. Sixteen of the added wells are in CBM areas. AENV initiated a water and gas sampling program in 2006 and has sampled 116 GOWN and other wells to March 2009, with the majority of these being in CBM areas. Sampling of 30 to 40 wells per year will continue on an ongoing basis. Information from water well monitoring and sampling will help industry and government better understand and protect Alberta's groundwater resources.

- **Edmonton-Calgary Corridor study:** AENV and the Alberta Geological Survey have partnered for a long-term provincial groundwater inventory and mapping program. This started with work in the Edmonton-Calgary corridor, which has experienced the most CBM activity to date.

- **Gas Migration Study:** This study investigated the potential for gas migration as a result of CBM development. The AENV/ERCB joint response to the report is also available.

- **ERCB Bulletin 2007-10:** This bulletin announced the new Base of Groundwater Protection (BGWP) database and is available on the ERCB website. The Bulletin provides an overview of the BGWP information and reiterates cementing requirements designed to protect groundwater.

- **ERCB Directive 27:** An interim directive was released in 2006 to impose shallow fracturing controls to help protect water resources. A Multi-stakeholder Shallow Fracturing Steering Committee was formed which recommended a study be commissioned to look at available fracturing data to assist in the development of science-based shallow fracturing requirements. The directive was updated and released in August, 2009 and can be found on the ERCB website.

- **ERCB Directive 35:** The AENV Standard for Baseline Water Well Testing (BWWT) for Coalbed Methane/Natural Gas in Coal Operations was implemented by the ERCB in May, 2006. It specified the water well testing requirements operators must undertake prior to drilling or recompleting a CBM well. The Standard is available on the AENV website, while Directive 35 is available on the ERCB website. A Science Panel was established to review the effectiveness of the BWWT program.

- **ERCB Directive 36:** This directive was updated in 2006 to address non-toxic components as part of the overall minimum equipment and procedure requirements that the licensee must follow when drilling wells in Alberta.

- **ERCB Directive 43:** This directive requires industry to undertake shallow logging to provide additional information to assist groundwater mapping and water well complaint investigations.

- **ERCB Directive 44:** This directive, "Requirements for the Surveillance, Sampling, and Analysis of Water Production in Oil and Gas Wells Completed Above the Base of Groundwater Protection (BGWP)" has resulted in increased surveillance of water production at all oil and gas wells with perforations above the BGWP. The directive enhances produced water sampling and provides more accurate information to AENV.

- **Protection of Alberta Groundwater Resources:** AENV and ERCB signed a Memorandum of Understanding in December 2007 to ensure a coordinated and collaborative approach within government to protect groundwater resources in Alberta.

- **Ardley project:** The AGS project reviews the interface between the Paskapoo and Ardley formation and will contribute to a better understanding of the risks that may be associated with CBM development in the Ardley coals. A report is currently under review and will be available later in 2009.

1.3 Ongoing Commitment

Water for Life: The original Water for Life strategy was unveiled in November 2003, at the same time the MAC started its review of CBM development in Alberta. The renewed strategy, released in 2008, confirmed and updated the original strategy. The three key goals of the renewed strategy are to ensure: a safe, secure drinking water supply; a healthy aquatic ecosystem and; reliable, quality water supplies for a sustainable economy. To support the strategy, the Alberta Water Research Institute was established in 2007 to help coordinate world class and leading edge water research.

Land-use Framework (LUF): The LUF proposes seven key strategies to improve land-use decision-making in the province. Two strategies in particular exemplify a continued commitment to MAC - Outcome 1: Protecting Water Resources:

- Strategy 1 proposes the development of seven regional land-use plans to formalize coordination of land use decisions for the Alberta government and municipalities to provide an integrated process for land, air, and water management. The regional plans will: integrate provincial policies at the regional level; set out regional land-use objectives; and provide the context for land-use decision-making within the region. The regional plans will also reflect the uniqueness and priorities of each region. Municipalities, other local authorities and provincial government departments will be required to comply with each regional plan.

- Strategy 3 addresses how "Cumulative effects management will be used at the regional level to manage the impacts of development on land, water and air." Alberta's system for assessing the environmental impacts of new developments has usually been done on a project-by-project basis. While this worked at lower levels of development activity, it did not address the combined or cumulative effects of multiple developments which have taken place over time. A cumulative effects management approach will be used in regional plans to manage the combined impacts of existing and new activities within the region. Using this approach within a regional planning framework for CBM or other unconventional gas plays will identify opportunities for industry and communities to work together to better manage competing land priorities e.g., oil and gas development, forestry and mining, agriculture, recreation, and local housing and infrastructure.

2. Enhancing Information and Knowledge

When the MAC was established in 2003, much of the available information regarding CBM development came from jurisdictions where both the geology and regulatory framework differed significantly from that in Alberta. The initial lack of Alberta-based information resulted in concerns by some stakeholders about the potential impact of future CBM development. The expanded collection of Alberta-based CBM information and knowledge, and communication of the facts to Albertans, has been key to the success of the MAC process.

2.1 Objectives

The objective of this key issue was to ensure current, accurate information and data is available on CBM development in Alberta and related issues. In particular, there was an identified need to improve available scientific information on the province's water and CBM resources.

2.2 Deliverables

The MAC Final Report contained six recommendations relating to enhancing information and knowledge. Work has been completed on three recommendations (one of which will be addressed through other broader government initiatives), one is on schedule, two recommendations were not accepted and no recommendations are behind schedule. The main reports and other deliverables include:

- **One Year Mineral Lease Continuations:** A review of the history of Alberta CBM production and an investigation of methods used by industry for mineral lease continuations determined that the current regulation allowing for a one year continuation is sufficient.

The following initiatives also relate to enhancing information and knowledge, and have already been discussed in Section 1.2:

- Water Well Monitoring
- Edmonton-Calgary Corridor Study
- Ardley Project
- Water Innovation Forum

- Water Well Complaint Process
- Protection of Alberta Groundwater Resources
- ERCB Directive 27
- ERCB Directive 35
- ERCB Directive 43
- ERCB Bulletin 2007-10

2.3 Ongoing Commitment

The government is committed to ensuring that current and accurate information continues to be available to Albertans regarding CBM and related issues. Government departments will continue to work together to identify opportunities for better efficiencies on how the information is shared with the public.

Provincial Energy Strategy: The PES identifies the need to "bolster knowledge and awareness of and appropriate education on energy issues." The strategy to complete this objective is under development. The government will prepare an annual report card to communicate progress to Albertans. The report card will also showcase collaboration across government on energy-related matters and it will be incorporated into annual business plan reporting.

Land-use Framework: Strategy 6 under the LUF is to "Establish an information, monitoring and knowledge system to contribute to continuous improvement of land-use planning and decision making." Good land-use decisions require accurate, timely and accessible information. A sound monitoring, evaluation and reporting system is needed to ensure the outcomes of the LUF are achieved. The government will collect the required information to support land-use planning and decision-making. This information will be used to create an integrated information system to ensure decision-makers have access to relevant information. The system will include regular monitoring, evaluation and reporting on the overall state of the land, and progress toward achieving provincial and regional land-use outcomes.

Strategy 7 under the LUF specifically addresses the requirement to undertake inclusion of Aboriginal peoples in land-use planning.

3. Minimizing Surface Impacts

The MAC's recommendations on minimizing surface impacts range from activities associated with local improvements to looking at potential major changes resulting from reviews of province-wide land use policy.

3.1 Objectives

Objectives included reviewing the regulatory process to identify ways to minimize surface disturbance, reducing cumulative impacts associated with CBM development, addressing noise related issues and protecting wildlife. The MAC identified steps that should be undertaken through the ILM process to assist with minimizing surface impacts. Government and researchers were to identify opportunities to improve the science and technology for remediation and

reclamation of land, particularly in sensitive areas that could be impacted by CBM. Another objective was to review the current application process to promote project-based planning and disclosure, in particular for high density CBM developments.

3.2 Deliverables

All six recommendations relating to this key issue have been addressed (two of which will be addressed through other broader government initiatives). The main reports and other deliverables include:

- **Integrated Land Management Program:** As mentioned earlier in the document, the ILM program's approach encourages users of public land to work together to reduce their impact on the land.

- **Best Management Practices:** Associated with the ILM program, the development of "best management practices" has been undertaken for CBM, both in central and in north central Alberta. These practices identify options to reduce the environmental footprint created by energy development. Techniques such as multi-well pads and modified locations for wells have been tested.

- **Enhanced Area Operating Agreements:** Alternative consultation and stakeholder involvement options under an enhanced Area Operating Agreement are being attempted in order to be more pro-active in minimizing surface impacts.

- **Restoration of Rough Fescue (Festuca campestris) Grassland on Pipelines in Southwestern Alberta:** SRD sponsored a study on Foothills fescue reclamation and is reviewing the study recommendations. Well-managed fescue grasslands provide a low maintenance and high production source of feed, especially in winter and are a valuable resource for livestock production. The outcomes of the study include the creation of the Fescue Forum (industry and government group) to conduct and review research on reclamation and the development of new reclamation standards for the native prairie grasslands.
  Land Pilot Initiative: Two pilot projects were undertaken by the ERCB in central Alberta to examine ways to promote improved CBM project planning and disclosure. These pilot projects included earlier engagement of stakeholders in the planning process, better
- information exchange and more coordination between government, industry and stakeholders.

  Canadian Association of Petroleum Producers (CAPP) Best Management Practices for Natural Gas in Coal (NGC)/Coalbed Methane (CBM): The best management practices (BMP) document includes information on many issues associated with CBM development, including how to quickly deal with short-term noise complaints not currently covered under

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ERCB's Directive 38. The BMPs will be reviewed every few years to ensure practices are current and reflect any new issues. The document can be found on CAPP's website at http://www.capp.ca.

- **ERCB Directive 65**: Changes were made to the directive and regulations regarding the management of commingled production in the wellbore. The changes assisted in reducing the number of future wellbores required to recover oil and gas resources, thereby minimizing the impact to the surface.

3.3 Ongoing Commitment

Even though all recommendations in this section on minimizing surface impacts have been addressed, the government remains committed to the continued responsible development of resources such as CBM. The following initiatives will address not only CBM issues but to a range of related activities as well.

Provincial Energy Strategy: The PES addresses the need to "properly account for cumulative effects to the environment". Energy production and consumption decisions will also have to consider cumulative impacts to the environment, including impacts to the land, air and water.

Land-use Framework: Strategy 5 of the LUF is to "Promote efficient use of land to reduce the footprint of human activities on Alberta's landscape." This underlying principle should guide all areas of land-use decision-making. The future regional plans under LUF will identify mechanisms to mitigate the surface impacts of CBM and other industrial development.

Integrated Land Management: The ILM program focuses on managing and reducing the industrial, recreational and other footprints, reclaiming the land, and providing an appropriate level of access. The program will address the challenge of managing the needs of industry with the needs of other users to sustain the productivity of the land, and provide options for land and resource use in the future. The program and associated planning approaches will assist industry and stakeholders by providing a "tool" for mitigation. The various components in the program will be available to industry to assist them in better planning and delivering the objectives of minimizing surface impacts.

Area Operating Agreements (AOAs): AOAs are currently being used and will be the primary technique utilized by industry in the future to design their development plans. This will involve taking a "landscape" approach to better assess the surface impacts and potentially link surface with subsurface activity. This linkage will assist both industry and regulators in understanding the full spectrum of the present and the future "footprint". Through the use of this tool, the objectives of both the LUF regional plans and the ILM program will be realized.

Land Use Operating (Wildlife) Guidelines: Work is underway to develop a regional or area specific guideline that can be used by industry when designing their applications and their development impacts. These will assist in providing priorities and approaches that can be used to reduce the impacts on all wildlife species, especially the ones listed as threatened or endangered under the *Species At Risk Act.*

4. Communication and Consultation

The focus of communication and consultation is to increase opportunities for dialogue and public awareness on possible impacts of CBM development so that Albertans are better informed and engaged.

4.1 Objectives

Objectives included ensuring industry is aware of requirements to protect non-saline aquifers and to increase opportunities for stakeholder input on CBM development and its potential impacts. The MAC also identified a need to ensure better access to data and information relating to CBM, including both paper to electronic options. The need to help address issues related to split-title ownership was also identified[1].

4.2 Deliverables

Government, stakeholders and industry have all taken steps to improve the availability of Alberta-based information pertaining to CBM. For example, information on CBM is available on several government websites. The ERCB provides monthly CBM well location reports and has also created or updated a number of directives to address specific aspects of CBM development.

The availability of CBM information has not been limited to government. For example, each fall the Canadian Society for Unconventional Gas hosts the largest unconventional gas conference in North America, where stakeholders have an opportunity to exchange information on unconventional gas issues.

Of the 18 recommendations in this category, 15 are complete (one of which will be addressed through other broader government initiatives), two are on schedule and one was reviewed with no action taken. The main reports and other deliverables include:

- **Clarification of Split-Title Ownership Risks:** Information regarding the potential risks and associated impacts of split-title ownership issues was posted to the DOE website.

- **Freehold Oil and Gas Issues Stakeholder Consultation:** In 2009, a multi-stakeholder consultation process, led by former Alberta Energy Parliamentary Assistant, Len Webber, was established to facilitate parties in addressing split-title ownership. An independent

[1] Provincial legislation (the *Mines and Minerals Act* and associated Regulations) is conclusive in determining the ownership of CBM where the Crown owns both coal and natural gas. However, in the instances of where coal rights are freehold owned and natural gas rights are Crown-owned, vice versa, or two separate freehold owners exist, the matter is to be determined and ruled on by the courts. For Crown-owned mineral rights, CBM is considered to be natural gas and is administered in the same manner as conventional gas. If lands and/or rights in an agreement are no longer considered productive, Alberta Energy will serve a one-year notice (Section 18 in the Petroleum and Natural Gas Tenure Regulation) which requires the lessee to prove the rights productive or the rights will revert to the Crown.

consultant met with stakeholders individually in February/March, and held a group session in March to develop consensus-based recommendations for consideration by the Minister of Energy. The consultant's recommendations on the split-title issue are currently under review by the DOE.

- **Section 18 Notices Review:** A new technical review was undertaken, which determined that serving more Section 18 notices under the Petroleum and Natural Gas Tenure Regulation would not result in an increase in the release of shallow rights to industry. As such, there was no identified need to change the existing regulation.

- **CBM Best Management Practices:** Best management practices were developed by CAPP to assist industry in better understanding how to reduce the environmental impacts of CBM development. Further information can be found on the CAPP website at http://www.capp.ca/

- **Creation of unique fluid codes for CBM:** The ERCB created unique fluid codes for CBM in order to more effectively track production and development.

- **Clarification of 'wells per section per pool':** In order to avoid misunderstanding of the number of wells approved per section, the ERCB included a well density clause in its spacing/holding applications.

- **Groundwater and CBM Public Information Sessions:** A series of 13 information sessions were held across Alberta in 2006 to provide better information on CBM and potential impacts to groundwater.

- **Working Well Program:** An outcome from the above-noted information sessions was the delivery of additional workshops to focus on water well management (i.e. proper construction, operation and maintenance). The Working Well program was launched in 2008 and, to date, over 40 workshops have been delivered to water well owners in rural communities across Alberta.

Creation of the MAC II: The MAC II was established to review progress in addressing the MAC Final Report recommendations and provide public updates for a three year period.

- **Online Mapping Tool for P&NG Sales and Oil Sands Sales Data:** An on-line mapping tool was developed to display the most recent results of P&NG sales, oil sands sales data and existing agreements.

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- **Website Instructions on the Process for Conducting an Information Search:** DOE's website was modified to make it easier for the public to conduct an information search by land or mineral agreement. Interactive maps are on the Alberta.ca website at https://www.alberta.ca/energy-maps.aspx.

- **Improve Education/Certification of Land Agents:** The Land Agents Licensing Regulation was amended to include post-secondary education requirements and more stringent standards of conduct. This will help to ensure that land agents are knowledgeable and understand about the potential impacts of CBM and other gas developments.

- **ERCB Directive 27:** See Section 1.2.

- **ERCB Directive 35:** See Section 1.2. The requirements of this directive include expanded notification and water well testing opportunities for landowners with water wells in the vicinity of shallow CBM wells.

- **ERCB ST 109:** CBM well locations were initially reported on an annual basis. In order to improve access to this information a monthly report on CBM well locations is now available through the ERCB.

4.3 Ongoing Commitment

Provincial Energy Strategy: An approach under the PES's outcome of "Sustained Economic Prosperity" is to "create a better understanding among stakeholders, including energy customers within and beyond our boundaries, of our efforts to manage the environmental footprint of energy development." The PES identified the need for effective communication and consultation and will provide its findings in an annual report to Albertans. The PES specifically references the need to "consult Aboriginal communities whose constitutionally protected rights under section 35 of the *Constitution Act*, 1982 (Canada) are potentially adversely impacted by development".

The MAC consultation process demonstrated how timely, accurate, Alberta-based information can facilitate understanding and help develop an environment which encourages co-operation.

Land-use Framework: LUF Strategy 6 outlines the need to establish an information, monitoring and knowledge system. Creating an "improved Integrated Information Management System that monitors the state of the land and the status of land use in the province" provides clear benefits to achieving this outcome. Stakeholder consultation, part of the LUF regional planning process, also contributes to this MAC outcome by ensuring that "Stakeholders are fairly engaged in planning processes, which in turn improves the quality of land-use decisions and builds confidence in the decision-making processes".

5. Other

The MAC Final Report identified the need for sufficient financial and human resources to successfully address the recommendations (recommendation 7.7.1). Although this

recommendation has been addressed, it will be an ongoing focus for the government, which will continue to work towards ensuring effective and efficient allocation of resources. The government will continue to identify opportunities to work collaboratively both cross-ministry and with external stakeholders.

ADDENDUM
Additional Completed Final Report Recommendation

Recommendation 3.4.2
Since this report was reviewed by the MAC II, recommendation #3.4.2 (to investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers) has been completed with the release of ERCB report 2009-C: "Risk to Water Wells of Pathogens in Drilling Fluids". The report can be found on the ERCB website at http://www.ercb.ca. The total number of completed recommendations is now thirty; six are on schedule, five are behind schedule and one was reviewed and not actioned.

Non-government MAC II Members' Feedback

The following section reflects feedback from non-government MAC II members on the progress achieved in addressing the MAC Final Report recommendations. This feedback was gathered through the distribution of a questionnaire. The input from non-government members who provided a response is summarized below.

Government Commitment

All questionnaire respondents agreed that the provincial government has shown ongoing commitment in addressing the MAC Final Report recommendations. One respondent was pleased that a number of the recommendations would continue to be addressed under ongoing broader government initiatives.

Progress

One respondent strongly agreed, one neither agreed nor disagreed and the rest agreed that there has been significant progress on most of the 42 accepted recommendations since the release of the MAC Final Report in 2006.

Early Action

Half of respondents agreed and half strongly agreed that recommendations identified for early action have been appropriately addressed since the release of the MAC Final Report.

CBM Processes

With one exception, respondents agreed or strongly agreed that the deliverables which were developed in response to the MAC Final Report recommendations helped improve existing processes relating to CBM development in Alberta. One non-industry respondent disagreed strongly with this statement. Another non-industry respondent wanted a stronger focus on enforcement.

MAC II Process

Almost all respondents agreed or strongly agreed that the MAC II process helped ensure MAC Final Report recommendations were implemented. One respondent who had not been involved for all of the three year MAC II process neither agreed nor disagreed.

Another respondent thought the process worked well and that all MAC II members had ample opportunity to state their case and reach agreement in most cases. The process afforded a good opportunity for open dialogue, said another respondent: "There was good agreement by all members of the committee on the various issues at the last meeting."

Another respondent expressed frustration with the 'out of scope' categorization of issues relating to freehold mineral rights but was pleased with the process for addressing MAC recommendation 6.2.2, which called for the government to set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.

Members generally believed that the MAC II process itself was well organized, Red Deer was a good location for meetings, and the meetings themselves were well-run and reasonably efficient. One respondent noted that communication was at times a concern but expressed overall satisfaction with the process.

Expectations

With one exception, all respondents agreed or strongly agreed that they found it worthwhile to be part of the MAC II process and that their expectations for the MAC II process were met. One respondent neither agreed nor disagreed.

Comments

Respondents were also asked to comment on the following areas:

- Protecting water resources
- Enhancing information and knowledge
- Minimizing surface impacts
- Communication and consultation

The feedback on these areas is separated into two groups:

1. Feedback from non-industry members, such as landowner and environmental groups and
2. Feedback from the industry, which includes energy industry association members.

Protecting Water Resources

The MAC Final Report identified protection of water resources as a significant concern related to CBM development. Water-related recommendations included establishing a more rigorous regulatory process to address CBM operations that potentially pose a risk to non-saline water resources. The development of standard procedures and reporting requirements for sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected water wells is also important. Protection of water resources was a major concern and a priority for all respondents.

Non-Industry Feedback

One respondent indicated that this area is the one most in need of ongoing diligence. The forthcoming results of aquifer mapping research will be critical to protecting the province's water resources. This research may require Albertans to revisit existing policies, according to this respondent.

Another respondent believed that more needs to be done to protect aquifers and landowners' water wells from potential gas seepage.

Industry Feedback
A large amount of effort has gone into those recommendations that provide protection of Alberta's groundwater resources, noted one industry respondent. However, disappointment was expressed regarding the Science Panel's review of water well test results. This information would have helped provide assurance that CBM development was not impacting groundwater resources.

Another industry respondent noted that much has been accomplished to protect groundwater from industrial use, however, felt little has been done to protect groundwater from other major users. This respondent also expressed disappointment that the Science Panel did not undertake water well analysis and that setback regulations were not based on scientific analysis of data.

Enhancing Information and Knowledge

The MAC Final Report indicated that more information and knowledge are required in order to ensure the continued responsible development of CBM in the province. For example, there was an 'umbrella' recommendation to improve scientific information about the province's water resources, including completion of a groundwater inventory and the Base of Groundwater Protection (BGWP) mapping project, and obtaining baseline data on water quality and quantity in non-saline aquifers. As well, more scientific information was needed to develop a threshold volume of produced water below which a simplified code of practice or similar regulatory practice would apply.

Non-Industry Feedback
One respondent expressed the view that he felt a large amount of information had come to light regarding regulations that both industry and landowners were unaware of, e.g., regulations regarding fracturing. The respondent also commented that use of the government website for making information available is not suitable for some Albertans, and other methods of publishing information should be added.

Another respondent noted the collective experience and resources shared at the MAC II table have thrown much light on the recommendations and policy being tracked. The process was clearly effective in some respects, said another respondent, who also suggested the names of committee members be publicly available to assist with better tracking of outcomes.

Relative to recommendation 3.3.1, one respondent suggested having a lower threshold volume for produced non-saline water below which a simplified approval process would apply. Another respondent supported the new requirements but noted that enforcement is needed to ensure that they are met.

Industry Feedback
Industry stakeholders indicated that the information shared at the MAC II meetings was very instructive and thought provoking. This information encouraged ongoing discussion, noted one

respondent. Another respondent indicated that the MAC II provided an opportunity for ongoing dialog / information exchange between the government and stakeholders.

Minimizing Surface Impacts

Recommendations in the MAC Final Report which focused on surface impacts addressed the need to protect the environment and minimize cumulative impacts. For example, the MAC recommended that the CBM regulatory process promote project-based planning to manage potential long-term surface impacts.

Non-Industry Feedback
In part due to the long-term CBM consultation initiative, citizen expectations for reduced footprint management practices are now quite high, noted one respondent. The same respondent suggested industry appears prepared and able to deliver such a standard in the field without requiring regulation by government, and that landowners are hopeful this will happen.

Another respondent indicated that the timing of vehicle movement and the protection of top soil were important aspects of preventing surface impacts from CBM activity.

In theory, commingling of production minimizes surface impact, said one respondent but felt that until the split title situation is adequately addressed through government legislation, the threat of lawsuits remains for both industry and freehold owners. The respondent also commented that while government made great effort to understand and address surface issues, freehold issues impacting freehold development were not well addressed.

Industry Feedback
Some good work was done to try to determine how to minimize surface impacts, particularly the SRD-led Mannville CBM pilot, said one respondent. However, a number of the techniques used in this pilot (i.e., pad drilling, horizontal wells, etc.) were not applicable to the dry, shallow coals in the Horseshoe Canyon formation where most CBM activity is taking place.

Communication and Consultation

The MAC Final Report indicated the need for enhanced communication and ongoing consultation on CBM-related topics with all stakeholders, including members of the public.

Non-Industry Feedback
As with MAC, the MAC II process has continued to provide a respectful and constructive forum for all stakeholders to interact, noted one respondent. Collective experience and resources shared at the table have thrown much light on the recommendations and policy being tracked.

There was again concern expressed about communication issues related to freehold mineral rights.

Industry Feedback
There was overall satisfaction expressed about opportunities for ongoing dialogue and information exchange.

Summary of Feedback

Respondents in general were very satisfied with the MAC II process, and believed it helped ensure the accountability of government in carrying out the MAC's recommendations. They strongly believed the government had demonstrated its commitment in implementing the recommendations. Their expectations were met, they said, especially around the implementation of the recommendations slated for early action. The respondents also appreciated that the MAC II process provided an excellent opportunity for dialogue and information exchange. They found it very worthwhile to be part of the MAC II process.

Commitment to Ongoing Responsible CBM Development

For over 60 years, Alberta's regulatory frameworks have ensured that energy development takes place in a manner that is fair, responsible and in the public interest.

Although this is the third and final public update report on the status of MAC Final Report recommendations, the government will continue its commitment for responsible development, not just for CBM, but for all of the province's oil and gas resources.

AENV, SRD and DOE (which are primarily responsible for energy policy development) and the ERCB (which is primarily responsible for regulating CBM and other oil and gas development), will continue to work together in other collaborative processes to address outstanding CBM-related issues.

Acronyms and Glossary of Terms

Acronyms:

AENV	Alberta Environment
AERI	Alberta Energy Research Institute
AGS	Alberta Geological Survey
AOA	Area Operating Agreements
BGWP	Base of Groundwater Protection
BMP	Best Management Practices
BWWT	Baseline Water Well Testing
CAPL	Canadian Association of Petroleum Landmen
CAPP	Canadian Association of Petroleum Producers
CSUG	Canadian Society for Unconventional Gas
CBM	Coalbed Methane
CoP	Code of Practice
DOE	Alberta Department of Energy
ECC	Edmonton-Calgary Corridor
ERCB	Energy Resources Conservation Board (formerly the EUB: the Alberta Energy and Utilities Board)
GoA	Government of Alberta
GOWN	Groundwater Observation Well Network
ILM	Integrated Land Management
LUF	Land-use Framework
MAC/MAC II	Coalbed Methane Multi-Stakeholder Advisory Committee
MOU	Memorandum of Understanding
PES	Provincial Energy Strategy
PTAC	Petroleum Technology Alliance Canada
P&NG	Petroleum and Natural Gas
RAC	Regional Advisory Council
SRD	Alberta Sustainable Resource Development
TDS	Total dissolved solids
U of C	University of Calgary
UOGPIP	Upstream Oil and Gas Policy Integration Project

Glossary of Terms:

Abandonment: The permanent dismantlement of an oil or gas well or facility in the manner prescribed by the regulations including any measures required to ensure that the facility is left in a permanently safe and secure condition.

Aquifer: As defined by the Alberta Government's *Water Act*, an underground water-bearing formation that is capable of yielding water.

Best management practices: Management practices or techniques recognized to be the most effective and practical means to develop the resource, while minimizing adverse environmental and other effects.

Casing: A series of tubular pipes joined by threads and couplings that line a well bore to prevent water and rock from entering into the well bore. In oil and gas wells is also used for drilling control and wellbore integrity.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of organic matter without access to air.

Coal seam: Descriptive term for individual layers of coal found in the geological strata. It is also called a 'bed' in the coal industry.

Coal zone: A vertical extent of intermittent coal seams and intermingled shale or clay. The zone extends from the top of the uppermost seam to the bottom of the lowermost seam.

Coalbed methane (CBM): Methane found in coal deposits.

Commingling (oil & gas): Mixing oil and or gas from two or more different pools in the same well bore.

Commingling (water): Mixing water from two or more different aquifers in the same well bore.

Conventional natural gas: Conventional natural gas includes many different types and compositions of natural gas, and is generally better defined, more productive and more economic than natural gas produced from unconventional sources. Any type of unconventional gas resource can move into the conventional category over time, as the resource is developed.

Crown: Depending on jurisdiction, the Crown is either represented by the federal or Alberta government.

Drilling fluid: The circulating fluid (mud) used to bring drilling cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to maintain the fluid at desired viscosities and weights. Drilling fluids are also needed to complete water wells.

Formation: A designated subsurface layer that is composed of substantially the same kind of rock or rock types.

Fracturing: A method of improving the permeability of a reservoir by pumping fluids such as water or carbon dioxide, and nitrogen into the reservoir at sufficient pressure to crack or fracture the rock. It is also known as 'fracing'.

Freehold mineral rights: The Alberta Crown owns mineral rights which cover approximately 81 percent of the land area of Alberta. The remaining 19 per cent are freehold minerals rights

owned by private individuals and companies or minerals owned by the federal government (National Parks, Indian Reserves).

Gas migration: The movement of hydrocarbons from their source into reservoir rocks.

Groundwater: Water that occurs under the surface of the ground.

Landowner: See 'Surface rights holder'

Lessee: Defined in the *Mines and Minerals Act* as the holder according to the records of the Department of Energy of an agreement. The term 'lessees' may, therefore, refer to holders of leases or licences or both, depending on the context in which it is used.

Methane: The most prevalent component of much of the natural gas produced in Alberta. Its chemical notation is CH_4 and it is the most common hydrocarbon gas.

Mineral rights: Entitlement, through ownership or a leasing arrangement, to produce and sell the minerals in a parcel of land**.**

Migration: Movement from one place to another**.**

Natural Gas: A mixture of hydrocarbon gases which occurs with petroleum deposits, principally methane together with varying quantities of ethane, propane, butane, and other gases, and is used as a fuel and in the manufacture of organic compounds

Non-saline water: Water with total dissolved solids content less than 4000 milligrams per litre (mg/L). See also 'Saline groundwater'**.**

Operator: The company or individual responsible for managing an exploration, development, or production operation.

Pool: A natural underground reservoir containing an accumulation of oil or gas or both, separated or appearing to be separated from any other such accumulation.

Produced water: The water extracted from the subsurface along with produced oil and gas, including water from the reservoir, water that has been injected into the formation, and any chemicals added during the production/treatment process.

Reclamation: Process of restoring surface environment to acceptable pre-existing conditions.

Remediation: Cleanup of an environmentally contaminated site.

Saline groundwater: Water that has total dissolved solids content exceeding 4000 mg/L as defined in the Water (Ministerial) Regulation.

Section: An area one mile square or as close as the convergence of the meridians permit.

Sensitive areas: Lands or associated features requiring protection, including critical wildlife habitat, rare and endangered plant species, native prairies, areas prone to erosion or other geotechnical failure, or cultural heritage sites.

Split title: Where subsurface rights are owned by different parties, e.g., the Crown owns the coal rights and the P&NG rights are freehold, or vice versa, or two separate freehold owners exist.

Subsurface: Below the surface.

Subsurface rights holder: The owner or lessee of the mineral rights who has the right to explore for and produce oil, gas, and other minerals. The owner may be a freehold rights owner or the Crown.

Surface rights holder: The owner or lessee of the surface rights (the landowner) has control of the land's surface and the right to work it, in addition to any sand, gravel, peat, clay or marl which can be excavated by surface operations.

Total Dissolved Solids (TDS): A measure of concentration or how much substance is dissolved in a given sample.

Tenure: Term used to describe the system whereby mineral rights are managed by the Department of Energy and disposed to individuals and companies as agreements**.**

Township: A term used in the 'Alberta Township System'. Depending on the context in which it is used, it refers either to a six square mile area comprising 36 sections or to a row of townships spanning from north to south across Alberta. Township 1 lies at the southernmost boundary of Alberta and Township 126 lies at the northernmost boundary.

Unconventional Natural Gas: Typically, unconventional natural gas is gas that is more difficult, and less economically sound, to extract, usually because the technology to reach it has not been developed fully, or is too expensive. Examples include coalbed methane and gas from shale.

Water Act: The Alberta *Water Act* protects the quality of water and manages its distribution. The legislation regulates all development and activities that might affect rivers, lakes, and groundwater.

Water quality: Refers to a set of chemical, physical, or biological characteristics that describe the condition of a river, stream, lake, or aquifer.

Water well: As defined in the *Water Act*, an opening in the ground, whether drilled or altered from its natural state, which is used for:

1. the production of groundwater for any purpose,
2. obtaining data on groundwater, or
3. recharging an underground formation from which groundwater can be recovered and includes any related equipment; buildings, structures and appurtenances.

Well density: The concentration of wells on the land surface (per unit area).

Zone: Defined in the Petroleum and Natural Gas Regulation as a stratum or series of strata considered by the Minister to be a zone for the purposes of this Regulation. In many cases, zones may be geological formations or members but in some instances they are larger (geological groups) and include more than one formation (the Mannville zone, for instance, includes numerous formations).

Appendix A MAC II Membership

Non-Industry Members:

- Alberta Association of Municipal Districts & Counties
- Alberta Environmentally Sustainable Agriculture Council
- Alberta Surface Rights Federation
- Butte Action Committee
- Freehold Owners Association of Alberta
- The Pembina Institute
- Alberta Beef Producers

Industry Members:

- The Coal Association of Alberta
- Canadian Association of Petroleum Producers (CAPP)/Canadian Society for Unconventional Gas (CSUG)/Small Explorers and Producers Association of Canada (SEPAC) – represented by two members on the MAC II
- Canadian Association of Petroleum Landmen

Provincial Government Members:

- Alberta Agriculture and Rural Development
- Alberta Energy
- Alberta Energy Resources Conservation Board
- Alberta Environment
- Alberta Sustainable Resource Development

Facilitator:

- Alberta Culture and Community Spirit

29 - complete
6 - on schedule
6 - behind schedule
1 - reviewed and not actioned
2 - not accepted
44 Total Recommendations

Appendix B: Progress Table
MAC Recommendations
As of August 15, 2009

Note: Early Action Items Indicated in Bold Face Type

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Protecting Water Resources					
3.3.1	AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold volume for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply.	2008	behind schedule	ARC report on developing a scientifically based threshold volume completed in March '06. Interim threshold volumes developed by a sub-committee of MAC have been adopted. Stakeholder workshop held Dec. 14/'06 to discuss Code of Practice (CoP) concepts. Process to review threshold limits also discussed at the workshop. Background information being collected (mapping, monitoring, surveillance) to provide the necessary information for development of scientifically based threshold volumes. AENV and ERCB are working together to examine and develop options for a streamlined, one-window simplified regulatory process to address the joint needs. The simplified regulatory process is currently being drafted. Existing guidelines for production above the threshold also being revised. The simplified regulatory process will	

E denotes early action as defined CBM Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				be available for public consultation in Q4'09. Increased surveillance of water production at all oil and gas wells with perforations above the BGWP was implemented with the release of ERCB Directive 44 (Oct. 31'06). AENV is advised of any shallow CBM wells that are producing water, and this surveillance process can be modified to any new threshold volume that is ultimately arrived at.	
3.3.2E	**AENV and the EUB should develop a 'decision tree' approach for reviewing CBM/NGC applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should:**				
3.3.2.1	Incorporate the threshold volume of produced non-saline water, below which the Code of Practice would apply (See Recommendation 3.3.1).	2008	behind schedule	A simplified regulatory process is currently being drafted that will incorporate the threshold volumes. Interim threshold values will be used for the draft simplified regulatory process until scientifically based rate is determined. The increased surveillance processes for water production at all oil and gas wells with perforations above the BGWP that was implemented with the release of ERCB Directive 44 (Oct. 31'06) can be modified to any new threshold volume, and may be used to assist the simplified regulatory process.	
3.3.2.2	Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas.	2008	behind schedule	Water short areas identified through oilfield water injection study. AGS Ardley Project will identify high risk areas which will help inform policy on where requirements need to be more	

E denotes early action as defined CBM Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				rigorous. A draft report is under review by ERCB and AENV and expected to be available for by the end of 2009.	
3.3.2.3	Ensure that applications for CBM wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies.	2009	on schedule	Any water diversion already requires an aquifer study. Update of 2004 Guideline for CBM water diversion to be released with simplified regulatory process. No large CBM related non-saline groundwater diversions to date.	
3.3.2.4	Ensure appropriate compliance with the decision tree.	2008	complete	Activity to be coordinated with the ERCB production water surveillance. Directive 44 is in place.	
3.3.3	AENV's Guidelines for Groundwater Diversion for CBM Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated.				
3.3.3.1	The guidelines should be reflected in the risk-based decision tree process.	2008	behind schedule	The updated Guideline will be released when the simplified regulatory process is implemented. Stakeholders will be consulted when a draft is available.	
3.3.3.2	To ensure consistency, minimum conditions for approvals should be standardized across the province with additional site-specific conditions possible.	2008	complete	Interim threshold value will be used to determine when an approval or licence under the *Water Act* is required. Site-specific conditions are considered in the current authorization process. All *Water Act* authorizations already have standardized minimum conditions.	
3.3.3.3	The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project.	2008	complete	Current guidelines require that field-verified survey radius be scaled according to potential impact of CBM project. Revised guidelines will incorporate Baseline Water Well Testing (BWWT) in conjunction field verified survey.	
3.3.3.4	A province-wide review of existing CBM wells should be undertaken to ensure all guidelines have been met.	ongoing	on schedule	ERCB surveillance and audit processes enhanced. Pending completion of simplified regulatory process. Monthly	

E denotes early action as defined CBM Final Report

*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report

** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				surveillance of water production at all CBM wells with perforations above the BGWP was implemented with the release of ERCB Directive 44 (Oct. 31'06). This ensures that any shallow CBM wells that are producing water are identified, and this surveillance process can be modified to any new threshold volume that is ultimately arrived at.	
3.3.5 E	**AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis, and monitoring of both saline and non-saline water quality and quantity for CBM/NGC wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including:**				
3.3.5.1	Testing for a variety of metals and other impurities, as well as total dissolved solids.	2007	complete	BWWT standard outlines sampling procedures for required for routine and other parameters for water wells. U of C reports for AENV water/gas sampling program outlines procedures used for various inorganic and organic parameters. Reports will be available on AENV Water for Life website in 2009.	
3.3.5.2	Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file (See Section 3.6 for discussion on methane migration and release).	2007	complete	Protocol for gas sampling completed in Aug '06 by AENV under BWWT standard. Science Panel provided recommendations to government in '08. https://www.alberta.ca/water.aspx U of C literature review on gas sampling techniques is available on AENV's 'Water for Life' website.	
3.3.5.3	Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.	2008	complete	Testing policies and procedures are in place to ensure appropriate testing is undertaken. Insufficient volumes of non-saline water	

E denotes early action as defined CBM Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
				produced to date to be tested or used for consumptive purposes.	
3.3.6	AENV should develop a water well testing program as follows:				
3.3.6.1	CBM operators should be required to offer baseline testing (as described in 3.3.5) of all nearby water wells within a specified distance of a proposed CBM well to be completed above the Base of Groundwater Protection. (No consensus was reached on an appropriate distance or depth of completion.)	2006	complete 2006	Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by the ERCB - effective date May 1, '06. Science Panel reviewed Standard and provided recommendations to government in '08. Report is available on https://www.alberta.ca/water.aspx Standard will be revised based on Science Panel recommendations and consultant/laboratory feedback. A draft of proposed revisions will be distributed to stakeholders for comment. Data to be evaluated on an ongoing basis to assess and update the program.	Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by ERCB May 1, '06.
3.3.6.2	The information from the baseline testing should be filed by operators in an open, public registry to enhance understanding of Alberta's groundwater system.	ongoing	on schedule	Updated version of template for reporting released in Feb'09. Work on a publicly accessible system is continuing. An online tool is expected to be available by Q4 '09.	
3.3.6.3	A clear process to address water well complaints should be developed and communicated to water well owners, surface rights holders and other stakeholders.	2007	complete 2007 – with work ongoing	Complaint number (1-800-222-6514) is posted on the AENV website under "Emergency Numbers". Complaint process communicated in June '06 CBM public information sessions. Training of AENV staff on water well issues is on-going. Internal manual being developed by AENV to ensure consistency.	Environmental Hotline (1-800-222-6514) process to register complaints with AENV communicated to stakeholders in CBM public information sessions in spring 2006. Two water well training workshops for AENV and ERCB compliance staff were held in '08 and '09. Summary of CBM related complaints independently

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					reviewed by Alberta Research Council available on AENV 'Water for Life' website.
3.3.7	AENV and the ERCB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; fracturing; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.	2010	on schedule	The ERCB issued Directive 27 (Jan. 31'06) imposing constraints on shallow fracturing. Directive 27 was updated in August '09. Directive 08 on surface casing depth requirement is scheduled for an update by Q3, '09. The ERCB issued an update to Directive 36 (Feb.'06) to address non-toxic components. The ERCB initiated a one-year field surveillance program specific to CBM in the fall of '05 to monitor compliance to identify if there are other areas requiring short term reviews and change. Inspections showed consistent operational compliance with industry standards for both conventional gas and CBM development. A CBM control well system is in place to collect segregated data specific to production from coals. Temporary water source wells are regulated under the *Water Act* and wells are required to be reclaimed after use. AENV encourages conversion of energy wells to water wells to be supervised by a licensed water well driller.	
3.4.2 E	**The ERCB and AENV should, in cooperation with other organizations such as the ARC, investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may**	2007	behind schedule	Included in 3.3.7 project. A third party report (microbiology and hydrogeology) is complete and is currently being reviewed by ERCB. Expected public release by Q3, '09. Previous reviews	

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	affect aquifers, and review regulations to determine whether changes are needed.			have shown no potential for impact.	
3.5.1	AENV and the ERCB, with stakeholder input, should: Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate. Establish criteria for the beneficial use of non-saline produced water. Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water, and include them in the decision-tree approval process. Revisit authorized diversions of non-saline groundwater for industrial use when CBM developments create new sources of water in the area.	2008	behind schedule	Two scoping studies were undertaken by AENV, Petroleum Technology Alliance Canada, Alberta Energy Research Institute and DOE, one on high total dissolved solids (TDS) (June '07 and one on low TDS (August '07). The reports can be found on the web at www.ptac.org/ Information to be presented to stakeholders in Q2/Q3'09 from the above studies and other information gathered regarding beneficial use of produced water. General beneficial use considerations to be included in revised CBM Groundwater Diversion Guidelines. Where appropriate, and having regard for waste management and environmental protection, applications will be considered by regulators for small scale tests of alternative uses for non-saline produced water.	
3.5.2	AENV and the ERCB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the ERCB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision tree approval process.	2008	behind schedule	Two scoping studies were undertaken by AENV, PTAC, AERI and DOE, one on high TDS (June '07 and one on low TDS (August '07). The reports can be found on the web at www.ptac.org . Information to be presented to stakeholders in Q2/Q3'09 from the above studies and other information	

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				gathered regarding beneficial use of produced water. General beneficial use considerations to be included in revised CBM Groundwater Diversion Guidelines.	
3.5.3	AENV, the ERCB, and Alberta Energy should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.	Ongoing (Align with PTAC)	complete – ongoing commitment	PTAC has expanded its activities to study new technology and water conservation practices including a new water conservation committee co-chaired by the GoA. Water Innovation Forums held Jun '06, June '07 and June '08 with increasing attendance in each year. These forums raise the profile of produced water conservation and reuse as well as showcasing new produced water management technology and ideas. Report on Cost-Benefit Analysis of Treating Saline Groundwater (AMEC) completed in March '07. Promoting and encouraging use of available funding opportunities such as the Environment Enhancement fund to focus on produced water management technology, innovation and efficiency. ERCB uses its pilot project approvals to authorize and monitor applications to reduce the need for non-saline water in drilling, completions and other operations. Several small scale approvals have been issued.	
3.6.1 E	**AENV and the ERCB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM depressurization.**	2009	complete	AENV contracted a consultant to prepare a scientific report to provide background information on the potential for gas migration and other unintended effects of CBM development. The	

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				report is available on the AENV website at https://www.alberta.ca/water.aspx The AENV/ERCB prepared a joint response. Provincial groundwater monitoring system has been enhanced. Additional information is being gathered (Directive 35 and Directive 44) to support a future study. Data to date does not show a provincial problem. AENV complaint response to water well complaints is being enhanced.	
3.6.2	Based on the results of the previous recommendation, AENV and the ERCB should implement appropriate prevention, monitoring, and mitigation measures to address methane migration or release, if necessary.	2010	on schedule	AENV complaint response to water well complaints being enhanced. Provincial groundwater monitoring system being enhanced. ERCB continues to review and enhance CBM well construction requirements.	
5.2.3**	AE, in consultation with stakeholders, should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	2008	complete 2008	A scoping study "Produced Water Beneficial Re-Use – High TDS Waters" by AENV, PTAC, AERI and DOE was released in August' 07. The study found there is insufficient data regarding characterization of the produced water and that fiscal tools are not the appropriate mechanism at this time. After extensive consultation this conclusion was agreed to by the Royalty Review Panel.	The report can be found at www.ptac.org
Enhancing information and knowledge					
3.2.1E	**The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources:**				

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3.2.1.1	AENV should expand its current monitoring network and data management systems.	2007 & ongoing	complete – ongoing commitment	AENV has added 25 wells to the provincial Groundwater Observation Well Network (GOWN) since 2007, bringing the total number of sites up to 216. Of these, 16 of the added wells are in CBM areas. No expansion planned in 2009-10. AENV initiated a water and gas sampling program in 2007 and has sampled 116 GOWN wells up to Mar 2009, the majority being in CBM areas. Two sample trailers were built specifically for the program. Reports by U of C for 2006-07 and 2007-08 sampling programs will be available on AENV Water for Life website in Q2'09. Sampling of 30-40 wells per year to continue on an ongoing basis. The monitoring program will continue under 'Water for Life'.	
3.2.1.2	AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM development.	2012	on schedule	AENV and the AGS have partnered on a long-term, provincial groundwater mapping program, starting first with the Edmonton – Calgary corridor. This work is scheduled to be completed in 2011/12. Long-term commitment and funding to the program is key to the partnership. ERCB issued Directive 43 (Nov. 1/06) requiring shallow logging which will provide additional information on shallow geology to assist mapping. Additional related work includes the AGS Ardley project which is designed to study the interface between the overlying Paskapoo formation and the Ardley and should contribute to a better	

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				understanding of risk from CBM development. The work has been completed and a draft report is being reviewed by the ERCB and AENV. The report will likely be ready for release by the end of '09. The mapping program will continue under 'Water for Life'.	
3.2.1.3	The ERCB and AGS should complete the Base of Groundwater Protection mapping project.	2007	complete 2007	The AGS has completed the updating of the BGWP database. ERCB Bulletin 2007-10 on the BGWP database, was posted on the ERCB website.	
3.2.1.4	AENV and the ERCB, with industry, should investigate the potential for unintended effects of CBM development on surrounding aquifers.	2011	on schedule	Provincial groundwater monitoring system is being enhanced to provide information on any regional groundwater impacts. The AGS Ardley project is reviewing the interface between the Paskapoo and Ardley formations and will contribute to a better understanding of risk from CBM development. A draft report is under review by ERCB and AENV and is expected to be released by the end of '09.	
3.2.1.5	AENV should identify and characterize areas where CBM approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies, and other water users. Maps of these areas should be made available to regulators, industry, and stakeholders.	ongoing	on schedule	Edmonton-Calgary Corridor mapping to be completed in 2011/12. AGS Ardley Project will address high risk situations which will help inform policy on where requirements need to be more rigorous. A draft report is under review by ERCB and AENV and is expected to be released by the end of '09. Water short areas have been identified through oilfield water injection study.	
3.2.1.6	Before drilling and production from a	2006	complete	Standard for BWWT for CBM	Standard may be revised based

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	potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM operators should obtain baseline data; including gas and mineral content and other indicators of water quality, flow rate/yield, and water levels.		2006	operations implemented by the ERCB – effective May 1, '06. Protocol for gas sampling finalized in Aug '06.	on Science Panel recommendations (see 3.3.5). Requirements for collection of baseline data for non-saline water diversions will be specified in a simplified regulatory process (see 3.3.1).
5.2.1 non-consensus	Alberta Energy, in consultation with stakeholders, should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
5.2.2**	The Alberta and the federal governments should consider recognizing Canada's CBM potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five year pilot-type drilling program for saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
6.5.1	Alberta Energy should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	2010	complete 2007	Internal consultation completed. Extension history for CBM reviewed. Based on both the technical review and the lack of requests for more time outside current continuation legislation, there is no need for a second year under Section 17. P&NG Tenure Industry Advisory Committee agreed at their May 17, '07 meeting.	
7.4.1	The ERCB, AENV, and SRD should improve the coordination of their CBM related application and surveillance processes, and develop electronic solutions to facilitate data exchange.	2011	addressed under other broader government initiatives	Alignment of AENV and ERCB processes for baseline testing (coordinated standard and directive). Preliminary discussions on opportunities for data sharing commenced. AENV and ERCB signed	

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				a MOU in December '07 to further protect groundwater resources in Alberta. The Upstream Oil and Gas Policy Integration Project (UOGPIP) initiative is evaluating options to modify and align all processes in the oil and gas regulatory responsibility including data access. The UOGPIP is nearing the final stages and recommendations for regulatory change to streamline a number of aspects related to the oil and gas industry will be put forward to government. The Land-use Framework has made a commitment to "Support the establishment of a network connecting researchers, practitioners, institutions and programs to address strategic needs and priorities for the Land-use Framework." Work will continue through the LUF and the Regulatory Project.	
8.1.2	Regulators should review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	ongoing	complete	ERCB Directive 27 on shallow fracturing included a review of other jurisdictions. Gas migration report includes review of other jurisdictions with CBM. Additional reviews will be conducted on a topic basis.	
Minimizing Surface Impacts					
4.2.1	The ERCB, AENV, and SRD should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	2009	complete	Changes to ERCB regulations and Directive 065 regarding the management of commingled production in the wellbore were implemented in 2006 that assisted in reducing the number of future wellbores required to recover oil and gas resources.	

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				Activities completed in 4.3.1, and 7.2.1 address this recommendation.	
4.3.1 E	**To protect the environment and minimize the cumulative impacts from CBM development, a government-led multi-stakeholder committee, such as that being set up under SRD Integrated Land Management (ILM) Program, if appropriate, should undertake the following sequentially:** **1. Review integrated land management principles, policies, and practices relating to CBM to ensure they maintain the integrity and function of the land, taking into account all uses.** **2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM development.** **3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas and make appropriate recommendations for the protection of these areas. Implementation in their process.** **4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.**	2011	addressed under other broader government initiatives	The ILM Program Plan is being implemented and linked to the Land-use Framework. The techniques and approaches used for the management of CBM development and regulatory approval in the pilot can be implemented province-wide and are directly transferrable to all CBM developments. The Fort Assiniboine area has been identified for this pilot. SRD, ERCB, Nexen, Trident and the local communities are applying integrated approaches to land management for CBM activities on public and private land. The full implementation of the ILM operational plan will occur over the upcoming year as it is completed in conjunction with the development of the Land-use Framework which was released in December 2008. The initiation of the Lower Athabasca Regional plan and associated Regional Advisory Council (RAC) has occurred along with initial scoping of the issues and areas of concern for the Southern Saskatchewan Plan has occurred. The RAC for the South Saskatchewan Regional Planning area was officially created in May 2009 the planning process will start later in 2009.	

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4.3.2	Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM development.	2011	complete	An SRD sponsored study was completed by the U of C on foothills fescue reclamation. Implementation of study recommendations is being reviewed. Draft revised Forested Green Area Reclamation Criteria has been released for review. The reclamation section is at https://www.alberta.ca/land-conservation-and-reclamation.aspx	

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				px A gap analysis for reclamation and re-vegetation issues for prairie landscapes has been completed. Recommendations from the work have led to the creation of the Foothills Restoration Forum Initiative to bring researchers and the public together to discuss native prairie use and restoration issues. A similar forum is being discussed by the Boreal Forest Research Centre. Boreal gap analysis was completed in Spring '08. A Draft '09 reclamation criteria (including the grassland, forested, cultivated and peatland land uses) was presented at a practitioners' workshop in Feb. '08. Field trials on the criteria were conducted in summer and fall '08 and implementation is expected to occur summer '09. Ongoing work will be undertaken by the Fescue Forum Initiative.	
7.2.1E	**The ERCB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow:** ♦ **Definition of intense project developments.** ♦ **Full project disclosure** ♦ **Improved community consultation.** ♦ **Enhanced impact assessment.** ♦ **Review of mitigation measures**	2010	complete	ERCB conducting a series of pilots with expanded consultation with community and industry in several locations. Reports on initial ERCB-led pilots on website. Next pilots may target more environmentally sensitive areas or wet coals. New format for SRD Area Operating Agreements has been developed and approvals are being issued under the new format. Further work is being done on risk management, quality assurance,	

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				and compliance. Process for electronic submission of monthly status reports currently being developed. ERCB has adopted the land pilots as a new tool to address unique land use problems.	
9.2.1	Industry, regulators, and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the ERCB's Guide 38.	ongoing	complete-ongoing commitment	CAPP's NGC/CBM Best Practices, developed with stakeholder input, was distributed to MAC members and posted to CAPP's website and includes information on noise complaints. New BMP will be reviewed every few years to ensure practices are current and reflect any new issues.	
9.6.1	Industry should continue to consult with SRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.	ongoing	addressed under other broader government initiatives	SRD requirements for wildlife protection plans in certain situations remains. Consultation with SRD by industry on a project specific basis as well as development of guidelines to assist in reduction of disturbance is ongoing. SRD consults and develops guidelines on a continuous basis as part of their day to day operations. Ongoing work will be addressed through government initiatives such as Area Operating Agreement Enhancement and Development Operating Guidelines for Oil and Gas Activity.	
Communication and Consultation					
3.3.4	AENV should clarify and communicate the existing rules regarding how much drawdown is	2007	complete 2006	AENV has clarified drawdown rules at MAC meetings and at CBM info	

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	allowed during CBM/ depressurization in a confined, non-saline aquifer to ensure aquifer protection.			sessions in Spring '06. Drawdown requirements already considered in *Water Act* authorization reviews. The policy will be reiterated in the simplified regulatory process when it is released.	
3.4.1	The ERCB and AENV should communicate with CBM operators, drilling contractors, and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's updated Guidelines for Groundwater Diversion for CBM/NGC Development.	ongoing ongoing	complete 2007	ERCB Directive 27 summarized rules related to water protection. This stimulated numerous one-on-one discussions with companies to clarify requirements and confirm commitment to comply	
6.2.1	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	2006	complete 2006	Material posted to DOE's website on December 22, 2006.	
6.2.2	The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.	2008	complete 2009	As part of the new royalty framework, a separate multi-stakeholder consultation process was established in 2009. An independent consultant met with stakeholders individually in February/March, held a group session in March to develop consensus-based recommendations. A consultation summary was sent to stakeholders in May.	
6.3.1	Alberta Energy should review and clarify the criteria for Section 18 Notices of Non-Productivity and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to	2010	complete 2007	The extension history for CBM was reviewed. Serving more Section 18 notices will not release shallow rights (which CBM producers requested.) Based on the technical review and the	

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	deeper rights reversion.			lack of requests for more time outside current continuation legislation, there is no need for a second year under Section 17. P&NG Tenure Industry Advisory Committee agreed at May 17, '07 meeting.	
7.3.1	The ERCB, AENV, and SRD, with stakeholder input, should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM development.	2010	complete	ERCB Directive 35 was issued to expand information on potential impacts which supports reviews for notification. ERCB has adopted the land pilots as a new tool to address unique land use problems.	
7.5.1 E	**Industry, regulators, and other stakeholders should increase the opportunity for dialogue, education, and awareness of the public, surface and subsurface rights holders, leaseholders, and industry on the possible impacts resulting from CBM development, and how the use of the land will be affected.**	ongoing	addressed under other broader government initiatives	Increasing number of presentations are being made by regulators. CAPP's NGC/CBM Best Management Practices issued to MAC & posted to CAPP's website. AENV, ERCB, Farmers' Advocate & CSUG held public info sessions on groundwater & CBM in June '06. CSUG Conference Nov. '06 included sessions on stakeholder issues. Numerous industry reps. attended & participated in Synergy Alberta conference October '06 where stakeholder issues were discussed. CERI, CAPP, CSUG and AB Economic Development collaborated on "Socio-Economic Impact of Horseshoe Canyon CBM Development in Alberta" report, released and presented at CSUG conference. This recommendation will be addressed through broader government initiatives such as such as the LUF and ILM.	

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7.5.2	The ERCB and AENV should consolidate CBM/NGC data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data. The availability of data should be subject to the normal provisions of confidentiality.	2012	complete-ongoing commitment	Several topic-specific programs have been enhanced for areas of interest to CBM and other types of shallow development including tenure ownership, BGWP, application registry and CBM well identification which, in turn, can facilitate use of other existing database systems. The annual listing of CBM wells has shifted to a monthly release in ERCB ST 109. Information packages continue to be available for landowners upon request. There will be ongoing work for consolidated data systems under the direction of 'Water for Life' and LUF.	
7.5.3	The ERCB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	2007	complete 2007	The ERCB included a well density clause in spacing/holding applications effective fall 2005 to avoid misunderstanding of the number of wells approved. FAQ was added to the Q & A's on the ERCB spacing initiative website.	w
7.5.4	The ERCB and Municipal Affairs, along with other stakeholders, should clarify and communicate the requirements, roles, and responsibilities related to setbacks.	2012	on schedule	The ERCB is currently undertaking a review of setback requirements for sweet gas and sour gas facilities. Following the review the ERCB and Municipal Affairs will work with other stakeholders to determine appropriate methods of communicating the outcome of the review including requirements and roles and responsibilities of the various jurisdictions to stakeholders.	
7.5.5	Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM	2007 (and ongoing)	complete	AENV's Groundwater and CBM public information sessions conducted at 13 locations across Alberta in June '06. Public info Fact Sheets produced to	

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	issues, including potential effects on water supply.			coincide with sessions. AENV is working in partnership with organizations including Prairie Farm Rehabilitation Administration, Alberta Agriculture & Rural Development and various municipalities to provide rural Albertans with the knowledge and support they need to properly construct, site and maintain their water wells. The Working Well program has been very successful and is in high demand. Over 40 workshops have been delivered in rural communities across the province since 2008. Work relating to this recommendation will continue under 'Water for Life'.	
7.6.1	As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components: Annual reviews for three years to assess progress according to a monitoring plan. A second overall review in three years to assess: - The effectiveness of the recommendations, - New issues or information, and - An assessment as to whether additional recommendations may be needed.	2010	complete	Multi-stakeholder advisory committee established by Ministerial Order. First year meetings held Sept., Dec.'06 and Mar.' 07. MAC II agreed to minute objectives instead of Term of Reference. Report templates reviewed by MAC II. First public report released June '07. Second public report released May '08. Third year meetings were held Nov. '08 and May, '09. MAC II members didn't identify any concerns with effectiveness of the Final Report recommendations, raise any new issues or information, or identify any additional recommendations. Third public report released Nov. '09.	
8.1.1 E	**Industry, government, and other stakeholders should work together to**	2007	complete 2006	Second public report released July '08. Third year meetings held on Nov 6,	New BMP will be reviewed every few years to ensure

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	develop, document, and implement best practices for CBM operations.			2008 and May 21, 2009.	practices are current and reflect any new issues.
9.3.1	The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	2007	complete - ongoing commitment	ERCB commits to maintain its current practices.	
9.4.1	Alberta Energy should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	2008	complete	The DOE has developed an online mapping tool to display the results of the most recent P&NG sales and oil sands sales data. In addition, the mapping tool will also provide information on existing P&NG and oil sands agreements.	The mapping tool is found at https://www.alberta.ca/ interactive-energy-maps.aspx#toc-2 Summary and detailed user manuals are part of the online Help functionality.
9.4.2	Alberta Energy should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.	2008	complete 2007	To make it easier for the public to find the information they need, Alberta Energy's website has been revised to include quick links from all web pages under the "Our Business" tab to search services, interactive maps and related manuals. In addition, a detailed, step-by-step instruction manual for interactive maps was updated March 2, 2007 and can be found on the website.	

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** One group did not support this recommendation

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
9.5.1	The Alberta Government, including Human Resources and Employment should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.	2011	on schedule	The Land Agents Licensing Regulation was amended on November 30 '07. The amendments include post secondary education entry requirements, improved licensing procedures, continuing competency and more stringent standards of conduct. CAPL's Professional Surface Land designation program is in place for its members. The Canadian Association of Geophysical Contractors (Alberta) applied under the Professions and Occupations Associations Registration Act for self regulation and this is still under review. If approved, the regulation would include the regulation of seismic permit agents. Review of the Land Agents Act is proposed to begin in 2010/11.	
9.7.1	The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.	2007	reviewed - no action	Service Alberta advised that Land Titles Registry cannot require leaseholders to disclose lease terms and is not the vehicle to adjudicate or solve this issue.	
Other					
7.7.1	Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.	ongoing	addressed under other broader government initiatives.	The government will continue to evaluate its staffing requirements as part of its ongoing business. For example, resources have been committed to undertake initiatives such as 'Water for Life', LUF, ILM and Provincial Energy Strategy.	

E denotes early action as defined CBM Final Report
*Complete recommendation text can be found in the Coalbed Methane/Natural Gas in Coal Final Report
** One group did not support this recommendation