

Public Safety & Sour Gas

*Provincial Advisory Committee on
Public Safety and Sour Gas*

DECEMBER 2000

**FINDINGS AND RECOMMENDATIONS
FINAL REPORT**



ACKNOWLEDGEMENTS

The Advisory Committee on Public Safety and Sour Gas acknowledges and thanks all those who have provided input and assistance to the Advisory Committee. Their involvement has contributed significantly to the work of the Advisory Committee in the preparation of this final recommendations report. The Advisory Committee thanks all those who contributed in one or more of the following ways:

- **Participating in the public outreach processes by attending a session in your community**
- **Completing Response Forms**
- **Providing written submissions or comments by telephone**
- **Responding to the Random Sample Telephone Survey**
- **Providing expert opinion on a variety of issues, including toxicology, dispersion modelling, public consultation, risk communication, emergency response, resource development, and jurisdiction; this includes experts both within and outside of the Alberta Energy and Utilities Board**
- **Serving as an alternate to an Advisory Committee member or on a working group when not a member of the Advisory Committee**
- **Providing support to the overall process**

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The final report and appendices are available on the Advisory Committee's Web site at www.publicsafetyandsourgas.org.

EXECUTIVE SUMMARY

The Alberta Energy and Utilities Board (EUB) formed an Advisory Committee (Committee) on Public Safety and Sour Gas in January 2000 to review the regulatory system for sour gas as it relates to public health and safety. The Advisory Committee includes representation from all major stakeholders. It conducted an extensive outreach program and received considerable input from persons living in sour gas areas or involved with sour gas in some other manner.

On the basis of the input received, the Committee reviewed the sour gas regulatory system. In October 2000, it issued an interim *Directions* document that identified those issues related to the sour gas regulatory system that it believed to be of greatest importance. It also identified the direction it was moving in with respect to recommendations to address each of the issues.

The Committee conducted a second outreach program and received considerable input by way of reaction to its *Directions* report. It used that input to finalize its findings and recommendations.

Alberta currently has an extensive and comprehensive oil and gas regulatory and enforcement system. The Committee is of the view that the EUB and the industry are overall endeavoring to ensure that sour gas operations have minimal negative impacts on the public. While the Committee is aware that progress has been made, most notably in initiatives like the Appropriate Dispute Resolution process and increased public consultation requirements, the Committee believes that further improvements must be made. On the basis of all the information received throughout the process, it has developed 87 detailed recommendations directed towards

- a better understanding of sour gas,
- improving the sour gas regulatory system,
- reducing the impacts of sour gas on public health and safety, and, most importantly,
- improving the consultation that takes place with the public on all sour gas matters.

A major area where further effort is needed, on a priority basis, is in the understanding of the effects of sour gas on human health. Effort is also needed to standardize the technical procedures related to dispersion modelling and probabilistic risk assessment. These should then be used with the improved knowledge of health effects, to review current policy and requirements to protect public health and safety.

To accomplish this, the Committee is recommending that the EUB work with appropriate stakeholders to

- Develop comprehensive health effects information for sour gas mixtures and the combustion products of sour gas;
- Identify and support required research respecting the health effects of sour gas;
- Develop a framework and methodology for standardizing dispersion modelling and probabilistic risk assessment, and update them regularly;
- Upgrade EUB sour gas databases; and
- Review the current criteria and approach for establishing sour gas setbacks and for emergency planning zones (EPZ's) on the basis of the health effects information and standardized dispersion modelling and risk assessment methodology.

Another area of major concern relates to the effectiveness of consultation amongst all parties involved with sour gas. In this respect, the Committee is recommending

- A more consistent approach to public consultation;
- More stringent action by the EUB to ensure public consultation programs are effective;
- Development of effective public consultation and communications training programs;
- Formation of an EUB information office and a staff resource team that focuses on public consultation;
- Improved written material on technical issues related to sour gas and the role of the EUB and its regulatory and enforcement actions;
- Greater emphasis by the EUB in developing relationships with all stakeholders;
- More information sessions and workshops respecting sour gas; and
- Actions that would make it easier for the public to contact appropriate industry and EUB officials.

The Committee believes special attention is required to improve the relationship between the EUB and Aboriginal people. Towards this objective, it is recommending that the EUB

- Engage appropriate staff, including First Nations persons, and consider forming an Aboriginal advisory committee, to ensure more interaction among the EUB, industry and Aboriginal people;
- Strictly apply its public consultation requirements in and around First Nations and Metis communities;
- Ensure that a good complaint, monitoring and incident response program exists in First Nations and Metis communities; and
- Work with federal and other levels of government to ensure effective relationships among all parties, to eliminate gaps in regulation, to ensure overlap in regulation is handled efficiently, and to provide adequate infrastructure and resources to Aboriginal people for planning and development of disaster services capability.

The Committee heard many concerns about all aspects of emergency response planning (ERP), including the decision-making processes used to approve reduced emergency planning zones. It is making many recommendations to address these matters. They include

- At the time of application, assessment by the EUB of the capability of an operator to effectively implement an ERP;
- Improved early coordination with other responders and other plans in the area;
- More frequent audits by the EUB and development of requirements for mandatory testing of ERPs;
- Development of requirements and clear evacuation criteria for sulphur dioxide(SO₂) when a well is ignited;
- Development of clear criteria for introducing a reduced EPZ;
- Clarification of additional required protective measures for public health and safety when an EPZ is reduced, including improved definition of immediate ignition and roles and responsibilities; and

- More complete and concise guidelines and requirements for the development and implementation of ERPs.

The Committee directs numerous recommendations towards improving the EUB sour gas regulatory system as it relates to public health and safety. These include

- Consolidation, where possible, of sour gas requirements, and preparation of a summary document of requirements;
- Consideration of some additional or revised regulations;
- Increased inspections and audits, particularly for operators without a good performance record in sour gas operations;
- Improved response to sour gas complaints and more involvement of EUB staff in solving operational issues;
- Alterations to the enforcement ladder for sour gas operations to involve fewer, faster steps and more severe sanctions where there is a threat to public health and safety;
- Greater attention to the content and review of sour gas applications;
- Greater reliance on mediation and less formal hearings when they do occur;
- Recognition by the EUB of the performance of applicants in sour gas operations when making decisions;
- Greater recognition of public input and more descriptive material respecting public interest criteria in decision reports;
- The availability of appropriate expertise to the EUB; and
- Greater emphasis by the EUB on its role as a neutral regulator and on the profile of matters related to public health and safety.

The Committee recommends that, as the principal regulator of sour gas matters, the EUB take the lead role in clarifying and coordinating the responsibilities and roles of all parties that have some jurisdiction respecting sour gas. The Committee believes there are benefits to be gained by the parties working together in this regard. In terms of planning, the Committee recommends the immediate formation of a task force to investigate the possibility of improving coordination between subsurface and surface planning and development. It also recommends more stringent enforcement of the EUB's sour plant proliferation policy, and increased efforts to minimize proliferation of other sour gas facilities.

A number of recommendations are directed towards improved follow up of major sour gas releases, and efforts towards a more consistent medical response and improved records for those who have experienced substantial exposures to sour gas. Additionally, the Committee recommends that the EUB review current monitoring capability and ensure that it is adequate, not only for significant sour gas releases, but for other required monitoring such as complaint response and compliance programs.

A number of recommendations deal with the need to review, and, as appropriate, improve training for both industry and EUB personnel, in all relevant areas, including knowledge of sour gas, communication of risk and other technical information, and consultation with the public.

The Committee is asking the EUB to develop a plan to implement all of its recommendations, to make the plan public, and to publicly report progress towards implementation, each calendar year quarter, until all of the recommendations have been addressed.

IMPLEMENTATION

The Advisory Committee presents many recommendations in this report on public safety and sour gas. It makes the following requests of the EUB regarding the implementation of those recommendations:

- The EUB serve as the reporting agency for all recommendations in the report, including those that, in whole or part, require actions by others.
- The EUB issue public quarterly status reports respecting the planned actions and current progress on each recommendation. This reporting should be continued until implementation or action has been taken on all the recommendations. The first such report should include an overall implementation plan, including time-lines.
- The EUB establish a method of measurement for actions taken to implement each recommendation to assess if the actions are accomplishing the expectations of each recommendation. This assessment should be included in the quarterly status reports.

The Advisory Committee intends to meet annually until all the recommendations are implemented or acted on. At these meetings, the Committee will evaluate the actions taken by the EUB towards implementation and then provide an evaluation report to the EUB and all stakeholders. Additionally, members of the Committee will be available to assist the EUB in implementing the recommendations.

The Committee recognizes that there will be costs associated with the implementation of its many recommendations. It has attempted to address this, in part, by ensuring that its recommendations are practical and implementable. Additionally, the Committee believes there is a possibility that some of the costs of implementation might be covered by refocusing effort and resources away from issues of lesser importance towards paramount issues, such as sour gas and public health and safety. The Committee also believes that over time a higher level of public confidence respecting matters like sour gas and public health and safety will make the regulatory system more efficient, while remaining fully effective.

To the extent that implementation of its recommendations requires additional funding, such as for increased monitoring or increased involvement of municipalities or regional health authorities, the Advisory Committee believes that these funds should be provided by the Provincial Government. This is consistent with the position put forward by several public participants in the outreach process who expressed concern that those in sour gas areas are forced to directly carry the costs associated with the negative impacts of sour gas on health and life style, including the risks, by their proximity to sour gas developments. They take the position that they should not have to also carry the costs in dollars and in time to study applications, review them for weaknesses, learn about sour gas, and help prepare and test emergency response plans. They contend that these are regulatory matters that should be normally handled by the regulator, other government departments, or municipalities in a responsible manner on behalf of the public. The funding for this, in their view, should come from the province as a whole.

ADVISORY COMMITTEE ON PUBLIC SAFETY AND SOUR GAS

FINDINGS AND RECOMMENDATIONS REPORT

1 INTRODUCTION

The Alberta Energy and Utilities Board (EUB) formed the Advisory Committee on Public Safety and Sour Gas (the Advisory Committee or Committee) in January 2000 to review and make recommendations respecting the sour gas regulatory system as it relates to public health and safety. The Advisory Committee included representation from a broad spectrum of stakeholder groups. The EUB has expressed to the Advisory Committee its commitment to serious consideration of the Advisory Committees recommendations with implementation to follow. A similar process took place in 1993, resulting in a *Report and Recommendations to the ERCB on Public Safety and Sour Gas* dated February 1994. Copies of the 1994 report are available from the EUB's Information Services.

Before the Advisory Committee completed this Findings and Recommendation Report it issued a *Directions* document (*Directions: A Work in Progress, October 2000*) outlining the key issues identified by the Advisory Committee from an extensive public outreach and stakeholder consultation program. The *Directions* document set out the directions the Advisory Committee was moving towards in terms of recommendations, and reaction was sought from stakeholders including the general public.

This Findings and Recommendations Report provides background to the formation of the Advisory Committee, describes the Advisory Committee and its mandate, briefly outlines the process the Advisory Committee used to conduct its work, and provides a set of final recommendations to the EUB.

1.1 Background

The sour gas industry has been well established in Alberta for more than 40 years. More than one-third of Alberta's natural gas is 'sour gas', which is gas containing hydrogen sulphide (H₂S). Sour gas is very toxic to humans and animals at relatively low concentrations. Therefore, the exploration for and production of sour gas must be undertaken with special equipment and safety procedures to assure both worker and public safety.

The EUB is responsible for the regulation of sour gas development in Alberta. It must ensure that development of the sour gas resource takes place in a responsible manner that balances the risks to health and safety and the benefits to all Albertans and assures public safety and protection of health. The EUB has established many regulatory requirements that industry must follow in exploring for and developing sour gas resources. These regulations are continuously reviewed to ensure that they remain appropriate and consider changes in technology and address public concerns.

As a result of increasing public health and safety issues and concerns regarding growth and operation of sour gas wells and facilities near both rural and urban development, a review of the adequacy of current regulatory requirements was deemed desirable by the EUB. The EUB wanted this review to include the widest spectrum of input from those stakeholders ultimately

affected by sour gas development. In particular, the EUB wanted the review to explore the expectations of the general public living in sour gas areas.

1.2 The Advisory Committee

The Advisory Committee has 22 members who reflect a broad cross-section of stakeholders affected by sour gas development. It includes experts from disciplines such as risk management and health. Funding, secretariat services, and support was provided by the EUB. The following lists the members of the Advisory Committee and their alternates. A short biosketch of each member is provided in Appendix A.¹

Members	Constituency Represented
Gerry DeSorcy	Chairman
Marilyn Craig	Secretariat
Paul Jackson	Public-at-large
Brian Winter	Public-at-large
Judith Bugg	Public-at-large
Doreen Healy	Aboriginal Relations
Brent Friesen	Regional Health Authorities
Alternate: Tim Lambert	
Bart Guyon	Alberta Association of Municipal Districts and Counties
Barry Virtue	Alberta Urban Municipalities Association
Marjorie Young	City of Calgary Administration
Alternate: Harvey Rindfliesch	
Randy Gossen	Oil and Gas Industry
Alternate: John Kerkhoven	
Frank George	Oil and Gas Industry
John Squarek	Oil and Gas Industry
Bob Clark	Land Development Industry
Robert Ollerenshaw	Land Development Industry
Kevin McLeod	Alberta Health and Wellness
Alternate: Alex MacKenzie	
David Spink	Alberta Environment
Maureen Bolen	Alberta Agriculture, Food and Rural Development
Cindy Miller Reade	Alberta Municipal Affairs, Local Government Services
Alternate: Bill Symonds	
Ron Wolsey	Alberta Municipal Affairs, Disaster Services
Alternate: Ralph Holmes	
Dan Clarke	Alberta Human Resources and Employment
Steve Hrudehy	University Risk Research
David Wilson	University Risk Research

¹ The Appendices, which are substantial in length, are contained in a separate volume. Given the size of the Appendices, and since many readers will be primarily interested in the final recommendations of the Advisory Committee, the Appendices are not being distributed with this report. The Appendices are available on the Committee's Web site at www.publicsafetyandsourgas.org. You may also pick up or order copies at no charge from the EUB's Information Services (403) 297-8190 (this number may be reached toll-free in Alberta by dialing 310-0000) or from any of the EUB's Field Centres throughout the province.

1.3 Mandate

The scope of the Advisory Committee's work was centred on a review and assessment of public health and safety-related requirements currently being applied to the approval, development, and operation of facilities respecting Alberta's sour natural gas resources.

The Advisory Committee's Terms of Reference are included as Appendix B. "Public Health and Safety" as used in the Terms of Reference includes immediate or long-term effects of short-term exposure to sour gas on human health. It does not include possible long-term or chronic effects of very low concentrations of sour gas on human health, as this issue is being dealt with through other initiatives.

Similarly, the mandate of the Advisory Committee did not include chronic animal health, sulphur recovery guidelines, flaring requirements, or compensation matters related to a sour gas release, as these issues are being dealt with through other initiatives.

Since these types of issues could not be isolated from the work of the Advisory Committee, nor from the community, they were discussed and considered when directly relevant to the Advisory Committee's mandate. Observations and comments regarding these matters have been included in the Advisory Committee's final report.

2 PROCESS

The Advisory Committee used a variety of methods to enhance its understanding of the current regulatory system and to receive input respecting its effectiveness.

2.1 Advisory Committee Meetings

The diverse backgrounds, experience, and professional responsibilities of the Advisory Committee members resulted in a Committee, which as a whole, has a broad view of the issues associated with public health and safety and sour gas. In order to obtain a clear, common understanding of the current system, EUB and other experts provided the Advisory Committee with detailed information regarding current requirements and practices on many topics within the mandate of the Advisory Committee. (Written reports received from experts are identified in Appendix G.) These presentations and related discussions took place at meetings of the full Advisory Committee or at meetings of three focussed working groups formed by the Advisory Committee. These three working groups — Prevention, Policy and Jurisdiction; Event Consequence Management; and Communication and Compensation — were established to facilitate the work of the Advisory Committee. During the group meetings, Advisory Committee members brought forward views of their own constituents to be considered along with the input from others. Advisory Committee members visited a sour gas plant, well site, and drilling rig.

2.2 Public Outreach and Consultation Program

2.2.1 Public Outreach

To identify the public's concerns and issues and possible solutions related to public health and safety and sour gas, the Advisory Committee undertook a public outreach and consultation

program. Although the mandate of the Advisory Committee was to look at the immediate and long-term effects of short-term exposure to sour gas on human health, it agreed that all other sour gas issues would be noted, and therefore discussion of other matters was not restricted during any of the sessions.

The consultation process included regional discussion sessions held in June 2000 in 12 provincial locations directly affected by sour gas development. A total of 231 individuals attended the sessions. Through these sessions, Advisory Committee members gained an understanding of the public's issues, concerns and suggestions related to public health and safety and sour gas. Appendix C includes a summary of the input received at the regional discussion sessions. It is organized into three topic categories: Prevention, Policy and Jurisdiction; Event Consequence Management; and Communication and Compensation. Those comments not related to the mandate of the Advisory Committee are also summarized in the appendix under different headings.

2.2.2 Aboriginal (First Nations and Metis) Consultation

To provide Aboriginal people the opportunity to present their issues, concerns, and solutions related to sour gas and public health and safety to the Advisory Committee, a series of ten discussion sessions were conducted from May to August. These small group meetings involved representatives from each of the participating First Nation or Metis organizations or communities, members of the Advisory Committee, and senior representatives from the EUB. Each of the discussion sessions was conducted within the local communities or organization offices. Written submissions were also received from a few Aboriginal organizations.

The sessions and written input generated a series of common key issues related to sour gas. A summary of the material is provided in Appendix C.

2.2.3 Random Sample Telephone Survey

A random sample telephone survey was conducted to gather information from a broad representative group of Albertans living in areas of sour gas development about their awareness, perceptions, and concerns regarding sour gas activities in the province. A summary of the results of the survey is included in Appendix D. A more detailed report on the survey is on the Advisory Committee's Web site, www.publicsafetyandsourgas.org.

2.2.4 Input Received by Other Means

The Advisory Committee provided the opportunity for the public to submit input by completing a response form either on the Advisory Committee's Web site or by mail. Forms were available at the discussion sessions or by requesting one directly by calling the Advisory Committee.

Members of the public were also invited to make written submissions stating their views to the Advisory Committee throughout the whole process. Some of the written submissions were submitted electronically. Numerous submissions were received and a summary of the input received is also reflected in Appendix C.

2.2.5 Directions Document and Reaction Process

After the first outreach program the Advisory Committee prepared a *Directions* document entitled; “*Directions: A Work in Progress*”. The Directions section of that report is included as Appendix E. This *Directions* document was mailed to all those who participated in the regional discussion sessions. It was also mailed to numerous government agencies, industry associations, and other public interest groups, and made available on the Committee’s Web site. Through this process the Advisory Committee requested feedback and reactions to its summarization of issues, identification of key issues, and the directions of possible solutions.

The Advisory Committee then held further outreach sessions in October 2000 in nine of the twelve locations it visited during the regional discussion sessions. A total of 130 individuals attended this second outreach program and provided the Advisory Committee with valuable feedback on its *Directions* document. The Advisory Committee also held a second series of discussion sessions with the Aboriginal organizations and communities to get their feedback and input. In addition, the Committee received a number of written submissions in response to the *Directions* document. A response form was also utilized by the Advisory Committee to obtain feedback from the public on the *Directions* document. Appendix F is a summary of the entire written and public meeting reactions received from all participants in the outreach program regarding the *Directions* document. It has been organized in the sequence of the major issues identified by the Committee in its *Directions* document.

Appendices C and F are summaries of all the stakeholder input received by the Advisory Committee. That input is reflected in the findings and recommendations of the Committee as presented in section 4 of this report. The Committee is of the view that, in addition to reviewing and implementing the Committee’s recommendations, the EUB, industry and involved government departments, should carefully review the two appendices as they provide valuable insights into the views of the public respecting sour gas and health and safety.

3 IDENTIFICATION AND GROUPING OF ISSUES

Those who participated in the Advisory Committee’s outreach process raised many concerns and issues through public outreach sessions held in communities, completed response forms, written submissions, or replies to questions asked during the telephone survey. Also, members of the Advisory Committee, on their own behalf or on behalf of constituent groups, put forward concerns.

In total, these issues numbered in the hundreds and related to almost all aspects of oil and gas operations. Many of the concerns, although expressed in different words, were similar to concerns raised by others. Some related to fundamental policy matters, such as whether or not sour gas resources should be developed and who should have jurisdiction if they are developed. Many related to the role of the EUB in regulating sour gas development and to industry procedures and practices. Some dealt with detailed technical matters, while others were more general in nature. Many expressed the importance of communication among all parties involved with sour gas.

In order to determine its directions and ultimately its recommendations, the Advisory Committee grouped the many different issues into common subject areas. In the work leading up to the *Directions* document, the Advisory Committee categorized the issues into three groups. They were (1) Prevention, Policy and Jurisdiction (2) Event Consequence Management, and (3) Communications and Compensation. Within these groupings, it identified the key priority issues that were outlined in the *Directions* document. For each priority issue the Advisory Committee identified the direction it was moving in with respect to its recommendations. When input was received and reviewed from the reaction process on the *Directions* document, the priority issues and directions proposed by the Advisory Committee were generally confirmed.

The Advisory Committee in its deliberations respecting the findings and recommendations decided that it could further combine some of the priority issues into common areas. The restructuring of common areas does not reduce the importance or content for each issue, but in the view of the Committee better illustrates the relationship between the different issues. The re-structured priority issues are, in no particular order of priority, shown below:

- 1 Jurisdiction and Development Planning
 - Jurisdiction of Government Departments and Agencies
 - Coordination of Surface and Subsurface Planning
 - Subsurface Resource Development Planning
- 2 Health Effects
- 3 Technical Information
- 4 EUB Role
 - Regulations
 - Enforcement
 - Applications and Decisions
 - Industry Procedures and Personnel
 - Setbacks
 - Emergency Response
- 5 Monitoring
- 6 Communications
 - Public Consultation
 - Public Awareness and Understanding
 - Interaction of the EUB with Stakeholders
- 7 Aboriginal (First Nations and Metis) Issues
- 8 Non-mandate but Important Issues

The above represent the highest priority areas of concern as identified throughout the process. **The issues are not listed in order of priority or importance.** The Advisory Committee discussed the need to prioritize the issues and its recommendations and concluded it should not do so. The reason for this is that it believes all the recommendations are important. The Committee further believes that some of the recommendations may be easier or quicker to implement than others and does not wish to see those delayed because implementation of another recommendation of higher priority is delayed. The Advisory Committee does identify those recommendations it sees of greatest importance when it presents the findings and recommendations in the next section of the report.

4 FINDINGS AND RECOMMENDATIONS OF THE ADVISORY COMMITTEE

4.1 INTRODUCTION

The Advisory Committee was mandated to review the regulatory system for sour gas as it relates to public health and safety and to make recommendations to improve that system. In developing its recommendations, the Committee recognized that the development of Alberta's sour gas resources creates a public health and safety hazard that is of concern, particularly to those living in an area of development. The Committee concluded that, in most cases, the actual risk to people and the environment associated with this hazard could be reduced to acceptable minimal levels with appropriate development planning and operation.

The Committee's approach was to review current sour gas development regulations and practices and identify gaps and areas for improvement. It recognized that the present requirements and practices are based on the state of knowledge and the operational environment existing at the time particular requirements and practices were developed. In some instances that was a number of years ago.

The Committee believes that the EUB, for the most part, has reasonably addressed public health and safety in making decisions respecting sour gas development. However, there are areas for improvement, in particular the knowledge base needs to be updated and expanded. The improvements and knowledge acquisitions addressed in the following recommendations are seen as part of applying the principle of continuous improvement, which the Committee believes is essential for an issue as important as the public health and safety aspects of sour gas development.

The Committee recognizes that Alberta currently has an extensive and comprehensive oil and gas regulatory system and that the EUB and the industry are endeavouring to ensure that sour gas operations have minimal negative impacts on the public. At the same time, as noted previously, the Committee believes that improvements must be made.

The Committee notes that positive changes have been made recently, for example changes to EUB Guide 56: *Energy Development Application Guide*. The EUB has increased its attention to enforcement and is focusing greater effort on sour gas operations. In this regard, the EUB has increased the size of its field staff. The industry has actively participated in many initiatives to address sour gas concerns, and the Canadian Association of Petroleum Producers (CAPP) has taken a lead role in implementing its stewardship program. In addition, some sour gas producers

have made changes to their sour gas procedures as part of continuous improvement. The Committee's recommendations are intended to further enhance this trend of positive change.

A number of the Committee's recommendations relate to matters that some could suggest are not exclusively "sour gas and public health and safety" issues such as communication amongst stakeholders. The Committee emphasizes that it has formulated and is directing its recommendations specifically to sour gas and its effects on public health and safety, even though it recognizes that many of its recommendations reflect principles that are applicable on a broader basis.

The Committee also notes that some of its recommendations are similar to those that resulted from an earlier process in 1993-94. Many of the earlier recommendations were not implemented, for a variety of reasons. With the benefit of hindsight, the Committee believes not to have done so was a mistake.

It should be noted that all of the recommendations in this report are numbered sequentially.

4.2 JURISDICTION AND DEVELOPMENT PLANNING

Major Driver Issue: **The need to clarify jurisdictional responsibilities and to establish coordinated surface and subsurface planning for the development of sour gas, while ensuring an effective and efficient regulatory regime.**

In addressing this major issue, the Committee deals with the following sub-issues:

- Jurisdiction
- Coordination of Surface and Subsurface Planning
- Subsurface Resource Development Planning

4.2.1 Jurisdiction

Current Situation

The jurisdiction respecting sour gas and public health and safety in Alberta is complex. The EUB is the principal regulator of oil and gas development, including sour gas. All sour gas facilities must have approval of the EUB. The EUB also regulates ongoing operations, including the inspection of facilities, and has the ability to revoke approvals or suspend operations to correct deficiencies. The EUB has a regulatory role in the prevention of sour gas releases and in response to them when they do occur.

Alberta Resource Development has responsibility for the disposition of oil and gas development rights on behalf of the people of Alberta for the more than 80 per cent of the province where the resource belongs to the Crown. In this capacity, it establishes relevant policy, issues leases, and collects royalties.

Alberta Environment has responsibilities related to sour gas and plays a major role in establishing air quality standards, and the environmental regulation of sour gas plants. The

monitoring involvement is particularly important in the event of major releases of sour gas. Alberta Environment is also responsible for licensing seismic exploratory operations.

Sour gas facilities are located in many urban and rural municipalities in Alberta. Municipal governments have a relatively minor role in their development or approval because of the responsibility of the various provincial agencies in the siting of facilities, but they have substantial emergency response responsibilities in the event of major sour gas releases.

The regional health authorities and the department of Alberta Health and Wellness have overall responsibility for the health of Albertans, including the impacts of sour gas on public health and safety. The department has a special role in setting health standards. The Regional Health Authorities Act requires that regional health authorities protect and promote the health of residents in their region. Regional health authorities and Alberta Health and Wellness are part of the overall response team in the event of major sour gas releases.

The department of Alberta Municipal Affairs, Disaster Services, has overall responsibility through the Disaster Services Act for preparing and coordinating responses to all emergencies in the province, including those related to sour gas. All municipalities are required to develop and maintain emergency response plans for response to any emergency within their area of jurisdiction.

Alberta Human Resources and Employment has overall responsibility for the Occupational Health and Safety Act. This includes requirements for workers safety as related to sour gas.

Alberta Agriculture, Food and Rural Development and Alberta Environment have a shared responsibility under the Public Lands Act. With much of the sour gas activity occurring on Crown lands, there is a responsibility associated with the numerous activities on these lands and including lease and other management agreements.

Jurisdiction respecting sour gas and public health and safety is even more complex with respect to First Nations lands. In these situations, several federal government departments including Indian Oil and Gas Canada (IOGC), and Indian and Northern Affairs Canada (INAC)) are also involved. In addition, the Indian Resource Council (IRC), in its capacity of representing First Nations with proven or probable oil and gas reserves underlying their lands, has a significant role to play on behalf of First Nations.

There is much communication among the various departments and agencies with responsibilities related to sour gas and public health and safety. As well, a number of agreements exist respecting jurisdiction and roles and responsibilities, but they do not cover all areas of potential overlap.

Findings of the Committee

Many participants in the outreach process expressed concerns about the lack of coordination among various agencies involved with sour gas development. They generally stated that the lack of a mechanism for managing the various jurisdictions results in confusion, loss of credibility, and lack of confidence in the regulatory system.

The Committee indicated in its *Directions* document that it was considering recommendations towards ensuring that the responsibilities and relationships of the various government organizations are clear, that overlaps are minimized, and that where they do exist formal working agreements are developed. The Committee also saw a need to clarify for the public and industry the roles and responsibilities of the government agencies.

The reactions to the directions of the Committee in the second round of outreach were somewhat mixed but overall supportive. Some suggested giving all of the responsibility and all of the accountability to one organization, such as the EUB. Others opposed this and pointed to the need for greater involvement of health officials. Some noted concerns respecting gaps in regulation and suggested the Committee was placing too much emphasis on overlaps.

The Committee continues to believe that the appropriate objective to strive towards is the clarification of roles, responsibilities, and accountability of the various jurisdictions, while ensuring that the overall system is both effective and efficient. Additionally, efforts are needed to ensure that the public and industry have a better understanding of the various jurisdictions.

Recommendations

1. *In its role as the principal regulator of the Alberta oil and gas industry, the EUB work with provincial and federal government departments, municipalities, regional health authorities, tribal councils, IOGC, IRC, INAC, and any other agency that has jurisdiction respecting the impacts of sour gas on public health and safety in Alberta to*
 - *clarify roles, responsibilities, and relationships respecting sour gas and public health and safety,*
 - *identify and eliminate any gaps in the system, and*
 - *identify overlaps in jurisdiction and either eliminate the overlap or develop formal working agreements to avoid unnecessary duplication and confusion as to responsibilities.*

In this regard, the EUB should consider the designation of an individual or group within the EUB to coordinate jurisdictional matters.

2. *The working relationships established between the EUB and other involved jurisdictions (particularly the regional health authorities, municipalities, Municipal Affairs Disaster Services, Alberta Environment, and Alberta Health and Wellness) need to be strengthened to include meaningful involvement of the jurisdictions in establishing effective and efficient standards, criteria, policies, and processes for dealing with the public health and safety aspects of sour gas facility applications.*
3. *The working relationships established between the EUB and IOGC, IRC, INAC and other relevant federal government departments recognize the different jurisdictional circumstances respecting First Nations.*
4. *The EUB work with other involved parties to prepare a sour gas and public health and safety roles and responsibilities document and a summary brochure and widely distribute them to the public, industry, and other interested parties. These documents should be*

concisely written in understandable language and make clear who should be contacted to answer questions, deal with complaints and concerns, and report emergencies.

4.2.2 Coordination of Surface and Subsurface Planning

Current Situation

Alberta Environment directs an integrated resource planning process for the province. It has resulted in a series of regional sub-plans mostly in the Eastern Slopes, that consider various resources and land uses and designate areas where certain types of resource development or land uses are prohibited. Plans do not address the interface between sour gas developments and populated areas, nor potential impacts of sour gas on public health and safety.

Alberta Environment is currently leading the design of a program of “regional strategies” which are broad regional-scale planning for sustainable resource and environmental management under provincial responsibility. Regional strategies could help to address sour gas development conflicts at a broad strategic level. The program is currently at a pilot stage, so its potential is still somewhat undefined.

There is a progression of approvals and scale of review for sour gas development. Sour gas development first involves the acquisition of rights to potential sour gas-bearing formations through a public bidding process administered by Alberta Resource Development. The Crown Mineral Disposition Review Committee (CMDRC) recommends to Alberta Resource Development what, if any, restrictions should be noted pertaining to environmental concerns that can affect surface access for exploration and development of Crown mineral rights. Bidders are advised of any potential surface access restrictions during the public offering process. The CMDRC reviews proposed crown mineral leases on the basis of environmental effects. The potential effects of sour gas on public health and safety are not considered at this stage in the development process.

The acts and regulations administered by the EUB require it to review and, where judged to be in the public interest, approve the construction and operation of sour gas facilities. Other than the recommended setbacks that accompany the level classification of a sour gas facility, there is little focus on land-use designations that might exist within the municipality in question or on matters such as population density, municipal development plans, area structure plans, and other municipally approved plans. Municipalities, under the Municipal Government Act, cannot overrule an EUB decision or deny a permit to an operator if the facility is approved by the EUB, unless it is for reasons unique to the municipality which were not considered by the EUB nor covered by provincial standards.

Many of the participants in the June outreach process expressed concerns regarding the degree to which sour gas facilities exist and are being built in relatively populated areas. Several suggested that sour gas production should not be allowed near population centres (cities and recreational centres) or should be halted until technological improvements make it safer.

The Committee indicated in its *Directions* document that it was considering looking at ways to improve coordination of planning between surface developments (e.g., urban and recreational development) and the surface facilities (wells, plants, pipelines) from subsurface developments.

Reaction to the *Directions* document in this regard was generally supportive. However a number of responses raised concerns about any changes that would impact on the competitiveness and the confidential and proprietary information inherent in the current mineral leasing system.

The Committee recognizes that sour gas is widespread throughout the province and exists in many populated regions. It also recognizes that there is no way this valuable resource can be recovered without a considerable interface between sour gas development and people. The regulations that are intended to protect public health and safety from sour gas are thus of great importance. The Committee deals with these and makes many recommendations in later sections of this report.

The Committee continues to believe that even though sour gas development can safely occur in populated areas, given due care and caution, any measures that would allow the recovery of sour gas while reducing the potential impact between sour gas operations and people would be beneficial to the province. It believes that improved planning and coordination between subsurface and surface development has the potential to do this.

Recommendations

5. *The immediate formation of a task force of senior decision makers that would investigate the possibility of improving coordination between subsurface and surface planning and development.* The task force should be empowered to look at all relevant aspects of planning and development, including the mineral leasing system, and should include appropriate representation from Alberta Resource Development, Alberta Municipal Affairs, Alberta Health and Wellness, Alberta Environment, the Alberta Energy and Utilities Board, Aboriginal groups, urban and rural municipalities, regional health authorities in sour gas areas and their associations, surface land developers, the public, and the oil and gas industry. The Task Force should investigate and consider, among other matters, the following:
 - The development by the oil and gas industry, government, and urban and rural planning authorities of a complementary planning and development process. The Task Force might consider EUB Interim Directive (ID) 96-1 (regarding Hay-Zama Lake Complex – Special Requirements) as a useful precedent to assist in coordinating surface and subsurface development near populated areas, such as urban and seasonal recreational centres, as well as near First Nations and other Aboriginal lands.
 - The development of policies to ensure that sour gas reserves are delineated and recovered as soon as reasonably possible in populated areas (such as those identified in existing Inter-municipal Development Plans [IDP], designated fringe areas, or intensive transportation corridors), while still providing the industry with a reasonable opportunity to develop its mineral leases.
 - Where there are current land-use conflicts related to sour gas and public health and safety, the development of Land Use and Resource Development (LRD) Agreements by the surface and subsurface owners, relevant municipal planning authorities, and the EUB. These agreements could provide a workable solution for all parties involved in terms of development and timing. EUB Decision 2000-20, *Dynegy*

Canada Inc., Application for Pipeline Licence Amendments, is an example of how these types of agreements could be used. This might be accomplished through effective public consultation processes.

- The promotion of information exchange between industry, government, and Aboriginal people, regarding heritage (traditional lands and sacred sites), land-use planning, development, building, and emergency planning issues.
- Possible changes to the mineral leasing system. These might include matters such as leasing larger blocks of common ownership for sour gas near population centres and warnings when smaller blocks are posted that common operations are preferred; qualification criteria to ensure that operators have the necessary risk management standards and resources to handle sour gas; and notification to potential bidders of possible restrictions on resource development (such as lease time limit) in areas within or adjacent to urban centres or where land-use conflicts are relatively near-term.
- Possible restrictions on municipal development until the sour gas resources are recovered or building restrictions through land-use bylaws in areas where there is high potential for sour gas development.
- Possible modification to the existing membership of the Crown Mineral Disposition Review Committee to address the possible impacts of sour gas development on public health and safety.

4.2.3 Subsurface Resource Development Planning

Current Situation

With respect to the coordination of subsurface resource development, EUB Applications *Guide 56: Energy Development Application Guide* requires sour gas operators to conduct an assessment of nearby facilities that have the capability of handling and processing new resources in an area. In doing so, operators must attempt a reasonable degree of discussion with adjacent operators to investigate the possibility of using existing facilities and infrastructure. In addition, the EUB has a Gas Plant Proliferation Policy designed to achieve some level of coordination of subsurface planning.

While the EUB does encourage sour gas operators to look at innovative ways of mitigating a proliferation of surface facilities, there are no regulations, other than those stated above, compelling industry to use accepted techniques, such as directional drilling or pipeline corridors, to reduce proliferation. Furthermore, it appears that the EUB proliferation policy is primarily applied when there are objections to a new facility in an area.

Findings of the Committee

Many outreach participants raised public health and safety concerns respecting the number or density (proliferation) of sour gas facilities in any one area and questioned whether these were all

necessary to recover the resources. There was a general view that only the minimum amount of facilities necessary to recover the resource should be allowed.

The Advisory Committee indicated in its *Directions* document that greater effort was needed to reduce the proliferation of sour gas facilities near people. This received general support in the second round of outreach.

The Committee continues to believe that efforts should be made to improve the coordination of subsurface sour gas resource development with the aim of minimizing proliferation of the number of sour gas facilities to the extent practical. In particular, the Committee's view is that there should be a shift in onus towards the applicants to review proliferation issues and away from landowners, who under the current system are expected to raise concerns regarding proliferation of facilities.

Recommendations

6. *Adoption by the EUB of the recommendation that there be more rigid enforcement by the EUB of its gas plant proliferation policy as presented in the report recently submitted to the EUB by the Sulphur Recovery Guidelines Review Group* This Sulphur Recovery Guidelines Review report is available on the EUB's Web site at www.eub.gov.ab.ca/bbs/products/reports/srgag-2000-04.pdf.
7. *Revisions to EUB guides to require operators to include in their applications for critical sour wells, pipelines, and facilities a review and discussion of options to utilize existing sour gas infrastructure in the area in order to minimize the extent to which the public is impacted by additional sour gas development.* This would include both the applicant's facilities as well as other operators' facilities in an effort to reduce proliferation of well sites and sour gas pipeline infrastructure. Options may include consideration of directional drilling, target flexibility, and the establishment of pipeline corridors.
8. *Revisions to EUB guides to encourage operators to consider methods for reducing the visual and psychological impacts of sour gas facilities near people.* Options may include improved communications and relationships between the industry and the public, or buffering techniques, such as landscaping and berming, where these do not create additional hazards.

4.3 HEALTH EFFECTS

Major Driver Issue: The adequacy of our understanding of the health effects caused by sour gas mixtures.

Current Situation

The EUB has long relied on the appropriate departments of the Alberta Government and recognized experts in chemical toxicology to provide the acceptable limits for exposure to hydrogen sulphide (H₂S) and sulphur dioxide (SO₂). In this respect, it currently uses the 1988 table of effects of H₂S as prepared by Alberta Health and Wellness. Alberta also has stringent ambient air quality standards for H₂S and SO₂, which reflect the accepted scientific

understanding of concentrations that would not affect the health or safety of people or animals or the environment.

Regional health authorities are responsible for assessing the health of the people in their regions to determine what factors are affecting health. This information is used by regional health authorities to establish priorities and to plan for the delivery of health services, including public health services. In the case of environmental exposures, for example to sour gas, there is no routine health status monitoring, and special studies related to specific issues are carried out.

In the early 1990s, Alberta Health and the local Board's of Health identified the urgent need to strengthen environmental health services to deal with existing and future challenges, including those related to sour gas. Some regional health authorities have dedicated experts while other regional health authorities rely on ad hoc arrangements. This means that there is not a consistent response by regional health authorities to environmental health concerns raised by individual Albertans.

Findings of the Committee

The Advisory Committee, in keeping with its mandate, focused on the health effects of acute short-term exposures to sour gas. H₂S and SO₂ were the major chemical exposures that the Committee considered. There may well be health effects related to the other chemical compounds found in sour gas itself and in its combustion products when it is ignited, but H₂S and SO₂ are the two most likely to have health impacts in acute short-term exposures.

The Committee's review found a number of serious concerns about how potential health and safety issues are addressed. The Committee notes that the 1994 Public Safety and Sour Gas Advisory Committee report included a number of health and safety related recommendations that have not been acted on. In the view of the Committee, its current task would have been made much easier if the 1994 recommendations had been implemented.

The Committee heard from many members of the general public on the issue of health effects through the public outreach sessions and the telephone survey. Although the views were mixed on whether "scientists have a clear understanding about the effects of sour gas on public health," the Committee is satisfied that further work is needed in this respect. Some respondents stated that the "precautionary principle" is an important theme to be used respecting implementation of measures to reduce the impacts of sour gas on public health and safety.

Although the Committee's mandate was to review immediate or long-term effects of short-term exposure to sour gas, it heard many concerns during the outreach program about health effects of long-term exposure to low concentration levels of sour gas mixtures. Also of significant concern was the impact on human and animal health of the collective effects of multiple sour gas operations in a specific area.

The Committee in its *Directions* document indicated that more coordinated work is needed with respect to the health effects of sour gas. This was generally supported in the second round of outreach.

The Committee has little confidence in, and believes that overall there is a low level of understanding regarding the health-related information used by decision-makers in making decisions about sour gas. It further believes that a revised comprehensive health effects table should be developed as soon as possible. The one currently used was prepared in 1988. The review and table should cover both the constituents of sour gas mixtures and the products of incomplete combustion of sour gas, including SO₂, reduced sulphur compounds, and complex hydrocarbons. Alberta Health and Wellness has committed to undertake the review related to H₂S and to involve others.

The Committee believes that this revised health effects table should then provide the basis, along with the framework and methodology for dispersion modelling and probabilistic risk assessment, for a stakeholder review of EPZs as determined by the EUB. In the interim, the Committee believes the EUB should continue its current approach of using the EPZ curves developed in the early 1980s and published in *Interim Directive (ID) 97-6* for determining the size of EPZs. The Committee believes that the use of these curves is a reasonable approach to follow while the essential work is occurring on revising and updating the health effects information.

The Committee expects that the stakeholder review of the EUB approach to EPZs would consider whether the EUB's regulatory requirements should look beyond lethality and also address short- and long-term health effects. The Committee also believes that additional research work is required respecting the health effects of sour gas.

In the view of the Committee, additional effort is needed to ensure a more consistent and appropriate medical response to those exposed to high levels of sour gas, better records of the long-term health effects on such parties, and a more thorough follow-up to major sour gas releases.

Effort is also needed, due in part to jurisdictional uncertainties, to ensure that Aboriginal people are fully aware of the potential health effects of sour gas and the related regulatory requirements.

In order to address these findings and to increase public confidence and the understanding of the health effects related to sour gas, the Committee recommends that specific action be taken to 1) address the gaps in knowledge through a focused research strategy; 2) ensure that standards reflect the current knowledge about the health effects of sour gas mixtures; and 3) ensure a consistent response by health agencies, the EUB, and other involved government departments, to human health concerns, including exposure incidents. The Committee does not believe that the lack of scientific certainty should be an excuse for inaction.

Recommendations

9. *The EUB work with Alberta Health and Wellness, regional health authorities, Alberta Environment, Alberta Human Resources, industry, and other stakeholders to ensure that comprehensive health effects information (qualitative and quantitative) is developed, as soon as practical due to its urgency. This information is needed to conduct the review of the approach to emergency response planning referred to in recommendation 58. The review should cover both the constituents of sour gas mixtures and the combustion products of sour gas, including SO₂, reduced sulphur compounds, and complex hydrocarbons. (Alberta Health and Wellness has committed to lead the review for H₂S.)*

10. *The EUB, Alberta Health and Wellness, Alberta Environment, Alberta Agriculture Food and Rural Development, Alberta Research Council, regional health authorities, industry, and other interested parties including Alberta universities, jointly establish an independent Scientific Review and Advisory Committee to provide recommendations on required research programs related to sour gas and health. This should be an ongoing activity to ensure that the research activity supports best practices by all parties. Among the tasks of this committee would be to ensure recognition and thorough assessment of completed and ongoing studies and the dissemination of the information.*
11. *The EUB work with the Alberta Government to ensure financial support is available to address gaps in research respecting the health effects of sour gas. Such research should complement the multi-government Western Canada Study on Animal and Human Health Effects Associated with Exposure to Flare Emissions. This research study should review the current gaps in human health research to ensure the proposed study plan addresses the relevant issues.*
12. *Alberta Health and Wellness work with regional health authorities and physicians, through the Alberta Medical Association, to ensure a consistent, appropriate, and coordinated response to individuals exposed to major H₂S releases. This should be a 24-hour, seven-day-a-week response, possibly utilizing the Poison and Drug Information Service.*
13. *The EUB work with Alberta Health and Wellness and Alberta Human Resources to establish a high-level exposure registry to track individuals who have been knocked down or had other substantial exposures to sour gas. This would enable tracking of significant human exposures to H₂S and help ensure the consistent follow-up of exposed individuals.*
14. *The EUB, First Nations, Health Canada, and regional health authorities ensure there is effective communication on the health service expectations of the various parties related to sour gas in the vicinity of First Nations communities.*
15. *The EUB, industry, Alberta Environment, Alberta Health and Wellness, regional health authorities, and federal regulators, as required, ensure that there is a thorough follow-up process after major sour gas releases (such as well blowouts or pipeline failures) to determine impacts and identify opportunities for response improvement.*

4.4 TECHNICAL INFORMATION

Major Driver Issue: **The adequacy and understanding of the methods and mathematical models used in assessing potential effects on public health and safety from sour gas developments.**

Current Situation

The regulatory framework of the EUB recognizes air dispersion modelling and probabilistic risk assessment as valuable tools in predicting emissions from sour gas facilities and the potential impact they could have on the public and the environment. The EUB does not require industry to

perform hazard or probabilistic risk assessment for every sour gas application; rather it requires that the industry comply with regulatory standards established with consideration for hazard and risk assessment. Where industry chooses to perform hazard or probabilistic risk assessment to support applications, the EUB evaluates the suitability of the models and the input assumptions used.

Models can predict dispersion in air and probability of risk. However, the results of modelling are very dependent on the input information and calculation limits set in the model. Using different input data for variables like topography, meteorology, and failure statistics can result in a wide range of results.

In the late 1980s, the EUB conducted extensive research into the dispersion characteristics of sour gas and developed the GASCON2 dispersion and toxic exposure model. Field measurement testing was also done to support the model development. Many other models have been developed that are also used by industry today. The EUB is aware that improvements to modelling are ongoing. However, few resources have been committed by the EUB to remaining current with technology.

The EUB maintains databases for the collection of reservoir information, failure and release statistics, surveillance and enforcement programs. However, none is specific to sour gas and the databases are often incomplete and fragmented.

Currently most of the debate at public hearings on dispersion modelling, risk assessment, and toxicology occurs when experts, on behalf of various parties, argue the merits of methods used to predict the hazard or probabilistic risk that may be associated with a project.

Findings of the Committee

Some of the participants in the outreach process questioned the accuracy of models used to predict concentration levels of H₂S and SO₂, and suggested there was too much emphasis on risk analysis rather than on the consequences of a sour gas release. Others expressed concern that it was not appropriate to present or discuss the hazards associated with sour gas without simultaneously providing information on the probability of exposure from releases from wells or pipelines. These respondents said that it would be more appropriate to discuss the risks of sour gas, which would incorporate probability of exposure, instead of focusing just on the consequences of exposure.

The Committee believes it is important to clarify certain terms, such as hazard, risk, and probabilistic risk that are frequently used when dealing with the subject issues. These terms, as used in this report regarding public health and safety, have the following meanings:

- **Hazard:** A condition with the potential for causing an undesirable consequence. For H₂S and SO₂, it is the potential for the substances to cause adverse toxic effects at various levels of exposure.
- **Risk:** A subjective assessment of the combined hazard and likelihood of the hazard occurring.

- **Probabilistic Risk:** The measure of the combined probability (likelihood) and severity of an adverse effect on human health.

The Committee is aware that sour gas release events posing the greatest level of hazard to public health and safety rarely occur. Because these events are rare, it is necessary to rely on the use of limited available data that document actual equipment and failure events. Technical experts use the available data as input to computer models of release rates, atmospheric dispersion, and health effects to predict the effect of the sour gas industry on public health and safety.

The Committee found that the EUB's databases are not specific to sour gas, are fragmented, and do not include complete data sets. The Committee believes that it is essential for the EUB to have complete, accurate, and reliable data in order to effectively manage public health and safety.

Dispersion and risk modelling is a mixture of well-defined science within a database or computer model combined with the art of choosing which of several models to use and which release rate, terrain, and atmospheric conditions must be accounted for. There is considerable disagreement among experts and the public about the proper choices that will produce accurate, useful, and, above all, credible dispersion and risk predictions on which to base a policy of assessing and protecting public health and safety. There is no uniquely right answer to these choices, but there can be many wrong answers (e.g., erroneous calculations, inaccurate simulation assumptions and equations, impossible scenarios). The limitations as well as the capabilities of the models and methods must be well understood and communicated.

Hazard and probabilistic risk predictions often produce contradictory results that seem to be biased to strengthen the case of a particular side at a public hearing (the proponent of an application or the interveners). The Committee believes that these inevitable contradictions do not assist the industry or the public in understanding the potential probabilistic risk to public health and safety or in determining ways to improve the safety of sour gas operations. Decision-makers must be able to recognize the reasons for the differences that are debated in order to make informed decisions, which are in the public interest. Probabilistic risk assessment and hazard assessment are useful tools in scenario generation and sensitivity analysis. The essence of effective risk management is prevention of harm rather than reaction after harm occurs.

Recommendations

16. *The EUB review and organize its existing large quantity of sour gas data on well, pipeline, and facility leaks, ruptures, flares, and venting to provide a historical database that is accurate and complete, and, in conjunction with other stakeholders, urgently develop and maintain new databases that deal specifically with sour gas, and make such databases available to the industry and the public.* Databases should be accurate and comprehensive and include data on sour reservoirs, failures, release occurrences, release rates, enforcement actions, and continuous improvement. Recognizing that the databases can be only as good as the raw input data, there should be regulatory requirements that support the accuracy and submission of related information. The Committee acknowledges that implementation of this recommendation is likely to be costly in terms of initial development and continuous maintenance but believes it is critical to the process.

17. *The EUB, in cooperation with stakeholders, develop a framework and methodology for standardizing dispersion modelling and probabilistic risk assessment that will provide clarity to the industry and the public.* This would include review of existing models and defining a set of standard models and methods that will be accepted for evaluating health and safety exposure hazards and probabilistic risk from sour gas releases. Alberta Environment has developed a set of standard dispersion models for routine industrial releases that should be reviewed by the EUB.

The EUB should define the range of conditions for which each model is suited. A list of standard release, dispersion, and probabilistic risk models and a set of standardized scenarios of release rates, atmospheric conditions, and sour gas exposure effects should be made readily available by the EUB so that everyone has access to this information. These same models and methods should be suitable for assessing exposure close to the source, and evaluating policies for setbacks, emergency planning zones, and mitigation strategies, such as ignition and sheltering indoors. Where a non-standard approach to hazard or probabilistic risk modelling is brought forward by the industry or the public, the EUB should be responsible for bringing all parties together early in the process to discuss and resolve differences.

18. *The EUB require that users of sour gas hazard and probabilistic risk assessment techniques clearly state their methods and assumptions.* The sour gas hazard or probabilistic risk assessments should state the methods and assumptions in sufficient detail that a third party could duplicate the numerical results.
19. *The EUB be responsible for reviewing and updating its standard models and methods regularly.* As new techniques become available and are demonstrated to be superior, they should be adopted by the EUB. This responsibility would require the EUB to maintain the in-house expertise required to evaluate and adapt existing atmospheric dispersion and toxic risk models used by other agencies such as Alberta Environment, and other national and international agencies and researchers.

4.5 ROLE OF THE ALBERTA ENERGY AND UTILITIES BOARD

Major Driver Issue: The adequacy of the EUB approval and regulatory systems for sour gas as they relate to public health and safety.

The Committee, in dealing with this major issue of the role of the EUB, believes it should address the following sub-issues, each of which relates to a major function or aspect of the EUB's role:

- Regulations
- Enforcement
- Applications and Decisions
- Industry Procedures and Personnel
- Setbacks
- Emergency Response

Current Situation

The role of the EUB as it relates to public health and safety is based on the contents of many comprehensive acts, regulations, interim directives, informational letters and general bulletins, most which are listed in Appendix E, Section 4 of the *Directions* document. The regulations cover all aspects of industry activity, including exploration, construction, operations, and decommissioning of facilities.

The EUB enforces its requirements through surveillance of industry activity and application of enforcement actions for regulatory noncompliance. Initial enforcement is determined by the severity of the noncompliance matter and is escalated for repeated noncompliance or failure to respond. Enforcement involves sanctions up to and including immediate suspension of operations for major and serious non-compliance events.

EUB field inspections are prioritized based on weighting of three key criteria: operator history, site sensitivity, and inherent risk of the facility or operation. A review of the regulatory compliance history of the operator allows EUB inspectors to focus on those operators with an unacceptable level of unsatisfactory inspections, including repeat noncompliance. Sensitivity of the area where the operation is taking place is also reviewed and includes items such as proximity to the public, to water bodies, and to areas where there has previously been significant public concern regarding oil and gas operations. The inherent risk of a facility or operation is determined by reviewing specific technical details about the facility, such as well depth, complexity of the operation, and whether the facility is sweet or sour.

Applications are required for all new facilities and major modifications to existing ones, including those for handling sour gas. The EUB processes some 20,000 to 25,000 applications annually for the development of gas plants, batteries, pipelines, and wells. Approximately 2,500 to 3,000 of these are for facilities that produce, process, or carry sour natural gas.

The intent of the application process is to review the need, safety, and technical competency of the development and to ensure that all affected parties have an opportunity to learn about the project prior to approval. Should a member of the public or industry have a concern about the development, the applicant and the affected parties, sometimes with the involvement of the EUB, will work to identify and address those concerns. If the concerns cannot be resolved between the parties, the EUB will adjudicate and decide the disposition of the application at a public hearing.

The application-handling process provides for routine and nonroutine applications. If an applicant indicates that all application requirements are met and that no third-party objections exist, the application is treated as routine and approved. A selected number of applications are audited after approval has been issued. If the applicant's designation of the application as routine was based on false or misleading information, the approval may be suspended. All other nonroutine applications are subject to detailed review. A recent change to EUB policy means that that all critical sour well applications are now considered as nonroutine and reviewed in detail.

The EUB interacts with all stakeholders, including the public and industry. Much of this is through its eight field centres throughout the province and through written material respecting

the EUB, its role, and the many requirements it enforces. EUB staff investigate complaints and concerns and interact with stakeholders on these issues.

EUB regulations also apply to operators with developments on First Nations lands and Metis settlements and the EUB interacts with Aboriginal people in connection with applications, complaints, and concerns.

4.5.1 Regulations

Findings of the Committee

The EUB has a host of regulations related to essentially all aspects of the oil and gas industry, including sour gas. Some of the outreach participants, particularly from industry, suggested that the regulations respecting sour gas were in so many different sections within the regulations and that there were so many other directives or portions thereof pertaining to sour gas that it was difficult to know what the rules are. The Committee believes there should be an effort to correct this problem.

Most of the regulations-related comments received in the outreach process referred to enforcement rather than the content of the regulations. There were, however, several areas where concerns were raised that the regulations were not adequate. These included the integrity of old sour pipelines, third-party damage to pipelines, old standing sour wells, and conversion of facilities from sweet to sour operations.

The Committee is aware that the EUB does have regulations and policies related to each of these matters. These include requirements for pressure testing and corrosion inspections prior to relicensing a sweet gas pipeline to sour gas service, as well as corrosion prevention and monitoring programs for all sour gas pipelines. The Committee is also aware that the frequency of leaks from pipelines does not necessarily relate to the age of the pipelines. Notwithstanding, it does believe that special caution is needed when sour gas is involved in close enough proximity to the public to be a potential threat to health and safety.

Recommendations

20. *The EUB consolidate, to the degree possible, all of its regulatory requirements related to sour gas, and develop a single, concise document that summarizes all of its sour gas-related requirements and widely distribute the summary document.*
21. *The EUB review its requirements respecting older sour gas pipelines and the performance history of such pipelines to ensure that adequate attention is being focused on the possibility of corrosion-related or other types of leaks.*
22. *The EUB implement stronger measures to safeguard against third-party damage to sour gas pipelines.*
23. *The EUB review its requirements for approving the reclassification of sweet gas facilities to sour service and for the reactivation of older sour wells that have not been produced for ten or more years. In particular, attention should be focused on a review of production*

equipment and metallurgy, including tubulars and wellhead facilities, to ensure suitability for sour gas service.

24. *The EUB publicize the requirements to get an existing pipeline or well reclassified to sour service, in order to dispel the appearance that it is easy to do so.*

4.5.2 Enforcement

Findings of the Committee

As indicated in the *Directions* document, many outreach participants expressed the opinion that the current approach to enforcement is not working because it is not sufficiently validated through a process of EUB compliance audits. There are also concerns that the EUB is slow to respond to complaints and that there is too great a reliance on complaints as the basis for enforcement.

The direction set out by the Committee in its *Directions* document was towards greater involvement of EUB field staff in sour gas matters, particularly respecting inspections and enforcement of regulations. There was considerable support expressed for this during the second outreach process.

The Committee found that the EUB has an extensive enforcement system and publishes an annual report of the results, *EUB Field Surveillance Provincial Summaries*, but that this is not well communicated to the public. There has been a significant increase in field inspections from 1997 to 2000, nearly doubling from 3,839 to 7,340. The Committee generally supports the concept on which the current system is based, whereby the enforcement focus is on situations where problems can be most expected or where the consequences of problems would be most severe. The Committee is concerned; however, that the potential impacts of sour gas on public health and safety may not be given sufficient weight in the approach currently used by the EUB. Similarly, it is not certain that sufficient priority is given to complaints related to sour gas where public health and safety may be at risk. In addition, the Advisory Committee noted the importance of having well trained, experienced and qualified EUB inspectors as well as the importance of having clear inspection standards.

The Committee also supports the concept of an enforcement ladder as currently used by the EUB, with more severe penalties for repeat or more serious infractions. Again there is some question whether the importance of sour gas and public health and safety are sufficiently recognized in the enforcement ladder. There is also concern that the enforcement database be combined for the entire province, rather than be on the basis of the individual EUB field centres. The Committee notes that, in addition to the EUB enforcement process, Alberta Environment has an enforcement process for spills and leaks (including those with H₂S), which can result in fines.

The Committee is aware that the EUB field staff have been less involved in recent years than in past in the resolution of disputes between landowners and industry respecting sour gas operations. The Committee is concerned that the public sometimes sees this as the EUB being unconcerned about sour gas and public health and safety and believes that changes should be made.

Overall, the Committee believes that the EUB does a reasonable job in enforcing its regulations. However, it also believes that the EUB must find ways of putting even greater emphasis than is now the case on enforcing regulation of those matters where the consequences can be greatest. Public health and safety related to sour gas is one such matter. The EUB must also more clearly communicate its enforcement actions. Also, it must strive to move further towards a system that not only penalizes operators whose practices respecting sour gas are less than adequate but that provides recognition to those operators that take their sour gas responsibilities seriously and whose practices are exemplary.

The Committee recognizes that the implementation of its recommendations respecting regulations and enforcement could require greater numbers of staff in EUB field offices. It understands that the EUB is currently adding 12 positions in the 2000 – 2001 fiscal year and has plans for further additions. These additions may not be sufficient. The Committee is also of the view that to implement the spirit of its recommendations and to improve the image of the EUB as it relates to public health and safety, the required EUB staff must be experienced, well trained, and sensitive to the concerns of Albertan's respecting sour gas. Also, the Committee believes the EUB should consider locating some of its field staff closer to active sour gas operations, perhaps through the use of satellite offices.

Recommendations

25. *The EUB increase the frequency of inspections and audits and continue to conduct both arranged and unannounced inspections of sour gas operations and develop simple, practical ways of informing nearby residents of inspection and audit results.*
26. *The EUB increase inspections and audits for operators without a proven track record in sour gas operations and for those with a history of noncompliance.*
27. *The EUB inspect critical sour wells located near people at least once during or immediately prior to drilling of the critical zone and inform nearby people of the inspection results. The inspections should include considerable focus on ensuring that the crew is adequately trained and certified.*
28. *The EUB give highest priority to sour gas complaints, investigating them within one day, whenever possible, and always following up with the complainant.*
29. *The EUB field staff become more involved in landowner-operator discussions of sour gas concerns and in multistakeholders groups and assist in answering questions and resolving issues, particularly as they relate to public health and safety.*
30. *The EUB, when dealing with sour gas operations, consider alterations to the enforcement ladder to involve fewer, faster steps and more severe sanctions where there is a potential threat to public health and safety.*
31. *The EUB increase the extent to which it makes available the names of companies and the enforcement actions taken where there are major and serious infractions, as defined by the enforcement ladder, of sour gas regulations related to public health and safety. The EUB should continue recognizing those companies with outstanding records by*

appropriately reducing surveillance. It should also consider, along with industry and government, different ways in which recognition or further incentive could be provided to those whose records are exemplary and who continuously exceed expectations.

4.5.3 Applications and Decisions

Findings of the Committee

Many concerns were raised during the first outreach sessions respecting the application and decision processes of the EUB. The Advisory Committee, as a result, indicated a direction towards an increased focus on the contents and review of sour gas applications, a less formal hearing process, and more emphasis on public issues. The suggested directions were generally supported in the second outreach process.

A commonly expressed concern respecting applications was that each well, and even its flow line, is usually dealt with as a separate application and that the decision-makers do not consider the facilities that will follow. The Committee accepts that there are many constraints, such as legal requirements, lack of geological knowledge, and different owners of minerals, that push in the direction of single facility applications. It believes, however, that some changes can be made.

The Committee also believes that there can be changes to make hearings less frequent, less intimidating and more efficient when they are held, and better understood. Additionally, it is of the view that decision reports can be improved, particularly as they relate to the issues of greatest importance to the public, such as health and safety. With respect to such issues, the Committee sees a need for the EUB to ensure it has appropriate expertise available to it during the decision-making process.

Many concerns were raised that suggest that some of the public view the EUB as being biased in favour of industry and industrial development. One reason for this relates to the funding of the EUB, which is largely by industry. Another relates to its being a government agency and the view that the government promotes industrial development. The Committee believes that increased effort is needed by the EUB to address this question of the perception of neutrality.

Another area of concern that the Committee believes needs attention is the involvement of other government departments and agencies in the EUB application process and hearings. The Committee has addressed the broad matter of the relationship of the EUB with these parties in Section 4.2.1 of this report. That section states the Committee's view that these other government organizations, such as regional health authorities, should be more involved in the development of health-related policies and standards to be used by the EUB. This should minimize the need for their involvement in specific applications, but the Committee does believe that the process for their involvement, where appropriate, needs to be improved.

There were also concerns raised regarding commitments respecting sour gas and public health and safety made by applicants during negotiations and hearings that are not subsequently fulfilled. The Committee believes the EUB should be more involved in ensuring that such commitments are met.

Recommendations

Regarding the Content of Applications and Their Processing

32. *The EUB support area planning among operators and require well applications to include at least general information regarding existing and possible future area plans where sour gas is involved near people.*
33. *For sour gas near people, the EUB require project plans as part of well applications where a well is part of a larger project of the applicant and encourage applications for more than one well and facility at one time where feasible.*
34. *The EUB increase and improve coordination between itself and Alberta Environment, other involved government departments, and municipality and regional health officials. It should develop a system that provides for their involvement in relevant EUB policy making and, where applicable, for their early, efficient, and effective involvement in the review of applications dealing with sour gas and public health and safety. This matter is also dealt with in recommendations 1 and 2.*
35. *The EUB carry out a more detailed staff review of critical sour well applications immediately upon their filing and before licensing of the well. In other words, there would be no "routine" designation for critical sour well applications. This recommendation has been adopted through a recent change to EUB policy.*
36. *The EUB require information in applications for critical sour wells that demonstrates how the applicant will ensure that involved employees will be trained and certified in accordance with the standards.*

Regarding Hearings

37. *The EUB encourage mediation efforts and increase EUB staff involvement in an attempt to resolve concerns among stakeholders outside of the formal hearing process. This may require additional trained EUB staff. The Committee is aware of the recent announcement that the EUB has approved the *Report for Implementation of Appropriate Dispute Resolution (ADR)* and suggests that the EUB monitor the use and effectiveness of this approach to determine if further initiatives are required.*
38. *The EUB ensure adequate preparation time for hearings regarding sour gas facilities where there are public health and safety concerns.*
39. *The EUB increase efforts to make hearings less formal and more user friendly. One example of how this might be done is to hold more prehearing conferences, where there is a potential to better scope the hearing, explain the hearing process to public participants, and resolve differences of views before the hearing regarding eligibility for intervenor costs.*
40. *The EUB rewrite its brochure, Guide 29, on the hearing process to make it more understandable and then make it more widely available to the public.*

Regarding Decisions and Decision Reports

41. *The EUB increase recognition of public input in decision reports and provide more descriptive material regarding the criteria used in evaluating the public interest and the manner in which surface, subsurface, individual, and other interests (including health impacts, safety, nuisance effects, and the environment) are balanced in evaluating the public interest. The EUB should consider providing improved access to decision reports, for example through a key-word index.*
42. *The EUB recognize the past performance of the applicant as an operator of sour gas facilities elsewhere in the province when making decisions respecting proposed sour gas facilities.*
43. *The EUB ensure that appropriate expertise in special subject areas, such as health and probabilistic risk assessment, is available in the form of staff, consultants, EUB Board Members, and Acting Board Members to participate in decisions and to ensure that these subject areas are appropriately dealt with in decision reports. Given the increasing importance of health issues relative to sour gas applications, consideration should be given to appointing a medical doctor with toxicological and health impact experience as a full- or part-time EUB Board Member.*
44. *The EUB record public health and safety-related commitments and undertakings given by applicants and better ensure that these are fulfilled.*

Regarding the Perception of Neutrality

45. *The EUB place greater emphasis on the need for its involved staff to be neutral when dealing with the public and industry respecting inspection results, complaints, and the resolution of concerns. This may require special training.*
46. *The EUB place greater emphasis on its role as a regulator to protect the public and provide a higher profile for its involvement in matters related to public health and safety. One option for achieving a higher profile which might be considered, could be the creation of a public health and safety department within the EUB.*
47. *The public be made aware of the clear distinction between Alberta Resource Development's role of promoting the development of Alberta's resources and the role of the EUB as a regulator that ensures that if developments are approved they take place in a manner that is in the public interest.*
48. *The manner of funding the EUB be reviewed, including a consideration of the possibility of returning the funding back to an equal sharing by the industry and government to reflect the dual role of regulating the industry and serving the public interest. In this respect, a more conscious effort by the EUB is required to make the public aware that the contribution of the industry to the funding of the EUB is not voluntary but is a tax-like levy on production and facilities that, like any other tax, must be paid. It should also be*

made clear that the funding through an industry levy does not include control over EUB operational matters.

4.5.4 Industry Procedures and Personnel

Current Situation

Industry generally has a good record of maintaining pace with technological developments and improvements as they relate to sour gas. CAPP and other industry associations take lead roles in developing recommended practices and guidelines for the upstream petroleum industry. These same associations also participate in many EUB stakeholder processes where new policy and requirements are proposed, developed, and implemented. This process was used to develop the *Alberta Recommended Practice (ARP) 1 for Drilling Critical Sour Wells*. It is noteworthy that these Alberta recommended practices are widely used internationally as standards for sour gas operations.

Industry, along with the Petroleum Industry Training Service (PITS), runs many safety-related courses. One key course is “H₂S Alive”, which is an industry standard for petroleum industry workers who could be exposed to H₂S. PITS also offers training and certification in a number of drilling and well service programs, some of which are required by the EUB regulations.

For critical sour wells, specific experience requirements for supervisors, rig crew, service personnel, and safety specialists are outlined in EUB *ID 97-6: Sour Well Licensing and Drilling Requirements*. These requirements are currently being enhanced in revisions to ARP1.

A limited number of oil industry companies participate in the Alberta Government’s Partnerships in Health and Safety Program. In this program, Alberta Human Resources and Employment enters into partnership with associations, corporations, and organizations that wish to take an active role in workplace health and safety.

Findings of the Committee

Many outreach participants raised concerns respecting the sour gas and public health and safety-related procedures and equipment used by industry and the personnel responsible for those procedures and equipment. Some emphasized that industry should use the best available technology, procedures, and equipment, regardless of cost.

The main areas of concern related to the training and reliability of workers and to the attitudes and philosophies of some companies’ management regarding public health and safety, as well as strict adherence to EUB policies, guidelines, and regulations.

Recommendations

49. *The EUB review its requirements respecting sour gas drilling and completion, sour gas operations, and other industry practices and equipment to ensure they maintain pace with improvements in technology.*
50. *The EUB, in conjunction with industry and appropriate educational institutions, confirm or establish the necessary requirements to ensure adequate training and knowledge of sour gas workers.*
51. *The EUB, along with industry and government, investigate methods that will result in greater encouragement for all industry management to take sour gas issues and concerns more seriously and to impart this position and attitude to all company and contract personnel involved with sour gas operations.*

4.5.5 Setbacks

Current Situation

A setback is the minimum distance that must be maintained between an energy facility, such as a well, pipeline, or gas plant, and a dwelling, public facility, rural housing development, or urban centre. One important reason for the establishment of setbacks is to create a buffer zone between the energy facility and the surface development. The setbacks that the EUB uses for sour gas facilities are categorized into four levels. Minimum setback distances are reflected in a chart (see EUB *ID 81-3* and *ID 97-6*) which considers both the category of sour gas facility and the type of existing or proposed surface development in proximity to the proposed facility.

These setbacks are applied to proposed oil and gas developments as the minimum distance they must be located from existing surface developments. They are also applied to proposed surface developments as the minimum distance from existing oil and gas facilities through the Municipal Government Act.

In addition to the setbacks imposed on oil and gas facilities by the EUB and on surface developers through the planning legislation, some municipalities establish “nuisance” setbacks that are larger than those of the EUB and are related to matters like dust, noise, and visual effects. The intent of these municipality-imposed setbacks is to restrict land development near sour gas facilities. Municipalities do not, however, have the ability to reduce the minimum setback distances prescribed by the EUB.

Findings of the Committee

Some of the public participants questioned the reasonableness of the setbacks currently used by the EUB and suggested that the criteria to establish setbacks are not well understood. Although a number of those who attended public outreach sessions indicated that the setbacks for sour gas facilities are too small, many of those who responded to the telephone survey who have land affected by a sour gas setback stated that the distances are reasonable.

Some public participants commented about the effect of setbacks from sour gas facilities preventing certain types of surface developments. They questioned the fairness of these restrictions and whether some form of notification and/or compensation to landowners should be available.

The Advisory Committee indicated that it was moving in the direction of recommending that the EUB re-examine setback distances and there was considerable support for this direction in the second outreach program.

The Committee has in Section 4.4, Technical Information, recommended that the EUB develop a framework and methodology for dispersion modelling and probabilistic risk assessment. The Committee believes that this framework and methodology should form the basis for a detailed re-examination of the current sour gas setbacks, to be done through a multistakeholder process.

The effect that setbacks can have on the ability to proceed with certain surface developments is a very complex issue. The Committee believes that a possible solution requires further study and evaluation, which should be done in conjunction with the review of the adequacy of setbacks in protecting public safety.

Recommendations

52. *Once the framework and methodology for dispersion modelling and probabilistic risk assessment methodology have been developed (recommendation 17), the EUB use them as the basis for a review of the current criteria for sour gas setbacks.*
- The review should be carried out by a stakeholder group including representatives of the relevant regulatory agencies, government departments, First Nations, Metis, municipalities, regional health authorities, the public, the land development industry, and the oil and gas industry.
 - There should be some overlap in membership with the group studying dispersion modelling and probabilistic risk assessment.
 - The review should address, among other questions, whether the current approach to setbacks is appropriate, the number of levels of categories is acceptable, and whether the actual setback distances are appropriate. It should also assess whether a common set of setback distances can be agreed upon by different jurisdictions.
 - If changes to setbacks are to occur, the stakeholder group should address the appropriate manner for handling those situations where current facilities are based on existing approvals.
53. *The EUB should initiate a review of the implications of setbacks on the ability to develop property.* The review should be carried out by the same stakeholder group noted in recommendation 52 above to review the criteria of setbacks.

4.5.6 Emergency Response

Current Situation

Operators of all sour wells, pipelines, and facilities under EUB jurisdiction are required to have an approved site-specific emergency response plan (ERP) in place prior to conducting any operation. These requirements are detailed in Sections 7.060 (9) and 9.060 of the Oil and Gas Conservation Regulation, Section 65 of the Pipeline Regulation, and in many EUB interim directives, informational letters, and industry guides. Requirements for determining emergency planning zones (EPZ) are also within these requirements. Each plan must be developed to address the specific needs of the community that could be adversely impacted in the event of a sour gas release. The plans must be updated and tested at least annually to ensure that they can be effectively implemented. The degree of detail required in an ERP depends on the hazards of the facility and the complexity of emergency response measures that may be necessary to protect the public.

In addition, all municipalities within Alberta are required, by the Disaster Services Act, to have public safety emergency response plans in place. The purpose of these ERP's is to provide a prompt and coordinated response to any emergency that takes place within a municipality's jurisdiction. The designated Director of Disaster Services for each municipality leads all emergency planning efforts and response coordination. Mutual aid agreements are also typically developed with neighboring municipalities.

Significant coordination and collaboration between industry and government is needed when an emergency occurs. The *Government of Alberta Emergency Response Support Plan for an Upstream Petroleum Incident* provides a framework for the coordination of the resources of Alberta government departments and agencies in support of the industrial operator and the local municipal authority in an upstream petroleum incident.

The EUB uses a standardized approach for initial determination of the size of the EPZ. A set of formulas and curves (EPZ curves) was developed based on dispersion modelling and field-testing. An operator is expected to use this standardized approach to determine an initial EPZ and then to modify the zone based on site-specific conditions, such as population density, terrain, and manageability. If an operator wishes to reduce the calculated zone, an application must be made to the EUB including justification for the use of the reduced zone and details of additional mitigative measures, such as immediate ignition, which will be taken to ensure public health and safety.

The ERP must include specific information regarding public protective measures that will be taken both within and beyond the EPZ, including evacuation, sheltering, and ignition criteria. The operator must describe actions that will be taken within the EPZ to ensure public health and safety for each of three predefined levels of emergency. Whenever possible, actions to protect the public must begin before there is any possibility of exposure of the public to H₂S.

Evacuation of the public is the preferred public protection measure that the operator is expected to take if there is a release when safe to do so, before a toxic release occurs, or if there is a potential for the release to continue for a long period. Evacuation of the EPZ is expected to take

place based on the actions for levels defined in the operator's ERP. The EUB requires urgent mandatory evacuation of the public if measured H₂S levels reach 20 parts per million (ppm) (3-minute average) even if this occurs outside the EPZ. The public must be notified and voluntary evacuation considered if H₂S levels reach 10 ppm (1-hour average). Notification of sensitive individuals must begin once H₂S levels reach 1 ppm (1-hour average), and voluntary evacuation may follow. In addition, notification and evacuation may be recommended at lower levels in certain situations. For example, 50 parts per billion (1 hour average) was used in suggesting voluntary evacuation and in making re-ignition decisions during a well blowout near Enchant, Alberta earlier this year.

Criteria for sheltering in the event of a sour gas release must be included in the ERP if it is to be used. Seeking shelter indoors is an acceptable alternative public protection measure to evacuation in situations where there is no advance notice of a toxic gas plume or where a release is expected to be of short duration and limited volume. This is usually the case for sour gas pipeline releases.

The operator must include specific criteria for ignition of a sour gas release in the ERP. Ignition of a source will convert the H₂S to SO₂. SO₂ is also a toxic gas, but it is dispersed higher into the atmosphere by the heat of combustion. Resulting ground-level concentrations of SO₂ are lower than those of H₂S but could cover a wider area.

The EUB requires that uncontrolled or partially controlled releases of H₂S be ignited immediately once personnel working at the site have been cleared to a safe area if any of the following occurs:

- monitoring results indicate H₂S concentrations in excess of 20 ppm (3-minute average) in unevacuated areas, or
- H₂S concentrations exceed 1 ppm (1-hour average) in urban centres or other areas where evacuation is not feasible, or
- monitoring is not taking place due to weather or other unforeseen circumstances, or
- the release cannot be brought under control in the short term, or
- evacuation of the EPZ has not been accomplished, or
- events at the source are escalating.

The EUB requires that SO₂ evacuation criteria also be included in the ERP to cover the event where a release is ignited. Currently, the SO₂ standards used by the EUB and some regional health authorities are different. The EUB minimum evacuation criteria include: mandatory evacuation if monitored SO₂ levels reach 5 ppm (15-minute average), 1 ppm (3-hour average), or 0.3 ppm (24-hour average).

The Committee is aware that two health units are using much lower SO₂ levels, based on World Health Organization guidelines, as triggers for possible actions based on potential public health issues associated with SO₂.

The EUB requires that the operator coordinate its site-specific ERP with the local municipal ERP and meet with those officials who have a responsibility for emergency response planning and/or protection of the public.

Findings of the Committee

A large percentage of participants in the outreach program raised concerns about the current ERP requirements, the approach used to determine the size of an EPZ, and emergency preparedness. These included members of the public as well as health providers, municipal representatives, and members of the oil and gas industry.

Some participants suggested that even with the current EPZ and ERP systems, improved EUB monitoring and regulatory enforcement are required to ensure public safety and health protection. Others raised concerns about the apparently arbitrary size determination of EPZs, the public's confusion or lack of understanding of calculated EPZs, the use of reduced EPZs, and whether the associated ERPs adequately cover the potential hazard area.

Some participants of the outreach process questioned the scope, effectiveness, and quality of ERPs and had associated concerns with resident information packages. Others suggested the plans should be more site-specific and some expressed doubt about the ability of some companies to effectively implement their ERPs. Other issues raised included the availability of resources, appropriate training or certification of personnel, requirements for testing and exercising of the plans, and a proper degree of coordination.

The Advisory Committee indicated in the *Directions* document a move towards strengthening EUB regulations and its role in emergency response planning to provide clearer, more prescriptive requirements. There was general agreement with this direction and considerable comment reinforcing that the EUB needed to play a more important role.

The Advisory Committee reviewed the current EUB requirements for the development, implementation, and testing of ERPs and also viewed some examples of operators' ERPs. The Committee concluded that although ERPs are generally comprehensive and well documented, improvements are needed in areas of preplanning, coordination, communication, and plan implementation.

The Committee sees the need to clarify the standards used for SO₂. Additionally, it found that little ERP planning is undertaken by the operator or required by the EUB to mitigate the effects of SO₂ release over an extended period following ignition of an uncontrolled sour gas release. Also, the term "immediate ignition" requires further definition. The Committee also noted that sheltering as a public protective measure is not well defined within the requirements and is not well understood by the public.

The Committee is aware that the EUB and industry are currently in the process of developing two new documents. The first is an EUB guide compiling all existing ERP requirements, including several enhancements, and the second is an industry companion document intended to assist industry to meet the regulatory requirements. These documents may to some extent address some of the recommendations of the Committee. The Committee believes that the completion of the documents should be delayed until the Committee's recommendations can be considered and reflected in them.

Recommendations

54. *The EUB continue its current approach of reviewing all site-specific ERPs in detail, including the criteria used to determine the size of the EPZ, and all site-specific information included in an ERP.*
55. *The EUB assess the capability of an operator to effectively implement an ERP at the time of application, and develop specific requirements to cover ERP validation through mandatory testing and exercises. This assessment should relate to financial capability as well as the operator's access to resources required to manage an emergency situation. The EUB should take into consideration the operator's compliance record and ability and willingness to effectively coordinate, communicate, and consult with EPZ residents and emergency service providers. Additionally, operators should be required to involve other responders, such as municipal authorities and regional health authorities, in exercises at least annually.*
56. *The EUB audit existing ERPs on a more frequent basis to ensure that*
 - *the operator has the capability to implement its ERP,*
 - *plans are updated according to requirements regarding frequency of updates,*
 - *updating takes place immediately upon change of operatorship and prior to a new operator physically operating the facility, and*
 - *adequate communication of updates with EPZ residents and emergency responders takes place.*
57. *The EUB require the operator to coordinate roles and responsibilities to be followed in the event of an emergency with other emergency responders through early and effective discussions with the municipal Director of Disaster Services and regional health authority's Medical Officer of Health during plan development.*
58. *The EUB review the approach it uses for determining EPZs on the basis of the health effects information (recommendation 9) and the review of dispersion modelling and probabilistic risk assessment methodology (recommendation 17). The review of EPZs should be through a stakeholder process that includes involved government departments, municipalities, regional health authorities, the public, Aboriginal representatives, the land development industry, and the oil and gas industry. There should be some overlap in the membership of this review group and the one reviewing dispersion modelling and probabilistic risk assessment.*
59. *The EUB work with Alberta Health and Wellness, regional health authorities, and other stakeholders to develop clear requirements and evacuation criteria to address the hazard of SO₂ as a result of ignition.*

60. *The EUB require industry to use the EUB's current standard approach (EPZ curves) to determine EPZs until the review of EPZs proposed in recommendation 58 is completed.*
61. *In the interim until the review of the approach to EPZs is completed the EUB not approve a reduced EPZ unless it is conditional on the immediate ignition of the well, and the EUB is satisfied that the well can be immediately ignited and kept continuously burning. The EUB must also be satisfied that the ERP adequately addresses the potential hazards to the public within the reduced zone and also within an awareness zone out to the distance of the calculated EPZ based on the current EUB approach (EPZ curves), and that a specific assessment demonstrates protection of human health.*
62. *The EUB require the operator to identify in the ERPs filed with the EUB and emergency response agencies, using dispersion modelling, the distance to where the mandatory evacuation levels for H₂S (20 ppm, 3-minute average) and SO₂ (5 ppm, 15-minute average) could be experienced.*
63. *The EUB encourage operators to establish mutual aid agreements in areas with intensive industry development and multiple operators. This should include encouragement for operators to coordinate mutual aid with other industries (such as the forestry sector and petrochemical industries) in emergency response planning.*
64. *The EUB continue its initiative to work with stakeholders to develop clear, complete, and concise guidelines and requirements for ERP development and implementation. In doing so, the following should be considered:*
- standardizing the contents and format of ERPs as much as possible, including consideration of mandatory components and terminology;
 - standardizing the requirements for a specific assessment of health impacts for emergency response planning;
 - including site-specific conditions of wind, topography, population distribution, access and evacuation routes, livestock management, and other community issues;
 - developing accurate resident information, including determination on a self-declaring basis of special needs persons requiring evacuation assistance or those hypersensitive to sour gases; and specifying more detailed requirements for resident information packages and the timing of their availability;
 - referring critical sour gas well ERPs by the EUB to relevant municipal responders and regional health authorities, at the application stage, for comment regarding response capability;
 - filing approved critical sour ERPs with the EUB, municipal emergency response agencies, and other emergency responders, including mutual aid groups where they exist;

- establishing criteria for introducing a planning zone that is reduced from that determined by the EUB's standard approach, clarifying the meaning of "immediate ignition", identifying additional public protective measures to be required to ensure public health and safety, and describing roles and responsibilities of responders within the reduced EPZ, the Awareness Zone, and potentially affected areas beyond;
- annually reviewing and updating ERPs, including individual resident details and other users of land;
- establishing clear evacuation, ignition, and sheltering criteria, including criteria for when each of these measures would be considered acceptable;
- defining requirements for "post-event" debriefings and follow-up activities; and
- specifying how isolated communities and individuals (such as trappers, First Nations hunters, farmers, and transients) are planned for, including those where there is a lack of cellular coverage, which may cause communication delays.

4.6 MONITORING

Major Driver Issue: **The adequacy and coordination of public health and safety related monitoring programs for sour gas and associated pollutants, and the reporting of monitoring results.**

Current Situation

The EUB has one mobile air quality-monitoring unit, which is equipped to monitor H₂S and SO₂. The EUB uses its monitor unit for complaint response and routine compliance surveillance monitoring. The unit can also be used for emergency response monitoring but is normally on standby in the event that other responders need additional support. The EUB inspection staff is on call 24 hours per day and the monitoring unit can be deployed anywhere in the province on short notice. The EUB in many cases requires industry to hire a third party to do monitoring if complaints are received at their facilities. The results of the monitoring are then provided to the EUB for assessment. If required, appropriate enforcement or corrective actions are then implemented.

Alberta Environment has limited emergency or complaint H₂S monitoring capability, which also varies significantly from region to region. Where complaints or air quality issues are reoccurring, Alberta Environment uses its Mobile Air Monitoring Laboratory (MAML) to conduct short-term monitoring surveys in a particular area. The MAML can monitor hydrogen sulphide (H₂S), sulphur dioxide (SO₂), total reduced sulphur (TRS), total hydrocarbon (THC), reduced hydrocarbon (RHC), methane (CH₄), polycyclic aromatic hydrocarbons (PAHs), ozone (O₃), oxides of nitrogen (NO_x), carbon monoxide (CO), ammonia (NH₃) and particulate matter (PM). The EUB views Alberta Environment as the principal government responder for monitoring during emergencies. However, in general, Alberta Environment expects the EUB to take the lead in addressing sour-gas related emergency and complaint issues unless the emergency or complaint relates to a facility also regulated by Alberta Environment.

Alberta Environment also has a provincial monitoring network and monitors H₂S on a continuous basis in east Edmonton, east Calgary, Fort Saskatchewan and Red Deer. Alberta Environment maintains a wet deposition monitoring network across the province and also a number of soil plots at which soil pH and buffering capacity are measured to assess long-term impacts of acidifying emissions (i.e., SO₂ and NO_x), some of which come from oil and gas industry activities.

The Clean Air Strategic Alliance (CASA) is involved in promoting the development of regional (airshed) monitoring zones that address air quality issues that are of importance and relevance to that region. CASA is a provincial multi-stakeholder group (non-government organizations, government and industry) that examines air issues and develops recommended actions to address these issues. Under the auspices of CASA, three regional airshed-monitoring associations have been established and two additional ones are in the planning stage.

Industry in general does not have its own monitoring capabilities required to respond to emergency situations or complaints. It contracts these types of monitoring services from private companies. Operators are required to monitor and report an uncontrolled release of H₂S or SO₂ from their facilities. As well, they are required to do ambient monitoring for H₂S and SO₂ in the vicinity of their operations at sulphur recovery and flaring sour gas plants. The extent of this monitoring depends on the approved mass emission of SO₂ and the expected concentrations of H₂S and SO₂. Locations for monitors are based on the highest predicted ambient concentrations using air dispersion models. Industry in Alberta operates about 60 continuous ambient H₂S and SO₂ monitors. Industry also operates over 750 static H₂S and over 750 total sulphation monitors. The static monitors only provide information on average accumulated concentrations of H₂S and total sulphur compounds over a period of time. Industry is required to regularly submit data on ambient monitoring to the EUB and Alberta Environment.

Findings of the Committee

Outreach participants expressed concerns about the adequacy of emergency and complaint response monitoring and particularly the reporting of monitoring results. The Advisory Committee believes there should be sufficient monitoring capability, either in-house or in conjunction with other responders (e.g., industry, Health, Environment) to effectively address the main air quality and public health issues that may arise during a significant sour gas release. This response capability should be available at strategic locations throughout the province and should be quickly deployable. In addition to H₂S and SO₂, the monitoring capability should also be able to measure certain classes of hydrocarbons that may be released during an emergency/episode event.

The Advisory Committee also believes that addressing human health effects or concerns related to emergency or episodic releases of sour gas is often limited by reliable exposure data. Exposure monitors could be used during certain such events and also used in certain situations where repeat exposures to sour gas levels that are above guideline values may be occurring. Specific plans and protocols would be required as to how and when these exposure monitors would be used and how the data collected would be reported and used. The Committee believes that this type of monitoring capability can help address health concerns and issues that arise during

emergency and episodic-related sour gas releases and also help expand knowledge on the health effects associated with various exposures to sour gas-related releases.

Releases and odours associated with sour gas development often result in complaints that are based on public health and safety concerns. The EUB's single mobile air quality monitor is not considered adequate to address the number of issues and concerns that exist. The Committee believes a substantial expansion of the EUB's complaint response monitoring capability would increase public confidence that public health and safety concerns can and are being addressed. This expanded monitoring capability could be integrated with the emergency or episodic monitoring capability and also be used to do surveillance monitoring. As well, it could be used to deal with complaints related to nuisance odours and/or long-term low-level exposure concerns.

Recommendations

65. *The EUB undertake a review of the current monitoring response capabilities for events involving significant sour gas releases and ensure that adequate capability exists. This review should include an assessment of the number, type, reliability, sensitivity, and location of the current monitoring response capability.*
66. *The EUB, in cooperation with other emergency or episodic responders, ensure that the monitoring roles and responsibilities are clearly defined and that monitoring efforts and capabilities are coordinated.*
67. *The EUB, with the assistance of industry and researchers, promote and support the development of exposure monitors that can be used to measure personal exposure of the public to sour gas-related substances in a practical manner. Guidelines would also be required as to the circumstances in which they should be used.*
68. *The EUB enhance its capability to conduct monitoring as part of its complaint response and compliance programs.*

4.7 COMMUNICATIONS

Major Driver Issue: Delivery of consistent and appropriate public consultation programs by the industry and the EUB accompanied by programs to increase public awareness and understanding of sour gas issues.

The Committee dealt with the many communications issues under the following sub-issues:

- Public consultation
- Public awareness and understanding
- Interaction of the EUB with stakeholders.

Current Situation

In October 2000, the EUB revised its applications *Guide 56* to include increased public consultation requirements for industry. Previously some companies were only notifying the public regarding sour gas development and were not engaging the public in a dialogue regarding

proposed projects or existing operations. The EUB now expects industry to consult with the public and provide enough information to allow the public to participate meaningfully in the decision-making process.

The revised guide indicates that the EUB considers the public consultation program to be an extremely important precursor to the company filing its development application. The EUB may suspend an approval that has been routinely granted if it later finds that responses to the public involvement questions on the application were false or inaccurate.

Additionally, the EUB expects public consultation to be a regular part of an operator's business throughout the life of a project to ensure an ongoing relationship between the industry and the public.

Industry is now required by the EUB in *Guide 56* to provide the public with the following information:

- a) **EUB Letter to the Public:** This letter explains to the public what they should expect from the company in its consultation efforts, invites the public to contact the EUB at any of its field centres or Calgary office, and provides a map of the EUB's field centres and telephone numbers.
- b) **EUB Guide 62: *Responding to Public Concerns about Oil and Gas in Alberta*:** This booklet outlines how the EUB responds to public complaints, expectations for public notification and consultation, and new options to resolve landowner-industry disputes and provides telephone numbers of EUB staff and the EUB Web site location.
- c) **EUB Guide 17-2: *Well Site Selection and the Surface Landowner*:** This booklet outlines the rights of the public, how well sites are selected, and what happens during negotiations and after drilling.
- d) **EUB Guide 17-3: *A pipeline or surface facility on my land?*** This booklet outlines the landowner's rights, the application process, and the processes for selecting a location for the pipeline or facility and for negotiations and a hearing. It also identifies other agencies that may be of help to the landowner, including the Surface Rights Board, the Farmers' Advocate, the Registrar of Land Agents, and Alberta Environment.

As well, the EUB has set out what information a company is to provide to affected landholders near a proposed sour gas development. It also encourages the industry to use the *Guide for Effective Public Involvement*, published by the Canadian Association of Petroleum Producers.

With the recent change announced in Guide 56, the EUB expects the industry to

- communicate with people as early as possible to ensure that special sensitivities are addressed during project planning;
- provide full disclosure and consistent, factual information about the project and its impacts;
- discuss the potential scope of the project and how it relates to other nearby development;

- for sour gas projects, communicate with residents within an emergency planning zone during early project preparation;
- inform people about land-use restrictions that may occur because of sour gas setback requirements; and
- provide information about the regulatory process and how people may participate.

These requirements apply to Aboriginal people as well as all other Albertans.

In terms of public awareness of sour gas-related issues, the EUB and industry presently hold open houses in active sour gas areas and participate in stakeholder committees. The industry has available a number of brochures dealing with sour gas and its potential effects on public health and safety. This information and the previously mentioned consultation activities are intended for all sour gas regions in the province, including First Nations lands and Metis settlements.

4.7.1 Public Consultation

Findings of the Committee

During the public outreach process, most participants expressed concerns about the lack of consistent interaction between the public and industry to keep the public informed about operations in their area and to help resolve concerns about sour gas development. Recent changes in EUB policy in this area, as discussed above, have addressed some of the directions of the Committee. The Committee sees these changes as positive steps towards improving relationships between the industry, the public, and the EUB, but believes more can be done.

Recommendations

The Committee has the following recommendations for further improvement:

69. *The EUB establish a staff resource team that focuses on public consultation to assist industry in providing a more consistent approach to public consultation, including consultation with Aboriginal people.*
70. *The team referred to in recommendation 69 work with CAPP, training institutions and other industry associations to develop public consultation training programs that reflect EUB requirements and expectations for public consultation and that incorporate training in the practices set out in the CAPP Guide for Effective Public Involvement.*
71. *Stringent action, such as denying the application, be taken by the EUB for failure of a company to conduct effective public consultation programs.*
72. *The EUB develop a list of suggested questions to assist the public during the public consultation process.*

4.7.2 Public Awareness and Understanding

Findings of the Committee

Most participants in the outreach process expressed concern about the lack of awareness and opportunity for education regarding sour gas issues. Concerns included difficulty in accessing information, the general lack of public awareness, the uneven playing field regarding public consultation, misinformation, the lack of informed public participation in decision-making, and the issue of getting consistent, credible information.

The Committee had earlier indicated a direction towards improved understanding and awareness of potential public health and safety and sour gas-related issues on the part of the public through fair and accurate information readily available and written in understandable terms. This direction was generally supported in the second outreach.

The Committee believes changes are needed to improve the availability of unbiased information respecting sour gas and public health and safety. This may require additional communications training for those providing the information to the public. Additionally, to make the flow of information to the public and the response to concerns more efficient, better coordination is needed among operators in a particular region.

The consultation process often involves information respecting the benefits of sour gas development. Concerns were raised that suggested that many of the benefits accrue to the province as a whole and that the local or regional share of those benefits do not justify the risks and other negative impacts. The Committee believes this should be addressed.

Recommendations

73. *Formation of an information office located within the EUB and supported by a stakeholder committee, to provide accurate, reputable, neutral information related to sour gas development and to be a key contact for referring the public to sources of additional relevant, reputable information.* The objective would be to work toward building trust and understanding among industry, the public, and the EUB and to liaise with stakeholder groups throughout the province. The existence of this information office and its role should be widely publicized and the office should be easily accessible to the public. Advertising could possibly take place through distribution of initial information packages provided to the public during public consultation and through EUB field centres and the EUB Web site.
74. *The EUB initiate, in conjunction with industry and training institutions, the development of effective communications training programs for those individuals responsible for communicating with the public respecting technical aspects of sour gas.* Examples of programs would include risk communication methodology and emergency response consultation.
75. *The EUB conduct information sessions, workshops, and panel discussions involving the public, industry, and other stakeholders specifically focusing on raising awareness and*

understanding of sour gas developments, rights of surface and subsurface owners, and how the EUB determines the public interest in making decisions on applications.

76. *The EUB prepare material providing clear, understandable information on technical matters such as ERPs, EPZs, setbacks, rights of surface and subsurface owners, risk communication, and hazard and risk assessment.*
77. *The EUB field centres identify key operator contacts, telephone numbers, and locations of facilities and provide this information to the public in order to enable them to more efficiently contact appropriate industry officials regarding a development in their area, if they require information or have concerns. This information would need to be updated regularly and the public advised of changes.*
78. *The EUB encourage the development of mutual aid agreements where there are multiple operators in an area. This is also addressed in recommendation 63. Consideration should be given to having one central contact for the public to contact respecting information requests, concerns, or complaints, rather than members of the public having to determine the operator responsible for the facility relating to the query.*
79. *The EUB initiate a study involving industry, government, the public, and municipal representatives to determine the nature of local benefits, such as reduced property taxes and local business opportunities, to communities impacted by sour gas development.*

4.7.3 Interaction of the EUB with Stakeholders

Findings of the Committee

The outreach processes revealed that the role of the EUB is unclear to some of the public and that some question its credibility as a neutral regulator. The Committee in its *Directions* document indicated that it was moving towards actions to increase public understanding of the role of the EUB and to improve client service. This was broadly supported in the second outreach process.

The Committee is of the view that the EUB needs to be more proactive about its role, particularly respecting sour gas and public health and safety. This might involve upgrading printed material to make it more readily understandable and improving the availability of such material, including by electronic means. It might also involve the need for more specialized training for certain staff or other organizational changes. In the judgement of the Committee, improved interaction over the long term can only come from developing and nurturing sound relationships between the EUB and its stakeholders.

The Committee believes it is important that those presenting information to stakeholders on behalf of the EUB and representing the organization also be those who are involved with the regulation of operations and with the public on a daily basis. This may require special training of field staff or others in such positions.

Recommendations

80. *The EUB put greater emphasis on developing relationships with all of its stakeholders.* This might involve the holding of more EUB open houses, making staff more readily available to participate in meetings of concerned citizens, and making presentations about its role to interested groups throughout Alberta. This is also addressed in recommendation 75.
81. *The EUB develop a brochure for the public that focuses on the role of the EUB and provides contact names and phone numbers to be given out when industry does public consultation.* It should also be widely distributed to all interested parties, such as municipalities, and posted on the EUB Web site. The brochure must be clear and succinct and be kept up to date. Consideration should be given to having a brief summary brochure for those with limited interest and a more detailed one for those with greater interest.

4.8 ABORIGINAL (FIRST NATIONS AND METIS) ISSUES

Major Driver Issue: **Lack of awareness and understanding among Aboriginal people regarding sour gas related issues and the role and relationship between the EUB and other relevant provincial and federal departments including Health Canada and Indian Oil and Gas Canada.**

Current Situation

The area of jurisdictional responsibility as it relates to First Nations is a complex issue. Nonetheless, the EUB applies and enforces all of its regulations on First Nations lands and Metis settlements, and in the case of First Nations, in cooperation with Indian Oil and Gas Canada.

Findings of the Committee

Essentially all of the findings and recommendations proposed by the Advisory Committee throughout this report are common to both the general public and the Aboriginal people. However, some of the issues the Committee has dealt with are unique to First Nations communities. In these instances, the resulting recommendations are developed and presented in this section. Additionally, for the convenience of Aboriginal people, the Advisory Committee has repeated in this section all the recommendations that relate to Aboriginal people and appear elsewhere in the report.

It was clear, from the many meetings held by the Advisory Committee with Aboriginal people that the EUB is not well known among First Nations and Metis. Furthermore, the views of First Nations and Metis regarding sour gas issues are not well known to the EUB. To address this, the Committee indicated directionally that the EUB should be more involved with Aboriginal people as members of the Alberta public whose safety and health may be impacted by sour gas. This direction received widespread support in the second round of outreach.

The Committee believes the EUB must improve its relationship with Aboriginal people, not only regarding sour gas development and its potential impact on health and safety, but also with respect to all other regulatory matters. The relationship must recognize issues of special importance to First Nations people, such as their traditional lands and sacred sites.

The multiple federal jurisdictions applicable to First Nations (e.g., Indian and Northern Affairs, Indian Oil and Gas Canada, Health Canada) and their relationship to the EUB and other provincial agencies are often unclear. The jurisdiction is further complicated by the issue of the traditional use of lands outside of the specific boundary of reserves. The matter of identifying and delineating traditional lands of various First Nations is beyond the scope of the Advisory Committee as well as the EUB and is better defined through political processes.

The Advisory Committee found that communication and consultation by industry with First Nations and Metis is, at times, inconsistent, in part due to lack of understanding by industry of Aboriginal lifestyle, as well as internal protocol within First Nations or Metis communities.

The Committee has concluded that the First Nations are often ill prepared to deal with coordinated emergency response planning due to lack of adequate infrastructure and knowledge of disaster service processes. Although industry, in preparing emergency response plans that overlap First Nations lands are required to coordinate planning and preparedness with the Aboriginal communities, they seem to receive inconsistent support from within the communities due in part to the reasons noted above.

Additionally, in more remote areas, First Nations and their respective land bases are not recognized for the diffuse nature of housing. As a result, formalized consultation is often relegated to the “village” site only. Also, due in part to the multi-jurisdictional regulatory overlap, complaint and incident response, as well as air quality monitoring, are often lacking, especially where sour gas facilities are outside of but in general proximity to First Nations lands.

Recommendations

The Advisory Committee has the following recommendations that are unique to the Aboriginal communities:

82. *The EUB engage appropriate staff, including First Nations persons, to ensure more interaction among the EUB, Aboriginal people, and industry (including contractors). These staff would ensure that cultural awareness sessions are conducted for EUB staff and that informational sessions are conducted for Aboriginal people, specifically focusing on building understanding of sour gas development. Important issues to be addressed include isolated communities, communications systems, and language barriers.*
83. *The EUB consider forming an Aboriginal advisory committee or a series of regional advisory committees to better ensure that Aboriginal issues are recognized. Consideration should also be given to ad hoc committees to deal with specific issues.*
84. *The EUB work with federal and other government departments to ensure that the relationship among federal and provincial government departments, First Nations and Metis communities, and adjacent municipalities is clear, that gaps in regulation are*

eliminated, and that areas of overlap are handled efficiently through the necessary agreements. This matter is also dealt with in recommendations 1 and 3.

85. *The EUB ensure the existence in First Nations and Metis communities near sour gas developments, of a good complaint and incident response program that would have monitoring capability and surveillance and monitoring programs that provide good information on general air quality.*
86. *The EUB strictly apply its existing requirements that industry conduct timely and meaningful public consultation in and around First Nations lands and Metis settlements.*
87. *The EUB work with Indian and Northern Affairs Canada (INAC), Health Canada (regarding First Nations), and Alberta Municipal Affairs (regarding Metis Settlements) to provide adequate infrastructure and resources to the First Nations and Metis for planning and development of disaster services capability.*

The planning should include the following matters:

- a) identification of overlap between plans;
- b) understanding of the roles of all parties, particularly as they relate to evacuation procedures;
- c) effective communication in the case of emergencies with the First Nations and Metis if they are in the affected region, even if outside of the EPZ;
- d) identification of resources needed for the development and implementation of disaster plans and/or perhaps a disaster office or a disaster fund; and
- e) development of mutual aid agreements.

The following recommendations are taken from other sections of the report and are repeated for the convenience of the Aboriginal peoples.

1. *In its role as the principal regulator of the Alberta oil and gas industry, the EUB work with provincial and federal government departments, municipalities, regional health authorities, tribal councils, IOGC, IRC, INAC, and any other agency that has jurisdiction respecting the impacts of sour gas on public health and safety in Alberta to*
 - *clarify roles, responsibilities, and relationships respecting sour gas and public health and safety,*
 - *identify and eliminate any gaps in the system, and*
 - *identify overlaps in jurisdiction and either eliminate the overlap or develop formal working agreements to avoid unnecessary duplication and confusion as to responsibilities.*

In this regard, the EUB should consider the designation of an individual or group within the EUB to coordinate jurisdictional matters.

3. *The working relationships established between the EUB and IOGC, IRC, INAC, and relevant federal government departments, recognize the different jurisdictional circumstances respecting First Nations.*

5. *The immediate formation of a task force of senior decision makers that would investigate the possibility of improving coordination between subsurface and surface planning and development.* The task force should be empowered to look at all relevant aspects of planning and development, including the mineral leasing system, and should include appropriate representation from Alberta Resource Development, Alberta Municipal Affairs, Alberta Health and Wellness, Alberta Environment, the Alberta Energy and Utilities Board, Aboriginal groups, urban and rural municipalities, and regional health authorities in sour gas areas and their associations, surface land developers, the public, and the oil and gas industry. The Task Force should investigate and consider, among other matters, the following:
 - The development by the oil and gas industry, government, and urban and rural planning authorities of a complementary planning and development process. The Task Force might consider EUB Interim Directive (ID) 96-1 (regarding Hay-Zama Lake Complex – Special Requirements) as a useful precedent to assist in coordinating surface and subsurface development near populated areas, such as urban and seasonal recreational centres, as well as near First Nations and other Aboriginal lands.

 - The development of policies to ensure that sour gas reserves are delineated and recovered as soon as reasonably possible in populated areas (such as those identified in existing Inter-municipal Development Plans [IDP], designated fringe areas, or intensive transportation corridors), while still providing the industry with a reasonable opportunity to develop its mineral leases.

 - Where there are current land-use conflicts related to sour gas and public health and safety, the development of Land Use and Resource Development (LRD) Agreements by the surface and subsurface owners, relevant municipal planning authorities, and the EUB. These agreements could provide a workable solution for all parties involved in terms of development and timing. EUB Decision 2000-20, *Dynegy Canada Inc., Application for Pipeline Licence Amendments*, is an example of how these types of agreements could be used. This might be accomplished through effective public consultation processes.

 - The promotion of information exchange between industry, government, and Aboriginal people, regarding heritage (traditional lands and sacred sites), land-use planning, development, building, and emergency planning issues.

 - Possible changes to the mineral leasing system. These might include matters such as leasing larger blocks of common ownership for sour gas near population centres and warnings when smaller blocks are posted that common operations are preferred;

- qualification criteria to ensure that operators have the necessary risk management standards and resources to handle sour gas; and notification to potential bidders of possible restrictions on resource development (such as lease time limit) in areas within or adjacent to urban centres or where land-use conflicts are relatively near-term.
- Possible restrictions on municipal development until the sour gas resources are recovered or building restrictions through land-use bylaws in areas where there is high potential for sour gas development.
 - Possible modification to the existing membership of the Crown Mineral Disposition Review Committee to address the possible impacts of sour gas development on public health and safety.
14. *The EUB, First Nations, Health Canada, and regional health authorities ensure there is effective communication on the health service expectations of the various parties related to sour gas in the vicinity of First Nations communities.*
52. *Once the framework and methodology for dispersion modelling and probabilistic risk assessment methodology have been developed, recommendation 17, the EUB use them as the basis for a review of the current criteria for sour gas setbacks.*
- The review should be carried out by a stakeholder group including representatives of the relevant regulatory agencies, government departments, First Nations, Metis, municipalities, regional health authorities, the public, the land development industry, and the oil and gas industry.
 - There should be some overlap in membership with the group studying dispersion modelling and probabilistic risk assessment.
 - The review should address, among other questions, whether the current approach to setbacks is appropriate, the number of levels of categories is acceptable, and whether the actual setback distances are appropriate. It should also assess whether a common set of setback distances can be agreed upon by different jurisdictions.
 - If changes to setbacks are to occur, the stakeholder group should address the appropriate manner for handling those situations where current facilities are based on existing approvals.
53. *The EUB should initiate a review of the implications of setbacks on the ability to develop surface lands.* The review should be carried out by the same stakeholder group noted in recommendation 52 above to review the criteria of setbacks.
64. *The EUB continue its initiative to work with stakeholders to develop clear, complete, and concise guidelines and requirements for ERP development and implementation.* In doing so, the following should be considered:

- standardizing the contents and format of ERPs as much as possible, including consideration of mandatory components and terminology;
- standardizing the requirements of a specific assessment of health impacts for emergency response planning;
- including site-specific conditions of wind, topography, population distribution, access and evacuation routes, livestock management, and other community issues;
- developing accurate resident information, including determination on a self-declaring basis of special needs persons requiring evacuation assistance or those hypersensitive to sour gases; and specifying more detailed requirements for resident information packages and the timing of their availability;
- referring critical sour gas well ERPs by the EUB to relevant municipal responders and regional health authorities, at the application stage, for comment regarding response capability;
- filing approved critical sour ERPs with the EUB, municipal emergency response agencies, and other emergency responders, including mutual aid groups where they exist;
- establishing criteria for introducing a planning zone that is reduced from that determined by the EUB’s standard approach, clarifying the meaning of “immediate ignition”, identifying additional public protective measures to be required to ensure public health and safety, and describing roles and responsibilities of responders within the reduced EPZ, the Awareness Zone, and potentially affected areas beyond;
- annually reviewing and updating ERPs, including individual resident details and other users of land;
- establishing clear evacuation, ignition, and sheltering criteria, including criteria for when each of these measures would be considered acceptable;
- defining requirements for “post-event” debriefings and follow-up activities; and
- specifying how isolated communities and individuals (such as trappers, First Nations hunters, farmers, and transients) are planned for, including those where there is a lack of cellular coverage, which may cause communication delays.

69. *The EUB establish a staff resource team that focuses on public consultation to assist industry in providing a more consistent approach to public consultation, including consultation with Aboriginal people.*

4.9 NONMANDATE BUT IMPORTANT ISSUES

There were a number of matters related to sour gas and public health and safety that were excluded from the mandate of the Advisory Committee because other initiatives were already dealing with the matters. Some of the concerns raised by participants in the outreach process related to such matters. Participants also raised concerns respecting other matters not related to sour gas. All of these nonmandate concerns are reflected in Appendix C, so that those responsible can have regard for them.

The Committee believes that some of these nonmandate issues are of such importance that it wishes to comment on them. The comments reflect the input during the outreach processes and the Committee's own views. They are directed generally to the EUB. In the case of those issues excluded from the mandate because other initiatives are already in place, the comments are also directed to those responsible for these initiatives.

The nonmandate but important issues that the Committee believes it should comment on are

- Flaring
- Monitoring of long-term low levels of H₂S or SO₂
- Research on health effects from long-term low-level exposures
- Protection of groundwater
- Compensation
- Intervener funding
- Seismic exploration activities

4.9.1 Flaring

Many participants in the outreach process raised concerns regarding flaring. Although most of the concerns appeared to relate to the flaring of sour gas and potential impacts on health, some simply dealt with the degree to which flaring is allowed in the oil and gas industry in Alberta.

The Committee is aware of the Clean Air Strategic Alliance (CASA) flaring project team, its work to date, its plans for further work, and industry's performance in terms of exceeding flaring reduction targets to date. The Committee is very supportive of what this multi-stakeholder project team has accomplished to date and believes that the reduction in flaring will be increasingly recognized by the public. It is of the view that continued emphasis should be placed on the elimination of the flaring of sour gas close to residences.

The Committee notes that CASA's effort has resulted in a requirement that all solution gas flares within 500 metres of a residence must be evaluated by the end of the current year (2000) and that the remaining solution gas flares must be evaluated prior to the end of 2002. The evaluation must assess the elimination or reduction of such flares and, in those cases where a flare is still required, validation that the flare meets the required performance standards. The results of this evaluation must be provided to residents within 500 metres of the flare. It is the Committees understanding that the EUB will monitor the results of the evaluations and will be the deciding party when disputes exist between the operator of the flare and nearby residents.

The Advisory Committee considers this to be a reasonable requirement and approach. In resolving any disputes regarding the management of flares where sour gas is involved, it encourages the EUB to take a strong position and either require the elimination of the flare or the adoption of technology that will better ensure complete combustion of the sulphur compounds in the flare gas.

4.9.2 Monitoring of Long-term Low Levels of H₂S or SO₂

A number of participants in the outreach process commented on monitoring. Some of these comments related to the monitoring of low levels of H₂S and SO₂ that may exist over long periods of time. The EUB did not include the effects of such exposures on public health and safety in the mandate of the Committee because a proposed major research study, *The Western Canada Study on Animal and Human Health Effects Associated with Exposures to Flare Emissions*, is intended to address such matters.

The Committee is of the view that the research work should include considerable emphasis on the possible effects on human health of long-term low-level exposure to sour gas. In order to carry out such research in a manner most beneficial to concerned citizens, the Committee believes those responsible for planning and conducting the research should review the current gaps in human health research and consult with stakeholders. In concert with this research the EUB should work with all stakeholders to ensure that there is a surveillance and network-monitoring program to provide good information on air quality in areas with significant sour gas development. To the extent possible, this should be done in concert with the CASA regional airshed monitoring programs, as described in Section 4.6 of this report.

Additionally, the Advisory Committee is aware that complaints are often lodged with the EUB or Alberta Environment related to odours and other long-term effects of low levels of H₂S or SO₂. To ensure that these can be properly responded to, the Committee believes there must not only be adequate monitoring capability to deal with acute exposures resulting from emergencies or incidents (as recommended in Section 4.6), but also reasonable monitoring capability to respond to complaints that relate to chronic long-term exposure.

4.9.3 Research on Health Effects from Long-Term, Low-Level Exposures

As indicated previously, many participants in the outreach process raised concerns about the possible health effects of long-term exposure to low levels of H₂S, SO₂, or other sulphur compounds. Indeed, this is one of the major concerns raised by outreach participants, and a number were critical of and sceptical about the reasons for excluding this matter from the mandate of the Committee.

The Committee understands that a major research project, *The Western Canada Study on Animal and Human Health Effects Associated with Exposure to Flare Emissions*, is proposed to be under way shortly. It has reviewed the material publicly available respecting the intended research and it notes that there appears to be little emphasis on the effects of sour gas on humans, particularly resulting from long-term low-level exposures.

The Committee has the following comments for the Board that will direct the research project. One comment is that there should be appropriate emphasis on research related to the health effects of sour gas on humans, particularly from exposures over the long-term at low levels. In this respect, the Committee believes the project should consider developing linkages with the regional health authorities in sour gas areas and with any health-related research committee established as a result of the recommendations in this report.

The other comment relates to communications. The Committee heard from a number of concerned citizens who make an effort to know what is happening respecting sour gas and public health and safety, but who had no knowledge of the research study. As this study is a matter of great interest, with many potential benefits to the broad public, the Committee believes that those responsible for it should more extensively publicize the research plans and then the results of the research when they become available.

4.9.4 Protection of Groundwater

The Committee heard many comments about the impacts of the oil and gas industry, including seismic exploration, on groundwater. Some of the comments did relate to sour gas in that the concerns were about the impact of leaking chemicals and sulphur from blocks at sour gas plants on the groundwater system.

The Committee is aware that several provincial government departments are in the preliminary stages of developing a provincial groundwater strategy. Alberta Environment is taking responsibility for creating a framework for development of this integrated strategy. The Committee draws to the attention of the strategy group that the manner of groundwater remains very important to Albertans living in areas of intense oil and gas development. The latter group has many concerns and seems generally unaware of the steps being taken to protect groundwater.

The Advisory Committee believes that those responsible for the groundwater strategy should, at the appropriate time, make their plans better known to the public so that all views will be recognized in developing and going forward with efforts to protect groundwater quality and quantity in the province.

4.9.5 Compensation

Many of the comments from participants in the outreach process related to compensation paid to landowners by the oil and gas industry for various negative impacts. A few of the comments were specific to sour gas and the system for compensation when residents are affected by a major release and are evacuated. This matter is excluded from the mandate of the Committee because it is currently being handled through a stakeholder initiative to revise EUB *Informational Letter (IL) 89-20*.

Some of the comments that the Committee heard were related to the issue of compensation for the negative impacts on livestock and the difficulty in handling such matters. In this respect, the Committee is very supportive of a recently initiated animal health complaint and investigative procedure that has been organized by Alberta Agriculture, Food and Rural Development, Alberta Environment, the Alberta Cattle Commission, and the EUB, working together with industry. It

establishes a protocol and procedures for assessing possible impacts on animal health from oil and gas operations and resolving disputes over related compensation.

Additionally, the Committee was clearly reminded throughout the outreach process that the broad matter of compensation is a significant issue to many in sour gas areas. The Committee has the following comment for those government departments involved in the compensation system and for the industry.

The public sees compensation as one element of the total picture of the oil and gas industry and government policy towards it. If the public views compensation or any other important element as unfair and inadequate, this affects its overall view and reaction to the industry. It therefore seems to the Committee that those responsible for the total oil and gas compensation system in Alberta should, first, ensure that the system is fair and equitable and, second, make an effort to ensure that the broad public understands the system, the reasons why it is structured the way it is, and the checks and balances that ensure it remains fair to all parties.

4.9.6 Intervener Funding

The Committee heard some comments respecting intervener funding. This matter was excluded from the mandate of the Committee because a separate stakeholder initiative was going forward, entitled *The Review of Costs Procedures for Energy and Utility Proceedings*. The Committee has some comments that arise from the input it received respecting intervener funding and appearances at EUB hearings to deal with matters of public health and safety.

Some participants believe the definition of a “local intervener” for cost purposes is too limited when it comes to public health and safety because health effects on humans can extend beyond the boundaries typically used by the EUB in deciding eligibility for costs. One situation when this might occur is when a municipality intervenes at a sour gas facility hearing and requests that a larger than standard setback distance be used or perhaps suggests that it might impose a larger one. In this situation, a landowner beyond the normal setback distance but within that requested by the municipality may feel compelled to be at the hearing to protect its interests. Similarly, where an applicant requests an emergency planning zone (EPZ) reduced from that calculated in the normal fashion, the landowner beyond the requested reduced zone but within the calculated area may wish to be at the hearing.

Following a hearing, the EUB typically awards costs only to those who are within the setback or EPZ as set by the EUB in the decisions. This could exclude landowners who believed they had a legitimate reason to participate as a local intervener eligible for costs.

In the view of the Advisory Committee, the EUB should consider landowners who intervene in such cases to be intervening with respect to lands that may be directly and adversely impacted by the applied-for facility and therefore be eligible for costs.

Another area of concern relates to the uncertainty of eligibility for costs. Since eligibility is typically not decided until after a hearing, sometimes the public must put up its own funds for studies it believes necessary with no assurance it will be eligible for costs. Some see this as an effort by the EUB to reduce the number of public interventions. Efforts should be made to

resolve disputes about eligibility for costs and indeed the type of studies that will be funded prior to hearings wherever possible.

The Committee also agrees with suggestions raised by a few participants in the outreach program that the EUB should more frequently allow costs when there has not been a hearing because the hearing was not needed as a result of intensive and time-consuming negotiations between landowners and an applicant. The Committee notes that the recent approval by the EUB of Appropriate Dispute Resolution (ADR) should address this matter, because, presumably, one of the first issues addressed in an ADR process would be the matter of costs.

4.9.7 Seismic Exploration Activities

Seismic activity is a fundamental exploratory system extensively used in Alberta. It is not regulated by the EUB, but by other government departments, including Resource Development and Environment. It is clearly not specific to sour gas and public health and safety, but the Committee heard so much on the subject that it offers the following comment.

Seismic activity is often the first contact the public has with the oil and gas industry. Many of the comments the Committee received suggest that this first contact is frequently poorly handled by those responsible for seismic activities. When serious problems occur during this phase, they may result in a relationship between landowners and the industry based largely on distrust and a feeling that the industry is unregulated. The latter is in part because the myriad of oil and gas operating regulations do not apply to seismic activities.

Efforts are needed by the industry and government to recognize that seismic activities should be conducted in a manner that is fair and thoughtful towards landowners. This will in many cases improve the ongoing relationship between the public and the industry by, for example, improving confidence that the industry and government do care about and protect the health and safety of the public.