

## **KEARL OIL SANDS PROJECT JOINT REVIEW PANEL**

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**Calgary Alberta**

### **IMPERIAL OIL RESOURCES VENTURES LIMITED APPLICATION FOR AN OIL SANDS MINE AND BITUMEN PROCESSING FACILITY (KEARL OIL SANDS PROJECT) FORT MCMURRAY AREA**

**Decision 2007-013 Errata  
Applications No. 1408771 and 1414891**

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There is an omission in *Decision 2007-013*, issued by the Joint Panel on February 27, 2007, that requires correction. A recommendation contained in Section 12.1.10 of *Decision 2007-013* should have been summarized in Section 1, under the Joint Panel recommendations to Canada. By oversight the summary did not appear in Section 1 of the decision report.

The Joint Panel therefore adds the following to Section 1 of *Decision 2007-013*, immediately following enumerated item 8) that appears under the heading “The Joint Panel recommends to Canada that”

- 9) EC collaborate with AENV in a review of the cumulative impacts on the Yellow Rail in the oils sands region using appropriate regional nocturnal surveys in areas of potentially suitable habitat within the next two years (Section 12.1.10)

Dated at Calgary, Alberta, on May 23, 2007.

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Canada

# Imperial Oil Resources Ventures Limited

Application for an Oil Sands Mine and Bitumen Processing  
Facility (Kearl Oil Sands Project) in the Fort McMurray Area

February 27, 2007

**REPORT OF THE JOINT REVIEW PANEL ESTABLISHED BY THE  
ALBERTA ENERGY AND UTILITIES BOARD AND THE GOVERNMENT OF CANADA**  
EUB Decision 2007-013: Imperial Oil Resources Ventures Limited, Application for an Oil Sands  
Mine and Bitumen Processing Facility (Kearl Oil Sands Project) in the Fort McMurray Area

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## EXECUTIVE SUMMARY<sup>1</sup>

Imperial Oil Resources Ventures Limited (Imperial Oil) filed Application No. 1408771 with the Alberta Energy and Utilities Board (EUB) pursuant to Sections 10 and 11 of the *Oil Sands Conservation Act (OSCA)* and Sections 3, 24, 26, and 48 of the *Oil Sands Conservation Regulation (OSCR)* for construction and operation of the Kearl Oil Sands (KOS) Project. Imperial Oil also filed Application No. 1414891 pursuant to Section 11 of the *Hydro and Electric Energy Act (HEEA)* to construct and operate a cogeneration facility consisting of three 85 megawatt units for the KOS Project.

Located about 70 kilometres north of Fort McMurray, Alberta, the KOS Project includes the design, construction, operation, and reclamation of four open pit truck and shovel mines and three trains of ore preparation and bitumen extraction facilities. Each train is designed to produce an average of 16 000 cubic metres (m<sup>3</sup>) per calendar day of partially deasphalted bitumen. The total project is designed to produce a maximum capacity of 55 000 m<sup>3</sup>/day of partially deasphalted bitumen for a period of 50 years. The KOS Project also includes tailings management facilities and other supporting infrastructure.

In addition to meeting the environmental assessment requirements of the Alberta Government, the KOS Project required an environmental assessment under the *Canadian Environmental Assessment Act (CEAA)*. On January 18, 2006, the Honourable Geoff Regan, former Minister of Fisheries and Oceans Canada, requested that the Minister of the Environment of Canada refer the KOS Project to a review panel, in accordance with Section 25 of the *CEAA*. On July 14, 2006, Canada and the EUB entered into an agreement to establish a joint environmental assessment panel (the Joint Panel) for the project review. Under the agreement, the Joint Panel was authorized to undertake the review requirements of the *CEAA*, the *Energy Resources Conservation Act (ERCA)*, and the *OSCA*.

The Joint Panel considered the applications at a public hearing held in Fort McMurray, Alberta, during November 6-10 and 14-16; at Nisku, Alberta, during November 20-24; and at Edmonton, Alberta, during November 27-29, 2006. Participants that provided evidence at the hearing or registered to otherwise participate in the hearing included First Nations, local aboriginal groups, local residents, the Oil Sands Environmental Coalition, the Northern Lights Health Region, the Regional Municipality of Wood Buffalo, the Governments of Alberta and Canada, and other oil sands companies. While participants raised a number of issues for the Joint Panel's consideration, the most critical issues were related to the cumulative environmental and socioeconomic impacts of the project within the context of overall development of Alberta's mineable oil sands.

The Joint Panel reviewed the KOS Project in accordance with the requirements of *CEAA*. The Joint Panel assessed the environmental effects of the project and their significance, including possible effects caused by accidents and malfunctions and the cumulative environmental effects that the project could cause when combined with the effects from other works, projects, or activities, taking into account measures to mitigate these effects. The purpose and need for the

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<sup>1</sup> This executive summary is provided for the benefit of the reader and does not form part of the report. All persons making use of the executive summary are reminded that the report should be consulted for all purposes relating to the interpretation and application of the Joint Panel's views.

project, alternative means of carrying out the project, the capacity of the renewable resources to satisfy the needs of present and future generations, and the need for a follow-up program were also reviewed.

Having regard for its responsibilities under the *ERCA*, the *CEAA*, the *HEEA* and the *OSCA*, the Joint Panel has carefully considered all of the evidence pertaining to the applications. The Joint Panel finds that the KOS Project is in the public interest for the reasons set out in this report. The Joint Panel concludes that the project is not likely to result in significant adverse environmental effects, provided that the recommendations and mitigation measures proposed by the Joint Panel are implemented. Under its EUB authority, the Joint Panel is prepared to approve Application No. 1414891, and it is prepared to approve Application No. 1408771 subject to the approval of the Lieutenant Governor in Council of Alberta.

While this project has been considered to be in the public interest, the Joint Panel must emphasize the importance of the Governments of Alberta and Canada giving priority attention to critical challenges related to cumulative impacts for a number of key environmental sectors and to the acute and growing issues faced by both the Regional Municipality of Wood Buffalo and the Northern Lights Health Region. With each additional oil sands project, the growing demands and the absence of sustainable long-term solutions weigh more heavily in the determination of the public interest.

The responsibility for developing regional environmental management frameworks has largely been assigned to the Cumulative Environmental Management Association (CEMA), and this work is important to the sustainable development of the mineable oil sands over the long term. The Joint Panel believes that the efficiency of CEMA needs to be improved in order to keep pace with current development in the region and that there is a need for more definitive priority setting and adherence to deadlines. The success of CEMA is viewed by the Joint Panel as critical. The Joint Panel acknowledges that management of environmental effects in the region is ultimately the responsibility of the regulators, and so it encourages the regulators to take a more direct leadership role in all aspects of CEMA.

In approving Applications No. 1408771 and 1414891, the Joint Panel has set conditions relating to mining operations, resource conservation, and tailings management. In addition, the Joint Panel has also made recommendations to the federal and provincial governments that will aid in the mitigation of anticipated environmental and socioeconomic effects of the project and will address the need for follow-up measures.

## **KEARL OIL SANDS PROJECT JOINT REVIEW PANEL**

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**Calgary Alberta**

**IMPERIAL OIL RESOURCES VENTURES LIMITED  
APPLICATION FOR AN OIL SANDS MINE AND  
BITUMEN PROCESSING FACILITY  
(KEARL OIL SANDS PROJECT)  
FORT MCMURRAY AREA**

**Decision 2007-013  
Applications No. 1408771 and 1414891**

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### **1 DECISION AND RECOMMENDATIONS TO CANADA AND ALBERTA**

Having regard for its responsibilities under the *Energy Resources Conservation Act (ERCA)*, the *Canadian Environmental Assessment Act (CEAA)*, the *Oil Sands Conservation Act (OSCA)*, and the *Hydro and Electric Energy Act (HEEA)*, the Canadian Environmental Assessment Agency and the Alberta Energy and Utilities Board (EUB/Board) joint review panel (the Joint Panel) has carefully considered all the evidence pertaining to the applications of Imperial Oil Resources Ventures Limited (Imperial Oil). The Joint Panel finds that Imperial Oil's Kearl Oil Sands (KOS) Project is in the public interest for the reasons set out in the report. Under its authority as the EUB, the Joint Panel is prepared to approve Application No. 1408771, subject to the approval of the Lieutenant Governor in Council. The Joint Panel also approves Application No. 1414891.

The Joint Panel's approval is subject to the conditions listed in Appendix 2. The Joint Panel also expects that Imperial Oil will adhere to all commitments it made during the consultation process, in the applications, and at the hearing to the extent that those commitments do not conflict with the terms of the approval or licence affecting the project or any law, regulation, or similar requirement that Imperial Oil is bound to observe.

With regard to its responsibilities under the *CEAA* and its terms of reference, the Joint Panel assessed the environmental effects of the project and their significance, including those caused by possible accidents and malfunctions, and the cumulative environmental effects that the project could cause when combined with the effects from other works, projects, or activities, taking into account measures to mitigate these effects. The purpose and need for the project, the feasible alternatives, and the need for a follow-up program were also reviewed, as well as the capacity of renewable resources to meet the needs of current and future generations. The Joint Panel concludes that the KOS Project is not likely to cause significant adverse environmental effects, provided that the proposed mitigation measures and the recommendations of the Joint Panel are implemented.

The Joint Panel recommends to Canada that

- 1) Environment Canada (EC) and Alberta Environment (AENV) work together to assess the need for a mine fleet emissions technology review and regulation development process (Section 13.7);
- 2) Fisheries and Oceans Canada (DFO), AENV, the oil sands industry, and all other affected stakeholders dedicate the resources, staff, and funding to ensure that Phase II of the Water Management Framework for the Athabasca River is completed in a comprehensive manner and on time (Section 14.1.9);

- 3) Phase II of the Water Management Framework be implemented by January 1, 2011, in keeping with the stated commitments of the Governments of Alberta and Canada (Section 14.1.9);
- 4) DFO and AENV incorporate an ecological base flow (EBF) into the final Water Management Framework for the Athabasca River (Section 14.1.9);
- 5) Canada raise the issue of integrating all regional monitoring systems with the appropriate multistakeholder forums, having regard for existing priorities and resources; AENV should determine how integration could best be accomplished (Section 14.3.6);
- 6) DFO continue discussions with Imperial Oil towards establishing a no net loss plan (NNLP) that meets the objectives of the *Fisheries Act* in terms of fish habitat losses and disturbances (Section 15.1.3);
- 7) EC and DFO, together with AENV and other regional stakeholders, develop the parameters required for regional monitoring for cumulative effects on fish habitat in the lower Athabasca River and Muskeg River watersheds (Section 15.1.3); and
- 8) Canada take a more active and direct leadership role in all aspects of the Cumulative Environmental Management Association (CEMA) (Section 16.6).

The Joint Panel recommends to Alberta that

- 1) Alberta continue to work with the Northern Lights Health Region (NLHR) to address the lack of land, infrastructure, and resources that the NLHR is currently faced with in Fort McMurray (Section 9.2.4);
- 2) coordinated action be taken at all levels of government to ensure that the Regional Municipality of Wood Buffalo (RMWB) has the ability to service the anticipated level of sustained growth in the region (Section 9.3.4);
- 3) Alberta continue to work with the RMWB to ensure that the supply of land ready for residential development and the necessary planning are in place to meet the existing and expected housing demand in the region (Section 9.4.5);
- 4) Alberta take a lead role in assessing and establishing the most appropriate route for a new access road/highway on the east side of the Athabasca River (Section 9.5.1);
- 5) AENV require a detailed hydrogeological investigation for the external tailings area (ETA) site, including updated seepage modelling and mitigation design, as part of the detailed dike design required pursuant to the *Dam Safety Regulations* (Section 10.2.2);
- 6) AENV require Imperial Oil to provide a research schedule for the testing of end pit lake (EPL) predictions and design features in any *Water Act* or any *Environmental Protection and Enhancement Act* (EPEA) approval that may be issued (Section 11.2.4);
- 7) within the next two years, AENV, in collaboration with EC, coordinate a regional review of the cumulative impacts on the Yellow Rail in the oil sands region using appropriate regional nocturnal surveys in areas of potentially suitable habitat (Section 12.1.10);
- 8) AENV establish requirements within any EPEA approval to implement the findings of the Yellow Rail initiative for surveys, determination of effects, and mitigation strategies where appropriate (Section 12.1.10);

- 9) AENV require Imperial Oil to avoid land clearing during the period of April 1 to August 30 of each year due to potential impacts to migratory bird species (Section 12.1.10);
- 10) AENV, with the support of the EUB, establish a process or taskforce to develop a mechanism to ensure that the coordination of mine, landform, water management, and reclamation plans occurs on an industry-wide basis, both within and across lease boundaries (Section 12.3.4);
- 11) AENV and EC work together to assess the need for a mine fleet emissions technology review and regulation development process (Section 13.7);
- 12) Alberta, together with AENV, DFO, the oil sands industry, and all other affected stakeholders, dedicate the resources, staff, and funding to ensure that Phase II of the Water Management Framework for the Athabasca River is completed in a comprehensive manner and on time (Section 14.1.9);
- 13) Alberta implement Phase II of the Water Management Framework by January 1, 2011 (Section 14.1.9);
- 14) AENV and DFO incorporate an EBF in the final water management framework for the Athabasca River (Section 14.1.9);
- 15) AENV take immediate steps to ensure that the Muskeg River watershed management plan is completed and approved on a priority basis and no later than March 2008 (Section 14.2.6);
- 16) AENV provide direction to the Watershed Integrity Task Group (WITG) of CEMA by March 2007 on what AENV has been considering internally for the implementation of comprehensive criteria that would influence development in the Muskeg River basin (Section 14.2.6);
- 17) AENV implement a full backstop by the end of 2008 if CEMA fails to deliver a watershed management plan for the Muskeg River (Section 14.2.6);
- 18) AENV adhere to the target completion date of mid-2007 for reach-specific water quality objectives for the lower Athabasca River (Section 14.3.6);
- 19) AENV work with EC, DFO, and other regional stakeholders to develop the parameters required for regional monitoring for cumulative effects on fish habitat in the lower Athabasca River and Muskeg River watersheds (Section 15.1.3); and
- 20) AENV, as the responsible regulator, take a more direct leadership role in all aspects of CEMA (Section 16.6).

## 2 DECISION CONTEXT AND STRATEGIC OVERVIEW

Imperial Oil has filed an application for a major new oil sands mine about 70 kilometres (km) north of Fort McMurray. The proposed mine is a world-scale greenfield development that will be capable of producing over 48 000 cubic metres (m<sup>3</sup>) of bitumen per day at full production in 2018.

Imperial Oil has attempted to be thorough, forthright, and progressive in striving to meet the expectations of this review process. While some uncertainties continue to exist at the project-specific level, particularly related to tailings management, Imperial Oil stated that it had

built on the research and knowledge of earlier applicants to address virtually every site-specific implication of the mining and processing of oil sands on its lease area.

It is clear that the critical issues surrounding oil sands development are increasingly not project specific, and successful management of these issues is often not the responsibility of the applicant alone. As has been the case with other recent decisions on mineable oil sands development, the major concerns and issues related to this proposal have mostly to do with the pace of development of the mineable oil sands and the capacity of the regional environment to accept these developments without creating such impacts that the developments could be considered to be no longer in the public interest.

The Joint Panel has made the decision that the KOS Project is in the public interest, but it must be clearly understood that the lack of certainty related to the management of cumulative impacts for key environmental parameters and the socioeconomic impacts on the region have weighed heavily in this process. As has been stated in two recent decisions on mineable oil sands applications, these key issues must be addressed with urgency if oil sands development is to continue at the current pace.

Comprehensive evidence presented at this hearing and at the other two hearings on mineable oil sands projects held in 2006 clearly indicates that public infrastructure and services in the Wood Buffalo region are at or fast approaching a critical stage. Imperial Oil has proposed a workforce model that minimizes the impact on the public services of Fort McMurray, at least in the short term. The Joint Panel believes that the Government of Alberta has a short window of opportunity to address the infrastructure needs that the RMWB and the NLHR consider to be critical to their ability to function responsibly. The Joint Panel also believes that there would be merit in considering whether an appropriate share of the benefits generated by oil sands development could be directed to supporting the region on an ongoing basis.

For the cumulative environmental impacts, the issue is not whether the Joint Panel was presented with evidence that thresholds have been exceeded or unacceptable impacts documented. The issue is rather the uncertainties that exist because the regional management frameworks and integrated end use planning remain incomplete. The Joint Panel is deeply concerned by the inability to establish and maintain priority for critical items such as the Water Management Framework for the Athabasca River, the Muskeg River Watershed Integrated Management Plan, and the Regional Terrestrial and Wildlife Management Framework.

This slower than planned performance was cited by a number of the parties during the public hearing. One of the contributing factors seems to be the lack of a current development strategy for the mineable oil sands. Cumulative management frameworks must be supported by clearly enunciated regional objectives and strategies. The RSDS and the Fort McMurray Subregional Integrated Resource Plan are in urgent need of updating. Underpinning these documents must be a clear vision concerning the nature and pace of oil sands development, and in particular the preferred approach to ensuring that a productive and sustainable landscape follows the completion of resource extraction.

The Regional Sustainable Development Strategy (RSDS) must include a work plan with clear priorities and well-defined ambitious targets for completion of the critical management

frameworks. The evidence presented to the Joint Panel suggests that the review of RSDS and the prioritization of its work plan could be and should be completed by no later than the end of 2008.

The Joint Panel notes that CEMA has been assigned responsibility to address most of the critical cumulative effects challenges and views the work of CEMA as vital in addressing the cumulative impacts of oil sands development on the region. The Joint Panel is concerned about the capacity of CEMA to complete the management frameworks that have been assigned to it and notes that CEMA struggles to meet its deadlines. The success of CEMA is viewed by the Joint Panel as critical and the Joint Panel, recognizing that management of environmental effects in the region is ultimately the responsibility of the regulatory agencies, encourages the regulators to take a more direct leadership role in all aspects of CEMA.

The Joint Panel has made the decision that the KOS Project is in the public interest. The Joint Panel has concluded that the project is not likely to cause significant adverse environmental effects, provided that the proposed mitigation measures and the recommendations of the Joint Panel are implemented. The Joint Panel emphasizes the importance of the Governments of Alberta and Canada taking a more aggressive leadership role in urgently addressing both the critical socioeconomic issues facing the community of Fort McMurray and the completion of the management frameworks and integrated plans that will establish the context for management of the cumulative environmental and land-use impacts of mineable oil sands development.

### 3 INTRODUCTION

#### 3.1 Application No. 1408771

Application No. 1408771, for approval of an oil sands mine and bitumen processing facility, was made by Imperial Oil, pursuant to Sections 10 and 11 of the *OSCA* and Sections 3, 24, 26, and 48 of the *Oil Sands Conservation Regulation (OSCR)*.

In support of its proposal and as part of its application to the EUB, Imperial Oil also submitted an environmental impact assessment (EIA) report to AENV, pursuant to *EPEA* requirements. A copy of the EIA was also submitted to the Canadian Environmental Assessment Agency (the Agency) pursuant to *CEAA*.

The oil sands leases included in the KOS Project are located about 70 km north of Fort McMurray within Township (Twp) 95, Range (Rge) 7 and 8, Twp 96, Rge 6, 7, and 8, Twp 97, Rge 6, 7, and 8, Twp 98, Rge 10, and Twp 99, Rge 10.

The KOS Project would include the design, construction, operation, and reclamation of the following major facilities:

- four open pit truck and shovel mines, designed to produce 48 000 m<sup>3</sup> per calendar day of partially deasphalted bitumen, with a maximum production capacity of about 55 000 m<sup>3</sup> per calendar day of partially deasphalted bitumen for a period of 50 years;
- three trains of ore preparation;
- three trains of bitumen extraction facilities, consisting of a primary separation vessel and flotation with flexibility to operate in the range of 35°C to 50°C;



- paraffinic solvent-based bitumen froth treatment process;
- tailings management facilities, including
  - one external tailings areas for tailings placement for the first 12 years, about four years after start-up of the third train, and
  - pumps, flow lines, and thickeners;
- other supporting infrastructure, including
  - water intake,
  - water pipeline,
  - water storage,
  - tanks and related facilities,
  - construction and operations camps,
  - roads, and
  - airstrip.

Construction is scheduled to begin in 2007, with first oil by 2010, train two available in 2012, and train three in 2018. Mining is scheduled to be completed in 2060.

### **3.2 Application No. 1414891**

Application No. 1414891, for approval to construct and operate a 255 megawatt (MW) gas-fired cogeneration facility, was made by Imperial Oil, pursuant to Section 11 of the *HEEA*. The cogeneration facility, consisting of three units of 85 MW each, would be located within Section 9, Township 97, Range 7, West of the 4th Meridian.

The cogeneration facility would be within the KOS Project plant site area. Imperial Oil indicated that any potential land or surface water issues associated with the power plant had been integrated into the assessment of the entire project. It stated that current land uses in the vicinity were traditional, including trapping and logging, and that there were no residents or trapper cabins within a 2000 m radius of the proposed cogeneration facility.

The major source of electrical power for the KOS Project would be from the proposed gas-fired power plant. The main purpose of the power plant would be to provide heat and power for the project.

Imperial Oil indicated that a majority of the subsurface surrounding the cogeneration facility had mineable oil sands. Mine pits would be developed to the west and south of the facility. An external tailings area would be established to the north, and an overburden storage area would be developed to the east.

Imperial Oil indicated that an application for approval of the necessary transmission lines, electrical distribution system, and industrial system designation pursuant to the *HEEA* would be submitted at a later date. Imperial Oil would also submit a future request to the Alberta Electric System Operator for connection with the Alberta Interconnected Electrical System. The

connection was desirable for supply reliability and flexibility and to balance short-term surplus or deficit of the internal supply of power.

Imperial Oil applied to AENV under *EPEA* for approval of the KOS Project, including the cogeneration facility. A noise impact assessment, in accordance with EUB *Directive 038: Noise Control Directive*, was undertaken for the KOS Project, including the cogeneration facility.

Imperial Oil's EIA for the KOS Project included the cogeneration facility. Ground-level concentrations of pollutants from the cogeneration facility were included in the air quality assessment completed for the KOS Project. The combined concentration of emissions would meet the *Alberta Ambient Air Quality Objectives*.

No issues were raised at the hearing with respect to Imperial Oil's cogeneration power plant.

### 3.3 Joint Panel Review Process

DFO is the sole responsible authority for the KOS Project under Section 5 of the *CEAA* because an authorization under Section 35(2) of the *Fisheries Act* is required for project activities resulting in harmful alteration, disruption, or destruction (HADD) of fish habitat. Prior to DFO fulfilling its responsibility, an environmental assessment of the project was required.

On January 18, 2006, the Honourable Geoff Regan, former Minister of Fisheries and Oceans Canada, recommended to the Minister of the Environment of Canada that the environmental assessment of the project be referred to a review panel, pursuant to Section 25 of the *CEAA*.

On June 14, 2006, the Honourable Rona Ambrose, former Minister of the Environment of Canada, referred the proposed project to a review panel. On the same date, the Agency announced that it was proposing to establish a review panel with Alberta for the environmental assessment of the project, in accordance with the *Canada-Alberta Agreement on Environmental Assessment Collaboration (2005)*. Following a 21-day public comment period, Minister Ambrose and Neil McCrank, Q.C., Chairman of the EUB, signed an agreement (the Joint Panel Agreement, reproduced in Appendix 3) to establish the Joint Panel.

Under *CEAA*, the Joint Panel must

- submit a report to the Minister of the Environment of Canada providing the Joint Panel's rationale, conclusions, and recommendations relating to the environmental assessment of the project, including any mitigation measures and follow-up programs;
- assess the environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects likely to result from the project in combination with other projects or activities that are existing or planned;
- determine the significance of the environmental effects of the project; in examining whether any potential adverse effects associated with the project are significant, the Joint Panel must consider the magnitude, geographic extent, duration and frequency, degree to which they are reversible or irreversible, and ecological context of those effects; and
- consider whether there are technically and economically feasible measures that would mitigate any significant adverse environmental effects of the project.

Under the Joint Panel Agreement, the Joint Panel must conduct its review in a manner fulfilling the requirements under the *CEAA*, the *ERCA*, *HEEA*, and *OSCA*. The Joint Panel must determine if the project is in the public interest. In making this determination, the Joint Panel is required to consider a range of factors, including resource conservation, public safety, and the economic, social, and environmental impacts of the project.

### **3.4 Hearing**

The Joint Panel consisted of J. R. Nichol, P.Eng. (Presiding Member), T. McGee, and L. Cooke. The Joint Panel considered the application at a public hearing held at Fort McMurray, Alberta, during November 6-10 and 14-16; at Nisku, Alberta, during November 20-24; and at Edmonton, Alberta, during November 27-29, 2006. Accordingly, the Joint Panel considers that the record was completed on November 29, 2006.

Those who appeared at the hearing and the abbreviations used in this report are set out in Appendix 1.

Canadian Natural Resources Limited, Deer Creek Energy, Petro-Canada Oil Sands, Shell Canada Ltd., Suncor Energy, Syncrude Canada Ltd., and Synenco Energy Inc. registered to participate in the hearing but did not provide evidence, question witnesses, or make final argument.

### **3.5 Submission of Wood Buffalo Métis Locals Association**

The Wood Buffalo Métis Locals Association (WBMLA) filed a written submission in this proceeding and participated in the oral hearing. On November 21, 2006, the WBMLA stated that it had reached an agreement with Imperial Oil and requested that the Joint Panel no longer consider its oral and written submissions. The WBMLA also requested that the Joint Panel not render a decision with respect to its constitutional or aboriginal rights.

### **3.6 Submission of Deninu Kue First Nation**

The Deninu Kue First Nation (DKFN) filed a written submission on October 10, 2006. The Joint Panel understands that during the hearing the DKFN attempted to file a further written submission that included a Notice of Question of Constitutional Law (NQCL) as contemplated under Section 12 of the *Administrative Procedures and Jurisdiction Act (APJA)*. Secretariat staff advised the DKFN that leave of the Joint Panel was required to file any additional written submissions because the deadline for filing had passed. The DKFN did not request leave to file new material and therefore the Joint Panel is not aware of nor has it considered any question of constitutional law from the DKFN.

## **4 CLEARWATER BAND AND WBFN—NOTICE OF QUESTION OF CONSTITUTIONAL LAW**

### **4.1 Preliminary Matter—Sufficiency of the Notice Given to Alberta and Canada**

#### **4.1.1 Introduction**

The WBMLA filed an NQCL as part of its written submission. A group comprising the Clearwater River Paul Cree Band #175 (Clearwater Band), the Wood Buffalo First Nation, the Wood Buffalo First Nation Elders Society, and John Malcolm (collectively the WBFN) also filed a written submission that included an NQCL. As discussed elsewhere in this report, the WBMLA subsequently withdrew from the proceeding and the Joint Panel agreed to its request that the panel not make any decisions on the positions originally advanced by it. As a result, only the Clearwater Band and the WBFN have requested that the Joint Panel rule on the NQCL filed with their submission.

Counsel for Alberta made an application to the Joint Panel for a ruling that the NQCL did not meet the requirements of the *APJA* and that the Joint Panel did not have jurisdiction to consider the constitutional question raised by the Clearwater Band and the WBFN.

#### **4.1.2 Views of Alberta**

Alberta stated that the Clearwater Band and the WBFN failed to meet the notice requirements set out in Section 12 of the *APJA*. That provision requires a person to give 14 days' notice of intention to raise a question of constitutional law, including notice to the Attorney General of Canada and the Minister of Justice and Attorney General of Alberta. Subsection 12(2) states that until the notice requirement is met, the decision maker must not begin the determination of the question of constitutional law. Subsection 12(4) states that the notice must be in the form and contain the information provided for in the regulations. The form of notice is provided in Schedule 2 of the *Designation of Constitutional Decision Makers Regulation*, AR 69/2006.

Alberta's motion stated that the NQCL filed by the Clearwater Band and the WBFN did not clearly disclose the aboriginal or treaty rights the parties wanted the Joint Panel to consider, the materials or documents that would be relied upon by those parties, or a list of witnesses and the substance of their testimony. These are matters that are included under the heading "Details of Argument," which appears at the foot of the prescribed form of an NQCL. Although Alberta's motion alleged a number of defects in the NQCL, in its argument it stated that the most serious defect was the failure of the Clearwater Band or the WBFN to provide a list of witnesses and the substance of their proposed testimony. Alberta acknowledged that a list of 100 or more individual names was attached to the submission that accompanied the NQCL; however, it argued that it was not fair or reasonable to hold that such a list satisfied the requirement under the regulation.

Alberta argued that strict compliance with the notice requirements was essential to ensure that the Crown was able to properly prepare for a constitutional argument and that a failure to meet the requirements precluded the Joint Panel from considering the constitutional issues raised in an NQCL. Alberta cited a number of legal authorities in support of its position that the Crown was entitled to require strict compliance with the notice requirements.

### 4.1.3 Views of Canada

Canada adopted Alberta's argument regarding the failure of the Clearwater Band and WBFN to provide an NQCL that met the requirements of Section 12 of the *APJA*. Canada also stated that the environmental assessment process, which the Joint Panel was engaged in, was different from the issues to be addressed when an NQCL was filed that asserted rights under Section 35 of the *Constitution Act, 1982*. Canada further stated that in this proceeding the Joint Panel was not required to address a question of aboriginal rights under the Constitution of Canada.

### 4.1.4 Views of the Clearwater Band and WBFN

The Clearwater Band and WBFN stated that the NQCL filed with their written submission satisfied the requirements under Section 12 of the *APJA*. They also stated that given Alberta's failure to raise the question of the adequacy of the notice at an early stage of the proceeding, for example after the Joint Panel had issued a letter seeking comments on the process for dealing with constitutional questions, it would not be fair for Alberta to later raise the question of the adequacy of the notice.

### 4.1.5 Views of Imperial Oil

Imperial Oil stated that it shared the views of Alberta and Canada on the law in relation to the constitutional question. Imperial Oil emphasized that it had reached an agreement with the Clearwater Band and WBFN, and that any issues concerning consultation related to the question of the Crown's duty, if any, to consult and not to Imperial Oil's consultation efforts.

### 4.1.6 Views of the Joint Panel

The Joint Panel has carefully considered the submissions of the parties on whether the NQCL filed by the Clearwater Band and WBFN complies sufficiently with the requirements under the *APJA*, so as to give the Joint Panel authority to consider the question of constitutional law raised in the notice. Alberta argued that strict compliance with the notice requirements is mandatory and that a failure to meet any of the requirements results in the Joint Panel losing jurisdiction to determine the constitutional question. Alberta cited a number of authorities for its position; however, the Joint Panel notes that none of the decisions specifically addressed the notice that must be given under Section 12 of the *APJA*. The Joint Panel understands that the reason for the requirement to provide notice to the Crown is to ensure that the Crown has a full opportunity to understand the questions raised in the NQCL and to respond appropriately.

The Joint Panel notes that a form of NQCL was filed by the Clearwater Band and WBFN. No party suggested that there was a failure to give **any** notice of the question of constitutional law; rather, the Joint Panel considers the question to be the adequacy of the notice that was given by the Clearwater Band and WBFN. Section 3 of the *Designation of Constitutional Decision Makers Regulation* states that the notice for the purpose of Section 12(1) of the *APJA* is set out in Schedule 2. The following appears at the foot of the Schedule 2 form of notice:

#### **Details of Argument**

Details are to include:

- The grounds to be argued and reasonable particulars of the proposed argument, including a concise statement of the constitutional principles to be argued, references to any statutory

provision or rule on which reliance will be placed and any cases or authorities to be relied upon.

- The law in question, the right or freedom alleged to be infringed or denied or the aboriginal or treaty rights to be determined, as the case may be.
- The material and documents that will be filed with the decision-maker.
- List of witnesses intended to be called to give evidence before the decision-maker and the substance of their proposed testimony.

The Clearwater Band and WBFN filed a common written submission and a common NQCL. The NQCL states:

We intend to raise the following questions of constitutional law under section 35 of the *Constitution Act, 1982* related to our application for standing. Attached is our written argument. We are seeking to have standing in a hearing with respect to Application No. 1418771, 1414891 (Imperial Oil Sands (Kearl) Project).

The words “meaningful consultation, costs & legal counsel” are inserted in handwriting after the word “standing”. The written argument that included the NQCL is 337 pages long. It is partly handwritten and partly typewritten, with handwritten annotations. It has an “Authorities” section that includes Treaty No. 8, EUB decision reports, court decisions, excerpts from legal texts, the *Constitution Act, 1982*, and the *Designation of Constitutional Decision Makers Regulation*.

Representatives for the Clearwater Band and WBFN emphasized that those groups’ participation in the proceeding was undertaken without the assistance of legal counsel. That does not excuse the groups from complying with the notice requirements under the *APJA*, but the Joint Panel believes that it may take into consideration that the parties are not represented by legal counsel when it considers the adequacy of the NQCL that was given.

The Joint Panel has considered the NQCL and the written submission filed with the NQCL and has determined that in this case the NQCL contains sufficient information to satisfy the notice requirements under Section 12 of the *APJA*. The NQCL indicates that the constitutional question relates to Section 35 of the *Constitution Act, 1982*, and that the parties are seeking meaningful consultation. The parties’ written submission refers a number of times to the duty to consult and the lack of meaningful consultation in connection with the proposed development. The law in question and the material and documents to be relied upon by the parties are not only referred to in the written submission, but are attached to the written submission. Although the material filed does not specify the witnesses who will appear to address the question of constitutional law, it does contain a list of individuals affiliated with the Clearwater Band and WBFN. Bearing in mind the purpose for requiring a party to provide an NQCL to government, it is the Joint Panel's view that the NQCL and written submission of the Clearwater Band and WBFN provided sufficient notice to Canada and Alberta of those parties’ intentions to raise the questions relating to aboriginal and treaty rights so as to allow Canada and Alberta to respond appropriately.

The Joint Panel notes that Alberta did not raise the question of the sufficiency of the NQCL until immediately before the hearing commenced, despite having an opportunity to raise the issue at an earlier date. Canada did not raise the question until after Alberta made its application. Although this is not determinative of the question of the sufficiency of the notice, it does indicate

to the Joint Panel that any defects in the NQCL were not so fundamental to cause Alberta or Canada to raise question of the sufficiency of the notice earlier in the proceeding. Given all of the foregoing, the Joint Panel has determined that it has jurisdiction under the *APJA* to consider the substantive question of constitutional law raised by the Clearwater Band and WBFN.

## **4.2 Duty to Consult**

### **4.2.1 Views of the Clearwater Band**

The Clearwater Band stated that its members were legitimate descendants of the signatories to Treaty No. 8 and that its members' traditional hunter/gatherer lifestyle was protected by the treaty. The Clearwater Band stated that the federal and provincial governments had not consulted with it regarding its members' loss of access to their lands or traditional rights. It asked the Joint Panel to recommend to Alberta and Canada that they honour their obligations under Treaty No. 8 before any further development proceeded within the Clearwater Band's traditional lands. It also asked the Joint Panel to make specific recommendations to both Alberta and Canada that they each consult with the Clearwater Band as a requirement before any further oil sands development took place.

### **4.2.2 Views of the WBFN**

The WBFN stated that it was a community of aboriginal peoples with communal rights recognized in Section 35 of the *Constitution Act, 1982*. It also stated that it had a right of consultation that was grounded in the honour of the Crown to treat the aboriginal people of Canada with respect, dignity, and fairness. The WBFN asserted that it was not necessary for there to be a treaty relationship between the Crown and the aboriginal people, but that a duty of consultation arose when there was a potential threat to an aboriginal right. The WBFN urged the Joint Panel to recognize it as a Band and to recommend that Canada and Alberta also recognize the WBFN and take certain actions to improve the circumstances of its members. The WBFN stated that it believed it could improve things for its communities if it were provided an opportunity to be consulted with in a meaningful manner. It concluded its argument by stating that even though the issues and treaty settlements were not concluded, the Crown still had a duty to consult with the WBFN in a meaningful manner.

### **4.2.3 Views of Alberta**

Alberta stated that if the Joint Panel decided that the NQCL provided by the Clearwater Band and WBFN satisfied the notice requirements under the *APJA*, the Joint Panel should decide that those parties were not owed a duty of consultation by government. Alberta stated that the ruling of the joint panel reproduced in *Decision 2006-128: Albian Sands Energy Inc.: Application to Expand the Oil Sands Mining and Processing Plant Facilities at the Muskeg River Mine* applied equally to the positions the Clearwater Band and WBFN brought forward in this proceeding. Alberta argued that neither group was an Indian Band, a recognized First Nation, or any other entity capable of possessing aboriginal or treaty rights that would give rise to a duty of consultation. Alberta also stated that to the extent that individual members of either group were members of a First Nation recognized under the *Indian Act*, the rights they may exercise that give rise to a duty of consultation were collective rights that only a First Nation—not an individual—was entitled to assert. Alberta urged the Joint Panel to find that the Clearwater Band

and WBFN did not have aboriginal and treaty rights that gave rise to a duty of the Crown to consult with those groups.

#### 4.2.4 Views of Canada

Canada stated that if the Joint Panel decided the NQCL provided by the Clearwater Band and WBFN satisfied the notice requirements under the *APJA*, the Joint Panel did not need to address the questions of constitutional law raised in the notice because those questions were not incidental to the Joint Panel's mandate in the context of the legislative regime and the Joint Panel Agreement. However, Canada also stated that if the Joint Panel's view was that it should address the NQCL, the evidence did not support the existence of aboriginal rights so as to bring upon the Crown a duty to consult with the Clearwater Band and WBFN. Canada referred to the registry of citizens of the WBFN that was entered as evidence in the hearing and the evidence of Ms. Susan Weston, of the Department of Indian Affairs and Northern Development. Canada noted that a number of individuals named in the registry or in the list of stakeholders attached as a schedule to the Clearwater Band and WBFN submission were affiliated with a recognized Indian Band. Canada also referred to court decisions as having established the principle that aboriginal and treaty rights were communal rights possessed by aboriginal collectivities and not, in the circumstances of this proceeding, rights that can be raised by individuals.

Canada further stated that if the Joint Panel was of the view that the Crown was required to consult with the Clearwater Band or WBFN, the Crown's consultation obligations in these circumstances were satisfied by notice of the project having been given to those groups and the opportunity they were given to participate in the proceeding.

#### 4.2.5 Views of the Joint Panel

On the question of the aboriginal and treaty rights asserted by the Clearwater Band, the Joint Panel heard and considered evidence that was the same or substantially similar to the evidence heard by the joint panel whose ruling appears in *Decision 2006-128*. Based on the evidence in this proceeding, the Joint Panel has determined that the Clearwater Band is not a recognized entity or distinct community of individuals with treaty or aboriginal rights that give rise to a duty of government to consult with it. The Clearwater Band is not a "Band" as defined in the *Indian Act*. Many of the individuals who identify themselves as members of the Clearwater Band are registered members of another recognized Indian Band. This includes, for example, Chief Mary Ann Powder, who stated that she is a registered member of the Fort McMurray First Nation. While the individuals who identify themselves as members of the Clearwater Band have made efforts to be recognized as an Indian Band, it is clear that they have not yet succeeded in that task.

On the question of the aboriginal and treaty rights asserted by the WBFN, the Joint Panel similarly concludes that it is not a recognized entity or distinct community of individuals with treaty or aboriginal rights that give rise to a duty of government to consult with it. The WBFN is not a "Band" under the *Indian Act*. The Joint Panel notes that many of the individuals who identify themselves as members of the WBFN are registered members of another recognized Indian Band, including Bands far removed from the Wood Buffalo region. The desire of these individuals to be recognized as a distinct aboriginal community is apparent. But that desire and their efforts to be recognized as such are not sufficient for this Joint Panel to conclude that the



WBFN exists as an aboriginal community that is owed a duty of consultation arising from Section 35 of the *Constitution Act, 1982*.

The Joint Panel recognizes that the law in Canada is that aboriginal and treaty rights are communal rights, and where there is a corresponding duty on the part of government to engage in meaningful consultation, that duty is owed to the recognized aboriginal community as a whole and not to individuals. The Joint Panel notes that Mr. John Malcolm's entitlement to status under the *Indian Act* appears to be unresolved. While the Joint Panel has neither the mandate nor the evidence to conclude what, if any, aboriginal or treaty rights Mr. Malcolm may be entitled to, based on the principle of law cited above the Joint Panel finds that he is not an individual who could be owed a duty of consultation by government.

With respect to the Wood Buffalo First Nation Elders Society (the Society), the Joint Panel finds that it is not an entity that has aboriginal or treaty rights that could give rise to a corresponding duty of consultation. The Society was created on January 18, 2005, by incorporation under the *Societies Act*. It is not a "Band" under the *Indian Act*. The WBFN referred to the decision *Labrador Métis Nation v. Newfoundland and Labrador*, [2006] N.J. No. 213 (NLTD), in support of its argument that the Society could assert the rights of the WBFN aboriginal community. But in the *Labrador Métis Nation* case, the Court accepted that the community represented by the corporate entity had aboriginal rights and had selected the corporation as its agent to assert those rights. The Court also stated that it was impossible under the laws of Canada for aboriginal rights to be transferred to any entity other than the Crown. In the *Labrador Métis Nation* proceeding, Canada argued that point when it stated that the Society itself could not hold communal aboriginal rights. The Joint Panel accepts as a principle of law that the Society itself is incapable of holding aboriginal or treaty rights. The Society cannot, therefore, be owed a duty of consultation under Section 35 of the *Constitution Act, 1982*. As stated above, the Joint Panel does not accept that the WBFN exists as an aboriginal community with Section 35 rights. If the WBFN had provided evidence indicating that the Society was the agent of the WBFN—which it did not—the Joint Panel would not have decided the constitutional question in relation to the Society any differently.

## 5 ISSUES

The Joint Panel considers the issues respecting the applications to be

- purpose, need, and alternatives to the project,
- alternative means of carrying out the project,
- stakeholder and public consultation,
- social and economic effects,
- mine plan and resource conservation, including overburden disposal areas,
- tailings management,
- reclamation,
- air emissions,
- surface water,

- aquatic resources,
- CEMA,
- traditional land use and traditional ecological knowledge,
- need for EIA follow-up,
- human health, and
- capacity of renewable resources.

The following sections summarize the evidence of Imperial Oil and the interveners and provide the Joint Panel's assessment of the issues. If Imperial Oil or an intervener expressed no views on a particular issue, there is no corresponding section for that party in the report. While the Joint Panel has attempted to reflect the views and evidence that it considered most relevant to the issues arising from the applications, this report may not address all of the evidence put forward by a party.

## **6 PURPOSE, NEED, AND ALTERNATIVES TO THE PROJECT**

### **6.1 Views of Imperial Oil**

Imperial Oil stated that the purpose of the KOS Project was to develop oil sands mining and processing facilities to produce clean bitumen from its Crown oil sands leases. The project would access a large, high-quality oil sands resource with daily production capacity reaching about 48 000 m<sup>3</sup> of bitumen per day by 2018. Imperial Oil added that the project would contribute to Alberta's stated vision of increasing oil sands production to 480 000 m<sup>3</sup>/day by 2020. This would offset declines in conventional oil production and help meet North America's energy demands for many years to come. Imperial Oil also noted that development of the KOS Project would enable it to establish its identity in the region through its own direct community participation. It stated that its past experience and record had demonstrated its ability to manage future obligations that might arise if the KOS Project were approved.

Imperial Oil indicated that the project would generate significant economic benefits through increased employment and the purchase of goods and services. The benefits would include a development investment of about \$5.5 billion, annual expenditures of about \$1 billion to operate the facility at full capacity, and 2700 person years annually of ongoing employment. Imperial Oil added that significant opportunities for local and aboriginal businesses would be generated during construction and operation.

Imperial Oil indicated that the oil sands resources on the project lands were not suitable for recovery using in situ techniques and that there were no realistic or viable recovery alternatives. Imperial Oil stated that the only practical way to extract this resource and to maximize the bitumen recovery was to use mining techniques. Should high crude oil prices continue, Imperial Oil added that socioeconomic benefits would also increase. The project would create wealth and enhance the standard of living for Albertans and Canadians.

### **6.2 Views of the Intervenors**

None of the intervenors took issue with Imperial Oil's view about the need for the project.

### **6.3 Views of the Joint Panel**

The Joint Panel notes that the purpose and need for the project provide the context for the Joint Panel's consideration of alternatives to the project. The Joint Panel accepts Imperial Oil's stated need for and purpose of the project, as well as Imperial Oil's evaluation of the alternatives to the project. The Joint Panel notes that no parties objected to the purpose of and need for the project, although the RMWB, Mikisew Cree First Nation (MCFN), and DKFN requested that the issuance of any approval be delayed, and several of the parties expressed concerns about a new mine being started at this time.

Having considered the potential alternatives to the KOS Project, the Joint Panel concludes that it has sufficient information about the purpose of and need for the project. The Joint Panel also concludes that there is no alternative to Imperial Oil's proposed project as a means to access the existing resources.

## **7 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT**

### **7.1 Views of Imperial Oil**

Imperial Oil stated that essentially all of the technology in its development plan was either commercially proven or commercially demonstrated in industry today, resulting in a plan with a very high degree of certainty. Where uncertainties existed, Imperial Oil was committed to applying adaptive management, which it said had been successfully applied across the oil sands mining industry.

Imperial Oil stated that its comprehensive approach allowed it to present a clear and complete plan to stakeholders and to facilitate full resource development, while minimizing impacts. This comprehensive approach included

- one mine plan for the estimated project life of 50 years;
- one external tailings pond, which will result in the smallest tailings footprint per barrel of oil produced of any oil sands mining development;
- an innovative tailings process and pit lake system, with only a small volume of mature fine tailings in the last of the six proposed pit lakes;
- a compensation lake plan to address the disturbance of fish habitat—the plan being staged to allow learning and be adapted as development progressed; and
- one integrated, progressive reclamation plan for the whole lease area that optimized direct placement of forest floor material.

Imperial Oil indicated that it had considered several mine development options and plant site locations, alternatives to ore preparation, bitumen extraction, froth treatment, tailings management, water sources, pipeline routing, and transportation of bitumen. The evaluation of the different aspects of tailings management, water sources, and pipeline routing, and Imperial Oil's conclusions for each of them are discussed further later in this report.

## **7.2 Views of the Interveners**

None of the interveners provided views on alternative means of carrying out the project.

## **7.3 Views of the Joint Panel**

The Joint Panel finds that Imperial Oil has provided sufficient information on alternative technologies and means of carrying out the project and their associated environmental impacts. The Joint Panel is satisfied that Imperial Oil has adopted an appropriate approach to the recovery of resources from these leases. The Joint Panel's views on alternative means for tailings technology and other operational matters are discussed in later sections of this report.

# **8 STAKEHOLDER AND PUBLIC CONSULTATION**

## **8.1 Consultation**

### **8.1.1 Views of Imperial Oil**

Imperial Oil stated that its public consultation process for the KOS Project had continued since the application documentation was filed in July 2005. Imperial Oil held numerous meetings with stakeholders to address specific issues of concern about the project and to develop cooperative working relationships with adjacent leaseholders, aboriginal groups, and municipal service organizations. Imperial Oil stated that the process had been very successful and had helped build a better understanding of stakeholders' concerns and Imperial Oil's commitment to stakeholders.

Imperial Oil committed to an ongoing and adaptive consultation process. Imperial Oil stated that it would continue to document all its meetings with stakeholders, track its commitments and follow-ups, and work with stakeholders to monitor progress and keep stakeholders informed.

Imperial Oil stated that it had reached cooperative agreements with Husky Oil Operations Ltd., Suncor Energy Inc., Syncrude Canada Ltd., and Shell Canada Ltd.

### **8.1.2 Views of the Oil Sands Environmental Coalition**

The Oil Sands Environmental Coalition (OSEC) stated that it had significant unresolved issues concerning the KOS Project, despite meetings with Imperial Oil to try to reach an agreement, including

- contributions to nitrous oxide (NO<sub>x</sub>) emissions in the oil sands region;
- contributions to greenhouse gas emissions and climate change;
- proposed water withdrawals from the Athabasca River during winter low flows;
- Imperial Oil's failure to identify effective terrestrial and wetland mitigation strategies;
- failure of the EIA to reflect on a foreseeable development scenario;
- loss of royalty revenue to Albertans due to an outdated royalty regime; and
- increased socioeconomic impacts on the region.

### **8.1.3 Views of DKFN**

The DKFN stated that it had not been consulted about the KOS Project.

### **8.1.4 Views of the Joint Panel**

The Joint Panel believes that Imperial Oil has satisfactorily undertaken public consultation on the KOS Project. The Joint Panel notes that Imperial Oil's KOS Project is a greenfield project and therefore has significant issues that differ from recent applications for the expansion of existing oil sands projects. The fact that Imperial Oil had signed agreements with many of the intervening parties is a positive reflection of the efforts of both the proponent and the interveners to make meaningful attempts to address issues arising from the KOS Project.

## **8.2 Agreements**

### **8.2.1 Athabasca Chipewyan First Nation**

The Athabasca Chipewyan First Nation (ACFN) reached an agreement with Imperial Oil such that the ACFN did not object to the KOS Project. The ACFN stated that some of its issues remained unresolved, including in-stream flow needs (IFNs), permanent loss of wetlands, and other concerns related to cumulative effects assessments (CEAs).

### **8.2.2 Clearwater Band and WBFN**

During the hearing, the Clearwater Band and the WBFN stated that they had reached an agreement with Imperial Oil.

### **8.2.3 Fort McKay IRC**

The Fort McKay First Nation Industrial Relations Corporation (Fort McKay IRC) had reached a partial agreement with Imperial Oil. Imperial Oil stated that the agreement covered all the Fort McKay community, including First Nation and Métis residents.

The Fort McKay IRC had outstanding concerns about the KOS Project's water withdrawals from the Athabasca River as currently proposed under the draft IFN framework.

### **8.2.4 MCFN**

The MCFN stated that it had reached a partial agreement with Imperial Oil, which provided for the MCFN to be involved with the KOS Project in the future. MCFN stated that it would be involved in assessing the results of monitoring programs and would have the opportunity to recommend necessary changes.

The MCFN stated that not all of its concerns were addressed by this agreement. It requested a delay of the project based on concerns it had about ecosystem integrity of the Athabasca River under the draft IFN framework, the tailings process and the end pit lakes (EPLs), and the liability associated with the unknowns of what the final landscape and its ecological function would be, as well as other concerns, including the current and long-term effects on the Mikisew Cree traditional land uses and culture.

### **8.2.5 NLHR**

A memorandum of understanding was signed between the NLHR and Imperial Oil providing for them to work cooperatively towards the development of an on-site, robust medical centre. With respect to the KOS Project, the NLHR believed that its agreement with Imperial Oil would be adequate to allow the NLHR to work out concerns it had about the KOS Project over the next several years.

### **8.2.6 RMWB**

The RMWB reached a partial agreement with Imperial Oil regarding some of the issues it had concerning the KOS Project. The RMWB believed that the KOS Project should not be viewed in isolation, but in conjunction with all other projects currently in operation, under development, or still to come.

### **8.2.7 WBMLA**

The WBMLA reached an agreement with Imperial Oil during the hearing and withdrew from the proceeding.

### **8.2.8 Non-Assertion of Rights Agreements**

Alberta signed Non-Assertion of Rights Agreements with the ACFN, MCFN, and Fort McKay IRC. These agreements were filed by Alberta as evidence in the proceeding. The agreements allowed the parties to address issues relating to constitutional rights claimed by each of the First Nations in other forums or proceedings.

### **8.2.9 Views of the Joint Panel**

The Joint Panel commends Imperial Oil, ACFN, MCFN, Fort McKay IRC, NLHR, RMWB, WBMLA, WBFN, and the Clearwater Band on their efforts in reaching full or partial agreements. While these agreements will not form part of the EUB approval, the Joint Panel does expect Imperial Oil to meet its commitments and continue its consultation and communication efforts throughout the life of the KOS Project.

## **9 SOCIAL AND ECONOMIC EFFECTS**

### **9.1 Project Benefits**

#### **9.1.1 Views of Imperial Oil**

Imperial Oil stated that the KOS Project would create new economic activity in the region and Alberta. The project's capital investment was estimated at \$5.5 billion (2005 dollars) over the 2007 to 2018 period. Imperial Oil expected to pay almost \$24 billion in taxes and royalties to the federal and provincial governments throughout the life of the project, starting in 2010. It expected that property tax payments to the RMWB would be \$15 million per year, or \$700 million over the life of the project.

To minimize project impacts on public and private infrastructure and services, Imperial Oil proposed a camp-based operation, with 90 per cent of its workforce living outside the region. Workers would fly to and from the KOS Project and stay in camp accommodations during shift rotations. Imperial Oil submitted that this approach would avoid a significant increase in the population of Fort McMurray, while contributing tax revenue to the municipality.

The project's total direct, indirect, and induced employment creation was estimated to be 20 800 work years over the 2007 to 2018 construction period. Peak on-site construction was expected to be 1700 persons during 2009. Over the period of mine operation, it expected that direct, indirect, and induced employment would total 2660 jobs.

Imperial Oil indicated that it had reached agreements with stakeholders that contained commitments addressing socioeconomic and business concerns. It stated that the KOS Project would generate significant opportunity for local and aboriginal businesses both during construction and on a sustained basis over the operating life of the project.

### **9.1.2 Views of NLHR**

The NLHR acknowledged the significant benefits from the continued development in the region created by way of increased royalties, taxes, training, and employment opportunities. However, the NLHR indicated that it continued to work with dangerously strained resources and that the exponential growth in the region was affecting its ability to deliver proper health care services.

### **9.1.3 Views of RMWB**

The RMWB recognized the benefit of oil sands development to the economy as a whole, but stated that additional oil sands development should be delayed until the outstanding infrastructure issues were addressed. While Imperial Oil estimated that the impact of its project would be relatively small, the RMWB submitted that many municipal services were already operating at or beyond capacity.

The RMWB believed that while Imperial Oil's proposed camp-based construction and operation approach would be responsive to the pressures on the municipality in the short term, it would also create negative impacts on the local community in the long term. The RMWB stated that many of the economic benefits from the project would bypass the community and the RMWB would lose the benefit that could be realized if the workers and their families were living and participating in the community.

### **9.1.4 Views of the Joint Panel**

The Joint Panel acknowledges the economic benefits associated with the major investment in good and services for the KOS Project. It also notes that the need for governments to invest in new infrastructure and expanded public services will offset to some extent the taxes and royalties generated by the project. The Joint Panel believes that the net benefit to Alberta and Canada from taxes and royalties will be significant.

The Joint Panel also acknowledges Imperial Oil's efforts to address socioeconomic and business concerns in its agreements with stakeholders. The Joint Panel encourages companies to

undertake and support initiatives that will ensure the broadest possible participation of local residents and businesses in the economic opportunities created by their projects.

## **9.2 Health Services**

### **9.2.1 Views of Imperial Oil**

Imperial Oil acknowledged that the NLHR had experienced an increase in the number of people seeking treatment at the Fort McMurray Hospital. It also acknowledged that one contributing factor was the work camp population, which sought medical services especially through the hospital's emergency room. Imperial Oil argued that the KOS Project would have a limited impact on health facilities and services in the region.

Imperial Oil indicated that it had reached a memorandum of understanding with the NLHR that addressed a number of action items to be undertaken related to the delivery of health care for the KOS Project. Imperial Oil pointed out that it would provide an on-site medical centre that was appropriately staffed and equipped to support the people working and staying at the KOS Project site.

### **9.2.2 Views of NLHR**

The NLHR acknowledged the efforts of Imperial Oil to minimize the project impacts on the health care system and stated that it had signed a memorandum of understanding with Imperial Oil. However, the NLHR argued that this would not solve existing or future problems with health services.

The NLHR stated that short-term measures need to be taken immediately by all levels of government to address the current crisis facing the NLHR and to allow it to continue functioning until proposed longer-term strategies could be implemented.

The NLHR outlined the efforts it had made to communicate these issues and infrastructure needs to senior levels of government. NLHR indicated that it had sent letters to Alberta Infrastructure and Transportation, communicated with the Minister of Health and Wellness, and provided the Minister of Seniors and Housing with a letter prepared by the region's member of the Legislative Assembly (MLA) that pleaded the NLHR's case to government. The NLHR stated that it had made a request to the province for capital funding for a continuing care facility, but had not yet received the province's response.

The NLHR stated that health issues were not sufficiently represented in the consultation or regional initiatives under way. It stated that it was not a member of Regional Infrastructure Working Group (RIWG), nor was it involved in the Oil Sands Consultation Initiative (OSCI),<sup>2</sup>

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<sup>2</sup> The OSCI followed the release of the *Oil Sands Consultation Group Final Report and Recommendations* report. It established a process to consult on the development of Alberta's oil sands and to provide a report to the Ministers of Sustainable Resource Development, Environment, and Energy by June 2007. The Oil Sands Ministerial Strategy Committee (OSMSC) is an internal government committee that Cabinet has directed to develop a coordinated short-term government action plan to address the social, environmental, and economic impacts of oil sands development in local communities. The OSMSC is chaired by the Minister of Justice and Attorney General. Alberta noted that a report containing recommendations and an implementation plan was expected to be delivered to the chair of OSMSC by December 31, 2006.



and that neither of these organizations appeared to have made health care a priority. The NLHR acknowledged that RIWG had agreed to strike a health committee to address concerns on health services and advise how the oil sands industry could help to alleviate some of the challenges facing the NLHR.

The NLHR stated that the health care system in Fort McMurray was unsustainable at the region's current rate of growth. It added that physicians were becoming increasingly desperate as they continued to work in conditions with critical shortages, soaring overhead costs, and insufficient and inadequate infrastructure. The NLHR reported that it was short 34 physicians across the region. This represented an overall vacancy rate of 41 per cent, which meant that many patients were being forced to go to an already overburdened emergency room for all their medical needs, including routine consultations.

The NLHR stressed that the situation was critical, given the inadequacy of the province's global funding formula and infrastructure funding to address the NLHR's unique issues. It stated that

- the Alberta Health and Wellness (AHW) global funding formula used only registry data and did not reflect the shadow population or the actual population growth in the area; and
- the designated fee for delivering health services to the nonresident public did not reflect the real cost of delivering these services in the NLHR.

The NLHR also indicated that it was the sole provider of chronic and acute care to all persons coming into the Wood Buffalo Region. Its legislative mandate was to provide health services to everyone at all times, including nonresidents working in Fort McMurray.

The NLHR requested that the Joint Panel recommend to the Government of Alberta that certain immediate and long-term measures be taken to address the critical impact that current and planned oil sands developments were having and would continue to have on the delivery of health services in the region. These recommendations included

- funding the projected NLHR deficit and rectifying the current funding formula deficiency to eliminate the ongoing imbalance;
- indexing the fees that northern physicians are able to charge to AHW for providing services in communities where it is difficult to recruit and retain physicians;
- releasing ten acres of land to enable the NLHR to transfer its continuing care services from the Health Centre site to allow the expansion of its acute care services, and allocating between two and three acres of land in each new division for the development of community health centres;
- providing capital funding for a new continuing care facility (\$49 million), two community health centre pilot projects (\$20 million), and a new parkade and helipad (\$9 million);
- providing funds to establish and operate a district trauma centre in Fort McMurray;
- providing funding for housing and other incentives to aid in recruiting more medical students and health care workers to the NLHR;
- making available more academic seats designated to northern regions;

- releasing to the NLHR about 80 acres of land to construct a new health centre/hospital in Fort McMurray;
- providing \$200 million in capital funds to the NLHR for the construction of a new health centre/hospital in Fort McMurray;
- providing operating funding to support the new health centre/hospital;
- developing partnerships between oil sands companies and the NLHR to establish community health centres within all major oil sands projects; and
- providing funding for future infrastructure required to meet the health needs of the expected real population growth.

The NLHR acknowledged that the creation of the OSCI was a positive step in addressing the issues, but it claimed that AHW, and especially the NLHR, had not been included in this initiative.

The NLHR also acknowledged the establishment of the OSMSC. The NLHR stated that the OSMSC's report would be a positive first step but that there was no guarantee that a coordinated plan for growth management in the Fort McMurray region would result. It stated that the OSMSC did not have a policy-making role.

### **9.2.3 Views of Alberta**

Alberta submitted that it was aware that the NLHR faced a number of issues that needed to be addressed. It stated that the Government of Alberta had responded with resources and funding and would continue to work with the NLHR to further address these issues.

Alberta indicated that AHW was constantly working with the regions to improve its ability to address concerns and improve the equity of its funding allocation. It noted that the funding formula was not static and was not based on municipal census estimates; rather the funding formula evolved, adjusted, and took into consideration historical and anticipated growth in order to address costs and other pressures. Alberta indicated that the NLHR's funding had been increased by 19 per cent above the amount that was based on its registered population and that an additional \$3.8 million was provided as a northern allowance. It stated that the expertise to address the funding issues lay within the NLHR and AHW and that these issues would be best resolved through continuing dialogue between the NLHR and AHW.

Alberta submitted that capital-funding pressures across the province and across departments were prioritized and balanced. The process assessed competing funding needs and allocated available resources among these competing pressures. It also stated that AHW would continue to work with the NLHR to assist in this process but that it was up to the management of the NLHR to file the appropriate applications required as part of this process.

Alberta stated that it was the role of the NLHR to manage its resources and to make choices about what services it would provide and how best to deliver them within the constraints of available resources.

Alberta acknowledged the NLHR's evidence that it had been bringing its issues forward to the OSMSC, AHW, and other departments at the very highest levels. It indicated that the NLHR's

views and concerns were being considered and that work to resolve the issues was constant and ongoing.

#### **9.2.4 Views of the Joint Panel**

The Joint Panel notes that in the True North Energy Corporation hearing in 2002 (*Decision 2002-089*), the Fort McMurray Medical Staff Association stated that medical services in the region were stretched to capacity. It warned that placing additional demands on medical services without providing adequate resources would adversely affect the quality of health care. In 2002, the Fort McMurray Medical Staff Association reported that there were 38 physicians serving a population of about 60 000 (including a shadow population of about 15 000), or 1 physician per 1600 population. In this proceeding, the NLHR reported that there are 41 physicians serving a population of about 80 000 (including a shadow population of about 13 000), or 1 physician per 1950 population. The Joint Panel notes that despite the best efforts of all involved, health services in the region continue to be stretched and the NLHR continues to struggle to keep pace with the cumulative effects of rapid oil sands development. The Joint Panel also notes the evidence provided by the NLHR that if it is not allowed to continue to operate in a deficit position, or if it is required to pay back the deficit it has already accumulated, it may be required to make cuts to health services in the region.

The Joint Panel acknowledges that the incremental contribution to the impact on medical services in Fort McMurray by the KOS Project is limited. It also acknowledges that Imperial Oil has signed a memorandum of understanding with the NLHR, and through this agreement it has made a commitment to assume a greater responsibility for the health care needs of its on-site workforce. The Joint Panel believes that industry must assume greater responsibility for its mobile workforce and should take steps to minimize the impact this workforce has on the medical services in Fort McMurray.

While it does not take a position on the adequacy of the existing funding formula, the Joint Panel does note the evidence provided by the experts for the NLHR that typical funding models for medical services and infrastructure do not work well for rapidly growing areas like Wood Buffalo, a region that is expansive but has a relatively small, isolated population. The Joint Panel believes that the NLHR has already or is in the process of putting the necessary plans in place to effectively deliver on its health care mandate. However, the Joint Panel also believes that the NLHR must have the necessary resources and the support of AHW to implement and deliver on those plans. Otherwise, with growth pressures expected to continue, it is the Joint Panel's view that the health services in the region will continue down a path that is fast approaching a state of crisis.

The Joint Panel believes that finding solutions to the need for additional land, infrastructure, and resources that the NLHR is currently facing in Fort McMurray can best be addressed through continued negotiation and cooperation between the NLHR and the Government of Alberta.

The Joint Panel recommends that the Government of Alberta continue to work with the NLHR to address the lack of land, infrastructure, and resources that the NLHR is currently faced with in Fort McMurray.

## **9.3 Public Infrastructure and Municipal Services**

### **9.3.1 Views of Imperial Oil**

Imperial Oil stated that the KOS Project would only have an incremental impact on public and private infrastructure and services in the Wood Buffalo region, especially in Fort McMurray. Imperial Oil indicated that the project's camp-based operational approach would ensure that most of the population impacts of its operations phase would occur outside of the region. Given the distance to the mine, Imperial Oil believed that having workers live in Fort McMurray and commute to and from work on a daily basis was not a safe, healthy, productive, or efficient alternative. It indicated that the daily commuting time of at least 90 minutes each way between the KOS Project and Fort McMurray, combined with long shifts on site, would not be sustainable.

Imperial Oil emphasized that this fly-in/fly-out approach would eliminate travel exposure for the majority of the workforce, reduce traffic volumes on Highway 63, enhance worker safety and quality of life, and reduce the demands on Fort McMurray's infrastructure and services. It also stated that the camp for construction and operations workers would have its own water and sewer system and would provide workers with a health centre and a range of retail, recreation, and other services that would reduce the demands on local service providers.

Imperial Oil stated that it had reached an agreement with the RMWB to notify the municipality if the company planned to modify its fly-in/fly-out operation and to engage in meaningful consultation with the RMWB and other stakeholders to address any additional demands created by the modified plans.

Imperial Oil indicated that it would further minimize any negative impacts caused by the project by supporting the initiatives of RIWG, the Athabasca Tribal Council, and other regional organizations.

Imperial Oil stated that it was opposed to the recommendations made by the RMWB for a delay of the KOS Project and to have a portion of infrastructure costs recovered directly from Imperial Oil through an industrial agreement.

### **9.3.2 Views of RMWB**

The RMWB indicated that it had supported previous oil sands development in the region. It recognized the long-term economic benefits associated with development of the oil sands and was optimistic that responsible government agencies would respond to the negative impacts caused by industrial growth. However, the RMWB also indicated that in the absence of immediate and tangible solutions, it was unable to manage the adverse cumulative social effects of additional oil sands development within acceptable levels.

The RMWB recognized that Imperial Oil's proposed camp-based operation would minimize the impacts of the project on infrastructure and services, but suggested that the project would still exacerbate an already critical situation. It indicated that it had made efforts to address the growth pressures by preparing and updating the Wood Buffalo Business Case (WBBC). Although the findings of the WBBC were presented to government on a number of occasions, the RMWB stated that none of the recommendations contained in the WBBC had been implemented. The

RMWB acknowledged that some actions had been taken by senior levels of government, but stated that an infrastructure and services deficit still existed and current provincial government programs would not provide effective solutions, given the magnitude of the challenges it faced.

In addition, the RMWB pointed out that one of its biggest challenges was that it must invest in municipal infrastructure and services for population growth from the new oil sands development well in advance of receiving any property taxes from these projects. In response to this challenge, the RMWB prepared a capital plan for funding the necessary infrastructure and services over the next three years that relied heavily on debt. However, RMWB indicated that it faced serious financial risks in implementing this capital plan, as it would have to maximize and perhaps surpass its allowable debt limit. It suggested that carrying this level of debt removed its flexibility to fund programs and services and limited its ability to respond to any unanticipated needs for debt financing or an unexpected decrease in municipal revenue.

The RMWB suggested that unique solutions were required from a collaborative effort by all levels of government. These solutions might include a tripartite regional development agreement to address joint funding, a special funding mechanism to address existing deficits, and the province releasing land to the RMWB at a nominal cost so that the municipality could address the housing deficit.

The RMWB submitted that it had significant concerns about the long-term impacts of the fly-in/fly-out approach proposed by Imperial Oil. The RMWB stated that it would still face cost burdens from the need to provide services for transient construction workers and operators. The RMWB was also concerned that this approach would result in little economic benefit flowing to local workers and business, and neither the plant workers nor their families would become invested in the region. It estimated that over the 50-year life of the project, this would equate to \$5.25 billion in lost expenditure to the region. The RMWB's position was that oil sands workers should live in the local communities, contribute to the positive economic growth of the region, and become invested in the community as a whole.

The RMWB acknowledged the ongoing efforts of the OSCI and the OSMSC. However, it did not believe that the OSCI would result in any tangible action. It also suggested that the terms of reference for the OSMSC did not meet the needs of the municipality, as the committee would be focusing on short-term issues rather than providing an integrated approach to address both short-term needs and a long-term strategy involving all partners. It also suggested that the OSMSC was unlikely to be effective, as it had no policy-making role and no power to allocate funds.

The RMWB requested a delay of the KOS Project so that it could collaborate with senior levels of government and industry to formulate an appropriate plan and assign financial responsibility. The RMWB requested that if the Joint Panel chose to approve this project, the panel should include, in any approval that may be issued, the seven conditions it had reached in its agreement with Imperial Oil. Although Imperial Oil did not agree to the condition that would require it to enter into an agreement that would allow the municipality to recover from Imperial Oil the costs for new or expanded infrastructure and services needed as a result of the KOS Project, the RMWB asked that this requirement be made a condition of any oil sands approval that Imperial Oil may receive for this project.

The RMWB also requested that the Joint Panel recommend that the Government of Alberta

- participate in a collaborative process for creating a long-term, comprehensive development plan for the oil sands region,
- execute a regional development agreement with the RMWB that outlined a regional growth strategy,
- provide special funding mechanisms to allow the RMWB to bring its existing infrastructure and services to a standard similar to other Alberta municipalities,
- modify funding formulas and establish a new policy for sustained growth in the region,
- release additional Crown lands to the RMWB at nominal or no charge, with sufficient funds to allow the RMWB to develop the lands in a timely manner,
- cooperate with the RMWB and oil sands industry developers in the region to create and maintain a system for monitoring the cumulative socioeconomic impacts of oil sands developments,
- collaborate with Imperial Oil, the RMWB, and other oil sands developers to address the labour and equipment shortages experienced in the region,
- report to the Board periodically on the status of the work done by the OSMSC, the OSCI, and other provincial initiatives to address regional socioeconomic issues, and
- prepare a formal, coordinated annual progress report on socioeconomic issues in the region, including a compilation of activities and outcomes (both positive and negative), and that this annual progress report be available to the public.

### 9.3.3 Views of Alberta

Alberta submitted that the province had a detailed understanding of the challenges facing the RMWB. It stated that the Government of Alberta had responded with resources and funding and would continue to work with the RMWB to further address these challenges.

Alberta noted that in the third quarter of 2005, thirty MLAs, including ten Cabinet ministers, visited Fort McMurray to learn firsthand about the issues being experienced by the RMWB. It stated that actions were taken to address the issues immediately following the visit and pointed to the fact that departments across government had committed to take steps to address the broad range of issues. These efforts included more than \$730 million in capital funding over the 2006-2009 period for support for health care facilities, school facilities, post-secondary facilities, the provincial highway network (including Highway 63), municipal infrastructure support, government facilities, housing, and equipment. The most significant financial commitment was made by Alberta Infrastructure and Transportation, with about \$630 million allocated to twin Highway 63 from Fort McMurray south to Highway 55.

Alberta submitted that it would continue to work on finding solutions and it expected the OSMSC and the OSCI to provide a path forward by identifying the needs and gaps in services and infrastructure and by proposing solutions that could be implemented by the government in the near future. It stated that an oil sands coordinator had been appointed to assist the ministerial committee in its task of developing recommendations and an implementation plan. It added that a report from the ministerial committee would be presented to the Government of Alberta and

would include a realistic forecast for the next three to five years for northern Alberta regarding anticipated impacts on health, education, housing, social services, infrastructure and policing; an inventory of current programs and services and plans to address pressures arising from oils sands development; and recommendations for a coordinated plan to remedy these gaps. It would also address short-term policy issues for the government that required resolution in order to effectively manage growth and development options for action.

Alberta stated that Phase I of the OSCI was complete. It noted that public consultation meetings had been held in Bonnyville, Peace River, Fort McMurray, Edmonton, Calgary, Wabasca, and Fort Chipewyan and that more than 280 submissions had been received from local, regional, provincial, and national stakeholders. The interim report from the consultation was on schedule to be completed by the end of November 2006.

Alberta emphasized that both the NLHR and the RMWB were actively engaged with government, the ministerial committee, its staff, and the OSCI.

### **9.3.4 Views of the Joint Panel**

While the Joint Panel recognizes that the additional demands on municipal services attributable to the KOS Project are relatively modest, it believes that they must be considered in the context of the cumulative impacts of oil sands development. Comprehensive evidence has been presented at this hearing (and at the other two hearings on mineable oil sands projects held in 2006) that clearly indicates that Fort McMurray is at a crucial turning point in its evolution as the major urban centre for the oil sands region. The municipality must make substantial investments in public infrastructure and municipal services in order to keep pace with expected growth and, in turn, preserve and improve upon the quality of life in the region. The Joint Panel believes the window of opportunity for the municipality to respond is very short, given the anticipated sustained high growth in oil sands development. As a result, it is the Joint Panel's view that the RMWB is unlikely to meet the challenges of growth in the absence of immediate financial assistance and supportive public policy from the provincial and federal governments.

Both the NLHR and the RMWB have asked the Joint Panel to recommend to Alberta that it take a number of specific actions to address the infrastructure and operational funding shortfalls and gaps in the region. The Joint Panel notes Alberta's evidence that Cabinet directed the OSMSC to develop recommendations and a coordinated short-term government action plan. The Joint Panel believes that the Government of Alberta is well aware of the action and resources needed and recognizes the serious nature of the situation and the necessity to quickly and substantively address these issues.

The EUB and a previous Joint Panel have made a number of recommendations to the Government of Alberta in two recent decision reports (*Decision 2006-112* and *EUB/CEAA Joint Review Panel Report [EUB Decision 2006-128]*) respecting the infrastructure needs in the RMWB. This Joint Panel supports those views and sees little value in repeating the recommendations in detail in this report. It is the Joint Panel's view that capacity constraints related to socioeconomic impacts can be mitigated with proper planning and response by the appropriate government authorities. The Joint Panel is not prepared to require or recommend that Imperial Oil contribute toward the cost of new or expanded public infrastructure and services, as requested by the RMWB.

The Joint Panel does note the RMWB's evidence that the costs associated with infrastructure investments could be so large, relative to the municipality's financial capability (at least in the short term), that cost, rather than need, could overly influence the investment decision or the timing of implementation. Recognizing the lead time for new or expanded infrastructure and the potential risk to the municipality associated with prebuilding infrastructure for the existing and forecast population, the Joint Panel believes that senior levels of government should have a role in minimizing that risk. The Joint Panel believes that the provincial government should work in cooperation with industry, local organizations, and the municipal and federal governments to find solutions and to determine the appropriate funding sources. The Joint Panel believes that this can be done in parallel with oil sands development and therefore does not see a need to delay the KOS Project, as requested by the RMWB.

The Joint Panel recognizes the concerns raised by the RMWB about Imperial Oil's long-term fly-in/fly-out approach for operations. The Joint Panel believes that during the 50 years' operational life of the project, regional circumstances might well change and the initial fly-in/fly-out approach to operations could evolve to a more locally based workforce. However, the Joint Panel believes that these concerns can be addressed within the agreement reached between Imperial Oil and RMWB, again assuming the appropriate level of support from senior governments.

The Joint Panel recommends that coordinated action be taken at all levels of government to ensure that the RMWB has the ability to service the anticipated level of sustained growth in the region.

## **9.4 Availability of Housing and Affordable Housing**

### **9.4.1 Views of Imperial Oil**

Imperial Oil acknowledged that the rapidly escalating cost of housing was largely responsible for the high cost of living in Fort McMurray, as well as several related community issues. It also recognized that rapid oil sands industry expansion was the primary cause of high housing costs.

Imperial Oil stated that it would minimize the impacts of the KOS Project on housing during its construction and operation phase by adopting a camp-based model, thus reducing pressure on the housing market in Fort McMurray. Imperial Oil indicated that this approach would make it easier for the housing industry to catch up with housing demand.

Imperial Oil recognized that even with its operations camp, the KOS Project would still require an estimated 290 housing units in Fort McMurray and elsewhere in the region. This housing estimate pertains to the people who come to Fort McMurray for positions that support the KOS Project. Imperial Oil stated that it would contribute to regional efforts to address the housing issue by supporting the RIWG's Housing Sub-committee, which was working with the RMWB towards

- establishing a \$17 million fund of government monies so that the RMWB can develop infrastructure to support housing development,
- developing an improved mechanism for the release of provincial lands for housing developments, and



- providing timely information to the housing development industry to facilitate its response to emerging housing market need.

#### **9.4.2 Views of RMWB**

The RMWB pointed to Imperial Oil's evidence that the project was expected to increase the population in the region by 600 people by 2018, which equated to a need for about 290 dwelling units. The RMWB argued that the need for new dwelling units was likely underestimated, given that the camp-based model did not preclude workers from living in the Fort McMurray area.

The RMWB indicated that the housing deficit in the Fort McMurray area was roughly 3918 dwelling units. It further argued that at the current 9 per cent rate of population growth, the total new dwelling units required would reach 12 454 by 2011 (including the existing shortfall). The RMWB submitted that the need for housing units would continue to outstrip the rate of new housing development, even with the recent and planned release of land by Alberta to private developers.

The RMWB argued that the released lands from the Government of Alberta were only expected to accommodate 11 800 new dwellings units, which would not meet short-term and long-term regional needs. It also maintained that transforming raw land into residential neighbourhoods would present a number of challenges. Among them would be the cost and timing of developing land, uncertainty with respect to municipal expenditures, location and topography of the land, and a limited number of skilled residential construction workers.

The RMWB submitted that the existing and expected ongoing housing shortage created a number of stresses on the community, including difficulty recruiting and retaining workers. The RMWB submitted that Fort McMurray had the distinction of having one of the highest, if not the highest, housing costs in the province. It provided evidence that the cost of housing in Fort McMurray had quadrupled between 1995 and 2005 and that rental rates were currently about double the rental rates in Edmonton and were cited to be the highest in Canada.

#### **9.4.3 Views of NLHR**

The NLHR submitted that the high cost of living in the RMWB, particularly housing costs, was a significant deterrent to recruitment and retention of physicians and other health care workers. The NLHR pointed out that it had to divert \$360 000 from its budget to ensure that at least 18 rental units were available for its staff, noting that the NLHR was the only health region in the province forced to use its budgeted resources for such a purpose.

The NLHR requested that the Joint Panel recommend to Alberta that it extend to the employees of the NLHR the same Fort McMurray Allowance and the Fort McMurray and Northern Alberta Initiatives that it provided to all Government of Alberta employees in the Fort McMurray area.

#### **9.4.4 Views of Alberta**

Alberta outlined a number of efforts it had taken to respond to the need for housing and, in particular, affordable housing in Fort McMurray, including

- providing for the release of 673 acres of Crown land in 2006 to provide 5800 housing units, including 600 affordable housing units;

- providing a northwest parcel called North Parsons Creek, which should yield up to 1800 dwelling units when fully developed; and
- providing 700 acres that were being readied for release at the south end of Fort McMurray, called Saline Creek Plateau, which should yield an additional 4200 dwelling units.

Although the North Parsons Creek and Saline Creek Plateau parcels had not yet been released, Alberta indicated that Alberta Sustainable Resource Development (SRD) was working with the RMWB to prepare the area structure plans for these two parcels and the area covered by the fringe study, as well as related feasibility studies for future urban expansion. Once these plans were completed and the development boundaries finalized, SRD would proceed with assessment and subsequent transfer of the lands. It emphasized that the province's policy was that land would not be released until the area structure plans were complete.

The new areas, when fully developed, would yield in total over 11 800 dwelling units. To facilitate growth beyond this, Alberta stated that Alberta Municipal Affairs was coordinating the efforts of SRD, Alberta Seniors and Community Supports, and Alberta Infrastructure and Transportation to develop a provincial strategy in cooperation with the RMWB to ensure that land release was consistent with the municipality's long-range development plans.

To address affordable housing, Alberta stated that close to \$17 million in funding had been approved for the construction of 414 affordable housing units in Fort McMurray under the Canada-Alberta Affordable Housing Program.

#### **9.4.5 Views of the Joint Panel**

The Joint Panel is encouraged by the initial steps taken and the commitment made by the Government of Alberta to work in cooperation with the RMWB to address the availability and affordability of housing. However, the Joint Panel notes that new residential areas expected to come on stream will likely still lag behind projected demand for housing. It also notes that planning requirements, cost of servicing, and land development timelines have the potential to delay when new lands are actually available for housing construction. The Joint Panel recommends that the Government of Alberta continue to work with the RMWB to ensure that the supply of land ready for residential development and the necessary planning are in place to meet the existing and expected housing demand in the region.

### **9.5 East-Side Corridor Access**

#### **9.5.1 Views of the Joint Panel**

Although not discussed in detail during the hearing, the Joint Panel is aware that there are ongoing discussions on establishing a new access road/highway on the east side of the Athabasca River. The Joint Panel understands that work on east-side access is currently being led by Suncor, which intends to improve access to its Firebag in situ project. In addition, based on evidence from Alberta witnesses, it is apparent to the Joint Panel that Alberta is not taking a direct role in the process and is allowing industry participants to develop the route and pay for the construction of a new access road on the east side of the Athabasca River.

The Joint Panel believes that in developing east-side access, there is an opportunity to address a number of regional issues. These include

- minimizing the sterilization of energy resources,
- creating additional access to surface mineable and in situ oil sands projects,
- reducing both existing and planned traffic on Highway 63 north of and through Fort McMurray,
- creating access around Fort McMurray for large, wide loads, and
- creating access to parcels of land on the northeast side of Fort McMurray for new residential developments.

The Joint Panel understands that funding for this proposal will be an issue, but it believes that a fully coordinated approach involving industry and all levels of government would allow for full consideration of the issue.

The Joint Panel is concerned that in the absence of a strong leadership or coordination role by Alberta, the spectrum of regional issues and opportunities may not be fully explored. The Joint Panel recommends that Alberta take a lead role in assessing and establishing the most appropriate route for a new access road/highway on the east side of the Athabasca River.

## **10 MINE PLAN AND RESOURCE CONSERVATION**

### **10.1 Mine Plan and the Location of Facilities**

#### **10.1.1 Views of Imperial Oil**

Imperial Oil stated that it would meet EUB *Interim Directive (ID) 2001-7: Operating Criteria—Resource Recovery Requirements for Oil Sands Mine and Processing Plant Sites* during the mine life. Imperial Oil identified a number of resource recovery challenges that it anticipated during the initial start-up period. These included the presence of oxidized ore, ore quality prediction, blending ability, plant reliability, and process water quality. Imperial Oil considered each of these factors to be risks bearing on its ability to meet *ID 2001-7* requirements during start-up. Imperial Oil committed to work with the EUB to ensure that all reasonable actions were taken to maximize resource recovery during start-up.

Imperial Oil identified nine separate external overburden disposal areas required to support the development of four separate mine pits. Imperial Oil noted that overburden disposal areas C, F, and G extended onto lands held by adjacent oil sands lease (OSL) holders. Portions of both the mine pit and the ETA shared common lease boundaries with OSL holders. Imperial Oil stated that it was committed to working with all parties involved to coordinate project development efforts and maximize resource recovery. Imperial Oil stated that the potential water storage site would be located on an OSL held by Suncor and Husky. Imperial Oil indicated that transboundary infrastructure, such as power, pipelines for product, natural gas, raw water, and the water intake all crossed lands held by other stakeholders and would require additional cooperative agreements.

Imperial Oil stated that it had entered into cooperative agreements with Suncor regarding OSLs 7 and 85 and with Husky regarding OSLs 6A and 87A. Imperial Oil was progressing towards

finalizing similar agreements with Shell regarding OSLs 88 and 13 and with Syncrude regarding OSL 31.

The cooperative agreements are currently envisioned to address the following:

- a process to manage the recovery of resources at common lease boundaries;
- a process to manage the recovery of resources in areas inaccessible by one party and accessible by another;
- a process to evaluate additional drilling requirements and the resource potential of impacted lands;
- a process to reach agreement on the potential size, location, and timing of surface facilities while also ensuring that competing project constraints, such as maximizing economic resource recovery, are prudently managed;
- periodic reviews of adjacent mine and in situ development plan information to identify opportunities for additional cooperation;
- sharing of common infrastructure and lands for the development of utility rights-of-way;
- harmonizing reclamation, closure, surface, and groundwater plans; and
- exchanging environmental information and supporting data.

Imperial Oil acknowledged that some additional resource information was required within overburden disposal areas C, F, and G. Imperial Oil committed to share this information with the EUB and the OSL holders.

Imperial Oil stated that the KOS Project shared a common OSL with the Husky Sunrise project along Lease 87A. It recognized that the presence of mining and steam-assisted gravity drainage (SAGD) operations in close proximity could result in constraints for both operations. Imperial Oil stated that existing project schedules showed Husky completing operations at the common lease boundary before Imperial Oil began to mine the area. Imperial Oil stated that the recent agreement with Husky provided for a process to determine the additional work required to define an appropriate setback in advance of development. Imperial Oil committed to share this information with the EUB.

Imperial Oil stated that a potential water storage location had been identified as a contingency in the event IFN restricted water withdrawals from the Athabasca River beyond the volumes that could be managed in the ETA. Imperial Oil stated that the potential water storage area was a temporary structure and therefore did not sterilize economic oil sands.

Imperial Oil stated that the results of the 2005 geological model indicated a second raw water pipeline route alternative that would avoid crossing mineable oil sands within and adjacent to the KOS Project area. Imperial Oil said it would evaluate these two alternatives based upon several considerations when the application for the water pipeline was submitted to the regulatory agencies. Imperial Oil committed to include the EUB in the evaluation of the potential raw water pipeline routes prior to finalizing a preferred route.

### 10.1.2 Views of Alberta

Alberta noted that Imperial Oil was requesting surface dispositions for portions of the overburden disposal sites that extended onto adjacent lands outside the boundaries of its subsurface lease. It pointed out that these dispositions might limit the exercise of subsurface rights by other oil sands operators that wished to extract resources from beneath their lands or use the surface for their own operations.

Alberta understood that while operators were able to enter into agreements to accommodate these competing uses, they might not always reach agreement. Alberta added that the integration of mining and related activities, such as stockpiles across lease boundaries, was vital to the orderly development of the oil sands.

Alberta stated that Imperial Oil would be requested to submit written agreements with adjacent operators and demonstrate that all land-use conflicts had been resolved prior to the issuance of any land disposition outside of Imperial Oil's subsurface lease boundaries. Alberta requested that the EUB provide guidance regarding priorities for coordinated development so that the issuance of surface dispositions for overburden dumps did not inadvertently constrain development of adjacent subsurface resources.

### 10.1.3 Views of the Joint Panel

The Joint Panel accepts Imperial Oil's commitment to meet the EUB *ID 2001-7* requirements and to work with the EUB to define resource recovery solutions should recoveries fail to meet *ID 2001-7* requirements during start-up. The Joint Panel expects Imperial Oil to implement all contingency measures it identified so as to minimize recovery issues during this period.

The Joint Panel acknowledges the cooperative work Imperial Oil has conducted with Shell regarding the exchange of reserves to complete the acquisition of OSL 88A. The Joint Panel expects OSL holders to continue this cooperative work to maximize resource recovery at common lease boundaries. The Joint Panel also acknowledges the cooperative agreements currently in place or being sought with adjacent OSL holders as key first steps to resolving potential development issues at common lease boundaries. The Joint Panel believes that additional drilling information and updated resource mapping are required in the potential water storage area, mine waste disposal sites C, F, and G, and possibly along the Suncor OSL 7/ETA boundary. The Joint Panel believes that the resource potential of each of these areas, the mining and SAGD setbacks, and other common OSL holders' issues should be resolved sooner rather than later.

The Joint Panel understands the importance of completing work to examine the impacts of adjacent SAGD and mining developments to establish guidelines in the future. The Joint Panel also believes this work must be completed to understand the impacts of in situ recovery upon mining waste disposal sites. This information is required to properly assess competing land requirements of simultaneous mining and in situ resource recovery projects in the future. The Joint Panel believes industry is best positioned to research this subject and expects that Imperial Oil and Husky will work together to complete work on the effects of in situ steaming upon tailings and mine waste disposal structures, in addition to establishing the required setbacks.

The Joint Panel approves the location of external mine waste disposal sites A, B, E, and H, subject to the normal drilling and mine pit wall refinements conducted in conjunction with finalizing the annual mine plan submission to the EUB. The Joint Panel approves the reconfigured plant site subject to Imperial Oil completing additional site evaluation. Imperial Oil must advise the EUB of any plant site changes and outline the plans to mine additional areas as compensation for the changes required. The Joint Panel approves the main access corridor subject to the relocation commitments made by Imperial Oil. The Joint Panel approves in principle the location of external mine waste sites F and G and the ETA, subject to the following conditions:

- Imperial Oil will consult with the impacted OSL holders and the EUB to develop an acceptable resource appraisal drilling program to be completed by the end of the 2008/2009 drilling season.
- Imperial Oil will work with the EUB to determine the economic resource potential and recovery plans for these areas prior to finalizing agreements.
- Imperial Oil will finalize the agreements with adjacent OSL holders regarding all resource and land-use related concerns arising from the impact of the KOS Project facilities upon adjacent OSL holders no later than 2010. Imperial Oil is required to consult with both the EUB and SRD prior to the finalization of these agreements.
- Imperial Oil will work with Husky and the EUB and submit a mining and SAGD impact report to the EUB no later than the end of 2009. This report will include the effects of steam pressure upon geotechnical factors of safety for external mine waste disposal facilities. It will also include the effects of mining and SAGD operations upon resource recovery at common lease boundaries.

The Joint Panel is not prepared to approve the potential raw water storage site and external mine waste site C at this time, as there is insufficient resource appraisal drilling information available to permit a full evaluation of the resource potential under these sites. The Joint Panel therefore directs Imperial Oil to fulfill the following conditions related to these two sites:

- Imperial Oil will consult with the impacted OSL holders and the EUB to develop an acceptable resource appraisal drilling program to be completed by the end of the 2008/2009 drilling season.
- Imperial Oil will work with the EUB to determine the economic resource potential and recovery plans for these areas prior to finalizing agreements.
- Imperial Oil will finalize the agreements with adjacent OSL holders, the EUB, and SRD regarding all resource and land-use related concerns arising from the impact of the KOS Project facilities upon adjacent OSL holders no later than 2010.
- Imperial Oil will work with the government agencies to define the content and work required to support an amendment to the EUB approved project area as shown in Figure 1. An application must be submitted to the EUB for approval of an increased project area that includes external disposal site expansion and a raw water storage area.

The Joint Panel believes that there is insufficient drilling to properly evaluate the resource potential associated with the proposed raw water pipeline routes. The Joint Panel directs Imperial Oil to work with the EUB to define the required drilling and analysis needed to evaluate any routes under consideration for the raw water pipeline and to file the appropriate pipeline

application once this work is completed. The Joint Panel expects Imperial Oil to consult with the EUB on the normal fine-tuning of all external disposal sites and utilities as development plans proceed.

With respect to mining at common mine lease boundaries, the Joint Panel notes that Imperial Oil is committed to finalizing plans with adjacent OSL holders to maximize resource recovery at these boundaries. The Joint Panel believes that lease boundary mining plans must be in place well in advance of mining to allow for a workable mine plan, including tree clearing, placement of ditches, dewatering of muskeg, location or relocation of infrastructure, and incorporation of material volumes. The Joint Panel believes that a full consideration of mining details and alternatives is required at least five years prior to commencement of mining at the lease boundary to provide adequate time to resolve any outstanding issues. The Joint Panel therefore directs Imperial Oil to submit to the EUB for its review and approval, five years prior to mining at any common lease boundary, a report containing

- a comprehensive evaluation of the lease boundary geology and reserves,
- geotechnical conditions,
- alternative mining scenarios and impacts,
- associated costs in accordance with Section 3.1 of EUB *ID 2001-7*,
- the final results on agreements reached between Imperial Oil and adjacent leaseholders,
- any impacts on landform design and drainage, and
- efforts made by Imperial Oil to enhance cross-boundary coordination of mining and closure.

In addition, the Joint Panel directs Imperial Oil to provide as part of its annual mine plan reporting an update of its efforts to coordinate mine and closure plans with other operators in terms of landform design, drainage, reclamation, and material balances.

## **10.2 External Tailings Area**

### **10.2.1 Views of Imperial Oil**

Imperial Oil proposed several out-of-pit (external) structures, including an ETA. Imperial Oil stated that it had evaluated five locations and selected the proposed location for the ETA based on its consideration of environmental, resource sterilization, and economic factors.

Imperial Oil stated that the ETA would be constructed with starter dikes of overburden soil, followed by upstream constructed sand cells stepping over beached sand tailings. The conceptual design of the ETA was based on a final crest elevation of 415 m and a pond elevation of 412 m. Based on preliminary stability analyses, the overall downstream slopes in both the overburden and sand dikes were 6 horizontal to 1 vertical (6H:1V), with dike heights ranging between 35 m and 95 m above grade.

Imperial Oil stated that the foundation conditions beneath the ETA consisted of relatively thin glacial clays overlying thick, relatively permeable, quaternary sand and gravel deposits ranging in thickness between less than 10 m to greater than 40 m. Imperial Oil noted that the main sands were laterally extensive and were expected to have predominantly horizontal groundwater flow within them. Imperial Oil said that based on the known surface and subsurface condition at the

ETA, there was potential for seepage from the ETA into the underlying surficial granular deposits. Imperial Oil stated that its understanding of these deposits was not complete and that information gaps would be supplemented by additional investigation. It added that these surficial deposits were shown to be underlain by the less permeable McMurray Formation.

Imperial Oil indicated that ETA seepage would need to be captured in order to maintain acceptable water quality levels in surrounding water bodies to the north, including the Firebag River and its three main tributaries. Imperial Oil predicted that seepage rates as much 1000 litres per second could occur when the pond was at the design elevation and the proposed seepage mitigation was in operation.

Imperial Oil stated that its proposed seepage mitigation would consist of a seepage collection ditch around the ETA perimeter and seepage interception wells beyond the ditch. Imperial Oil's preliminary conceptual modelling indicated that in order to capture the seepage, interception well spacing could range between 50 m and 250 m around the ETA's northeastern, northern, and northwestern perimeters. It noted that dewatering well locations could vary based on site-specific characteristics and that the detailed design would be based on additional (ongoing) monitoring well installation and pumping tests and detailed groundwater modelling. Imperial Oil stated that it expected the seepage mitigation plan would operate until closure in 2065, and beyond then if necessary.

Imperial Oil stated that the concept of interception wells was conventional and proven technology, which had been approved as a seepage mitigation strategy in the oil sands mining industry. However, Imperial Oil also indicated that groundwater and surface water quality monitoring during operation of the ETA would provide information to confirm the effectiveness of the interception wells during operations. Imperial Oil stated that should the interceptor wells not be operating as predicted, the groundwater monitoring system would facilitate early warning and allow measures to be implemented, which could consist of one or more of the following:

- optimization of pumping rates of existing interceptor wells to address new conditions,
- conversion of monitoring wells to additional interceptor wells,
- installation of additional interceptor wells, and
- earlier installation of the tributary wetlands north of the ETA.

Imperial Oil stated that a detailed groundwater monitoring plan for the KOS Project, including the area north of the ETA, would be prepared to support the *EPEA* approval. Imperial Oil also stated that it would work with AENV to determine the appropriate threshold values that must be met by the seepage control management system. Imperial Oil stated that it was committed to monitoring water and sediment quality through the Regional Aquatics Monitoring Program (RAMP) and through *EPEA* conditions.

### 10.2.2 Views of the Joint Panel

The Joint Panel notes that the proposed location of the ETA overlies permeable surficial deposits that will likely be the primary pathway for transmission of process-affected tailings water from the ETA. The Joint Panel also notes that if unmitigated, this seepage will likely impact surface water bodies to the north, specifically the Firebag River and its three tributaries, and that groundwater and surface water quality could degrade. The Joint Panel notes that Imperial Oil's



understanding of these surficial deposits is not complete, especially as it pertains to the extent of the deposits north of the ETA. The Joint Panel therefore recommends that Alberta require a detailed hydrogeological investigation for the ETA site, including updated seepage modelling and mitigation design, as part of the detailed dike design required pursuant to the *Dam Safety Regulations*.

The Joint Panel is confident that Imperial Oil's commitment to monitor the effectiveness of the proposed seepage interception system will provide the means to assess whether alternative or additional mitigation will be required. The Joint Panel expects that Imperial Oil will work closely with Alberta in developing its detailed groundwater monitoring plan for the KOS Project. The Joint Panel notes Imperial Oil's commitment to work with AENV to determine the appropriate threshold values that must be met by the seepage control management system.

The Joint Panel believes that the ETA will not have any significant adverse environmental effects if the Joint Panel recommendations and the mitigation measures proposed by Imperial Oil are implemented.

### **10.3 Overburden Disposal Areas**

#### **10.3.1 Views of Imperial Oil**

Imperial Oil stated that a number of overburden disposal areas would be required for the permanent storage of material over the life of the project. Several out-of-pit or external disposal locations would be required in addition to the disposal areas located in the mined-out pit.

Preliminary design indicated that the external overburden disposal areas could be constructed at most locations to heights ranging between 40 m to 80 m, with overall slopes of 4H:1V. Setbacks from the toe of the disposal area to the final pit crests would range between 100 m and 400 m. Imperial Oil stated that flatter slopes would be required at external disposal locations overlying Clearwater clay foundations in order to meet geotechnical stability requirements.

#### **10.3.2 Views of the Joint Panel**

The Joint Panel understands that further geotechnical drilling will be completed within the overburden disposal areas prior to the geotechnical designs being finalized. The Joint Panel directs Imperial Oil to submit the detailed geotechnical designs for all external overburden disposal areas to the EUB at least six months prior to conducting any field preparation in these areas.

### **10.4 Bitumen Recovery and Solvent Loss**

#### **10.4.1 Views of Imperial Oil**

Imperial Oil stated that it had selected a low energy extraction (LEE) process capable of operating at temperatures between 35°C and 50°C. It noted that the process would initially incorporate primary separation vessels and secondary flotation units, with the addition of cyclones and more flotation cells after 12 years of operation. Imperial Oil stated that it had designed its extraction process both to achieve the EUB bitumen recovery target and to conserve energy. It committed to meet the *ID 2001-7* bitumen recovery requirements.

Imperial Oil stated that it understood that *ID 2001-7* outlined the minimum resource recovery guidelines and it planned to continuously strive to improve the recovery of economic resource above the minimum guidelines. It indicated that it would continue to conduct research to improve ore processing efficiency and would evaluate incorporating new technologies into its plans once they had been commercially proven.

Imperial Oil stated that solvent would be recovered from the froth treatment tailings in a tailings solvent recovery unit (TSRU) prior to discharge to the tailings pond. It committed to maintaining solvent losses from the TSRU to less than or equal to 4 volumes per thousand volumes of bitumen production on an annual average basis. Imperial Oil also stated that it would not discharge untreated froth treatment tailings to the tailings disposal area.

Imperial Oil stated that it would work with EUB staff at the plant design stage to develop measurement plans that would satisfy the requirements of *ID 2001-7*.

#### **10.4.2 Views of the Joint Panel**

The Joint Panel expects oil sands developers to use extraction technology that will maximize resource recovery and reduce energy and water consumption. The Joint Panel believes that Imperial Oil will meet these goals through the use of the LEE process. The Joint Panel is satisfied that the proposed extraction process will meet the bitumen recovery requirements specified under *ID 2001-7*.

The Joint Panel acknowledges Imperial Oil's commitment to limit annual average solvent losses from the TSRU to not more than 4 volumes per 1000 volumes of bitumen production. In order to be consistent with the current industry standard pertaining to solvent losses, the Joint Panel directs that on an annual average basis, Imperial Oil must limit site-wide solvent losses to not more than 4 volumes per 1000 volumes of bitumen production under all operating conditions. The Joint Panel also directs Imperial Oil not to discharge untreated froth treatment tailings to the tailings disposal area.

The Joint Panel accepts Imperial Oil's commitment to work with EUB staff at the plant design stage to develop measurement plans. The Joint Panel directs that one year prior to plant start-up, Imperial Oil must provide measurement plans to the EUB for review and approval, including process and instrumentation diagrams, metering, sampling methods, and material balance procedures that satisfy the requirement of *ID 2001-7*.

The Joint Panel concludes that the proposed extraction process and solvent losses are unlikely to result in significant adverse environmental effects, provided that the proposed mitigation measures and Joint Panel recommendations are implemented.

### **10.5 Asphaltene Rejection**

#### **10.5.1 Views of Imperial Oil**

Imperial Oil stated that it had selected a high-temperature paraffinic solvent froth treatment process. The key features of the selected technology were the ability to produce a high quality marketable bitumen product that would also meet pipeline quality specifications. Imperial Oil noted that the required bitumen quality could be achieved by rejecting asphaltene from the

bitumen froth feed and still maintain a corresponding maximum asphaltene content in the bitumen product.

Imperial Oil indicated that preliminary analysis of core data suggested the range of asphaltene in the bitumen to be between 16 and 24 mass per cent. Imperial Oil proposed a range of 8 to 12 mass per cent asphaltene rejection based on bench and pilot scale testing and marketability assessment of the bitumen product.

Imperial Oil stated that typically rejection of 5 mass per cent of the asphaltene was required to meet standard pipeline specification. It indicated that it may reject additional asphaltene volumes to maximize the value of the bitumen resource without compromising the acceptability of the resulting product to be processed in existing upgraders. Imperial Oil noted that the proposed higher range of asphaltene rejection was not intended to be a long-term average, but was selected to provide the flexibility to deal with areas where asphaltene content could be higher.

Imperial Oil stated that it would accept a condition in its approval limiting asphaltene rejection to 12 mass per cent and not to exceed 10 mass per cent, based on bitumen production on a three-year average basis.

### **10.5.2 Views of the Joint Panel**

The Joint Panel notes that Imperial Oil has proposed the operation of a high-temperature paraffinic solvent froth treatment process, which would result in asphaltene rejection and disposal of asphaltene as a component of the TSRU tailings. The Joint Panel accepts that higher quality bitumen provides a more marketable product than non-deasphalted bitumen, but is concerned about the increased rejection of asphaltene because it is a potentially usable resource.

The Joint Panel acknowledges Imperial Oil's position that it needs flexibility to deal with mining areas containing bitumen with higher asphaltene content, but it also believes that the rejection of asphaltene should be minimized in order to maximize resource recovery. The Joint Panel is concerned that Imperial Oil's requested approval condition respecting the level of asphaltene rejection may not result in an appropriate recovery of the resource. The Joint Panel notes that the current standard applied to most oil sands operators is that they must meet a limit of 10 mass per cent of asphaltene rejection on an annual average basis. Based on the evidence provided, the Joint Panel does not believe that the resource at the KOS Project is sufficiently different to justify a different standard for Imperial Oil. Therefore, the Joint Panel directs that on an annual average basis, the amount of asphaltene rejection must be limited to 10 mass per cent based on bitumen production.

The Joint Panel believes that the adoption of the froth treatment process proposed by Imperial Oil will not result in significant adverse environmental effects, provided that the recommendations of the Joint Panel are implemented.

## 11 TAILINGS MANAGEMENT

### 11.1 Tailings Technology

#### 11.1.1 Views of Imperial Oil

Imperial Oil stated that its tailings plan was environmentally responsible, was technically and economically viable, had minimum operability uncertainties, and maximized its ability to adapt the process as it continued to develop this technology. Imperial Oil also stated that the plan integrated commercially demonstrated tailings technology with enhancements that were being developed commercially on a larger scale. Imperial Oil further stated that the KOS Project tailings plan included two significant approaches. The first was the rapid reclamation of the ETA by delaying the implementation of consolidated tailings (CT) until CT could be placed in-pit. The second approach included both the use of a tailings thickener when making CT and the recycling of in-pit mature fine tails (MFT) to mitigate periods of time when CT could not be made. Imperial Oil stated that as a result, its MFT inventory at closure would only be about 7 to 10 per cent by volume of what would have resulted without the recycling of in-pit MFT. By recycling MFT, Imperial Oil expected its effective efficiency to be higher than that of operators currently using CT.

Imperial Oil stated that it would not implement CT until in-pit space was available. As a result, it expected to develop substantial knowledge about CT production before CT was implemented through its work with other operators to better understand the operational issues.

Imperial Oil stated it had not reached a decision whether to conduct a CT demonstration test utilizing MFT and thickened tailings to produce a CT deposit. It also stated that the target CT efficiency of 80 per cent indicated in its application was stated for mass balance purposes, but it was confident that it could meet its reclamation targets by attaining a CT efficiency as low as 60 per cent. Imperial Oil believed it was unnecessary to regulate performance criteria on the physical process of CT for the KOS Project.

Imperial Oil stated that there were challenges with setting performance criteria, because tailings production units were required to make sand for other purposes besides CT, such as dikes, beaches, and roads. It also stated that performance indicators for tailings management could include the proper management of MFT inventory, CT production against target, and the trafficability of the CT deposits.

Imperial Oil recognized that concerns were expressed by stakeholders about the viability of CT technology, including the trafficability of the final reclaimed landscape. Imperial Oil noted that the application of CT technology was relatively new, but the technology had been demonstrated on a commercial scale. Imperial Oil stated that it had information about the Syncrude CT prototype facility, a 40 hectare (ha) cell measuring 400 m by 1000 m by 10 m deep, where half of the CT deposit had been successfully sand-capped and half of the sand-capped area (i.e., 10 ha) had been revegetated.

Imperial Oil stated that in the event MFT overages were observed, it planned to evaluate the following options:

- adding the incremental volume of MFT to the EPL if data indicated this was feasible;

- spreading MFT on top of completed CT cells to initiate freeze/thaw dewatering; and
- reforming the MFT to thin fine tails and sending them to the thickener to produce thickened tailings.

Imperial Oil also stated that it intended to investigate the following technologies both as improvements to the CT process and alternative methods to reduce fine tails inventories:

- densification of thickened tailings deposits,
- stacking of cycloned sand,
- dewatering MFT inventories,
- filtering of whole tailings stream,
- improvements to CT facility design, and
- improvements to CT deposition techniques.

### **11.1.2 Views of ACFN**

The ACFN stated that it was concerned about the substantial volumes of water to be taken from the Athabasca River that would be used in the process throughout the project life and would end up in tailings waste.

### **11.1.3 Views of the Joint Panel**

The Joint Panel accepts that Imperial Oil's proposed tailing plan is reasonable based on currently available technology. The Joint Panel is concerned, however, that the use of thickeners to produce CT has not been commercially demonstrated by the industry at this time. The Joint Panel encourages Imperial Oil to demonstrate this technology in a pilot-scale project, either in cooperation with other operators or on the KOS Project site itself, prior to start-up of CT production.

The Joint Panel believes that Imperial Oil's tailings material balance expressed in Tables 2-1 through 4-10 (pages 4-161 through 4-221) of the Supplemental Information submission of March 2006 provides a reasonable method by which to track tailings performance in relation to the tailings management plan. However, the Joint Panel understands that Imperial Oil's estimate of 80 per cent CT system operating availability is not expected on a continuous basis. The Joint Panel expects Imperial Oil to meet its commitment to recycle MFT when necessary to increase the "effective" CT efficiency. The Joint Panel directs Imperial Oil to work with EUB staff to update the data in Tables 2-1 through 4-10 of the mine application so that the EUB can use the data to reliably track Imperial Oil's tailings performance over time. The new material balance should reflect expected CT efficiencies, including expected MFT recycle. The Joint Panel requires Imperial Oil to submit the updated tailings material balances in Tables 2-1 through 4-10 of the application for EUB approval no later than September 30, 2008.

The Joint Panel also directs Imperial Oil to provide the EUB with updates to Tables 2-1 through 4-10 with the annual mine plan. Reporting of actual performance against this plan will be required within one month following the end of each quarter.

The Joint Panel continues to be concerned about the overall tailings performance of the oil sands industry in general; therefore, the Joint Panel believes that it would be appropriate for the EUB to revisit the tailings criteria initiative, as initially discussed in the 2004 Jackpine Mine decision (Joint EUB/Agency *Decision 2004-009*) and further discussed the 2006 Albion Sands decision (Joint EUB/Agency *Decision 2006-128*). The Joint Panel believes that the tailings criteria initiative should attempt to establish tailings performance criteria in a timely fashion and should also recommend consequences for not meeting performance requirements. The Joint Panel recommends that the full Board establish a formal mechanism or taskforce to establish tailings performance criteria and specific enforcement actions on an industry-wide basis.

The Joint Panel concludes that by implementing the proposed tailings technology, supported by Imperial Oil's commitment to MFT recycle and ongoing testing, the KOS Project is unlikely to result in significant adverse environmental effects.

The Joint Panel recognizes Imperial Oil's contribution through Syncrude to developing existing tailings technologies and processes, and it expects Imperial Oil to continue testing these and other technologies to identify further ways to reduce MFT inventory, accelerate pond reclamation, reduce land disturbance, and reduce water consumption. In addition, the Joint Panel expects that any improvements in tailings technology will be immediately incorporated into Imperial Oil's tailings management program.

## **11.2 End Pit Lakes**

### **11.2.1 Views of Imperial Oil**

Imperial Oil stated that EPLs would be inevitable parts of the closure landscape due to the large voids left after mining. Those voids would accept runoff water from the reclaimed landscape and therefore were necessary to ensure that the proper bio-remediation took place so that contaminants would be remediated to acceptable levels. This would be accomplished through bio-remediation, absorption, and dilution. Imperial Oil stated that its conclusion that the retention times it identified would provide sufficient treatment of substances of concern was based on results of water quality modelling and uncertainty analysis used to model the EPLs. It noted that the modelling was based on conservative assumptions, such as slow decay rates, high consolidation rates, and the absence of sorption and settling.

Imperial Oil noted that it had used the huge body of information on experimental EPLs that Syncrude and the Canadian Oil Sands Network for Research and Development (CONRAD) started in the late 1980s and early 1990s. It also stated that the performance of EPLs was of common interest to all oil sands operators and was being investigated by regional groups, such as CEMA's EPL Subgroup (EPLSG). Imperial Oil stated that it was a member of this group and supported the initiatives and studies of the group. Imperial Oil also stated that the results of this and other studies would be used to confirm and augment model predictions and produce guidelines that would form the basis of EPL design, operation, and management to ensure that water quality releases from the lakes would not have adverse effects on aquatic health.

Imperial Oil identified mitigation options and contingencies that could be applied to the EPLs to ensure that by the time discharges took place, the water would be of acceptable quality. Imperial Oil stated that these might include water treatment and that the pit lake system would be part of a remediation adaptive management program. Imperial Oil stated that it would demonstrate that it

was meeting objectives in test pits. It maintained that adequate time existed to progressively apply and incorporate key findings from ongoing research and modelling to resolve uncertainties before and after the first pit lakes were completed.

Imperial Oil stated that it was important to have EPL criteria and performance benchmarks set by the regulators to guide the various companies in making the right decisions with respect to EPL management.

### 11.2.2 Views of Alberta

Alberta stated that substantial progress had been made in reclamation science for aquatic systems including wetlands and EPLs. Alberta noted that management frameworks for these systems were not urgently needed, but work to provide assurance as to wetland and lake operating constraints and performance was considered a top priority.

Alberta noted that although it would be a number of years until the first EPLs were in place in the region, the complexity and uncertainty about their function made it critical that priority be given to ongoing, comprehensive research. In addition, Alberta expected greater attention to be paid to validation of models by providing near-future timelines for the construction of a physical test case in the oil sands area. Alberta stated that any *Water Act* or *EPEA* approval that may be issued for the project may require Imperial Oil to provide a schedule that included the testing of EPL predictions and design features, with a physical test case undertaken in cooperation with other oil sands companies.

### 11.2.3 Views of ACFN

The ACFN stated that it was concerned about the release of process-affected waters from both tailings facilities and EPLs and about the use of dilution as the means to treat these waters. It was also concerned that on a cumulative regional level, many pit lakes would be releasing simultaneously for extended periods of time. The ACFN stated it would like to see performance criteria developed with input from stakeholders, which would also take into consideration the multiple sources and reduced flows in the Athabasca River.

### 11.2.4 Views of the Joint Panel

The Joint Panel notes that the concept of EPLs has been proposed for a number of oil sands projects and that EPLs have been approved subject to successful full-scale demonstration of this reclamation method. The Joint Panel also notes that the CEMA's EPLSG, CONRAD's Fish Tainting group, and others are conducting research to address many of the uncertainties regarding the viability of EPLs and their ability to support higher trophic levels, including fish.

The Joint Panel notes ACFN's concerns with respect to cumulative discharges to the Athabasca River from EPLs; however, the panel expects that the impacts of EPLs will be fully addressed in the studies that are already under way to prove the efficacy of EPLs. The Joint Panel also notes that the decisions on the Shell Jackpine and Canadian Natural Resources Limited (CNRL) Horizon applications requested that the efficacy of EPLs be proven within 15 years following 2003. The Joint Panel expects that an EPL's ability to support higher trophic levels, including what would be the most appropriate species composition of an EPL, will be a part of those determinations.

The Joint Panel agrees with AENV that due to the complexity and uncertainty about EPLs, it is a priority that ongoing, comprehensive research occur now. The Joint Panel supports the use of Syncrude's Base Mine Lake as a test project beginning in 2009. The Joint Panel encourages Imperial Oil to continue to work with Syncrude and other oil sands industry members on developing this demonstration lake to ensure the viability of EPLs as a reclamation concept. The Joint Panel recognizes Imperial Oil's commitment to operating demonstration test pits for EPL objectives. The Joint Panel recommends that Alberta include a requirement for Imperial Oil to provide a research schedule for the testing of EPL predictions and design features in any *Water Act* or *EPEA* approval that may be issued. The Joint panel expects that this testing would include a physical test case that would be conducted by Imperial Oil directly or in cooperation with other oil sands operators.

The Joint Panel will require Imperial Oil to submit to the EUB on an annual basis a report that describes its EPL research and development efforts for the previous year. This report should include all of Imperial Oil's efforts and its contributions to any industry collaboration on a full-scale EPL demonstration. The Joint Panel also expects that Imperial Oil will continue its participation in CEMA's EPLSG and CONRAD's Fish Tainting group.

The Joint panel believes it unlikely that there will be significant environmental effects resulting from the use of EPLs, provided that the proposed mitigation measures and the Joint Panel's recommendations are implemented.

## **12 RECLAMATION**

### **12.1 Reclamation and Renewable Resource Conservation**

#### **12.1.1 Views of Imperial Oil**

Imperial Oil advised that the reclamation approach for the KOS Project's oil sands mine was based on a fully integrated, progressive reclamation plan for the lease area. Imperial Oil stated that it expected this approach would minimize the operation's active footprint and establish a stable, self-sustaining, natural landscape of equivalent land capability. Imperial Oil was confident that it would be able to achieve the reclamation timelines and milestones identified in the supplemental information it provided as part of its applications.

Imperial Oil confirmed that its commitment was to work with all stakeholders, including the First Nations, regulators, and adjacent leaseholders, to achieve a viable, self-sustaining landscape that met stakeholders' needs and regulatory requirements. Imperial Oil stated that discussions with stakeholders on the preferred characteristics and land-use capabilities of the closure landscape were ongoing, in parallel with its participation on CEMA's Reclamation Working Group (RWG). In response to questions from ACFN, Imperial Oil advised that it had been meeting with aboriginal groups to ensure that traditional knowledge was incorporated into the reclamation planning process so that traditional activities could be resumed at closure.

In response to questions from the Joint Panel, Imperial Oil stated that as development proceeded, there needed to be accountability from industry to the regulators on the achievement of the reclamation goals outlined in their applications. Imperial Oil indicated that it expected to be held accountable for the success of its mine development and reclamation plans.



Imperial Oil stated that it understood that stakeholders were concerned about the viability of CT technology and the trafficability of the final reclaimed landscape, but it was confident that it could accomplish its reclamation goals. Imperial Oil observed that the application of CT technology was relatively new but that it had been demonstrated. Imperial Oil advised that 20 ha of Syncrude's CT pilot had been sand-capped and 10 ha had been revegetated to a pasture grass. Imperial Oil concluded that CT worked and that it could be used to establish landforms that could be successfully reclaimed.

Imperial Oil observed that the area around Kearl Lake had been identified as a regionally important ecologically significant area (ESA) for moose. It predicted that on a regional scale the movement of large animals, such as moose and black bear, would likely be negatively impacted by oil sands development. Imperial Oil stated that should Alberta require moose habitat enhancement or movement corridor development, Imperial Oil would work with Alberta and CEMA's working groups to design the most appropriate mitigation strategy.

Imperial Oil stated that based on incidental observations on its KOS Project site and on other adjacent mine projects, it believed the Yellow Rail occurred in low numbers within the Muskeg River drainage basin and adjacent areas. Imperial Oil advised that it had not conducted a predevelopment survey on the KOS Project leases for the Yellow Rail, but that it would do so unless regional initiatives made project-specific surveys unnecessary.

Imperial Oil stated that over 11 000 ha of wetlands would be disturbed during mining. It predicted that reclamation could re-establish close to 5000 ha of wetlands made up of a mix of swamps and marshes. Imperial Oil stated that it had not yet been able to reach agreement with ACFN respecting mitigation for the lost wetlands. It confirmed that the only re-established peat-accumulating formation would be a 383 ha unpatterned fen.

### **12.1.2 Views of ACFN**

The ACFN stated that it was depending on Imperial Oil's assurances that it could mitigate the mine development through reclamation, but that it had become increasingly concerned about the prospects for successfully achieving the stated goals. The ACFN noted that its concerns were due to the absence of proven approaches and the lack of concrete results on other mine projects. The ACFN stated that the ability to reclaim to an upland landscape capable of supporting commercial forestry was in doubt, based upon Syncrude's and Suncor's lack of success to date. The ACFN stated that EPLs were presented as the best available technology to reclaim tailings ponds, but it had not been demonstrated that EPLs would work on a commercial scale. The ACFN was concerned that there were no known technologies to reclaim the wetlands, which are a primary characteristic of the boreal forest.

The ACFN observed that there had been no integrated assessment of the cumulative effects that the various projects in the area may have on Kearl Lake. The ACFN stated that it wished to have discussions with Imperial Oil and other developers to understand the cumulative impact of all the projects affecting Kearl Lake over the lives of the projects.

The ACFN stated that the KOS Project would result in a significant loss of biodiversity, which would persist, since there was no proven methodology for restoring affected wetlands. The ACFN stated that reclamation could not restore the existing landscape. It believed that the rivers,

wetlands, and vegetation communities would not return to anything resembling the predevelopment conditions.

The ACFN stated that the KOS Project would result in the loss of a large area of wildlife habitat, which would affect the viability of moose populations in the Muskeg River and Kearl Lake areas. The ACFN requested that any *EPEA* approval granted to Imperial Oil require the re-establishment of wildlife on reclaimed lands and mitigation of the loss of moose habitat with compensatory offsets. The ACFN further requested that any approval provide for wildlife movement corridors and monitoring to verify the effectiveness of the movement corridors.

### **12.1.3 Views of DKFN**

The DKFN expressed concern about the effect that oil sands development was having on waterfowl and other migratory birds in its traditional use area. The DKFN requested modifications to the oil sands development to reduce the impacts on its traditional use areas.

### **12.1.4 Views of the Clearwater Band**

The Clearwater Band stated that neither Imperial Oil nor Alberta had met with it to discuss its members' resource issues. The Clearwater Band stated that the Athabasca Lake delta was no longer able to sustain the abundant wildlife and food supply for its aboriginal members.

The Clearwater Band requested the Joint Panel recommend a mitigation strategy to ensure that wildlife would be sustainable over the life of the KOS Project.

### **12.1.5 Views of WBFN**

The WBFN stated that wildlife, particularly moose, was in very short supply because of the high level of disturbance throughout the region, resulting in its members having a difficult time maintaining their traditional lifestyle.

### **12.1.6 Views of OSEC**

OSEC stated that the early modelling results from the Regional Terrestrial and Wildlife Management Framework being developed by CEMA's Sustainable Ecosystem Working Group (SEWG) suggested that it would not be possible to implement the predicted long-term level of development and maintain indicators like woodland caribou and old growth forests. OSEC believed that the SEWG terrestrial modelling painted a very different picture of what would happen to the lands and wildlife than what Imperial Oil presented. OSEC observed that the SEWG co-chairs recently indicated in a presentation to the Alberta Government that a few small tweaks to "business as usual" would not address the anticipated problems.

OSEC advised that the SEWG work plan objective to recommend terrestrial management objectives and strategies had been delayed to 2008. It stated that there was a risk that project approvals in the meantime could permit environmental impacts that exceeded the environmental thresholds that may ultimately be recommended by SEWG.

OSEC believed that Imperial Oil should be required to mitigate terrestrial impacts and it requested that Alberta set interim management objectives for wildlife and landscapes, as well as

regional compensation for wetlands. OSEC advised that it was essential that effective biodiversity monitoring be incorporated into project management.

OSEC stated that its expectation for effective terrestrial mitigation was the establishment of full offsets for the disturbance footprint of each oil sands project. OSEC recommended that Imperial Oil be required to provide three hectares of offset for each hectare disturbed. OSEC stated that offsets could, much like the No Net Loss approach under the federal *Fisheries Act*, involve the creation of new habitat or the preservation or acquisition of endangered habitats elsewhere through the purchase of private land.

OSEC stated that due to the rapid pace of development, the region was rapidly running out of options to identify ecological benchmark sites in the RMWB. OSEC added that forest areas proposed in the application to benchmark against reclamation had no security or recognition by government regulators. OSEC recommended that Alberta provide legislated protection for benchmark areas.

#### **12.1.7 Views of MCFN**

The MCFN stated that it had an agreement with Imperial Oil that would give it the opportunity to be involved in the reclamation planning for the KOS Project, including the incorporation of traditional knowledge.

The MCFN stated that attainment of CT performance targets would be essential to ensure the ability to create a foundation for the closure landscape and that tailings management and EPLs would be pivotal elements to overall reclamation success.

#### **12.1.8 Views of Canada**

Canada stated that based on SEWG environmental modelling conducted to date, it would not anticipate drastic changes to terrestrial ecosystems before the completion of the Regional Terrestrial and Wildlife Management Framework in 2008. Canada stated that the SEWG modelling of terrestrial ecosystem indicators predicted impacts based on existing regional development plans. It explained that additional development would likely result in impacts on wildlife, especially caribou habitat and populations. Canada stated that SEWG's early modelling results showed potential declines in most of the environmental indicators. It predicted that the level of mitigation currently proposed would not prevent the decline of indicators due to the cumulative effects of regional development.

EC requested that the Joint Panel recommend that Imperial Oil conduct a region-wide census of the Yellow Rail, in cooperation with other oil sands companies. EC stated that this information would assist both with the development and application of effective mitigation measures to avoid or lessen impacts and with the design of monitoring programs and the measurement of reclamation success.

EC recommended that Imperial Oil avoid land clearing during the period of April 1 to August 30 of each year. EC also recommended that the Joint Panel require CEMA to develop and incorporate biodiversity monitoring within an integrated environmental monitoring approach.

### 12.1.9 Views of Alberta

Alberta confirmed that the reclamation process must include recontouring of the landform, placing the reclamation cap on the landform, and establishing a self-sustaining vegetative cover. Alberta further stated that a landform would be considered for reclamation certification once regulators had determined that the designated land-use capability had been achieved.

Alberta stated that it supported reclamation being completed in a timely and progressive manner for all mining projects. Alberta observed that there was a risk that current land conservation and reclamation practices, especially the salvage and replacement of soil, may not meet all of Alberta's end land-use objectives for reclamation. Alberta stated that soil was a valuable resource and its salvage and wise use were key to successful reclamation. Alberta requested that the EUB support it in requiring immediate improvements to material handling to enhance reclamation. Alberta stated that any *EPEA* approval or public land disposition issued for the KOS Project may require Imperial Oil to adopt the following improvements to current conservation and reclamation practices:

- priority use of upland soil in reclamation, where available, rather than the peat/mineral mixes currently used in reclamation;
- separate salvage of all upland surface material, including the forest floor, as defined in the document *Soil Quality Criteria Relative to Disturbance and Reclamation*;
- salvage of good over fair subsoil, as defined in the *Soil Quality Criteria* document;
- increases in the minimum and average depth of replaced peat/mineral mixes, where it must be used;
- participation in a multistakeholder process to develop best management practices for reclamation in the oil sands region; and
- participation in a multistakeholder program to develop a comprehensive framework for measuring and determining reclamation performance.

Alberta stated that two of the objectives for wildlife within the Mildred-Kearl Lakes Resource Management Area of the Integrated Resource Plan was to maintain moose habitat and to rebuild the wintering moose population. Alberta noted that reclamation techniques to replace moderate to high moose wintering habitat typical of the KOS Project area had not been proven. Alberta advised that further research may be required to determine optimal reclamation criteria for moose habitat. It stated that any *EPEA* approval or public land disposition that may be issued for the KOS Project may also require Imperial Oil to

- develop protocols for monitoring biodiversity and wildlife on reclaimed landscapes using standardized protocols, preferably developed through a multistakeholder organization such as the RWG of CEMA;
- develop reclamation criteria for high and moderate moose habitat;
- incorporate moose habitat targets in reclamation planning, and achieve enhanced moose habitat over that identified in the existing and approved case; and
- monitor the success of reclamation in the re-establishment of moose habitat, and respond using adaptive management to enhance moose habitat on reclaimed lands and adjacent areas to ensure that predictions of success would be met.

### 12.1.10 Views of the Joint Panel

The Joint Panel believes that reclamation is an important regional issue with uncertainties that require adaptive management for resolution. The Joint Panel supports Alberta's recommendation to immediately modify reclamation requirements to enhance reclamation. The Joint Panel notes that Alberta will lead a regional committee to develop best management practices for reclamation in the mineable oil sands region. The Joint Panel recommends that Imperial Oil actively support this initiative.

The Joint Panel expects Imperial Oil to be an active participant on CEMA committees to assist with the development of effective wildlife habitat reclamation, regional wildlife management, and peat-forming wetland reclamation strategies to address stakeholder concerns. The Joint Panel also expects Imperial Oil to implement all CEMA reclamation and land management strategies approved by Alberta.

The Joint Panel observes that reclamation and reclamation performance are critical to returning mined lands to their end use capability. The return of those lands to acceptable condition within established time frames is required in the public interest. The Joint Panel agrees with Imperial Oil's proposal that the development approval contain the necessary milestones. The Joint Panel expects Imperial Oil to maintain the timelines for project development, including the achievement of CT targets and related reclamation milestones consistent with the dates and areas proposed in its application.

The Joint Panel supports Alberta's recommendations to implement approval requirements for the development and implementation of criteria for moose and other wildlife habitat reclamation, regional wildlife management, biodiversity, and wetland reclamation strategies. These strategies would provide industry and government with the resource stewardship guidance sought by stakeholders.

The Joint Panel notes EC's concern that the Yellow Rail (listed in the *Species at Risk Act* as a species of "special concern") may be affected by the intensity of regional development. The Joint Panel recommends to Alberta that within the next two years AENV, in collaboration with EC, coordinate a regional review of the cumulative impacts on the Yellow Rail in the oil sands region, using appropriate regional nocturnal surveys in areas of potentially suitable habitat. The initiative should determine mitigation options to minimize the impacts on the Yellow Rail. The Joint Panel recommends to Alberta that AENV establish requirements within any *EPEA* approval to implement the findings of the Yellow Rail initiative for surveys, determination of effects, and mitigation strategies where appropriate. The Joint Panel expects Imperial Oil to implement effective Yellow Rail predevelopment surveys and habitat mitigation strategies in its reclamation plans, unless these matters are being addressed on a regional basis.

The Joint Panel recommends that AENV require Imperial Oil to avoid land clearing during the period of April 1 to August 30 of each year due to potential impacts to migratory bird species.

The Joint panel encourages Imperial Oil to continue meaningful consultation with affected aboriginal communities and stakeholders. The Joint panel recommends that Imperial Oil continue to work with stakeholders to mitigate their concerns wherever it is reasonable and appropriate to do so.

The Joint Panel concludes that by implementing the mitigation measures and recommendations proposed, the KOS Project is unlikely to result in significant adverse environmental effects on terrestrial resources.

## **12.2 Reclamation Liability**

### **12.2.1 Views of Imperial Oil**

Imperial Oil stated that it was confident that it would be able to deliver reclamation at the rate presented in its application. Imperial Oil stated that public confidence would be reinforced when the public understood that companies were executing their plans and being held accountable to their plans.

Imperial Oil stated that there was a security regime in place requiring Imperial Oil to post a bond based on an annual estimate of its potential reclamation liability. Imperial Oil stated that it understood that a Mine Liability Management Program (MLMP) was being developed by Alberta. Imperial Oil acknowledged that it must comply with any new MLMP that Alberta implemented. Imperial Oil further stated that it understood there would be transparency and consultation about how the MLMP process would be administered.

### **12.2.2 Views of MCFN**

The MCFN stated that it was concerned about gaps in the current security program that left the public unprotected and about the lack of transparency surrounding the calculation of liabilities. The MCFN argued that security requirements must be based on the full long-term costs related to the re-establishment of equivalent ecosystem capability and function. It stated that liability assessments of key elements of mine development were missing from the existing program, including no assessment of the liabilities associated with plant decommissioning, which could eventually cost Albertans billions of dollars. The MCFN stated that it was concerned that the return of security was based on the movement of material rather than the issuance of reclamation certificates.

The MCFN understood that a new MLMP was under development, but it was concerned about the lack of transparency and consultation with stakeholders to date. The MCFN requested that the Joint Panel recommend to Alberta that full disclosure of the information and determinations used to calculate the required security be included in the new program. The MCFN asked that if changes to regulations were required to permit full disclosure, the Joint Panel recommend to Alberta that it make those amendments without delay.

### **12.2.3 Views of OSEC**

OSEC stated that it was concerned about the inadequacy of reclamation security and the risk that this would leave for Albertans if Imperial Oil defaulted on its reclamation responsibilities. OSEC stated that greater transparency was required respecting the security formulas and how the security numbers were created. OSEC stated that security estimates should be validated by an independent third party and made publicly available.

OSEC argued that more work needed to be done to resolve the uncertainty surrounding tailing performance. OSEC stated that the current strategy of returning reclamation security to

companies before the reclamation work had been audited or certified was not an appropriate practice. OSEC requested that the Joint Panel recommend that this process be stopped.

OSEC stated that it understood that the Alberta Government was working on a new MLMP and that a draft program was being prepared, but it was also concerned because it had not seen the draft MLMP. OSEC stated that it understood consultation had occurred between industry and government but that no other stakeholders had been afforded the same opportunity.

#### **12.2.4 Views of Alberta**

Alberta stated that the disclosure of liability assessment information needed to balance third-party needs to assess the adequacy of the amount bonded with the proprietary significance of that information. Alberta stated that security requirements were reassessed annually based on reclamation work done and on reclamation and monitoring work still required. Alberta noted that annual approvals would be required on an ongoing basis until certification was issued.

Alberta acknowledged that an MLMP had been under development for about two years. Alberta stated that regulatory agencies were working on a proposal and that a decision from the government on the next steps in the process was expected by July 2007. Alberta believed that there would be consultation with stakeholders on the program before it was finalized.

Alberta indicated that until the government approved the MLMP, the current reclamation security program would apply to the KOS Project. Alberta stated that if there were a change in requirements as a result of a new MLMP, the new requirements would apply to the KOS Project from that point forward.

#### **12.2.5 Views of the Joint Panel**

The Joint Panel acknowledges that the current security program does not require a deposit or the posting of security with respect to total project liabilities and that work is under way to address any shortcomings in the existing program. It is the Joint Panel's view that a liability management program should provide a financial mechanism for the funding of total project liabilities, including decommissioning of project facilities, reclamation/remediation of all disturbed lands, and any end-of-project-life monitoring that may be required for a project. The Joint Panel expects that Imperial Oil will fully comply with the new MLMP when it is implemented and that it will meet the disclosure obligations of that program.

### **12.3 Coordination of Mine Plans Across Lease Boundaries**

#### **12.3.1 Views of Imperial Oil**

Imperial Oil stated that individual project plans were required under the existing oil sands regulatory requirements. Imperial Oil recognized the importance of integrating adjacent project reclamation and watershed management plans within a broader context. Imperial Oil said that it had incorporated the coordination of watershed management plans and reclamation plans into its agreements with Syncrude and Shell.

Imperial Oil stated that the KOS Project's closure drainage plan had been developed taking into consideration closure plans of adjacent oil sands leaseholders. It had engaged in discussions with

adjacent oil sands leaseholders to develop an understanding of their future closure plans and to share information about the KOS Project's closure plan. This information sharing had provided the basis for development of an integrated regional closure plan.

### 12.3.2 Views of ACFN

The ACFN stated that reclamation integration was a long-standing issue that still remained unresolved and had become more critical because of the additional mining proposed for the Muskeg River watershed and Kearl Lake area. The ACFN observed that drainage patterns in the area would need to be completely rebuilt to provide a flow pattern that supported the pit lakes.

### 12.3.3 Views of Alberta

Alberta stated that reclamation should be planned and carried out at the KOS Project, adjacent leases, and at regional levels to produce seamless and less fragmented reclaimed landscapes. Alberta noted that to date the level of integration had not been as effective as needed and there had been challenges getting oil sands operators to work on common time frames or within a common regional framework. Alberta noted that the integration of proposed landforms and drainage between mine project areas and across lease boundaries had been raised as an issue at CEMA's RWG.

Alberta stated that it expected reclaimed landscapes to have a natural appearance and function consistent with boreal forest. Alberta observed that coordinating reclamation between adjacent oil sands mine developments was necessary to ensure the continuity and integration of drainage, landform design, and vegetation patterns, to manage runoff water from reclaimed land, and to coordinate the end land-use plans on a regional basis.

Alberta stated that coordinating reclamation could help to optimize the conservation, use, and storage of valuable surface soil resources. Alberta stated that any *EPEA* approval issued for the KOS Project may require Imperial Oil to have discussions with other oil sands operators on the feasibility of sharing reclamation materials between adjacent leases and to participate in any oil sands mine cooperative that may be formed to share reclamation material.

Alberta recommended that the Joint Panel require Imperial Oil to coordinate drainage, landform design, and vegetation patterns across lease boundaries and to demonstrate the success of these coordination efforts. Alberta requested that the Joint Panel encourage Imperial Oil to discuss use, sharing, and scheduling of surface reclamation material with adjacent oil sands mine operators in a timely manner to ensure the viability of seeds and vegetative propagules.

Alberta also stated that any *EPEA* approval that may be issued for the KOS Project may require Imperial Oil to

- prepare an end land-use plan that demonstrated the integration of drainage and landform design across lease boundaries;
- participate in and work cooperatively with any regional-level end land-use working groups, and
- develop preliminary design elevations within a specified period of time.



Alberta observed that the project coordination requirements would require communication and cooperation among Imperial Oil, the EUB, and Alberta.

#### **12.3.4 Views of the Joint Panel**

The Joint Panel acknowledges and fully supports the need for coordination of mine, landform, water management, and reclamation plans both within and across lease boundaries. The Joint Panel recommends that Alberta, with the support of the EUB, establish a process or taskforce to develop a mechanism to ensure that the coordination of mine, landform, water management, and reclamation plans occurs on an industry-wide basis, both within and across lease boundaries. The Joint Panel expects Imperial Oil to participate in and comply with recommendations of the taskforce. The Joint Panel believes that this initiative should be given high priority by Alberta.

### **13 AIR EMISSIONS**

#### **13.1 Views of Imperial Oil**

Imperial Oil stated that no credible arguments disputing the completeness, reasonableness, or comprehensive nature of the EIA were made in the proceeding. Therefore, it maintained that the EIA's conclusion (based on using the mitigation proposed) that the KOS Project would not result in unacceptable adverse environmental impacts was uncontested.

Imperial Oil stated that the project was expected to increase regional NO<sub>x</sub> emissions by 11 per cent from both stationary sources and the mobile mine fleet. Imperial Oil proposed to mitigate NO<sub>x</sub> emissions by

- meeting or exceeding the Canadian Council of Ministers of the Environment (CCME) guidelines for stationary sources through optimized combustion control, including the use of low-NO<sub>x</sub> burners;
- purchasing and operating the mine fleet to meet or exceed the regulations in place at the time of purchase; and
- participating in AENV's Best Available Technology Economically Available (BATEA) study for stationary sources.

Imperial Oil stated that federal initiatives were currently under way to introduce Tier IV emissions standards between 2011 and 2015 and the use of low-sulphur diesel fuel for large off-road vehicles by 2010. This would reduce NO<sub>x</sub> and sulphur emissions by 38 and 97 per cent respectively. In light of this benefit, Imperial Oil stated that it would continue to pursue opportunities to implement Tier IV and use low-sulphur diesel in advance of regulatory requirements.

Imperial Oil objected to EC recommendations regarding research and implementation of aftertreatment equipment for large off-road equipment. Imperial Oil stated that ad hoc solutions would compromise engine performance and reliability and ultimately lead to higher emissions. Imperial Oil stated that it would be more appropriate to pursue NO<sub>x</sub> reduction by allowing engine manufacturers to design engines that could safely and effectively meet the Tier IV emissions standards using the most appropriate combination of technologies.

Imperial Oil stated that the KOS Project would result in a 6 per cent increase in acid forming compounds over the existing and approved case (EAC). It also stated that it would continue its participation in regional initiatives such as CEMA's NO<sub>x</sub>/SO<sub>x</sub> Management Working Group (NSMWG) and Wood Buffalo Environmental Association's (WBEA's) Terrestrial Environmental Effects Monitoring (TEEM) program.

Imperial Oil stated that it would incorporate the following management and monitoring initiatives as part of its project:

- CEMA working groups (NSMWG and the Trace Metals, and Air Contaminants Working Group [TMAC]),
- WBEA air monitoring and air emissions assessments,
- TEEM, which monitors for air emissions effects on vegetation and soils in the region,
- Human Exposure Monitoring Committee, and
- a leak detection and repair program (LDAR), consistent with the CCME code of practice for control of fugitive emissions.

Imperial Oil stated that it did not have a greenhouse gas (GHG) management plan specifically for the KOS Project. However, globally in conjunction with ExxonMobil, a substantial effort was being made to address GHGs through its Global Energy Management System. This manifested itself through the relentless pursuit of energy efficiencies at the operational level, as well as research into GHG reduction for downstream emissions. Imperial Oil also stated that when provincial and/or federal GHG regulations were in place, it was confident that it would meet all requirements.

In regard to modelling predictions, Imperial Oil did not accept EC's and OSEC's views that the EIA air assessment could not be compared to the monitored values, did not assess developed areas, and should have included a fourth present-day scenario. Imperial Oil stated that monitored ambient values were evaluated against the CALPUFF air quality dispersion model and the results were clearly shown. Furthermore, developed areas were included in a variety of assessments for effects on water, soils, vegetation, and human health. Specific to the fourth present-day modelling scenario, Imperial Oil expressed the view that it would be of limited value by only giving a snapshot in time that could not be carried forward through time like the other scenarios.

### **13.2 Views of ACFN**

The ACFN expressed concern generally about potential effects from air pollution on its traditional lands and on human health, particularly regional nitrogen emissions, which it expected would increase dramatically from current rates, effectively doubling the rate seen in 1990.

### **13.3 Views of OSEC**

OSEC stated that overall project emissions of the primary air pollutants were predicted to increase between 6 and 15 per cent. Sulphur emission increases were not as dominant as in the past, while nitrogen emissions had moved to the forefront in terms of regional concern. OSEC argued that this increase in primary pollutants would certainly change the air quality and increase

the amount of secondary pollutants, such as ozone, fine particulate matter (PM<sub>2.5</sub>), and acid deposition in the region.

OSEC pointed to Imperial Oil's failure to have a GHG management plan specific to the KOS Project, as set out in the KOS Project's terms of reference, when some of the other oil sands operators had committed to targets to reduce and offset GHG emissions by 50 per cent compared to their planned start-up emissions.

OSEC recommended the following to address climate change and air quality issues:

- Imperial Oil be required to reduce and/or offset the project GHG emissions at start-up significantly below the project's planned emission level and to progressively tighten them so as to achieve net zero emissions (carbon neutral) production by 2020;
- AENV define the KOS Project as a new project that would be required to meet any new standards coming out of the BATEA study;
- as an approval condition, Imperial Oil be required to incorporate best available demonstrated technology (BADT) equivalent to achieve the 1998 California standard using ultra-low-NO<sub>x</sub> burners and selective catalytic reduction (SCR) technologies;
- AENV amend the terms of reference to include an approach that assesses the significance of air quality in relation to current guidelines, reflecting the principle of keeping clean areas clean everywhere, including developed areas;
- Imperial Oil include the fourth present-day modelling scenario in future EIAs;
- AENV place a spatial limit on the modelled areas exceeding the Alberta Acid Deposition Framework; and
- EC complete new scientific modelling using state-of-the-art regional scale models for both ozone and secondary PM<sub>2.5</sub> and publish the results by 2006.

### 13.4 Views of DKFN

The DKFN expressed general concern about air emissions from the oil sands that it believed reached its traditional lands located only 500-650 km away. The DKFN stated that the air had been filled with haze at times, and it believed that this was associated with emissions from the oil sands projects in the Fort McMurray area.

The DKFN stated that its concerns extended to Wood Buffalo National Park, due to the park's close proximity to the oil sands region, and more specifically, the possibility of air emissions reaching the nesting sites of the Whooping Crane, which was on the endangered species list.

The DKFN stated that it was concerned about the footprint of the KOS Project, which it stated would certainly extend beyond the project boundaries to the traditional lands of the DKFN.

### 13.5 Views of Canada

EC stated that emissions from criteria air contaminants (CAC) from oil sands developments were predicted to increase significantly. It noted that these pollutants contributed to the formation of ozone, PM<sub>2.5</sub>, and acid deposition, as well as having a direct effect on human health. Canada led

evidence based on 2002 data that Alberta was the largest emitter of NO<sub>x</sub> in Canada. EC recommended that in order to minimize NO<sub>x</sub> emissions:

- Imperial Oil should actively participate in research into adapting on-road and off-road NO<sub>x</sub> and particulate matter (PM) emission aftertreatment equipment for very large off-road vehicles, and
- when such technology became available, Imperial Oil should retrofit a large portion of its mining fleet with NO<sub>x</sub> and PM emission aftertreatment equipment.

EC recommended that the Joint Panel direct Alberta and Canada to

- require proponents to provide an additional set of model predictions using a baseline emission scenario consisting of the existing emissions in the oil sands region,
- ensure that proponents excluded only those areas under active development or where current operations existed when determining air quality effects and guideline exceedances,
- manage emissions to avoid exceedances of existing ambient air objectives, and
- ensure that degradation in regional air quality be minimized to the extent possible by requiring the application of best available technology and best management practices to minimize the emission of volatile organic compounds (VOC), NO<sub>x</sub>, sulphur dioxide (SO<sub>2</sub>), PM, and reduced sulphur compounds from the KOS Project and other oils sands projects.

In order to minimize other air pollutants, EC also recommended that Imperial Oil, in cooperation with other oil sands operators;

- undertake a long-term acrolein monitoring program, and
- implement a continuous benzene monitoring program.

Furthermore, EC stated that the use of ultra-low-sulphur diesel by itself could reduce NO<sub>x</sub> and PM emissions by 16 and 17 per cent respectively. Therefore, EC encouraged Imperial Oil to use ultra-low-sulphur diesel in all its off-road vehicles during site construction and overburden removal prior to this becoming mandatory in 2010.

### 13.6 Views of Alberta

AENV stated that despite future NO<sub>x</sub> emission reduction plans, regional NO<sub>x</sub> emissions were projected to increase due to the number and size of proposed projects. This could lead to increased NO<sub>2</sub> levels, which could in turn lead to an increased potential for environmental impacts associated with acid deposition and nitrogen eutrophication. In response to a recommendation from CEMA, AENV stated that it was conducting a review of BATEA for stationary NO<sub>x</sub> emissions sources.

AENV also stated that it expected operators whose projects were sources of acidifying emissions to contribute to the regional air quality monitoring and management system. It encouraged all oil sands operators to continue to support studies and work towards a better understanding of the acidifying versus eutrophication effects of nitrogen deposition. Alberta recommended that

- NSMWG, TEEM, and possibly RAMP assess the eutrophication issue and determine whether there was a need for a eutrophication monitoring and management strategy for the region,

- TEEM undertake vegetation monitoring studies as part of this assessment, and
- TEEM undertake an enhanced lichen vigour study, as well as a deposition mapping project, using lichens to determine if there is a link between emissions and deposition and health in lichens. Alberta stated that it believed lichens were an effective and inexpensive “early warning” signal for effects of emissions and deposition on forest health.

AENV also stated that any *EPEA* approval it may issue could require Imperial Oil to

- participate in the BATEA study and implement its findings;
- implement an LDAR program to control fugitive VOC emissions, in accordance with the CCME Code of Practice;
- continuously monitor ambient benzene concentrations to confirm the conservativeness of the modelling approach in estimating the influence of the KOS Project on ambient benzene concentrations (Imperial Oil could conduct the monitoring on its own or in collaboration with WBEA);
- monitor VOC emissions from major fugitive sources (Imperial Oil could conduct the monitoring on its own or in collaboration with WBEA);
- participate in ongoing regional efforts through CEMA to develop regional management frameworks to address trace air contaminants, such as benzene and acrolein; and
- continue participating in regional acid deposition and eutrophication monitoring efforts.

Alberta stated that it had consulted with stakeholders on a GHG regulatory framework and that the proposed *Specified Gas Emitters Regulation* would capture this framework. These regulations would outline how Alberta specifically planned to address GHG emissions by large industrial emitters. However, until sector-wide regulations were in place, AENV intended to put emission intensity targets in approvals for large oil sands projects. Furthermore, Alberta stated that any *EPEA* approval that may be issued for the KOS Project may require Imperial Oil to reach its stated GHG intensity target of 40 kilograms (kg) of carbon dioxide equivalent (CO<sub>2e</sub>) per barrel.

Alberta stated that AHW viewed Imperial Oil’s conclusions respecting air emissions as reasonable and that human health impacts for the application case were negligible, including negligible to low for acrolein. In addition, Alberta stated that AHW would continue to observe and evaluate regional monitoring data to ensure that unacceptable human health risks were avoided.

### 13.7 Views of the Joint Panel

The Joint Panel notes that air emissions are an important concern for stakeholders and that NO<sub>x</sub> emissions are expected to increase. The Joint Panel therefore expects Imperial Oil to follow through on its commitments to

- reduce NO<sub>x</sub> emissions through combustion controls using low-NO<sub>x</sub> burners for stationary sources,
- purchase and operate low-NO<sub>x</sub> mine equipment as soon as it is commercially available, and
- participate in AENV’s BATEA study and implement its findings.

The Joint Panel notes Canada's recommendations with respect to mine fleet emissions. However, the Joint Panel also notes that low-NO<sub>x</sub> Tier IV equipment will not be introduced until the 2011 to 2015 time frame and that it will be even later before mine fleet equipment in service would be replaced. The Joint Panel believes that there may be merit in the development and implementation of retrofit NO<sub>x</sub> and PM aftertreatment technology for equipment that does not meet Tier IV standards. Any regulatory decision to impose retrofit emission controls on mine equipment would have to consider the significance of NO<sub>x</sub> and PM emissions reductions achievable, in terms of both regional emission rates at a given time and net cumulative reductions, having regard for the introduction of Tier IV equipment. These factors would have to be compared to the costs of the retrofits, impacts on equipment operability and reliability, and the risks that unmitigated emissions pose to the environment. It may not be reasonable to impose retrofits if there is not a clear benefit from installing this equipment when the shift to Tier IV equipment would achieve similar results within a few years. However, retrofits may be viewed as beneficial if it is possible to accelerate substantive net mine fleet emissions reductions by several years.

The Joint Panel believes that any decision to impose retrofit emissions controls should be based on technology development and an assessment involving federal and regulators, along with representatives of oil sands mine operators, at the time the equipment becomes commercially available. The Joint Panel recommends that EC and AENV work together to assess the need for a mine fleet emissions technology review and regulation development process.

With respect to the use of ultra-low-sulphur diesel fuel in mine equipment, the Joint Panel agrees with EC and encourages Imperial Oil to implement the use of ultra-low-sulphur for all of its construction and mining activities ahead of any mandatory requirements.

The Joint Panel supports Alberta developing appropriate *EPEA* approval requirements to address

- fugitive emissions control (LDAR program),
- continuous benzene and acrolein monitoring,
- VOC emissions monitoring,
- participation in CEMA and WBEA work to address trace air contaminants, including but not limited to benzene and acrolein,
- participation in regional acid deposition and eutrophication monitoring programs, and
- GHG emission intensity targets.

The Joint Panel notes the concerns raised by OSEC and the ACFN regarding the modelling approach used by Imperial Oil in the EIA. The Joint Panel also notes that the modelling was performed in accordance with the terms of reference and the AENV Air Quality Modelling Guideline. However, the Joint Panel recognizes that questions surrounding the treatment of exceedances in developed areas and the usefulness of the fourth present-day modelling scenario persist. Therefore, the Joint Panel supports AENV providing more specific modelling guidance in the EIA methodology on these and other important issues.

The Joint Panel considers that proponents of new or expanding oil sands schemes in Alberta need to be aware of reasonably foreseeable changes to current emission standards and new environmental management frameworks, and of the need to incorporate flexibility in the design

of their projects to facilitate retrofitting of improved controls. Because changes to current source emission standards are reasonably foreseeable, the Joint Panel recommends that proponents of new or expanding oil sands projects incorporate flexibility into their projects so that compliance with future standards can be achieved within a reasonable time.

The Joint Panel concludes that the KOS Project is not likely to result in significant adverse environmental effects to air quality, provided that the mitigation measures and recommendations proposed are implemented.

## **14 SURFACE WATER**

### **14.1 IFN**

#### **14.1.1 Views of Imperial Oil**

Imperial Oil stated that it was requesting a *Water Act* licence to withdraw water from the Athabasca River at a maximum rate of 4.9 m<sup>3</sup>/second, with an average withdrawal of 68 million m<sup>3</sup>/year. Imperial Oil noted that if approved, licensed maximum withdrawals from the Athabasca River to support oil sands development would represent only 2.3 per cent of the average annual flow. Imperial Oil stated that it was of the view that the timing of withdrawals, rather than the annual withdrawal amount, was the primary area of concern. To address withdrawal timing, Imperial Oil stated that its design would include the following:

- 30 days of water storage, a first in an oil sands application;
- a water intake design capacity that allowed the water storage area to be filled during higher flow periods;
- a facilities design and process that allowed it to reduce water withdrawals during low-flow periods;
- a staged water licence that reflected potential water requirements through the life of the KOS Project; and
- the provision for a contingency water storage area to allow it to adapt to future potential adjustments in the IFN Water Management Framework.

Imperial Oil stated that its tailings strategy to recycle in-pit MFT would significantly increase the water recovered from the MFT, equivalent to almost four years of Imperial Oil's average water demand for the project. Imperial Oil stated that this would ultimately result in lower water withdrawals from the Athabasca River over the life of the project and result in the lowest overall water consumption per barrel of bitumen produced of any of the oil sands mining projects.

Imperial Oil noted that under Phase I of the Water Management Framework for the Lower Athabasca River proposed by AENV and DFO, the maximum amount of water that industry could withdraw from the river was lower than the total of the licences allocated prior to the KOS Project. To address this, Imperial Oil stated that oil sands mining operators were developing an industry sharing agreement. In addition, Imperial Oil indicated that industry was considering regional water storage opportunities, sequencing of filling EPLs to be sensitive to low flows in the river, and ways to minimize evaporation losses. Imperial Oil indicated that release of the industry sharing agreement would be dependent on the release of the finalized Water

Management Framework. Imperial Oil stated that it was seeking a licence under the *Water Act* to withdraw water from the Athabasca River at flows allowed by the industry sharing agreement and that its minimum water flow requirement would therefore be determined by the industry sharing agreement.

Imperial Oil believed that its current design with 30 days of storage would allow it to fully comply with Phase I of the proposed Water Management Framework even during low-flow periods, and that it should not be required to install four to five months of storage capacity or to shut down the water line during low flows. Imperial Oil stated that if additional research resulted in future changes to the Water Management Framework that made it necessary for Imperial Oil to stop withdrawing water during low-flow periods, it would make the required changes to its facilities and operating practices at that time. Imperial Oil noted that although it had referred to a contingency water storage area in its application, based on available information it did not believe that it would have to implement the contingency water storage plan. Imperial Oil indicated that Suncor and Imperial Oil had committed to a process that would allow them to come to a resolution on the design of any water storage facility that may be required. Imperial Oil stated that it was not opposed to having conditions included in its licence that would reflect its commitments respecting the Water Management Framework and the prospect of potentially more restrictive water withdrawal provisions.

Imperial Oil stated that it believed Phase I of the joint AENV/DFO Water Management Framework was protective of the Athabasca River and that striking a balance between regional impacts and benefits was in the public interest for the region, the province, and the KOS Project. Imperial Oil stated that it was the objective and responsibility of AENV and DFO to achieve such a balance. Imperial Oil also stated that the design features of the project would allow it to operate under the anticipated Phase I criteria. It committed to continue working with stakeholders to increase the understanding of the Athabasca River and fish habitat and to work with industry on water sharing and reduction opportunities. Imperial Oil stated that it did not take a position on whether the Water Management Framework should include an EBF, but it had committed to increasing the understanding of what a minimum flow limit might be. Imperial Oil also stated that it was of the opinion that the decision to develop an EBF should be left to the expertise of AENV and DFO, which were charged with making those decisions when CEMA did not complete a Water Management Framework within the time allotted.

Imperial Oil stated that it was involved in a number of programs through the University of Alberta that were examining ways of reducing water demand or operating a non-aqueous process. Imperial Oil noted that the IFN and Water Management Framework issues raised by the MCFN were being addressed by CEMA and the federal and provincial governments.

#### **14.1.2 Views of ACFN**

The ACFN noted that aboriginal people were directly affected by the health of the aquatic ecosystem of the Athabasca River. The river had and continued today to support the aboriginal communities in the region through recreational and commercial fisheries. The aboriginal communities wanted to protect the Athabasca River and stated that negative effects from oil sands development were already noticeable. The ACFN stated that its primary objective was to ensure that further negative effects did not occur. Despite recommendations from a prior joint panel reviewing the CNRL Horizon application that an IFN recommendation be in place by the



end of 2005, the ACFN noted that a Water Management Framework was still not finalized and the concept of a guaranteed minimum flow had been dropped from the most recent draft.

The ACFN stated that because of the lack of information on the flow requirements of the Athabasca River and because the impact from changes in flow on the fisheries used by the ACFN had not been assessed, the management of the water withdrawals and the flows in the river must adhere to the “precautionary principle.” The ACFN further stated that the July 2006 draft Water Management Framework did not reflect the sound input into the earlier drafts provided by the ACFN and other First Nations. The ACFN noted that there were many different approaches that could be used to derive an IFN other than the approach taken by CEMA, AENV, and DFO.

ACFN identified the following areas of uncertainty in the methodology used to produce the current draft IFN and Water Management Framework:

- The current IFN and Water Management Framework relied too heavily on modelling and not enough on actual studies.
- The current IFN was based on instantaneous flow data, while there were many factors that could interfere with obtaining instantaneous flow data, especially on a shifting sand bed river such as the Athabasca. A simpler IFN would be easier to implement and administer through regulatory processes.
- The habitat suitability criteria used by CEMA did not include whitefish and burbot, species important to the ACFN. The IFN was based on a low number of species and life stages.
- The arbitrary nature of the habitat suitability criteria used by CEMA meant that flow thresholds chosen would be different if a different species were used to conduct the habitat analysis. The ACFN stated that in the current framework there was not enough rationale behind the selection of the most sensitive life stage used.
- Without additional data, there was a question as to whether the hydraulic modelling used was representative of the area of concern.
- Although the Athabasca was a shifting sand bed river, the models used were based on a fixed bed assumption.
- The model had not been correlated to the particular species or life stages selected, so there was no validation of the relationship between the habitat indices and the number of fish that could be present.
- There were other aspects of fish behaviour that had not been incorporated, such as foraging.
- PHABSIM was originally created to evaluate alternative flow regimes, not to set a low-flow threshold. For this reason, there could be multiple unknown environmental factors that could result in exceedances of the biological threshold.
- Stream flow data for the Athabasca River from 1999 to 2004 could suggest lower flows than previous years, so the possibility of global warming effects could not be dismissed.

The ACFN stated that in its view all of the above uncertainties suggested that the approach used by CEMA, DFO, and AENV should not be used as the basis for setting flow standards or for permitting new withdrawals from the Athabasca River. The ACFN stated that it especially disagreed with the absence of a low-flow threshold or EBF in the current proposed Water

Management Framework. The ACFN also stated that due to the uncertainties in the current framework and the need for responsible environmental stewardship, there had to be a cutoff point below which no more water should be diverted. It noted that the current framework included a “red zone” that was similar to an EBF, but that industry was still permitted to withdraw a certain amount of water when in the red zone. The ACFN noted that this could potentially reduce flows in the river below the lowest recorded flow on record, which could result in ecological damage.

The ACFN requested that if Imperial Oil’s application were approved, any approvals be conditioned upon

- the water withdrawal rates proposed by Imperial Oil not being permitted, as this would result in immitigable harmful alteration to fish habitat;
- Imperial Oil being required to re-engineer its water supply pipeline to enable it to shut down water intake if required during low-flow periods;
- Imperial Oil being required to develop a contingency water supply plan to fully meet its needs for a period of four to five months during times when water withdrawals from the Athabasca River may not be available due to low-flow restrictions.

The ACFN requested that the Joint Panel recommend to AENV and DFO that the draft Water Management Framework be revised and that a protective framework be put in place while government and industry conducted the research the July 2006 draft contemplated. The ACFN suggested that the EUB and AENV jointly develop water conservation and water storage guidelines for the oil sands industry.

### **14.1.3 Views of Fort McKay IRC**

Fort McKay IRC stated that its community had been affected by decreased flows in the Athabasca River and that its members were concerned that increasing water withdrawals from the river would create further adverse impacts on the fishery in the Athabasca River, as well as affecting river navigation.

Fort McKay IRC stated that the joint AENV/DFO draft July 2006 Water Management Framework put the Athabasca River at unacceptable risk. It wanted assurance that flow in the Athabasca River would not be permitted to go to zero by having a clearly defined EBF included as part of the framework. Fort McKay IRC stated that today’s science pointed to the need for an EBF. Fort McKay IRC also stated that setting a minimum flow level was essential

- to ensure the orderly development of the oil sands;
- to mitigate through prevention the potentially significant adverse effects of further withdrawals from the Athabasca River; and
- to protect the public interest.

Fort McKay IRC stated that in this case the public interest included ensuring that the Crown honoured its obligation to protect the aboriginal fishery in the Athabasca River. It also suggested that having the certainty that an EBF would be established would take Imperial Oil and the rest of industry to a different level of discussion concerning their industry sharing agreement, because they would have to consider sharing water for a four- to five-month period when withdrawals from the Athabasca River would be limited.

Fort McKay IRC stated that it was not critical for DFO and AENV to state what the EBF should be at this time, but that those organizations needed to confirm that at some future point an EBF would be established. Fort McKay IRC stated that the Phase II presented to CEMA by AENV and DFO on April 27, 2006, presented a reasonable, balanced, and complete management plan. That framework provided industry with an assured water supply, gave industry access to water at times of open-water periods, including water for storage purposes, and provided access to water during about 80 per cent of the winter. The April framework also stated that industry must avoid taking water during low-flow winter periods, thereby protecting the Athabasca River during the period currently believed to be the most sensitive. In addition, the April framework was complete in that an EBF was included. Fort McKay IRC requested the Joint Panel to recommend to AENV and DFO that industry be advised that a minimum flow level or EBF would be set in the final Water Management Framework. Fort McKay IRC stated that the failure to include a minimum flow level or EBF would pose a risk of collapse of the fish population. It noted that the likelihood of an EBF limit being exceeded at least once over the life of the KOS Project was high, regardless of where the EBF was set.

Fort McKay IRC stated that it believed Imperial Oil's request for continuous and uninterrupted water withdrawals from the Athabasca River should be denied. If the project were determined to be in the public interest, Fort McKay IRC requested that the following conditions form part of any approval:

- Imperial Oil re-engineer its Athabasca River water supply pipeline to make complete shutdown in winter possible.
- Imperial Oil develop a contingency water supply plan to fully meet its water needs for a period of four to five months.
- The EUB recommend that DFO and AENV revise the draft IFN Water Management Framework to include the minimum protection set out in the AENV/DFO April 27, 2006, Phase II presentation to CEMA.
- The EUB, DFO, and AENV jointly develop an industry directive for water conservation and contingency water supply plans based on the April 27, 2006, draft Water Management presentation.

#### **14.1.4 Views of OSEC**

OSEC stated that in cooperation with the ACFN, it commissioned a scientific review of the AENV/DFO Water Management Framework and that it relied on that joint report.

OSEC requested that the KOS Project be denied on the basis that it was not in the public interest. It maintained that the current uncertainty regarding water management issues and the impacts on the Athabasca River ecosystem were a tremendous disservice to the public interest. OSEC stated that the current draft Water Management Framework provided an insufficient amount of protection for the Athabasca River, as it was not adequately protective in the near term and failed to take a precautionary approach to regulatory decisions for future oil sands water licences.

OSEC noted that recently approved water licences were granted with the explicit understanding by the companies that their licences were subject to revision upon the determination of an IFN for the Athabasca River and that those companies had chosen to proceed with their projects

despite the risk associated with potential water withdrawal restrictions. OSEC questioned whether it was possible for AENV to make the determination that there would be no adverse effects at this time, when the research necessary to establish Phase II of the framework had not been decided upon, nor had the threshold limit (EBF) of the river for withdrawals been determined. OSEC stated that if the project were approved and critical questions regarding the IFN and Water Management Framework had to be answered by regulators after the fact, the regulators would be in the position of having to pick winners and losers between industrial development and the environment and possibly between current operators.

OSEC stated that an EBF was a necessary component of a water management system and that the need for balance was not an excuse for the lack of a threshold. The absence of clarity regarding Phase II of the framework made it impossible for proposed projects to adequately prepare for withdrawal restrictions that were likely to be more restrictive than those presented in Phase I. OSEC stated it was concerned that Phase II, as currently written, would prevent a transition by oil sands companies towards more innovative technologies and water management strategies by setting companies such as Imperial Oil on a trajectory of water management through their technology selections and their approach to managing water. The result of doing so would be that by 2011, when Phase II was to be implemented, Imperial Oil would have already made decisions and investments that could prevent it from complying with a more restrictive framework. In light of this, OSEC recommended that Phase II of the April 27, 2006, presentation to CEMA's Surface Water Working Group by AENV and DFO be used as the basis for guiding any decision-making regarding Imperial Oil's requested water licence.

OSEC stated that it was not appropriate for Imperial Oil to avoid further and more in-depth discussion about its options and ability to meet Phase I of the framework, or any future management framework, by simply referring to an industry sharing agreement that did not exist and for which needed additional information was not available. OSEC stated that the Joint Panel, AENV, and DFO should consider the KOS Project assuming that no such agreement existed today that would allow Imperial Oil to gain access to the minimum 1 m<sup>3</sup>/second of water that it maintained was required to prevent its water intake from freezing. OSEC stated that Imperial Oil was using the industry sharing agreement to avoid acknowledging that it would likely require more than 30 days of storage and so would in fact need contingency water storage. OSEC stated that this in turn allowed Imperial Oil to avoid having to consider the environmental impacts of the contingency water storage as a component of the KOS Project. OSEC stated that the Joint Panel should be considering the impacts from the contingency water storage area as impacts associated with this project, because in the absence of an industry sharing agreement or as a result of a more restrictive Phase II, Imperial Oil would require additional water storage to meet its project's water requirements.

OSEC stated that when an industry sharing agreement was reached, OSEC would want an approval process by which AENV and DFO gave their vote of confidence that the industry sharing agreement would achieve its objectives. Additionally, OSEC stated that the industry sharing agreement should be a transparent agreement that would be publicly available.

OSEC recommended that the following be included as approval conditions if the KOS Project were determined to be in the public interest:

- The water withdrawal rates proposed by Imperial Oil not be permitted due to their reliance on an industry sharing agreement that did not yet exist.

- Imperial Oil be required to re-engineer its water supply pipeline to enable it to shut down water intake (i.e., zero withdrawal) in winter.
- Imperial Oil be required to develop a contingency water supply plan to fully meet its water requirements for a period of four to five months, during times when water withdrawals from the Athabasca River were not available (i.e., due to water withdrawal restrictions under an IFN Water Management Framework).
- The Joint Panel recommend to AENV and DFO that they consider Imperial Oil's requested water withdrawal licence using the AENV/DFO Phase II Water Management Framework (April 27, 2006), in order to limit the increase in risk created by additional withdrawals.

#### 14.1.5 Views of MCFN

The MCFN noted the importance of the Athabasca River to its members' way of life. It stated that since there was no all-weather road between Fort McMurray and Fort Chipewyan, the Athabasca River was used for travel in the summer. Some MCFN members made their livelihood along the Athabasca River by hunting, trapping, and fishing. The MCFN noted that it was becoming increasingly difficult to travel on the Athabasca River to traditional land-use areas and that there was a decrease in the berries, birds, fish, and other wildlife along the Athabasca River. The MCFN stated that it had observed changes in the Peace-Athabasca Delta (PAD) and noted that less frequent flooding during ice breakup in the spring and less flooding of perched areas affected wildlife, such as muskrat, on which the MCFN depended. It added that barging companies were making fewer trips to Fort Chipewyan in the summer due to lower water levels. The MCFN stated that its rights to water in the Athabasca River, Kearl Lake, and other tributaries, as well as to the land upon which Imperial Oil proposed to develop its project, took priority over any other users.

The MCFN stated that it was concerned that the proposed AENV/DFO Water Management Plan was neither precautionary nor protective enough of the Athabasca River. MCFN stated that the proposed framework was becoming less protective of the river with each revision, and it maintained that because of the importance of the Athabasca River to the MCFN way of life, if any uncertainties existed the Water Management Framework should be more restrictive until greater certainty could be achieved. MCFN stated that until full protection of the river was achieved, it sought the delay of EUB approval of the KOS Project and the granting of any further water licences.

The MCFN stated that the methodology the current IFN was based on did not take into account the complexities of ecological interactions in the river. It stated that the important next step was to base the determination of IFN on a sound mechanistic understanding of how flow affected all aspects of the aquatic ecosystem. It was also important that the IFN be designed to protect habitats associated specifically with major fish life-history stages and related behaviours. The MCFN recommended that an extensive research program be required as part of the Water Management Framework that would ensure that flow was related mechanistically to ecosystem variables and the rate processes that governed fish population dynamics. The MCFN also recommended that in addition to incorporating traditional habitat suitability criteria, an understanding of the behavioural and physiological traits in aquatic species was needed, including water chemistry, temperature regime, oxygen availability, and nutrient cycling in both space and time. MCFN noted that the current IFN and Water Management Framework gave little

regard to the physiological considerations or needs of the fish. MCFN stated that there were other IFN methodologies that yielded more information and ability to understand what was happening in the system than a ranked analysis. It stated that measurable ecological indicators for subsequent monitoring, validation and follow-up were required.

The MCFN stated that studies had shown recent declines in surface water supply and general declines in river flows in Alberta. The MCFN was concerned that the current proposed Water Management Framework did not consider past trends in stream flow or any relationships that may exist between climate and surface water supplies. It noted that while there was more water coming out of the mountains in the last five or six years than in the early part of the 1970s, there was a decline in water coming off the catchment into the Athabasca River. The MCFN also noted that there had been substantial declines in snow pack and that an increase in annual temperatures, longer and more severe droughts, and decreased flows in rivers could be expected based on current data. It pointed out that the latest efforts to assess the degree to which industrial allocation of water from the Athabasca River was sustainable did not consider either historical trends in water supply or the evidence that the Athabasca River lowlands had been undergoing drying since the mid-1950s. The MCFN acknowledged that when it came to predicting future flows and impacts of climate change, there was uncertainty. However, it indicated that the absence of detailed hydrographic and ecological monitoring, especially in the lower reaches of the Athabasca River, made it very difficult to estimate future impacts. The MCFN stated that detailed monitoring programs should be started immediately and sustained during all seasons and through all reaches of the river. The MCFN stated that it believed there had been no long-term planning in the allocation and management of freshwater in Alberta, and it therefore recommended a delay in the granting of the water licence to Imperial Oil until further research was done and the effects of climate change on the water supply in the Athabasca River were better understood.

The MCFN stated that the absence of data for the PAD region of the Athabasca River caused it extreme concern. It recommended that given the many scientific uncertainties and what little data for the Athabasca River were available, the proposed IFN and framework needed to be revised to be truly precautionary until more science was available.

In terms of a final Water Management Framework, MCFN stated that it could accept the April 27, 2006, framework presented to CEMA. Specifically, MCFN stated that it would like to see an EBF for all weeks of the year and to have designated water withdrawals for all licence holders based on those EBFs. Water withdrawal below the EBF should not occur in winter. The MCFN stated that new and unused portions of existing licences should be subject to DFO authorization and that a letter of credit should be required for monitoring of water storage facilities. The MCFN also recommended that the IFN and Water Management Framework be reviewed and updated every five years.

The MCFN indicated that it was evaluating its participation in CEMA; therefore, if Phase II of the framework was going to be completed by CEMA, the MCFN felt that it was entitled to a separate consultation process between MCFN and the two government departments responsible for developing the Water Management Framework. The MCFN indicated that if Phase II of the framework were going to be completed by CEMA, the MCFN was evaluating its participation in CEMA and it felt it was entitled to a separate consultation process that would be between MCFN

and the two government departments that were responsible for developing the Water Management Framework.

#### **14.1.6 Views of DKFN**

The DKFN stated that its community was located within the Mackenzie River Basin and that water from the oil sands flowed past its doorstep. The DKFN also stated that the amount of water the oil sands was going to use was tremendous, would have an impact on the water in the Athabasca River, and would therefore directly affect the DKFN way of life. The DKFN further stated that its people had used the Slave River watershed since time immemorial and would like to continue to do so for generations to come. The DKFN had observed decreased water levels in the Slave River Delta, less frequent flooding, and a decline in fish health. The DKFN stated that it was concerned about cumulative impacts on water and that it was important for everyone involved to work collectively to protect the Athabasca and Mackenzie River watersheds. The DKFN stated that it believed a delay in the approval of the KOS Project would be beneficial in allowing it and other stakeholders to gain a better understanding of the issues and to be able to better address the issues.

#### **14.1.7 Views of Canada**

DFO stated that current average cumulative water withdrawals for the oil sands industry amounted to 4.6 m<sup>3</sup>/second and was expected to rise to 8 m<sup>3</sup>/second in 2008, 11 m<sup>3</sup>/second in 2009, and 15 m<sup>3</sup>/second by 2010. DFO stated that current ecological perspectives indicated that the natural aquatic ecosystem depended on seasonal variability of flow and inter-annual variability in flow. DFO stated that presently the cumulative effects of water withdrawals on fish and fish habitat in the lower Athabasca River watershed could not be predicted with confidence. DFO committed to continued participation in regional multistakeholder initiatives to advance the knowledge about the Athabasca River fisheries.

DFO noted that it was developing a joint Water Management Framework with AENV to address cumulative water withdrawals from the Athabasca River. The framework would be used for regulatory decision-making and to set out the procedures for managing the oil sands industry's water withdrawals from the lower Athabasca River. DFO stated that the framework was recommending a precautionary approach to be implemented in phases, with Phase I being a prescription for water use based on existing infrastructure, current understanding of aquatic ecosystem requirements, regulatory and legal constraints, and water demand. Phase II was to be a multistakeholder process for refining the understanding of fish habitat requirements, socioeconomic assessment, engineering/procedural requirements, and routine operation water requirements. DFO recommended that the Joint Panel support a Water Management Framework that would be implemented in phases with ongoing review, so that the monitoring could be incorporated in a system that would protect the fish and fish habitat of the lower Athabasca River. DFO also recommended that Imperial Oil comply with water withdrawal restrictions required by DFO, following the guidance of the IFN Water Management Framework.

DFO stated that it was concerned that the design of the water intake and pipeline would limit Imperial Oil's flexibility for water management planning. DFO recommended that Imperial Oil

- provide the assessment of routine operation water requirements;

- participate in and support the assessment of habitat requirements for fish in the lower Athabasca River;
- provide a complete assessment of mitigation alternatives that minimize or eliminate impacts on fish and fish habitat resulting from water withdrawals;
- participate in and support a socioeconomic assessment of social, recreational, and commercial values of the Athabasca River; and
- explore engineering options for Imperial Oil's diversion that would not require a minimum diversion.

DFO stated that the above recommendations would form Phase II of the framework and could be completed by a multistakeholder group.

DFO explained that an IFN was strictly a biological recommendation designed to provide full protection of the aquatic ecosystem, and it included an EBF component. DFO indicated that the IFN biological recommendation did not include factors such as economics, public interest values, social values, industry water needs, or current mitigation options, but that DFO and AENV had considered and attempted to balance those additional factors in the Water Management Framework. DFO stated that it and AENV believed that the habitat losses experienced under Phase I as a result of attempting to strike a balance were acceptable over the short term and would end with the implementation of Phase II. DFO also indicated that those habitat losses were based on the worst-case scenario, or the worst weeks of the worst year from 1957 to 2004.

DFO stated that Phase II of the framework was not an IFN recommendation yet, but was a process to refine the IFN science, evaluate water withdrawal mitigation options, better define industry water needs, and assess the socioeconomic values of the river. DFO noted that Phase II would be implemented on January 1, 2011, and that there was a Phase I and Phase II due to the present need for regulatory decisions on withdrawals from the river. DFO emphasized that there was no presupposed outcome for Phase II. Phase II would have its own associated habitat losses, but it was not known what those would be. DFO stated that work on Phase II had already begun under CEMA and that there were currently no other appropriate multistakeholder alternatives to undertake that work. DFO also stated that the absence of some aboriginal participants would have to be addressed.

DFO stated that the Athabasca River IFN was peer reviewed by the separate research arm of DFO, DFO Science, and was found to be a reasonable approach, but added that DFO Science did recommend that an EBF be included in the framework. DFO acknowledged that the EBF concept had been independently developed several times and was now becoming a typical component of IFNs around the world. However, there was currently not enough known about the Athabasca River to set a threshold below which one could say that there would be an unacceptable level of risk to the river. DFO stated that based on completed modelling, it believed that current oil sands industry withdrawals had yet to reach such a level and that defining the threshold would also depend on what could reasonably be compensated. DFO stated that it was unlikely that the final framework would contain what the April 27, 2006, presentation to CEMA had contained because some of the recommendations in the April framework were not based on sufficient information and it had been decided to alter that framework to avoid any presupposed outcome for Phase II. DFO explained that the method used to determine the EBF in past drafts was inexact and that it was working internally on alternatives. DFO stated that based on current information, it was of



the opinion that an EBF in Phase II would be essential. DFO also stated with respect to Phase I that regarding fish habitat, it believed that there was currently enough water in the river and that suitable mitigations could be developed that would protect the aquatic ecosystem of the lower Athabasca River.

#### 14.1.8 Views of Alberta

Alberta noted that Imperial Oil had applied under the *Water Act* for a phased water licence with an initial allocation of 80 million m<sup>3</sup> of water per year, increasing to 104 million m<sup>3</sup> of water per year from the Athabasca River at the peak of the project's requirements. Alberta stated that the exact quantity to be allocated would be closely reviewed before a decision on issuing a *Water Act* licence was made. AENV added that any licence would be subject to the conditions set out in the joint AENV/DFO Water Management Framework.

Alberta noted that the Joint Panel reports for the CNRL Horizon and Shell Jackpine oil sands applications contained recommendations that AENV, in cooperation with DFO, establish an IFN for the Athabasca River in the event CEMA was unable to do so by the end of 2005. Alberta noted that these recommendations were accepted by both government agencies and that CEMA had completed most of the associated technical work but had not delivered a recommendation by the end of 2005. Alberta stated that AENV and DFO were now in the process of finalizing their joint framework for Phase I for water use from the lower Athabasca River, which included the reach of the river adjacent to the KOS Project. Alberta stated that the framework would be released as soon as it was complete.

Alberta summarized its position on the joint Water Management Framework as follows:

- The draft Water Management Framework was precautionary and protective of the Athabasca River.
- Phase I of the draft Water Management Framework was aimed at limiting the environmental impacts of the oil sands industry's water withdrawals to undetectable levels, while providing the opportunity for development to continue.
- Phase II was a process to improve on Phase I where needed.
- A water management system would be developed in Phase II by 2011, based on improved knowledge of ecosystems, socioeconomic considerations, water demand, and water management options.

Alberta stated that using the joint AENV/DFO Water Management Framework, water withdrawals for the project could take place with a high degree of environmental protection. Alberta stated that the framework provided a fair and reasonable balance between environmental protection and economic development and would be applied to manage water withdrawals from the Athabasca River for oil sands projects. Alberta stated that the framework would be reviewed on an ongoing basis to see if adjustments were needed based on new information and validation from social, economic, and environmental considerations. Alberta noted that some of the work related to Phase II of the framework had already begun. Further, Alberta indicated that should the KOS Project proceed, the exact amount for maximum water allocation would be carefully evaluated and would include consideration of all the evidence presented to the Joint Panel as well as the Joint Panel's decision report.

AENV noted that the MCFN's experts agreed that a Water Management Framework was needed now for regulatory decision-making and that an adaptive management process could allow a framework to address climate change. AENV agreed that there were many approaches to determining an IFN recommendation and that multiple approaches were used in the determination of the lower Athabasca River IFN. AENV acknowledged that some of the other approaches suggested by ACFN, OSEC, and the MCFN may assist the Phase II process in refining the lower Athabasca River IFN recommendation, including an assessment of water supply under changing climate.

While many parties agreed that an EBF was needed in the framework, AENV noted that EBFs established elsewhere in the world had generally not been applied to all of the water users in the river system, with the typical case being that existing licences were "grandfathered" and not subject to EBF restrictions. AENV believed that the draft Water Management Framework for the lower Athabasca River came far closer to achieving both the IFN and the EBF recommendations, since it applied to all oil sands water withdrawals cumulatively, including the senior licences.

AENV stated that Phase I of the Water Management Framework did not include an EBF that could stop all water withdrawals because of several conditions:

- there was an extremely low risk of flows in the lower Athabasca River approaching anything near zero flow;
- there were no immediate adequate alternative water sources available to current water users;
- large-scale storage options would have their own potential environmental challenges to be considered and addressed in order to be acceptable; and
- there was currently no biologically relevant method for determining an EBF for the lower Athabasca River.

AENV stated that with the proposed Water Management Framework in place, it would not be possible to reduce flows to zero on the Athabasca River, and incorporating an EBF was therefore not necessary at this time.

AENV noted that the EBF in previous drafts of the framework was based on professional judgement and that there were no empirical data to support it or scale it to the Athabasca River. AENV also noted that for large rivers with many users, few water management frameworks had adhered to a recommended EBF. AENV stated that consideration of the concept of an EBF was required as part of Phase II and was something it was committed to doing. It also stated that if an EBF been included in the current Phase I, it would have been arbitrarily chosen. AENV further stated that it was concerned that identification of an EBF would force industry to focus potentially on a single solution for industrial users, that being to obtain water from large regional storage. AENV indicated that it preferred industry to consider options that would increase water use efficiency, decrease tailings inventory, and decrease process-affected water inventory, all of which were major challenges in the oil sands industry. In addition, there could be some negative impacts from large off-stream storage, including

- potential increases in methyl-mercury flux, which would affect water quality,
- low dissolved oxygen levels in the first years,

- substantial infrastructure requirements in the Athabasca River to mitigate against scouring, and
- potential impacts on the ice dynamics in the river.

AENV indicated that until work was completed in Phase II, the impacts of off-stream storage would not be adequately known and the effects of different mitigation solutions had to be balanced.

With respect to the April 27, 2006, presentation to CEMA, AENV stated that the current draft Water Management Framework represented an improvement over that presented in April. AENV stated that the April framework needed improvement in two primary areas: First, it did not allow flexibility for industry to determine the best way to share and use the available water. The July framework was an improvement because it allowed industry to work towards a water sharing agreement, which would allow new operators access to some of the water available during dry periods. Second, there was no scientific justification for the approximately 5.5 to 6 m<sup>3</sup>/second cumulative withdrawal limit, which was part of the April 27 presentation. AENV also noted that the April framework stopped all new withdrawals but continued to allow grandfathered withdrawals and those approved under the *Fisheries Act*. AENV stated that no changes to the limits or thresholds in Phase I of the July framework were being contemplated, but there would be a revised outline of the Phase II review process in the finalized framework, based on stakeholder feedback. Additional revisions would include providing more clarity on the work to be undertaken, including the immediate initiation of discussions on applying the concept of an EBF to the lower Athabasca River.

AENV stated that it expected to have a monitoring program in place by the 2011 time frame, but that it was going to make efforts to have it in place sooner. AENV envisioned that there would be a public Web site to provide industry with key information that included

real-time or most recently measured flow data, flow condition status for the week (red, yellow, or green), pertinent conditions of licences and the licensees, assignments of water allocations, and real-time information on withdrawals under licences. AENV noted that the technical work appropriately should continue in CEMA, but that the consultation aspects would require additional efforts. Over the long term, AENV believed that the appropriate place for the Water Management Framework would likely be within a Watershed Planning and Advisory Council (WPAC).

#### **14.1.9 Views of the Joint Panel**

The Joint Panel recognizes the efforts of AENV, DFO, and the other stakeholders in developing a draft Water Management Framework for the Athabasca River, but is concerned that the document has not yet been finalized and approved by the governments. The Joint Panel believes that the framework represents an important first step in resolving the long-term management of the Athabasca River.

The Joint Panel recognizes AENV and DFO as the responsible authorities for the regulation of water taken from the Athabasca River. However, the Joint Panel must consider all of the evidence to determine the capacity of the Water Management Framework to avoid or mitigate potentially adverse environmental impacts on the Athabasca River.

The Joint Panel acknowledges the importance of water to the First Nations' way of life and recognizes that maintaining a certain flow regime is essential to the integrity of the Athabasca River. The Joint Panel agrees with the MCFN's evidence and recommendation that an EBF that explicitly incorporates ecosystem dynamics is an essential element of any Water Management Framework for the Athabasca River. However, the Panel also believes that there is an urgent need for recommendations to inform regulatory decision-making and that an appropriate EBF could not be established at this time based on the information currently available. The Joint Panel accepts AENV's and DFO's positions that the Water Management Framework as set out in the July draft will be sufficiently precautionary and protective of the Athabasca River in the short term.

The Joint Panel expects AENV, DFO, the oil sands industry, and all other affected stakeholders to dedicate the resources, staff, and funding necessary to ensure that Phase II of the Water Management Framework for the Athabasca River is completed in a comprehensive manner and according to the timeline established in the current Water Management Framework. Based on the current framework, the Joint Panel expects that the Phase II Water Management Framework will be implemented by January 1, 2011.

The Joint Panel strongly recommends that AENV and DFO incorporate an EBF in the final Water Management Framework for the Athabasca River. The Joint Panel believes that the ongoing work contemplated under Phase II should provide the needed information to support the inclusion of a measure that could provide long-term certainty to industry and to the other users of the Athabasca River.

The Joint Panel notes that if it were necessary as part of any future requirement for Imperial Oil to reduce its water withdrawals to zero in low-flow conditions, Imperial Oil has committed to doing so and did not oppose having conditions put in its licence that would reflect the commitments it had made respecting both present and future water management requirements. The Joint Panel encourages AENV and DFO to condition any approvals or authorizations accordingly. Additionally, the Joint Panel expects Imperial Oil and other approval/water licence holders to provide funding for and to participate in Phase II of the Water Management Framework.

The Joint Panel supports the following recommendations being included as conditions in any approvals or authorizations that may be issued by AENV and DFO requiring Imperial Oil to

- provide the assessment of routine operation water requirements;
- participate in and support the assessment of habitat requirements for fish in the lower Athabasca River;
- provide a complete assessment of mitigation alternatives that minimize/eliminate impacts on fish and fish habitat resulting from water withdrawals;
- participate in and support a socioeconomic assessment of social, recreational, and commercial values of the Athabasca River; and
- explore engineering options for Imperial Oil's diversion that would not require a minimum diversion.

The Joint Panel notes that with the exception of the last item, the above recommendations would form part of Phase II of the framework development and could be completed as part of a multistakeholder process.

The Joint Panel recognizes industry's efforts to develop an industry sharing agreement. This agreement should be completed as soon as possible after the Water Management Framework is approved. The Joint Panel expects the regulatory authorities to scrutinize any sharing agreement to ensure that it is fully consistent with this decision report and Phase I of the Water Management Framework and is able to incorporate any changes necessitated by Phase II.

The Joint Panel expects industry operators to participate in Phase II of the Water Management Framework and to work together to identify water management options for the region. The Joint Panel notes Imperial Oil's evidence that industry is considering sharing water, regional water storage opportunities, sequencing of filling EPLs to be sensitive to low flows in the river, and ways to minimize evaporation losses. The Joint Panel believes that water could be the factor that limits oil sands development, and the Joint Panel supports industry putting more emphasis on strategies to decrease the overall water demand of the oil sands industry. The Joint Panel is in agreement with AENV that in addition to water sharing and regional storage, industry should consider options that would increase water use efficiency, decrease tailings inventory, and decrease process-affected water inventory. In this respect, the Joint Panel commends Imperial Oil's research with the University of Alberta and recommends to AENV and DFO that part of the work of Phase II promote industry's participation in or support for research that would increase water use efficiency, decrease tailings inventory, and decrease process-affected water inventory and the impacts of off-river water storage.

The Joint Panel concludes that with implementation of Phase I of the joint AENV/DFO Water Management Framework and completion of the work proposed in Phase II and in the above recommendations, significant adverse environmental effects associated with water withdrawals from the Athabasca River for use in the KOS Project are unlikely.

## **14.2 Integrated Watershed Planning**

### **14.2.1 Views of Imperial Oil**

Imperial Oil stated that full assessments on the Muskeg River and Kearl Lake watersheds were completed for the purposes of the EIA. Imperial Oil stated that it recognized that there was going to be a long-term ongoing consultative process with stakeholders regarding Kearl Lake, and that agreements to ensure that integrated reclamation and integrated drainage took place were being initiated.

Imperial Oil stated that it had changed its original plans and was no longer planning to divert the area identified in Volume 2, Section 6, of the EIA as diversion 1 of the Muskeg River. Imperial Oil noted that the Muskeg River would be diverted only at its headwaters.

Imperial Oil stated that it had been an active member of the WITG under CEMA for the last year and would continue its participation on the group until a watershed management plan for the Muskeg River basin was completed. Imperial Oil stated that it viewed the development of a watershed management plan for the Muskeg River basin as a worthwhile task. Imperial Oil indicated that it was important for industry operators to work together to integrate not only their

mining plans, but their complete cross-lease boundary plans, including complete closure reclamation and drainage plans. Imperial Oil stated that CEMA was the right vehicle for doing that. It also stated that much information was already available in terms of parameters and thresholds that had been established, but that it would be useful and appropriate for CEMA to develop an integrated plan. If CEMA were to fail to complete its task to develop a watershed management plan for the Muskeg River basin by its revised deadline of 2007, Imperial Oil stated that the government could backstop the work, but its preference would be to have the plan completed through the WITG.

#### **14.2.2 Views of ACFN**

The ACFN noted that existing, approved, and planned oil sands projects in the Muskeg River basin could disturb 50 per cent or more of the watershed. It stated that assessments of the cumulative effects of this large-scale change on the integrity of the watershed had been incomplete and inadequate. The ACFN noted that the original 2005 deadline for CEMA to produce a watershed management plan for the Muskeg River basin had passed and it was time for Alberta to backstop with its own plan. It further noted that AENV had stated in its submission that the water quality objectives being developed by CEMA and the investigation levels completed by the WITG could be applied to manage the area until CEMA could produce a watershed management plan. The ACFN noted that as it was no longer a member of CEMA, it could not rely on CEMA to produce management recommendations for the basin.

The ACFN requested that if Imperial Oil's application were approved, any approvals be conditioned upon

- an assessment being conducted of the entire Muskeg River basin to provide an integrated and comprehensive understanding of the impacts on that basin by the KOS Project in combination with other mines being planned or developed in that watershed; and
- the development of an integrated mitigation and reclamation plan for the basin.

The ACFN noted that Kearl Lake was considered a regionally significant environmentally sensitive area due to its hydrological importance, the rare plants found around the shoreline, and its use by waterfowl as a staging area. The ACFN stated that it was also an important traditional land-use area, particularly for moose hunting. It noted that Kearl Lake had a relatively small drainage basin and would be directly affected by the KOS Project. It also noted that other developers would have an impact on Kearl Lake. The ACFN stated that it was concerned about maintaining the integrity of the lake and would like to have a discussion with all of the developers whose projects would have an impact on the lake. It stated that it had tried to organize a technical workshop on its own to examine this issue, but with the exception of Imperial Oil it had received little response. The ACFN stated that it felt additional information was required on the integration and coordination of operators to sustain the lake and on the effect that impacts on the Kearl Lake watershed were having on the ACFN's traditional way of life in the area. The ACFN noted that it was asking for a separate and complete assessment of the sustainability of Kearl Lake over the entire operating period of the project through and beyond closure, including an assessment of the predicted impacts and the mitigation strategies proposed to deal with those.

The ACFN requested that if Imperial Oil's application were approved, any approvals be conditioned upon an assessment being conducted of the combined effects of the KOS Project, the Syncrude Aurora south mine, and the Shell Jackpine mine (Phase 2) on the integrity and viability

of Kearl Lake and on the development of an integrated mitigation and reclamation plan for the watershed.

### 14.2.3 Views of OSEC

OSEC stated that significant responsibility for CEMA's failure to complete its work in a timely fashion rested with Alberta, which had failed to adequately provide resources to CEMA working groups or regulatory backstops to missed CEMA deadlines. Further, OSEC stated that in some instances when the need for a backstop had been identified, Alberta had failed to implement a backstop. OSEC noted that in 2003 the WITG had committed to deliver an integrated watershed management plan by the end of 2005. The Joint Panel decision for the Shell Jackpine Mine project acknowledged this deadline and recommended that AENV develop management plans and objectives for the Muskeg River basin if the WITG timelines were not met. OSEC noted that the task group had failed to meet the end of 2005 deadline and yet no management plan or objectives for the basin had been developed by AENV. OSEC noted that the revised timeline for the work of the WITG would not deliver a management plan until September 2008, despite the need for this plan having been identified several years earlier.

### 14.2.4 Views of Canada

DFO noted that there were presently several existing and planned oil sands developments within the Muskeg River basin and that over time between 50 and 60 per cent of the watershed would be disturbed as a result of development. DFO noted that the KOS Project had the potential to affect nearly 1 300 000 m<sup>2</sup> of fish habitat and that the destruction of fish habitat in the Muskeg and Firebag River basins required a subsection 35(2) *Fisheries Act* authorization from DFO for the HADD of fish habitat.

### 14.2.5 Views of Alberta

Alberta noted that the RWG and the WITG of CEMA were developing management frameworks that would influence activities in the Muskeg River basin. Alberta also noted that the WITG had been unable to provide appropriate recommendations within an appropriate time for mine planning for the KOS Project.

AENV stated that until an integrated water management framework for the Muskeg River basin was in place, AENV would consider other options for implementing comprehensive criteria that would influence development in the Muskeg River basin. AENV noted that the draft water quality objectives for the Athabasca River expected in early 2007 from the CEMA Water Quality Task Group, combined with the CEMA WITG investigation levels study, would be considered when determining thresholds for water quantity and quality in the Muskeg River basin. AENV noted that this could be considered a "minimum" backstop and stated that Alberta was still determining whether anything beyond that would be considered.

Alberta indicated that any *EPEA* approval that may be issued for the project may require Imperial Oil to participate in industry-regulator meetings to frame integrated water management options for the Muskeg River basin.

#### 14.2.6 Views of the Joint Panel

The Joint Panel notes that one of the recommendations made in the Shell Jackpine Mine decision report (*Decision 2004-009*) was for CEMA to develop a management plan for the Muskeg River watershed by the end of 2005. The report further stated that if CEMA failed to develop a watershed management plan, AENV should backstop the process. Clearly, the development of a watershed management plan was considered a priority at that time, and it can be assumed that additional developments approved or proposed for the watershed only add to the importance and urgency of completing such a plan.

The Joint Panel notes, with considerable concern, that CEMA has not delivered a watershed management plan and AENV has not issued a backstop. In fact, the Joint Panel has seen no evidence that work has started on this critical priority, in spite of assurances given in evidence in the Albian Sands Muskeg River Mine Expansion hearing that this work would be completed by CEMA by the end of 2007.

The Joint Panel notes the evidence that CEMA's revised timeline for completion of this management plan is September 2008. This represents yet another delay from the end timeline put forward at the Albian Sands Muskeg River Mine Expansion hearing, in spite of the increasing levels of development within the Muskeg River basin. The Joint Panel recommends that AENV take immediate steps to ensure that the Muskeg River watershed management plan is completed and approved on a priority basis and not later than September 2008. Should CEMA again fail to deliver a watershed management plan for the Muskeg River by the revised timeline, the Joint Panel recommends that AENV implement a full backstop by the end of 2008.

The Joint Panel recommends that AENV provide direction to the WITG of CEMA by March 2007, based on what AENV has been internally considering for the implementation of comprehensive criteria that would influence development in the Muskeg River basin. The Joint Panel supports the implementation of interim measures, such as water quality objectives and investigative levels for determining thresholds for water quantity and quality in the Muskeg River basin.

In a later section of this report the Joint Panel makes several recommendations to improve the efficiency of CEMA that it believes could also assist the WITG in completing its work plan. These include identifying priority work, providing strong government leadership and direction, ensuring sectoral balance within the task group, ensuring active and consistent participation by all members, and ensuring that the appropriate science and technical expertise is at the table.

The Joint Panel expects Imperial Oil to participate in and provide funding to the WITG task group until its work plan is fully completed, including any follow-up work that may be required. The Joint Panel supports AENV's suggested *EPEA* approval condition to require Imperial Oil's participation in industry-regulator meetings to frame integrated water management options for the Muskeg River basin.

With respect to the ACFN's concerns regarding Kearl Lake, the Joint Panel notes Imperial Oil's reference to the initiation of agreements to ensure the integrated reclamation and drainage of the Kearl Lake watershed. The Joint Panel recommends that Imperial Oil continue discussions with the ACFN to address its concerns. The Joint Panel also expects other operators whose projects impact Kearl Lake to participate in these discussions with the ACFN.



The Joint Panel concludes that with the appropriate mitigation measures implemented by the operators currently present in the Muskeg River basin and with the implementation of interim measures and a completed watershed management plan by March 2008 by either CEMA or by implementation of a regulatory backstop by AENV, development could proceed in the basin without causing significant adverse environmental effects on the Muskeg River basin.

### **14.3 Water Quality**

#### **14.3.1 Views of Imperial Oil**

Imperial Oil predicted the KOS Project would have a negligible to small change on the water quality of water bodies and watercourses in the area. Imperial Oil stated that the water quality in the Muskeg River, the Firebag River downstream of the external tailings area, Wapasu Creek, and Kearl Lake would be monitored downstream of the project development area and that it would work with AENV to define the specific surface water monitoring and reporting requirements for the KOS Project. Imperial Oil stated that this monitoring was important for confirming its impact predictions and validating its modelling. Imperial Oil understood that it would have some additional project-specific monitoring requirements in its *EPEA* approval and in the DFO Section 35(2) authorization. In addition, Imperial Oil stated that it expected that some of those conditions might require it to participate in the various regional committees and working groups to ensure that regional cumulative monitoring was appropriately planned and carried out with other developers.

Regarding several of the recommendations by Canada, Imperial Oil stated that work was already being completed or contemplated by many of the regional committees and that most of those groups had systems to undertake scientific peer-review by experts. Additionally, Imperial Oil stated that in many areas the EIA had concluded that prediction confidence was high that there would be no adverse effects, and therefore requiring additional monitoring simply to increase Canada's level of confidence in the EIA predictions should not be required. Imperial Oil also noted that Canada agreed with the EIA definition of the potential development case but was now taking the position that the planned development scenario could be larger in the future and therefore recommended additional monitoring. Lastly, Imperial Oil noted that many of Canada's recommendations were directed at Imperial Oil but were intended for regional monitoring. With respect to regional monitoring, it stated that those recommendations should be addressed to the regional committees and not to Imperial Oil alone.

#### **14.3.2 Views of ACFN**

The ACFN stated that it was important for the Joint Panel to ensure that not only the quantity but also the quality of the water flowing through the different watersheds into the Athabasca River was protected for the long-term sustainability of the ACFN members and their traditional way of life. It pointed out that almost all of the ACFN reserves were along the Athabasca River and that its members continued to use the river for transportation, fishing, and hunting.

The ACFN noted that at the recent Joint Panel hearing of the Albian Sands Muskeg River Mine Expansion application, EC and DFO gave evidence that it was likely that the PAD, including the fishery, was being negatively impacted by water withdrawals from the Athabasca River, removal of tributaries to the Athabasca River, and changes to water quality. The ACFN stated that EC and

DFO further noted that there had been no research or monitoring to address the effects of the oil sands activities on the delta.

The ACFN requested that if Imperial Oil's application were approved, any approvals be conditioned upon an assessment of the effects of the KOS Project and the planned development case on the PAD due to reduced water flows and chemical and thermal changes to the Athabasca River water and upon the implementation of a monitoring program for the PAD to address this issue.

#### **14.3.3 Views of DKFN**

The DKFN stated that it was concerned that the water quality assessments considered in Imperial Oil's application would not fully capture cumulative impacts from oil sands development on the Athabasca River and the Slave River Delta, and thus did not adequately assess the impacts on the DKFN.

#### **14.3.4 Views of Canada**

EC acknowledged that Imperial Oil sampled water and sediment to characterize preproject water and sediment quality conditions on the KOS Project site. However, it stated that additional baseline data should be collected prior to project initiation, including under-ice conditions and event-appropriate sampling, to ensure that hydrological characteristics and water and sediment chemistry were completely characterized in all water bodies. EC requested the Joint Panel to recommend that Imperial Oil develop a site-specific water and sediment quality monitoring program based on the before/after/control/impact (BACI) principle. EC stated that this program should be linked to mitigation and action plans and incorporate event-appropriate sampling, including more extensive winter sampling.

EC noted that Imperial Oil's predictions of future water quantity and quality were derived from modelling that depended on certain assumptions and specific parameters that if not met could lead to greater uncertainty in water predictions. EC requested the Joint Panel to recommend that Imperial Oil update modelled impact predictions as new data became available and that this include public reporting as well as external scientific peer review. EC noted that RAMP was one means by which the information could be made public.

EC stated that it was of the view that uncertainty surrounding predictions of future conditions required continued research and monitoring to refine and validate initial assumptions and predictions. Intensive research on EPLs and on the water quality of the post-mining landscape was needed to provide data to support this work. EC noted that this research should be integrated into a regional ecosystem management framework to address cumulative effects on water and sediment quality in the Athabasca River watershed, including the PAD and western Lake Athabasca. The results of such research should be externally peer reviewed and made public in appropriate forums. EC requested the Joint Panel to recommend that Imperial Oil, in partnership with other industry and non-industry researchers, initiate, continue, and/or expand research on water and sediment quality from multiple reclamation test areas representing all types of reclaimed landscapes and that the results be used to update water quality predictions and refine adaptive management.

Given the scale of development in the Muskeg River basin, EC stated that it was concerned that water quality could be adversely affected to a greater degree than predicted. EC therefore requested the Joint Panel to recommend that Imperial Oil continue to monitor the Muskeg River for cumulative effects of sediment on water quality, especially at closure and beyond, and that it develop an action plan to address any additional adverse effects that might be detected.

EC stated that it was possible that cumulative effects from oil sands developments may expose the PAD to changes in water and sediment quality in the long term. Given that the PAD was a valued ecosystem component, EC requested the Joint Panel to recommend extending the aquatic resources regional study area to include the PAD area and the western end of Lake Athabasca in future oil sands EIAs.

EC stated that there were a number of assumptions and sources of uncertainty that could reduce the confidence in conclusions regarding the potential effects of changes in water quality on aquatic life. Rather than relying on the chronic effects benchmarks used by Imperial Oil, EC requested the Joint Panel to recommend that AENV implement site- or region-specific water quality objectives, including oil sands-related toxic substances for which provincial water quality objectives did not currently exist. EC also requested that the Joint Panel recommend that Imperial Oil participate in or facilitate, if necessary, research pertaining to the fate and potential toxic effects of contaminants on aquatic ecosystem health.

EC noted that eventually treated process-affected water would be released to the surrounding ecosystems through a system of wetlands, ditches, and pit lakes. EC requested the Joint Panel to recommend that Imperial Oil take into consideration the seasonal nature of flows in rivers and creeks prior to releasing water, so that concentrations of water quality parameters remained within predevelopment seasonal ranges throughout the year.

With respect to Imperial Oil's argument that some of Canada's recommendations not be imposed, Canada stated that each developer, including Imperial Oil, must be prepared to assess, monitor, mitigate, and if necessary compensate for its project-specific contributions to cumulative environmental effects. Canada noted that how Imperial Oil's contribution would be determined would have to be addressed. Canada agreed that partnering with other operators to accomplish regional monitoring was a reasonable approach.

Canada stated that many of its recommendations were intended to help achieve its overarching goal that a more comprehensive and integrated approach to environmental monitoring be developed that would capture cumulative effects in the area and support adaptive management. EC stated that component monitoring, such as that conducted by RAMP and TEEM, could continue to be done independently and should be integrated with regional monitoring. EC stated it would also be valuable to consider whether companies' site-specific monitoring should be integrated with regional programs. EC requested the Joint Panel to recommend that AENV lead the development and implementation of an integrated environmental monitoring approach to support adaptive management of cumulative effects in the Athabasca oil sands region.

### **14.3.5 Views of Alberta**

Alberta stated that water quantity and quality predictions were based on a thoroughly reviewed set of models known as the Hydrologic Simulation Program Fortran and the Athabasca River

Model. AENV stated that the models met AENV's requirements for adequate process representations.

Alberta indicated that uncertainty existed with respect to both water yield and quality from the reclaimed landscape and that continued model validation and refinement would be required to ensure that the project-specific and cumulative impacts were identified and managed. AENV indicated that any *EPEA* approval that may be issued for the KOS Project might require that Imperial Oil continue to work with CEMA on areas that influenced impact predictions, such as EPLs, treatment wetlands, and water quantity and quality and that it provide updates on future impacts as collective understanding improved. In addition, any *EPEA* or *Water Act* approvals may require Imperial Oil to support development of a regional groundwater monitoring program and the establishment of groundwater objectives for the reclaimed landscape.

Alberta noted that improvements in water quality modelling and validation of model predictions were required. Alberta stated that Imperial Oil must continue to validate model predictions and results, test the underlying assumptions, and provide updates to environmental impact predictions and that validation of drainage characteristics from reclaimed landscapes would be particularly useful. Alberta stated that Imperial Oil would be expected to assess water chemistry in runoff from reclaimed landscapes and provide updates if new information did not validate previous model predictions of impact. Alberta indicated that any *EPEA* approval that may be issued for the project might require Imperial Oil to provide a schedule for updating impact predictions.

Alberta stated that management frameworks for wetlands and EPLs were not urgently needed, but work to provide assurance as to wetland and EPL operating constraints and performance was considered a top priority. Alberta indicated that any *EPEA* approval that may be issued for the KOS Project might require Imperial Oil to provide a schedule for research into and reporting on advances in wetland and EPL science and management. Alberta noted that although it would be a number of years before the first EPLs were in place in the region, their complexity and the uncertainty about their function made it critical that priority be given to ongoing, comprehensive research. Alberta also stated that it expected greater attention to be paid to the validation of models by providing near-future timelines for construction of a physical test case in the oil sands area. Alberta indicated that any *Water Act* or *EPEA* approval that may be issued for the KOS Project might require Imperial Oil to provide a schedule that included the testing of EPL predictions and design features with a physical test case undertaken in cooperation with other oil sands operators.

Alberta noted that there was an internal Alberta Government group considering PAD issues in relation to bilateral agreements being developed with British Columbia, Saskatchewan, and the Northwest Territories under the umbrella of the McKenzie River Basin Board. Alberta stated that the overview completed so far suggested that the oil sands were not having a significant effect on the PAD at this point.

#### **14.3.6 Views of the Joint Panel**

The Joint Panel notes that Canada indicated that having Imperial Oil participate in RAMP and CEMA was one way to address the majority of Canada's monitoring recommendations, but that Canada believed there was a need to integrate all monitoring being conducted in the region. The

Joint Panel supports Canada's view that there is a need to integrate existing monitoring programs and agrees that information from such programs should be publicly available. The Joint Panel also supports having the programs undergo regular peer review. The Joint Panel encourages Canada to raise this issue with the appropriate multistakeholder forums, having regard for existing priorities and resources. The Joint Panel also supports AENV determining how integration could best be accomplished. The Joint Panel acknowledges the importance of the PAD and Lake Athabasca and agrees that both should be included in an overall integrated monitoring program for the region. The Joint Panel expects that the watershed management plan for the Muskeg River being developed by CEMA will include an integrated monitoring program for cumulative effects in the Muskeg River basin.

The Joint Panel notes that additional site-specific monitoring may be required to ensure that impacts resulting from the KOS Project would be identified. The Joint Panel recognizes and supports the jurisdiction of AENV and DFO to include conditions in its approvals and authorizations for additional site-specific monitoring for sediment and water quantity and quality for waters that may be affected by the project. The Joint Panel recommends that should additional site-specific monitoring be required, the program be developed with input from DFO, EC, and AENV. The Joint Panel believes that ongoing validation of modelling results is a key component of any management approach that uses modelling, and the Joint Panel supports Alberta including a condition in any approvals that may be issued for the project that Imperial Oil provide a schedule for updating its modelled impact predictions. The Joint Panel also recommends the ongoing review of EIA modelling practices by multistakeholder groups such as CEMA. The Joint Panel expects Imperial Oil to implement any changes in modelling procedures that CEMA may recommend.

The Joint Panel notes that CEMA is currently developing reach-specific water quality objectives for the lower Athabasca River, with a target for completion of mid-2007. The Joint Panel notes that Alberta indicated that these objectives could be used as part of an interim measure for determining thresholds for water quantity and quality in the Muskeg River basin. The Joint Panel recommends that CEMA and AENV adhere to this deadline. The Joint Panel expects Imperial Oil to support CEMA in its efforts to develop water quality objectives for the lower Athabasca River through participation and funding.

The Joint Panel understands that CONRAD and RAMP may be either completing or contemplating research related to the effects of water and sediment quality, including the fate and potential toxic effects of contaminants on aquatic ecosystem health. The Joint Panel supports EC's recommendation that research on water and sediment quality from multiple reclamation test areas representing all types of reclaimed landscapes be conducted and that the results be used to update water quality predictions. The Joint Panel recommends that Imperial Oil confirm that such research is being conducted by CONRAD and RAMP and, if it is not, that Imperial Oil request that CONRAD and RAMP give consideration to EC's recommendations. EC should be involved in the discussions to ensure that existing or proposed research meets its expectations.

Given the uncertainty regarding the water yield and quantity from the reclaimed landscape, the Joint Panel supports AENV including the following as conditions in any *EPEA* approval that may be issued:

- Imperial Oil continue to participate in CEMA working groups on surface water quality related matters;

- Imperial Oil provide a schedule for testing and updating water quality modelling predictions;
- Imperial Oil provide a research schedule that includes the testing of EPL predictions and design features, with a physical test case undertaken in conjunction with other oil sands companies, and a report on advances in wetland and EPL science and management; and
- Imperial Oil support development of a regional groundwater monitoring program and the establishment of groundwater objectives for the reclaimed landscape.

To conclude, the Joint Panel believes that by implementing a comprehensive monitoring plan, the suggested *EPEA* approval conditions, the Joint Panel's recommendation, and the mitigations identified by Imperial Oil in its EIA, the KOS Project is unlikely to result in significant adverse environmental effects on water quality.

## **15 AQUATIC RESOURCES**

### **15.1 Fish and Fish Habitat**

#### **15.1.1 Views of Imperial Oil**

According to Imperial Oil, activities that could potentially lead to a HADD of fish habitat during the three phases of the KOS Project would include landscape and surface drainage alterations, routing of water within a watercourse or from one watercourse to another, and modification of stream flow. Imperial Oil stated that these activities would result in losses in habitat area in some aquatic resources. Notwithstanding these predicted negative impacts on fish habitat, Imperial Oil argued that the impacted habitat had very limited suitability for forage or sucker species and that there were no sensitive or otherwise listed species in the project development area.

Imperial Oil submitted a draft NNLP to DFO in order to compensate for fish habitat losses associated with the destruction of a portion of the Muskeg River and Firebag River watersheds. The proposed NNLP, based on consultation with regulators and stakeholders, included the development of a new 1 500 000 m<sup>2</sup> lake in the upper Muskeg River watershed. The compensation lake would be located immediately to the northeast of Kearl Lake and would have limited connectivity to Kearl Lake via a connecting channel. The compensation lake would be constructed in three phases, corresponding to the three development phases of the KOS Project. The compensation lake would be designed to accommodate most of the species known or assumed to be present in the affected habitats and also known to be present in the Kearl Lake and the Muskeg Creek watersheds.

Imperial Oil stated that its assessment did not identify potential adverse effects on fish abundance and diversity resulting from the KOS Project. Imperial Oil also stated that although the project included changes in habitat area that would result in losses of certain low-quality habitat types, an overall increase in fish abundance, fish species diversity, and ecosystem diversity was expected as a result of habitat compensation.

Imperial Oil stated that flow changes were predicted in the watercourses that drain the development area and in the closure landscape, including the Muskeg River, Wapasu Creek, and one unnamed tributary to the Muskeg River. Imperial Oil also stated that predicted increases in flows in Wapasu Creek were expected to result in improved fish habitat conditions in this

watercourse. However, Imperial Oil further stated that mitigation measures could be necessary to eliminate potential changes in flows in the Muskeg River during project operations by augmenting flows during this period. Imperial Oil stated that flows could be provided using Athabasca River water obtained from the freshwater storage pond or using a portion of the minimum rate of diversion from the Athabasca River. It noted that other measures could be to implement fish habitat compensation earlier than the currently scheduled compensation for phase 3. Imperial Oil expected that appreciable increases in flows predicted during the winter period would result in an improvement in overwintering habitat throughout the Muskeg River.

Imperial Oil also stated that predicted reductions in open-water flows in the far future due to the KOS Project were considered to have a low-level residual effect on fish habitat with low environmental consequences. It indicated that adaptive management measures of flow reductions could be put in place in the future, if required. Imperial Oil stated that these measures could include directing an additional stream currently flowing to a Firebag River tributary in the closure drainage system to the Muskeg River to reduce the predicted effects on flows during the open-water period. Again, Imperial Oil stated that with its adaptive management strategy, further assessment of the potential for predicted flow changes to affect habitat productivity in the Muskeg River would be conducted during the detailed NNLP stage.

In terms of management and monitoring, Imperial Oil stated that it was already participating in RAMP, CEMA, CONRAD, and other regional initiatives concerned with ongoing research, development, and aquatic monitoring in the oil sands region. Imperial Oil also stated that it was planning on developing a program to monitor and confirm the establishment of fish habitat and fish populations in the proposed compensation lake in conjunction with the NNLP. To ensure that the NNLP would adequately address the fish habitat loss, Imperial Oil stated that its strategy would allow compensation measures to be adjusted, if necessary, to achieve no net loss. As such, the plan would be flexible to potential modification with respect to the specific measures taken to compensate for habitat losses, as well as the level of habitat compensation provided.

With respect to cumulative impacts of the KOS Project on fish habitat, in particular the potential cumulative impacts on fish habitat from water flow reductions in the upper Muskeg River, combined with the Shell Jackpine Mine Phase 1 development downstream, Imperial Oil stated that the KOS Project would have an incremental effect on these flow reductions and that it would expect to reverse the effects of the Jackpine Mine development during the ice-cover period, resulting in a net increase in winter flows. Given that Shell planned to compensate for all available habitats within the affected river section to meet the requirements for no net loss of productive habitat and to provide a net habitat gain, Imperial Oil did not plan further compensation for the same habitat, as incremental effects of the KOS Project would not result in uncompensated losses of habitat.

### **15.1.2 Views of Canada**

DFO stated that the direct fish habitat losses that would occur prior to mine development could be compensated for. DFO stated that it would continue to work with Imperial Oil to assist in finalizing an NNLP that would include estimating the fish and fish habitat losses for which compensation would be provided, as well as fish habitat compensation strategies, designs, construction activities, schedules, monitoring, and contingencies. DFO stated that the NNLP would have to be designed to achieve permanent fish habitat gains that offset direct fish habitat

losses to meet a compensation ratio of 2 habitat units (HU) created for every HU harmfully altered, disrupted, or destroyed. If the compensation habitat did not meet DFO requirements, DFO stated that it would require Imperial Oil to provide other habitat compensation measures until the 2:1 compensation ratio was met.

DFO also stated the development of the NNLP was based on a number of models, several of which were based on limited data and/or contained a number of assumptions. DFO stated that the model used by Imperial Oil to evaluate existing fish habitat and predict the productivity of fish compensation habitat had yet to be validated. Therefore, DFO stated that conservationism and caution should be overriding principles when making predictions for a future scenario for which baseline information was limited. Given that the models cannot predict with certainty the success of compensation fish habitat, DFO recommended that Imperial Oil develop and implement a monitoring program aimed at verifying predictions related to quality and quantity of fish habitat in the proposed compensation lake that would also address the uncertainties associated with modelling the productive capabilities of fish compensation habitats. DFO stated that the impacts resulting from water withdrawals had not been considered in Imperial Oil's proposed NNLP.

In terms of cumulative impacts, DFO stated that it had estimated that over time between 50 and 60 per cent of the Muskeg River watershed would be disturbed as a result of development, resulting in the direct loss of fish habitat and indirect losses consequential to changes in flow conditions and removal of small tributaries in the upper watershed. DFO stated that it was concerned that the quality and quantity of fish habitat in the Muskeg River watershed would be negatively affected as a result of disturbances to the watershed. DFO recommended that Imperial Oil monitor the Muskeg River watershed for cumulative effects on fish habitat resulting from its KOS Project. If monitoring indicated that there were adverse effects on fish habitat resources in the Muskeg River watershed not already considered, Imperial Oil would have to mitigate or compensate for the losses.

### 15.1.3 Views of the Joint Panel

The Joint Panel recommends that DFO complete discussions with Imperial Oil towards establishing an NNLP that meets the objectives of the *Fisheries Act* in terms of fish habitat losses and disturbances. The Joint Panel is satisfied that no net loss for the KOS Project can be achieved. However, the Joint Panel also believes that a strong monitoring plan is mandatory to ensure that impacts on fish and fish habitat are well understood and documented. The Joint Panel is satisfied with Imperial Oil's commitment to establish, in consultation with DFO, a monitoring program that would verify predictions related to the quality and quantity of Imperial Oil's fish habitat compensation structures.

The Joint Panel is concerned that the cumulative disturbance of the Muskeg River watershed by existing and planned oil sands developments could produce indirect losses of downstream fish habitat as a consequence of changes in flow conditions and removal of small tributaries in the upper watershed. The Joint Panel notes that DFO is well aware of this issue and that it participates on WITG, which is responsible for completing the Muskeg River watershed management plan. The Joint Panel expects that this plan will include a determination of thresholds for water quantity and quality in the Muskeg River watershed.

The Joint Panel notes that Imperial Oil proposes to implement mitigation measures in order to maintain the initial flow conditions in the upper Muskeg River watershed during the project's



operations. The Joint Panel also expects Imperial Oil to assess measures to maintain a sufficient water flow in the upper Muskeg River once operations have concluded and to address this issue in the proposed NNLP.

The Joint Panel acknowledges Imperial Oil's proposed mitigation measures to ensure maintenance of acceptable water flow and quality conditions downstream of the disturbed area in order to maintain viable fish habitats in the lower reaches of the Muskeg River during construction and operation of the KOS Project. In addition, the Joint Panel expects that any further measures identified in the Muskeg River watershed management plan and the interim measures will be integrated into the NNLP. These interim measures identified by AENV should include the draft water quality objectives for the Athabasca River expected in early 2007 from the CEMA Water Quality Task Group, combined with the CEMA WITG investigation levels study. The Joint Panel has also made several other recommendations related to the development of a Muskeg River watershed management plan in Section 14.2.6 of this report.

The Joint Panel believes that further monitoring should be carried out to ensure that impacts on fish and fish habitat can be identified and mitigated at the earliest stage possible to ensure that the cumulative impacts on the Muskeg River watershed are minimized. The Joint Panel recommends that AENV, EC, DFO, and other regional stakeholders work together to develop the parameters required for regional monitoring for cumulative effects on fish habitat in the lower Athabasca River and Muskeg River watersheds. The Joint Panel notes that this could potentially be completed through multistakeholder groups, such as CEMA and WITG. The Joint Panel requires Imperial Oil to participate in such a process.

The Joint Panel concludes that with the implementation of Imperial Oil's mitigation measures, the completion of an NNLP satisfactory to DFO, and the Joint Panel's recommendations, the KOS Project is unlikely to result in significant adverse environmental effects on aquatic resources.

## **16 CUMULATIVE ENVIRONMENTAL MANAGEMENT ASSOCIATION**

### **16.1 Views of Imperial Oil**

Imperial Oil indicated that it was an active member in CEMA and that it believed that multistakeholder groups served a valuable role by encouraging diverse inputs and working to develop balanced recommendations. Imperial Oil stated that it was confident that the body of information completed to date by CEMA was considered by the regulators in reviewing applications and it noted that government representatives were active within all of the CEMA working groups.

Imperial Oil stated that there was a significant body of information, including studies and research, that had been developed by CEMA and that CEMA had generally met the time frames established. Imperial Oil also stated that it was in the process of taking the body of studied information, converting it into a management framework, and gaining consensus, which was a time-consuming and unpredictable process. Imperial Oil agreed to work with ACFN and other stakeholders to try to improve the overall effectiveness and efficiency of the CEMA process.

Imperial Oil stated that it strongly supported CEMA and its initiatives and that it would adjust its design and operations appropriately as CEMA continued to provide products and management frameworks. Imperial Oil stated that it considered it critical that the government continue to maintain its responsibilities and make decisions to ensure that the appropriate regulations were in place. Imperial Oil stated that where consensus could not be achieved within CEMA, it may be necessary for the regulator to provide a regulatory backstop to ensure that appropriate guidelines and policies were in place when required.

## 16.2 Views of ACFN

The ACFN indicated that it had withdrawn from CEMA largely due to the perceived shortcomings in the AENV/DFO Water Management Framework, but also due to other concerns. The ACFN stated that its Chief and Council had concluded that

- CEMA members were participating for the interest of their own organization and not for the health and sustainability of the environment;
- CEMA had not delivered tangible results pertaining to the Regional Sustainable Development Strategy (RSDS);
- government and industry members controlled the agenda, committee chairs, and resources of CEMA, thereby giving themselves a disproportionate level of decision making influence;
- the work to create management frameworks to sustain the environment was not driving the work of CEMA; instead, the resourcing of CEMA dictated what work could be accomplished;
- traditional ecological knowledge was not being incorporated at the earliest possible stages of planned development within CEMA working groups;
- stakeholders needed to have the capacity and resources to fully and competently participate in CEMA; and
- CEMA had become a “parking lot” for both government and industry to default regional environmental concerns, as opposed to having to show how the regional environment was being affected by the proliferation of industrial development within the region.

The ACFN stated that the lack of an integrated assessment and management plan for the Muskeg River basin, including Kearl Lake, prior to the majority of the basin being considered for open pit mining was an example of how cumulative effects were not being adequately managed by CEMA or the RSDS. The ACFN requested that if Imperial Oil’s application were approved, any approvals be conditioned upon an independent assessment being conducted of the effectiveness of CEMA and the RSDS in managing the cumulative environmental effects in the region and upon implementation of changes to make CEMA more effective and responsive.

If these recommendations were adopted, the ACFN stated that it would participate in the evaluation process and re-evaluate its decision to leave CEMA. The ACFN also stated that RSDS and the Integrated Resource Plan were outdated and needed to be updated in order to meet the reality of current levels of development.

The ACFN noted that although it was no longer a member of CEMA, it would still welcome the opportunity for further communication with CEMA.

### 16.3 Views of OSEC

OSEC stated that CEMA had been far less effective than originally envisioned and noted that by 2005, CEMA had met its targets for environmental management deliverables and recommendations on only about 25 per cent of its work plan. OSEC stated that significant responsibility for CEMA's failure to complete its work in a timely fashion rested with Alberta, which had failed to adequately resource CEMA workgroups and provide regulatory backstops to missed CEMA deadlines.

OSEC stated that it was very concerned that in 2006, oil sands projects continued to be proposed and assessed in the absence of ecological thresholds for the Athabasca Oil Sands Region. OSEC stated that in the absence of thresholds, a true assessment of the environmental impacts associated with proposed projects could not occur. Given the lack of management plans to address cumulative effects in the region (from CEMA or AENV), the public interest could not be protected through reliance on CEMA.

OSEC noted that in the past CEMA had a challenge ensuring that it had adequate financial resources to complete its work, but it was now struggling to ensure that it had adequate participation and leadership from government departments to complete funded projects. OSEC stated that in 2006 it was expected that CEMA would fall well short of spending its allocated budget, due in part to the fact that government staff had been occupied with multiple major oil sands project reviews and regulatory hearings. OSEC stated that it believed the root cause of CEMA's failure was an ongoing lack of human resources, competition between individual project approvals, and limited government leadership. OSEC believed that CEMA's performance would improve rapidly if new project approvals were delayed until CEMA had made its recommendations or until interim limits for sustainable terrestrial ecosystems, reclamation, water use, GHG emissions, and other air pollutants were in place.

OSEC indicated that Imperial Oil's EIA demonstrated an extensive reliance on CEMA to provide answers to many of the uncertainties related to the KOS Project. OSEC stated that there was no evidence to suggest that CEMA's performance would improve under the current framework. OSEC recommended that

- the KOS Project be denied, given that the current government resources appeared incapable of delivering a regional cumulative effects management system that protected the public interest; and
- an assessment be conducted to determine the financial and human resources that would be required by AENV and SRD in order for them to meet CEMA and other environmental protection commitments.

OSEC requested that a decision to approve the KOS Project be deferred until such time as the EUB had been able to hold an inquiry pursuant to Section 22 of the *ERCA*. The inquiry would include a regional CEA of the environment, socioeconomic impacts, a review of the RSDS and CEMA, and determination of what mitigation measures should be incorporated into regulatory approvals of all companies operating in the region.

## 16.4 Views of MCFN

The MCFN indicated that due to its frustrations over the slow progress of CEMA deliverables, especially those related to water issues, it had begun to limit its participation in CEMA committees and was currently evaluating its participation in regulatory regional committees altogether.

The MCFN stated that it was concerned about CEMA's interaction with the First Nations and the perception by some, including Imperial Oil, that participation in CEMA was consultation with the First Nations. The MCFN noted that CEMA did not have a communication mechanism to effectively deal with First Nations.

The MCFN stated that there were several things that CEMA could do to become more effective, including

- revisiting the RSDS strategic framework upon which CEMA was formed and determining how the needs of the region had changed since 1999;
- receiving greater funding and participation by government, including funding for more projects and dedicating more resources to CEMA in terms of technical expertise, senior government decision-makers, strategic input, and additional CEMA program managers;
- communicating CEMA recommendations and the government's implementation of them to ensure or to demonstrate the progress that had been made on the RSDS issues;
- having an information system that would allow tracking or an inventory of water withdrawals, air emissions, terrestrial disturbances versus reclaimed areas, terrestrial monitoring data, etc.; and
- focusing more on terrestrial monitoring, since much of the work in CEMA had been focused on water.

The MCFN noted that the above recommendations were similar to those in a submission issued by the CEMA president to the Oil Sands Consultation Committee.

The MCFN recommended that the Joint Panel specify timelines for CEMA to deliver recommendations and that those timelines be backstopped by the appropriate regulators. It stated that without the imposition of specific timelines or backstops, and given the rate and scale of development in the oil sands region, by the time CEMA recommendations were approved and implemented by government many thresholds may have already been exceeded. MCFN recommended the following timelines:

- development of water quality objectives for the lower Athabasca River by the end of 2007;
- development of the watershed integrity plan for the Muskeg River Basin by the end of 2007;
- development of the trace air contaminants management framework by the end of 2007;
- development of wetland development guidelines by the end of 2007;
- development of EPL guidelines by the end of 2008;
- development of terrestrial resources management systems by the end of 2008; and

- development of IFN recommendations for reaches 1, 2, and 3 of the Athabasca River by the end of 2009.

The MCFN further requested that the Joint Panel recommend that the RSDS be re-evaluated and updated to reflect emerging environmental impacts and current stakeholder concerns.

## **16.5 Views of Canada**

EC indicated that it was a full member of CEMA and continued to support the CEMA initiative. However, EC also stated that it remained concerned that the rate of industrial development in the Athabasca Oil Sands Area was potentially exceeding the capacity of CEMA to effectively develop management frameworks. EC noted that the development of environmental frameworks to adaptively manage cumulative effects would require ongoing cooperation among all stakeholders in the region.

EC stated that an enhanced and updated RSDS, including its technical support documents, would strengthen and assist decision-making on sustainable development and environmental management in the region. The updates would reflect current development and likely future development scenarios, current government policy, and priority regional environmental issues. EC requested the Joint Panel to recommend that Alberta update the RSDS and technical support document within 12-18 months to include

- defined timelines for the development and implementation of environmental management frameworks, and
- renewal of Alberta's commitment to provide the regulatory backstop to ensure that environmental management frameworks succeeded.

Canada identified other areas within CEMA that could be strengthened, including

- streamlining of the multiple layers of CEMA, which currently could make it challenging for working groups and task groups to get their work plans and budgets approved in a timely manner;
- re-examining the composition of the working groups to ensure that there was balanced representation among industry, government, aboriginal groups, and nongovernment organizations;
- exploring opportunities to make better use of community-based monitoring and research opportunities;
- conducting better communication back to communities of what CEMA was doing so that CEMA could adapt and be receptive to the various parties' concerns; and
- ensuring consistent government participation and strengthening of the regulatory backstop approach by having some fairly specific timelines built into some of the work plans that were backstopped by the regulators.

DFO stated that one of the steps it was taking now to improve its participation in CEMA was putting together an oil sands team that would dedicate additional resources to its participation in organizations such as CEMA and to looking at oil sands developments in general.

## 16.6 Views of Alberta

Alberta noted that as of May 2006, CEMA had produced over 100 technical reports in addition to the following environmental management tools:

- an acid deposition management framework,
- a ground-level ozone precursor emission management framework,
- a Land Capability Classification for Forest Ecosystems Manual revision to improve assessment of reclamation capability for forest ecosystems, and
- a landscape design checklist for reclamation planning.

Alberta stated that CEMA's consensus process required adequate time for scientific studies to be completed, interpreted, discussed, and understood by stakeholders. Alberta noted that the process to develop recommendations could be time consuming, but often reduced implementation time. Alberta recognized that it was accountable for implementing CEMA's recommendations for areas under its jurisdiction, but noted that regulatory implementation of multistakeholder recommendations was at the discretion of the accountable regulatory decision-makers and that regulators may choose to accept all or part of CEMA's recommendations as potential guidelines for oil sands development.

Alberta stated that it monitored the progress of CEMA closely and that it was committed to initiating discussions with CEMA to establish appropriate deadlines for CEMA's work. Alberta indicated that when CEMA failed to meet a deadline, the regulators did need to consider what the appropriate response would be. It acknowledged that one response for regulators was to backstop, but another response, one that could be more appropriate in some circumstances, was to extend the deadline for CEMA to complete its work. AENV indicated that a number of factors influenced the appropriate response in the face of CEMA failing to meet a deadline, including

- the current view on the urgency of the item;
- consideration of how protective the existing regulatory requirements and guidelines were; and
- whether CEMA would make better progress on the item than if the regulators assumed the work.

Alberta stated that there were likely many aspects that affected CEMA's ability to achieve its work plan, including

- the capacity of CEMA members from all sectors, (government, industry, and nongovernment members) to attend meetings, review contracts and request for proposals, review and comment on reports and management options, and communicate effectively with their leadership;
- the ability to gain consensus among CEMA members on priority areas to fund, especially for items not supported by all stakeholders, not related to a regulatory decision process, or in an area with unclear government policy;
- the internal capacity of CEMA to provide program management support, get two-way feedback from its membership and the communities in the region, and provide strategic direction to its committees and working groups; and

- the capacity of the limited pool of highly specialized scientific and traditional knowledge holders, as well as the consulting community, to deliver on CEMA's work projects.

Alberta noted that the Management Committee of CEMA was currently taking action in each of the above areas to address these matters.

Alberta stated that the input provided during the hearing indicated that there was a need to re-evaluate the government's role in CEMA, determine how the government could improve CEMA's operation, and encourage better, more meaningful involvement of the aboriginal members of CEMA. Alberta acknowledged the concerns of the First Nations respecting the need for further consultation regarding the aboriginal perspective on the work being completed on regional issues. Alberta also stated that government participants would have to look to improve the involvement of the aboriginal stakeholders in the CEMA process.

Alberta stated that improving CEMA would require long-term commitments. It also stated that both AENV and SRD were considering increasing their staff complement in Fort McMurray. In addition, Alberta noted that it had taken the following actions:

- citing participation in CEMA in operating approvals to allow industry operators the flexibility to use CEMA activities to develop studies on regional issues;
- initiating backstop activities when CEMA had been unable to reach timelines;
- seconding two staff to CEMA to provide more capacity for program management;
- stepping in as chairs and co-chairs for CEMA working groups and committees and providing scientific and regulatory expertise to working groups to ensure CEMA products had up-to-date information on regulatory activities and policies; and
- having the CEMA Management Committee set up milestones and performance objectives for each of the working groups. If they missed a milestone, the Management Committee would intervene with that working group to find out why the milestone was missed and what could be done to correct it.

Alberta agreed that there would be some advantages to updating the RSDS. In terms of Canada's recommendation that an update be completed in twelve to eighteen months, Alberta agreed that could be accomplished if government regulators and stakeholders made it a priority to do so. Alberta noted that regulators needed to take leadership in terms of deadlines, follow-up work, and consequences for when deadlines were missed, and these areas could be revisited in an update of the RSDS and strategic document.

## **16.7 Views of the Joint Panel**

The Joint Panel views the work of CEMA as vital in addressing the cumulative impacts of oil sands development on the region and notes that CEMA has been assigned responsibility to address most of the critical cumulative effects challenges. The existence of regulatory standards and thresholds is an important element in determining whether a project is in the public interest from a cumulative impacts perspective and whether the impacts need further mitigation if the project is to proceed. The work of CEMA in developing management frameworks for addressing cumulative effects is central to the sustainable development of the mineable oil sands over the longer term.

The Joint Panel is concerned about the capacity of CEMA to complete the management frameworks that have been assigned to it. The Joint Panel notes that CEMA struggles to meet its deadlines, and the Joint Panel is troubled by the level of concern expressed by some of the interveners over the ability of CEMA to complete its work plan at all. The Joint Panel believes that the efficiency of CEMA needs to be improved in order to keep pace with current development in the region and that there is a need for more definitive priority setting and adherence to deadlines.

The Joint Panel believes that an update and prioritization of the RSDS and associated technical support documents should be completed as soon as possible under the leadership of AENV. There is also a need to develop specific timelines for priority projects and for CEMA to meet established timelines. The Joint Panel notes that Canada recommended that the task of updating the RSDS document be completed within twelve to eighteen months and that Alberta agreed that was a reasonable timeline if stakeholders and regulators committed to it. The Joint Panel acknowledges AENV's commitment to undertake a review of RSDS and expects that this review will be initiated immediately and completed within eighteen months.

An updated RSDS document could be used by CEMA to reprioritize its work plan and estimate specific requirements for participation in terms of the number of people, amount of time, and expertise required to complete its work plan. It is the responsibility of CEMA stakeholders to ensure that CEMA is adequately staffed to complete its work plan. The Joint Panel believes that CEMA members need to ensure that their organizations are giving sufficient recognition to the demands of CEMA and have the appropriate expertise and level of seniority engaged with CEMA to ensure effective participation in and contribution to the process. The Joint Panel notes DFO's plan to establish a dedicated oil sands team that would allow it to enhance its participation in organizations such as CEMA. The Joint Panel recommends that other members in CEMA consider such strategies to increase and improve their participation in CEMA.

The Joint Panel is concerned that some of the First Nations and Métis members of CEMA are reconsidering their continued participation and that the ACFN has withdrawn altogether over its concerns with CEMA. The Joint Panel believes that a consensus decision-making process requires full understanding of the issues, and it is concerned that limited participation would be a major obstacle to CEMA's achieving a meaningful consensus. The Joint Panel believes that CEMA needs to consider ways of ensuring First Nations and Métis input into work plans and projects. The Joint Panel believes that CEMA, the regulators, and industry need to consider ways of increasing the capacity of aboriginal participation and of improving communication with and within the aboriginal communities.

The Joint Panel believes that First Nations also need to determine how they can work together in their participation in CEMA. The Joint Panel believes that it would be an unrealistic and inappropriate use of resources for each of the First Nations to develop the same review capacity. In the same vein, the Métis Locals need to work together, perhaps through the auspices of the WBMLA, to develop the appropriate joint capability to participate in a meaningful way in the CEMA process.

Given the complex and sometimes burdensome structure of CEMA, the Joint Panel recommends that CEMA undertake a review to identify opportunities to streamline its operation, improve



communication among the various levels of CEMA, improve project management support, and strengthen the strategic direction given to its committees and working groups.

To conclude, the Joint Panel acknowledges that the Management Committee of CEMA and some members are currently taking steps to improve CEMA's efficiency. The Joint Panel is strongly supportive of these initiatives. The Joint Panel believes that the success of CEMA requires the commitment of all of its stakeholders and recommends that all members of CEMA consider ways they could improve their participation.

The Joint Panel does not believe that there is presently a satisfactory alternative to CEMA for the development of environmental management frameworks to address cumulative environmental effects in the oil sands region using a consensus-based approach. The success of CEMA is therefore viewed by the Joint Panel as critical. The Joint Panel acknowledges that management of environmental effects in the region is ultimately the responsibility of the regulators, and so it encourages the regulators to take a more direct leadership role in all aspects of CEMA.

## **17 TRADITIONAL LAND USE AND TRADITIONAL ECOLOGICAL KNOWLEDGE**

### **17.1 Views of Imperial Oil**

Imperial Oil stated that the final use of the reclaimed land and the timing of reclamation activities had been a key topic of discussion with its stakeholders and aboriginal neighbours. In those discussions, a primary concern included the ability of the reclaimed land to support traditional activities.

Imperial Oil assessed the potential effect of ongoing development and the potential effects of the KOS Project on traditional lifestyles in the oil sands region. A summary of the concerns expressed and the mitigation that Imperial Oil planned to put in place to address some of those concerns was included in the application. Imperial Oil also included a comparison of those traditional concerns that had been expressed respecting the Western science aspect of the EIA.

Imperial Oil developed local and regional study areas where it undertook assessment of water quality, water flows, and air quality. Imperial Oil noted that a number of receptors in this assessment were of special interest to traditional land users. Imperial Oil also assessed air emission effects in eleven communities, one being Fort Chipewyan. That information was used along with the water quality information in the Human Health Assessment to determine the health effects that may occur on those various receptors, and through that Imperial Oil determined that there would be negligible effect.

### **17.2 Views of MCFN**

The MCFN noted that in Treaty No. 8, it agreed to share its lands and resources in such a way that its way of life and rights to its traditional lands would not be compromised. The MCFN stated the KOS Project would impact the treaty rights of the Mikisew Cree. The MCFN noted that the only method of transportation to many traditional areas was by boat, and therefore its traditional lifestyle had been affected by the low water levels. The MCFN indicated that overall its traditional way of life was getting harder to maintain and practise due to the significant

decrease in water levels in all of its traditional areas. The MCFN also stated that further studies needed to be conducted to determine the overall effects of the KOS Project on the MCFN's traditional land uses.

### **17.3 Views of the Joint Panel**

The Joint Panel acknowledges the concerns of MCFN regarding the effect the KOS Project could have on traditional land uses. However, the Joint Panel is satisfied that Imperial Oil has adequately considered the traditional land-use areas that were in place at the time of application and has made appropriate commitments to work with First Nations, the Métis Locals, and other aboriginal groups in the area to address their needs and concerns.

## **18 NEED FOR EIA FOLLOW-UP**

### **18.1 Views of the Joint Panel**

Under *CEAA*, upon approval of a project the Responsible Authority is required to design a follow-up program to verify the accuracy of the environmental assessment or to determine the effectiveness of mitigation measures and ensure their implementation.

During the course of its deliberations, the Joint Panel considered the need and requirements for the follow-up program for the KOS Project. The specific areas identified by the Joint Panel for follow-up are

- tailings management,
- surface water quality and quantity,
- ground water quality and quantity,
- fish and fish habitat,
- in-stream flow needs,
- air emissions,
- levels of contaminants of potential concern in country food, and
- reclamation.

The Joint Panel is of the view that Imperial Oil should develop its follow-up programs in the early stages of the project in collaboration with stakeholders that have expertise or an interest in the development of these programs.

Follow-up programs should

- ensure that results are communicated to stakeholders and the public;
- be developed with stakeholders that have specific expertise;
- include details of the mitigation measures to be implemented;
- include details of the monitoring methods, frequency, and duration; and

- include details of who is responsible for following up on the various parameters of interest and the frequency of reporting.

## **19 HUMAN HEALTH**

### **19.1 Views of Imperial Oil**

Imperial Oil stated that the human health section of the EIA presented an assessment of the potential effects of chemical emissions on the health of people living near the KOS Project. It evaluated both the short- and long-term health effects that may occur as a result of chemical exposures.

Imperial Oil stated that the long-term effects on human health were predicted to be negligible for all chemicals in air at all locations for the project case. It also stated that long-term effects on human health were also predicted to be negligible for the combined exposure to all chemicals in air, water, soil, plants, fish, and animals.

Imperial Oil indicated that short-term effects on human health were predicted to be negligible for all chemicals in air at all locations for the project case. Short-term combined exposure effects on human health from acrolein exposures were predicted to be negligible to low for Fort McKay, the hunter-trapper cabins, and the worker camp for the project case and negligible for all other locations. It indicated that many layers of safety had been included in the assessment, and the actual risk posed by short-term exposure to acroleins was likely negligible for all locations. It also stated that short-term effects on human health were predicted to be negligible for all other chemicals in air at all locations for the project case. As well, it stated that human health effects as a result of particulate matter exposure were predicted to be negligible for the project case.

Imperial Oil stated that human health effects were predicted to be negligible for exposures to water from Wapasu Creek, the Muskeg River (and for fish), Kearl Lake, the portion of the Firebag River associated with the three tributaries north of the external tailings area, the Athabasca River, and the EPLs at closure and in the far-future for the project case.

Imperial Oil stated that acroleins were conservatively identified as a group of substances that potentially could result in low-magnitude long-term and short-term effects on human health in some locations for the existing and approved case and project case. However, it added that there was uncertainty in the air quality predictions for acroleins due to lack of measured data from oil sands emission sources for model validation. Imperial Oil also stated that it was working with two oil sands operators to investigate ambient acrolein emissions by conducting monitoring at existing oil sands operations.

### **19.2 Views of ACFN, Fort McKay IRC, and OSEC**

The ACFN, Fort McKay IRC, and OSEC stated that with regard to health, their members were concerned about potential health effects from consumption of contaminated foods and air pollution. The ACFN also stated that these concerns needed to be managed through proactive consultation. It pointed out that there was much uncertainty about the arsenic issue, which AHW had, to its credit, raised as a concern.

The ACFN stated that it had not yet been consulted by AHW about the arsenic issue and that it expected to be contacted directly by AHW on how this issue was being addressed and how the involvement of the ACFN elders would assist in dealing with the community's fear of cancer.

### **19.3 Views of DKFN**

The DKFN indicated that it was concerned about the health of its people because it believed that they would be impacted by the emissions from the KOS Project.

### **19.4 Views of MCFN**

The MCFN indicated that its members had noticed that the fish in the Athabasca River were not as healthy as they were four or five years ago, and therefore the members did not want to eat the fish.

### **19.5 Views of Canada**

Health Canada stated that it generally agreed with the conclusions relating to human health in the EIA, provided that the mitigation and monitoring measures detailed in the submission and raised at the public hearings were adequately addressed. Health Canada stated that its experts' review of the EIA for the KOS Project did not raise concerns with respect to significant adverse health effects.

Health Canada made the following recommendations:

- With respect to PM<sub>2.5</sub>, an analysis of less severe end points should be completed by Imperial Oil.
- Imperial Oil should uphold the Canada Wide Standard principle of keeping clean areas clean.
- Imperial Oil should present an additional assessment scenario for existing conditions.
- Further monitoring of acrolein should be undertaken.
- Complaints monitoring should be implemented consistent with Imperial Oil's stated intentions in the EIA.
- Baseline monitoring studies of arsenic levels in cattail, deer, and moose should be undertaken, and the lowest detection limits achievable should be employed.
- Monitoring for levels of arsenic and mercury in fish caught in the Muskeg River and Wapasu Creek and in other country foods should be included.

### **19.6 Views of Alberta**

AHW viewed the conclusions presented in the EIA as reasonable and stated that it would continue to observe and evaluate the regional monitoring data to ensure that unacceptable human health risks were avoided.

Alberta stated that the predicted arsenic risks for the KOS Project were less than those presented in the Suncor Voyageur application, but higher than those seen in applications prior to the Voyageur project. Alberta stated that the AHW arsenic report findings would be relevant, since arsenic would be released by the project. AHW was of the view that until the arsenic report

findings were complete, there was still too much uncertainty regarding the potential health impacts as a result of exposure to arsenic in subsistence foods in the region.

Alberta stated that it was AHW's position that any additional increase in the predicted risk, no matter how small, would be unacceptable if the magnitude of predicted risk presented in the Suncor Voyageur application was validated. Alberta stated that should this be the case, it would recommend that the EUB review any approval that may have been issued to Imperial Oil in light of this finding.

## **19.7 Views of the Joint Panel**

The Joint Panel accepts Alberta's and Canada's views that the conclusions of the health risk assessment conducted by Imperial Oil are reasonable and believes that the KOS Project should not pose any significant health risks.

The Joint Panel notes that predicted arsenic risks for the KOS Project are less than those presented in the Suncor Voyageur application, but higher than those seen in applications prior to the Voyageur project. The panel also acknowledges that AHW was in the process of conducting follow-up testing to determine what arsenic levels existed in moose meat and cattail roots. The Joint Panel supports Alberta's recommendation that if this follow-up work finds arsenic levels that AHW considers unacceptable, the EUB should review any approval that may have been granted to Imperial Oil in light of such findings.

The Joint Panel is satisfied that concerns about acrolein releases have been adequately addressed and it expects Imperial Oil to continue working in collaboration with other oil sands operators to monitor acrolein emissions.

The Joint Panel expects Imperial Oil to continue to participate in CEMA's TMAC health risk studies, WBEA's Human Exposure Monitoring Committee, and other regional initiatives addressing human health.

The Joint Panel concludes that with the implementation of the proposed mitigation measures and attention to the Joint Panel's recommendations, the KOS Project is unlikely to result in significant adverse human health effects. However, if elevated risks to human health from arsenic exposure are confirmed, the Joint Panel expects Imperial Oil and other operators in the area to take appropriate actions to address the matter.

## **20 CAPACITY OF RENEWABLE RESOURCES**

### **20.1 Views of Imperial Oil**

Imperial Oil stated that it was confident that a stable, self-sustaining natural landscape that would result in an equivalent land capability could be re-established. Imperial Oil further stated that the closure landscape would support a suite of current land uses in the area and would result in a net benefit for some resources, such as several wildlife species and fish habitat. The KOS Project would therefore not significantly affect the capability of renewable resources to meet the needs of the present and future generations.

## 20.2 Views of the Joint Panel

The Joint Panel concludes that the KOS Project is not likely to significantly affect the capacity of renewable resources to meet the needs of present and future generations. The Joint Panel is of the view that Imperial Oil has proposed adequate mitigation measures and the project is unlikely to result in significant adverse environmental effects on renewable resources if those measures and the Joint Panel's recommendations are implemented.

Dated in Calgary, Alberta, on February 27, 2007.

### **ALBERTA ENERGY AND UTILITIES BOARD CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY**

*<original signed by>*

J. R. Nichol, P.Eng.  
Joint Panel Chair

*<original signed by>*

T. McGee  
Joint Panel Member

*<original signed by>*

L. Cooke  
Joint Panel Member

## APPENDIX 1 HEARING PARTICIPANTS

Principals and Representatives (Abbreviations used in report)	Witnesses
Imperial Oil Resources Ventures Limited (Imperial Oil) A. McLarty, Q.C. M. Ignasiak H. Treacy S. Luciuk	R. Koszarycz, P.Eng. J. Suggett M. Little S. Nadeau I. Mackenzie R. Eccles R. Dawson, Ph.D., P.Eng. C. Grant M. Ingen-Housz B. Head M. Rawlings A. Beersing, Ph.D.
Athabasca Chipewyan First Nation (ACFN) K. Buss T. Nahirinik R. Secord	B. Whenham D. Smith T. Payne P. Marcel L. King R. Bothe
Canadian Natural Resources Ltd. (CNRL) H. Longworth, P.Eng. B. Mitchell	
Clearwater River Paul Cree Band No.175 (Clearwater Band) R. Coulter	
Deer Creek Energy G. Chow	
Deninu Kue First Nation (DKFN) P. Simon T. Unka	T. Unka D. Beaulieu E. McKay
Fort McKay First Nation Industrial relations Corporation (Fort McKay IRC) K. Buss T. Nahirinik R. Secord	
Her Majesty the Queen in Right of Alberta (Alberta) J. Moore B. Prenevost	Alberta Environment Joint Panel (AENV) R. Barrett R. Dyer K. Singh, P.Eng.

R. Normey  
D. Poskocil

P. Marriott, P.Eng.  
P. McEachern, Ph.D.  
Alberta Department of Energy  
C. Holly  
Alberta Health and Wellness (AHW)  
D. Hopkins  
A. MacKenzie  
Alberta Infrastructure and Transportation (AIT)  
D. Jackson  
Alberta Municipal Affairs  
W. Jackson  
Alberta Seniors and Community Support  
J. Martin, C.P.M., F.R.I.  
Alberta Sustainable Resource Development (SRD)  
G. Klappstein  
S. Johnston  
B. White, Ph.D.

Government of Canada (Canada)

D. Mueller  
R. Keswick  
M. Vincent  
D. Tomljanovic

Department of Fisheries and Oceans (DFO)

B. Ross, Ph.D.  
R. Courtney, P.Biol.  
M. Janowicz  
B. Mackowecki  
C. Katopodis

Environment Canada (EC)

C. Baraniecki  
M. Kellerhals  
D. Lindeman, Ph.D.  
R. Mintz  
M. Norton  
M. Sydor  
M. Tushingham, Ph.D.  
M. Wayland  
C. Watt

Health Canada

G. Boulton  
C. Lettner  
T. Nakamura  
R. Carrier

Indian and Northern Affairs Canada

S. Weston

Mikisew Cree First Nation (MCFN)

D. Mallon, Q.C.  
A. Floden

M. Lepine  
Chief R. Marcel  
S. Shih  
R. Marten (Translator)  
G. Marten



R. Campbell  
B. Waquan  
G. Poitras  
S. Courtoreille  
M. Vander Meulen, Ph.D.  
B. Barton, Ph.D.  
W. Donahue, Ph.D.  
J. Tanner, Ph.D.

Northern Lights Health Region (NLHR)

B. Curial  
D. Chubb  
D. Hannaford

J. Fitzner  
L. Metz  
V. Lawrence  
S. Corbett, Ph.D.  
H. Walker, Ph.D.  
R. Carlyle, Ph.D.  
B. Blais

Oil Sands Environmental Coalition (OSEC)

K. Buss  
T. Nahirinik  
R. Secord

D. Woynillowicz  
S. Dyer  
M. Raynolds, Ph.D.  
K. McDonald, Ph.D.  
C. Severson-Baker  
A. Taylor  
A. Dort-Maclean

Petro-Canada Oil Sands

R. Kolber  
S. Christianson

Regional Municipality of Wood Buffalo  
(RMWB)

R. Purdy, Q.C.  
T. Marriott  
R. Salamucha

Mayor M. Blake  
B. Newell  
B. Sanders  
M. Ulliac  
S. Clarke  
J. Sample  
J. Carlisle  
W. Holodniuk  
D. Howery  
D. Schneider  
H.R. Kuehne, P.Eng.  
G. Gordon

Shell Canada Ltd.

D. Kolenick

Suncor Energy

C. Fordham  
D. Johnson

J. Heisler

Syncrude Canada Ltd.

L. Estep

E. Cook

Synenco Energy Inc.

K. Beattie

Wood Buffalo First Nation and Wood Buffalo

Elders Society

J. Malcolm

W. Castor

G. Castor

H. Scannie

J. Grant

M. Cardinal

R. Woodward

Wood Buffalo Métis Association (WBMLA)

D. Bishop

B. Hochstein

W. Loutitt

R. Quintall

F. MacDonald

B. Fayant

Alberta Energy and Utilities Board staff

G. Perkins, Board Counsel

G. Bentivegna, Board Counsel

K. Parsons, P.Eng.

J. Farnell

M. Fierro

R. Graham

F. Haddad, P.Eng.

C. Hale

M. Mann

E. Rahn

Canadian Environmental Assessment Agency

M. Pineau

J. Davis

S. Roy

## APPENDIX 2 SUMMARY OF COMMITMENTS AND CONDITIONS

### COMMITMENTS

The Joint Panel notes throughout the report that Imperial Oil has undertaken to conduct certain activities in connection with operations that are not strictly required by the EUB, AENV, CEEA, or DFO regulations or guidelines. These undertakings are described as commitments.

The Joint Panel believes that when a company makes commitments of this nature, it has satisfied itself that these activities will benefit the project, the stakeholders, and the public, and the Joint Panel takes these commitments into account when arriving at its decision. The Joint Panel expects that Imperial Oil will adhere to all commitments it made during the consultation process, in the application, and at the hearing to the extent that those commitments do not conflict with the terms of any approval or licence affecting the project or any law, regulation, or similar requirement that Imperial Oil is bound to observe. The Joint Panel expects Imperial Oil to advise the EUB if, for whatever reasons, it cannot fulfill a commitment. The EUB would then assess whether the circumstances regarding the failed commitment warrant a review of the original approval. The Joint Panel also notes that the affected parties also have the right to request a review of the original approval if commitments made by the applicant remain unfulfilled.

### CONDITIONS

- 1) Imperial Oil will consult with the impacted OSL holders and the EUB to develop an acceptable resource appraisal drilling program to be completed by the end of the 2008/2009 drilling season (Section 10.1.3).
- 2) Imperial Oil will work with the EUB to determine the economic resource potential and recovery plans for these areas prior to finalizing agreements (Section 10.1.3).
- 3) Imperial Oil will finalize the agreements with adjacent OSL holders regarding all resource and land-use related concerns arising from the impact of the KOS Project facilities upon adjacent OSL holders no later than 2010. Imperial Oil is required to consult with both the EUB and SRD prior to the finalization of these agreements (Section 10.1.3).
- 4) Imperial Oil will work with Husky and the EUB and submit a mining and SAGD impact report to the EUB no later than the end of 2009. This report will include the effects of steam pressure upon geotechnical factors of safety for external mine waste disposal facilities. It will also include the effects of mining and SAGD operations upon resource recovery at common lease boundaries (Section 10.1.3).
- 5) Imperial Oil will work with the government agencies to define the content and work required to support an amendment to the EUB approved project area as shown in Figure 1. An application must be submitted to the EUB for approval of an increased project area that includes external disposal site expansion and a raw water storage area (Section 10.1.3).
- 6) Imperial Oil will work with the government agencies to define the content and work required to support an amendment to the mine plan. An application(s) must be submitted to the EUB for approval no later than 2009 (Section 10.1.3).

- 7) Imperial Oil will work with the EUB to define the required drilling and analysis needed to evaluate any routes under consideration for the raw water pipeline and to file the appropriate pipeline application once this work is completed (Section 10.1.3).
- 8) Imperial Oil will submit to the EUB for its review and approval, five years prior to mining at any lease boundary or final pit wall, a report containing
  - a comprehensive evaluation of the lease boundary geology and reserves,
  - geotechnical conditions,
  - alternative mining scenarios and impacts,
  - associated costs in accordance with Section 3.1 of EUB *ID 2001-7*,
  - the final results on agreements reached between Imperial Oil and adjacent leaseholders,
  - any impacts on landform design and drainage, and
  - efforts made by Imperial Oil to enhance cross-boundary coordination of mining and closure (Section 10.1.3).
- 9) Imperial Oil will provide as part of its annual mine plan reporting an update of its efforts to coordinate mine and closure plans with other operators in terms of landform design, drainage, reclamation, and material balances (Section 10.1.3).
- 10) Imperial Oil will submit the detailed geotechnical designs for all external overburden disposal areas to the EUB at least six months prior conducting any field preparation in these areas (Section 10.3.2).
- 11) Imperial Oil will limit annual average solvent losses from TSRU to not more than 4 volumes per 1000 volumes of bitumen production (Section 10.4.2).
- 12) Imperial Oil will not discharge untreated froth treatment tailings to the tailings disposal area (Section 10.4.2).
- 13) One year prior to plant start-up, Imperial Oil will provide measurement plans to the EUB for review and approval, including process and instrumentation diagrams, metering, sampling methods, and material balance procedures that will satisfy the requirement of *ID 2001-7* (Section 10.4.2).
- 14) On an annual average basis, the amount of asphaltene rejection will be limited to 10 mass per cent based on bitumen production (Section 10.5.2).
- 15) Imperial Oil will work with EUB staff to update the data in Tables 2-1 through 4-10 of the Supplemental Information such that EUB staff can use the data to reliably track Imperial Oil's tailings performance over time. Imperial Oil will submit the updated tailings material balances in Tables 2-1 through 4-10 of the application for EUB approval no later than September 30, 2008 (Section 11.1.3).
- 16) Imperial Oil will submit reporting of actual tailings performance against the plan represented by Tables 2-1 through 4-10 within one month of the end of each quarter (Section 11.1.3).

- 17) Imperial Oil will submit to the EUB on an annual basis a report that describes its EPL research and development efforts for the previous year. This report should include all of Imperial Oil's efforts and its contributions to any industry collaboration on a full-scale EPL demonstration (Section [11.2.4](#)).

**APPENDIX 3 JOINT PANEL AGREEMENT****AGREEMENT  
To Establish a Joint Panel  
for the Kearl Oil Sands Project****Between  
The Minister of the Environment, Canada****- and -****The Alberta Energy and Utilities Board****PREAMBLE**

**WHEREAS** the Alberta Energy and Utilities Board (the EUB) has statutory responsibilities pursuant to the *Alberta Energy and Utilities Board Act* and the *Energy Resources Conservation Act*; and

**WHEREAS** the Minister of the Environment, Canada (the Federal Minister of the Environment) has statutory responsibilities pursuant to the *Canadian Environmental Assessment Act*; and

**WHEREAS** the Kearl Oil Sands Project (the Project) requires a public hearing and approvals from the EUB pursuant to the *Alberta Energy and Utilities Board Act*, the *Energy Resources Conservation Act*, and the *Oil Sands Conservation Act*, and is subject to an assessment under the *Canadian Environmental Assessment Act*; and

**WHEREAS** the Minister of Fisheries and Oceans has requested, in accordance with section 25 of the *Canadian Environmental Assessment Act*, that the Federal Minister of the Environment refer the Project to a review panel; and

**WHEREAS** the Federal Minister of the Environment has referred the Project to a review panel in accordance with section 29 of the *Canadian Environmental Assessment Act*; and

**WHEREAS** the Government of the Province of Alberta and the Government of Canada established a framework for conducting Joint Panels through the *Canada-Alberta Agreement on Environmental Assessment Cooperation (2005)* signed on May 17, 2005; and

**WHEREAS** the EUB and the Federal Minister of the Environment have determined that a Joint Review Panel of the Project will ensure that the Project is evaluated according to the spirit and requirements of their respective authorities while avoiding unnecessary duplication, delays and confusion that could arise from individual reviews by each government or the EUB; and

**WHEREAS** the EUB and the Federal Minister of the Environment have determined that a Joint Panel review of the Project should be conducted in a manner consistent with the provisions of Appendix 2 of the *Canada-Alberta Agreement on Environmental Assessment Cooperation (2005)*; and

**WHEREAS** the Federal Minister of the Environment has determined that a Joint Panel should be established pursuant to paragraph 40(2) of the *Canadian Environmental Assessment Act* to consider the Project;

**THEREFORE**, the EUB and the Federal Minister of the Environment hereby establish a Joint Panel for the Project in accordance with the provisions of this Agreement and the Terms of Reference attached as an Appendix to this Agreement.

## 1. Definitions

For the purpose of this Agreement and of the Appendix attached to it,

**"Agency"** means the Canadian Environmental Assessment Agency established by the *Canadian Environmental Assessment Act*.

**"EIA Report"** means an environmental impact assessment report prepared in accordance with the Terms of Reference issued for the Project by the Director of Alberta Department of the Environment.

**"Environment"** means the components of the Earth, and includes

- a. land, water and air, including all layers of the atmosphere;
- b. all organic and inorganic matter and living organisms; and
- c. the interacting natural systems that include components referred to in (a) and (b).

**"Environmental Effect"** means, in respect of the Project,

- a. any change that the Project may cause in the Environment, including any change it may cause to a listed wildlife species, its critical habitat or the residence of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*,
- b. any effect of any change referred to in paragraph (a) on
  - i. health and socio-economic conditions
  - ii. physical and cultural heritage
  - iii. the current use of lands and resources for traditional purposes by aboriginal persons, or
  - iv. any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, or
- c. any change to the Project that may be caused by the environment,

whether any such change or effect occurs within or outside Canada.

**"Federal Authority"** refers to such an authority as defined in the *Canadian Environmental Assessment Act*.

**"Final Report"** means the document produced by the Joint Panel, which contains decisions pursuant to the *Energy Resources Conservation Act* or the *Oil Sands Conservation Act*, and the Joint Panel's conclusions and recommendations pursuant to the *Canadian Environmental Assessment Act* with respect to the environmental assessment of the Project.

**"Follow-up Program"** means a program for

- a. verifying the accuracy of the environmental assessment of the Project, and
- b. determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the Project.

**"Joint Panel"** refers to the Joint Review Panel established by the EUB and the Federal Minister of the Environment through this Agreement.

**"Mitigation"** means, in respect of the Project, the elimination, reduction or control of the adverse environmental effects of the Project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means.

**"Parties"** means the signatories to this Agreement.

**"Responsible Authority"** refers to such an authority as defined in the *Canadian Environmental Assessment Act*.

## **2. Establishment of the Panel**

**2.1.** A process is hereby established to create a Joint Panel, pursuant to section 22 of the *Energy Resources Conservation Act* with the authorization of the Lieutenant Governor in Council of Alberta, and Sections 40, 41 and 42 of the *Canadian Environmental Assessment Act*, for the purposes of the review of the Project.

**2.2.** The EUB and the Agency will make arrangements to coordinate the announcements of a joint review of the Project by both Alberta and Canada.

## **3. Constitution of the Panel**

**3.1.** The Joint Panel will consist of three members. Two members, including the Joint Panel Chair, will be appointed by the Chair of the EUB with the approval of the Federal Minister of the Environment. The third Joint Panel member will be appointed by the Federal Minister of the Environment in accordance with article 3.2 of this Agreement.

**3.2.** The Federal Minister of the Environment will select the third Joint Panel member and recommend the selected candidate as an individual who may serve as a potential acting member of the EUB. If acceptable to the Lieutenant Governor in Council of Alberta and the Chairman of the EUB, the Lieutenant Governor in Council of Alberta will nominate this candidate to serve as an acting member of the EUB and the Chairman of the EUB will appoint this candidate as a member of the Joint Panel. The selected candidate will then be appointed by the Federal Minister of the Environment as a member of the Joint Panel.

**3.3.** The Joint Panel members shall be unbiased and free from any conflict of interest relative to the Project and are to have knowledge or experience relevant to the anticipated environmental effects of the Project.



#### **4. Conduct of Assessment by the Panel**

**4.1.** The Joint Panel shall conduct its review in a manner that discharges the responsibilities of the EUB under the *Alberta Energy and Utilities Board Act* and the *Energy Resources Conservation Act*.

**4.2.** The Joint Panel shall conduct its review in a manner that discharges the requirements set out in the *Canadian Environmental Assessment Act* and in the Terms of Reference attached as an Appendix to this Agreement and that were fixed and approved by the Federal Minister of the Environment.

**4.3.** All Joint Panel hearings shall be public and the review will provide opportunities for timely and meaningful public participation.

**4.4.** The Joint Panel shall have all the powers and duties of a panel described in Section 35 of the *Canadian Environmental Assessment Act* and of a division of the EUB described in Section 10 of the *Alberta Energy and Utilities Board Act*.

#### **5. Secretariat**

**5.1.** Administrative, technical, and procedural support requested by the Joint Panel shall be provided by a Secretariat, which shall be the joint responsibility of the EUB and the Agency.

**5.2.** The Secretariat will report to the Joint Panel and will be structured so as to allow the Joint Panel to conduct its review in an efficient and cost-effective manner.

**5.3.** The EUB will provide its offices for the conduct of the activities of the Joint Panel and the Secretariat.

#### **6. Record of Joint Review and Final Report**

**6.1** Subject to sections 55.1, 35(4), and 35(4.1) of the *Canadian Environmental Assessment Act*, the public registry will include all submissions, correspondence, hearing transcripts, exhibits and other information received by the joint panel and all public information produced by the joint panel relating to the review of the Project.

**6.2** The responsible authority under the *Canadian Environmental Assessment Act* will make necessary arrangements with the Agency for the maintenance of the internet site component of the federal public registry, when the Joint Panel is announced. The internet site component of the registry will be maintained by the Agency during the course of the joint panel review in a manner that provides for convenient public access, and for the purposes of compliance with section 55 to 55.5 of *Canadian Environmental Assessment Act*. The Agency's co-responsibility for the Secretariat will include the Agency's obligation to maintain the internet site.

**6.3.** A public registry will be maintained by the Secretariat during the course of the review in a manner that provides for convenient public access, and for the purposes of compliance with section 55 and 55.4 of the *Canadian Environmental Assessment Act*. This registry will be located in the offices of the EUB.

**6.4.** On completion of the assessment of the Project, the Joint Panel will prepare a Final Report that will be published.

**6.5.** Once completed, the Final Report will be conveyed simultaneously in both official languages by the Joint Panel to the Government of Alberta and the Federal Minister of the Environment and will be made available to the public.

**6.6.** Once the Final Report is submitted, the responsibility for the maintenance of the public registry will be transferred to the responsible authority. The EUB will continue to maintain records of the proceedings and the Final Report, as per the EUB Rules of Practice.

**6.7.** The Agency will be responsible for the translation of key documents prepared by the Joint Panel, including public notifications and releases and the Final Report, into both of the official languages of Canada. The Agency will use all reasonable efforts to expedite the translation of the Final Report in an effort to meet the EUB's ninety day timeframe for the release of EUB decisions.

## **7. Other Government Departments**

**7.1.** At the request of the Joint Panel, federal authorities and provincial authorities having specialist information or knowledge with respect to the Project shall make available that information or knowledge in a manner acceptable to the Joint Panel.

**7.2.** Nothing in this Agreement will restrict the participation by way of submission to the Joint Panel by other federal or provincial government departments or bodies, subject to article 7.1, above, section 12(3) of the *Canadian Environmental Assessment Act* and the EUB Rules of Practice.

## **8. Participant Funding**

**8.1.** Decisions regarding participant funding by the Agency under the federal Participant Funding Program, and decisions on intervener funding by the EUB as provided for in the *Energy Resources Conservation Act*, EUB Rules of Practice and the EUB Guidelines for Energy Cost Claims (Guide 31A) will, to the extent practicable, take into account decisions of the other party.

## **9. Cost Sharing**

**9.1.** The EUB, as lead party, will develop a budget estimate of expenses agreeable to both parties prior to initiation of the Joint Panel activities.

**9.2.** The costs of the review will be apportioned between the EUB and the Agency in the manner set out in articles 9.3, 9.4 and 9.5.

**9.3.** The EUB will be solely responsible for the following costs:

- salaries and benefits of the Joint Panel Chairman and the member of the Joint Panel not appointed in accordance with article 3.2; and
- salaries and benefits of EUB staff involved in the joint review.

**9.4.** The Agency will be solely responsible for the following costs:

- per diems of the Joint Panel member appointed in accordance with article 3.2;
- salaries and benefits of Agency staff involved in the joint review;
- all costs associated with the federal Participant Funding Program;

- translation of records and documents into the official languages of Canada other than translation required as outlined in section 9.5 of this Agreement; and
- costs associated with the public registry established pursuant to section 55.1 of the CEEA.

**9.5.** The EUB and the Agency agree to share equally all those costs listed below, incurred as part of the Joint Panel review from the signing of this Agreement to the date the Final Report is issued by the Joint Panel. The shareable costs are as follow:

- travel-related expenses associated with the review incurred by Joint Panel members and Panel Secretariat staff;
- per diems and associated expenses of independent/non-government expert consultants, analysts and communications specialists retained by the Secretariat;
- language translation and interpretation services and facilities related to the evidence of applicants, participants and local interveners as required by the joint panel, but not including translation service referred to in Section 6.7 of this Agreement;
- printing of any reports and documents distributed by the Joint Panel necessary for the Panel's work;
- the publication of notices and releases;
- photocopying, including the reproduction of documents contained in the public registry, and postage related to the review;
- court reporting and transcripts as required by the Joint Panel;
- rental of hearing, public meeting and public information office facilities and equipment;
- audio and audio-visual services at the hearing and public meetings; and
- miscellaneous expenditures up to a maximum of five percent (5%) of the total budget for the review.

**9.6.** The Agency may only be responsible for contributing to shareable costs within the allowable limits of Treasury Board Secretariat directives.

**9.7.** Shareable costs of the joint review as detailed in article 9.5 will be incurred at the sole discretion of the Joint Panel with due regard to economy and efficiency.

**9.8.** All expenses not listed above will need prior approval of both parties if they are to be equally shared.

## **10.0 Invoicing**

**10.1** The EUB will be responsible for advancing funds for the payment of the shareable costs and will invoice the Agency for the amounts owed under this Agreement, except for travel-related expenses of the Agency's staff which will be advanced by the Agency. In the event that the Agency is required to advance shareable funds directly, it will advance funds for payment and will invoice the EUB as determined under this Agreement.

**10.2** The invoicing will be done either at the end of each month or quarterly at the discretion of the EUB. The invoice will cover all shareable costs paid by the EUB.

**10.3** Each invoice will be accompanied by a summary description of the shareable costs actually incurred and paid for the period covered by the invoice, in a form satisfactory to both Parties and will be certified by an official acceptable to both Parties. Detailed information about incurred costs will be retained and made available to either Party upon request.

**10.4** Subject to compliance with the above requirements the Agency will pay to the EUB the amount stated as being owed to it in the invoice within sixty (60) days of having received such invoice.

**10.5** With respect to invoices covering the last period of any fiscal year (ending March 31), and the last invoice to be produced for the joint panel review, each Party may review and deduct from the invoice, any incurred shareable costs that have not been previously recovered, so as to determine a net transfer of shared costs from one Party to another. The payment will be made within thirty (30) days of having received such invoice. An accounting of the shared expenses incurred by the Agency will be sent with the year-end and final payments, or earlier as may be requested by the EUB.

## **11.0 Audit**

**11.1** Subject to this Agreement, both Parties will keep open to audit and inspection by the Agency or the EUB, or their duly authorized representative, all invoices, receipts, vouchers and documents of any nature or kind whatsoever that have been relied on by either of the two Parties to calculate the shared cost of conducting the public review.

**11.2** The Party exercising its option to audit will be responsible for the cost of the audit.

**11.3** Where an audit conducted by either Party in connection with this Agreement reveals discrepancies regarding the amount billed to the Agency, and where prompt resolution between the Parties is unattainable, an independent auditor acceptable to both Parties will resolve the issue.

## **12. Amending this Agreement**

**12.1.** The terms and provisions of this Agreement may be amended by written memorandum executed by both the Federal Minister of the Environment and the Chairman of the EUB. Subject to section 27 of the *Canadian Environmental Assessment Act*, upon completion of the joint review, this Agreement may be terminated at any time by an exchange of letters signed by both parties.

## **13. Signatures**

**WHEREAS** the parties hereto have put their signatures  
this 13<sup>th</sup> day of July 2006. (Original signed by)

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The Honourable Rona Ambrose  
Minister of the Environment

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Neil McCrank, Q.C.  
Chairman  
Alberta Energy and Utilities Board

## Appendix

### Terms of Reference

#### Part I - Project Description

Imperial Oil Resources Ventures Limited and ExxonMobil Canada Properties are proposing to construct and operate an oil sands mining and extraction facility in the Fort McMurray area. The proposed Kearl Oil Sands Project is to be located approximately 70 kilometers north of Fort McMurray in Townships 95 to 99, Ranges 6 to 10, West of the 4th Meridian. The project includes four open pit, truck and shovel mines, three trains of ore preparation and bitumen production facilities, a cogeneration plant consisting of three 85-megawatt gas turbine generators, one external tailings area for all three trains, associated utilities and infrastructure, and a development and reclamation plan. The proposed project is designed to produce approximately 48,000 cubic metres per day of partially deasphalted bitumen (clean bitumen). The project, if approved, could begin construction in 2007, with mining expected to occur in the period 2010 to 2060.

#### Part II - Scope of the Environmental Assessment

1. The Joint Panel will conduct an assessment of the environmental effects of the Project based on the Project Description (Part I).
2. The assessment will include a consideration of the factors listed in subsection 16(1)(a) to (d) and 16(2) of the *Canadian Environmental Assessment Act*, namely:
  - a. the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
  - b. the significance of the effects referred to in paragraph a);
  - c. comments from the public that are received during the review;
  - d. measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
  - e. the purpose of the Project;
  - f. alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
  - g. the need for, and the requirements of, any follow-up program in respect of the Project; and
  - h. the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of the future.
3. Pursuant to subsection 16(1)(e) of the *Canadian Environmental Assessment Act*, the assessment by the Joint Panel will also include a consideration of the additional following matters:
  - a. the need for the Project;
  - b. alternatives to the Project; and
  - c. measures to enhance any beneficial environmental effects.
4. The Review will consider the environmental effects of the proposed Project within spatial and temporal boundaries which encompass the periods and areas during and within which the Project may potentially interact with, and have an effect on, components of the

environment. These boundaries may vary with the issues and factors considered, and with the different phases in the life cycle of the Project. The boundaries will reflect:

- the natural variation of a population or ecological component;
- the timing of sensitive life cycle phases in relation to the scheduling of the Project;
- the time required for an effect to become evident;
- the time required for a population or ecological component to recover from an effect and return to a pre-effect condition, including the estimated degree of recovery;
- the area affected by the Project; and
- the area within which a population or ecological component functions and within which a Project effect may be felt.

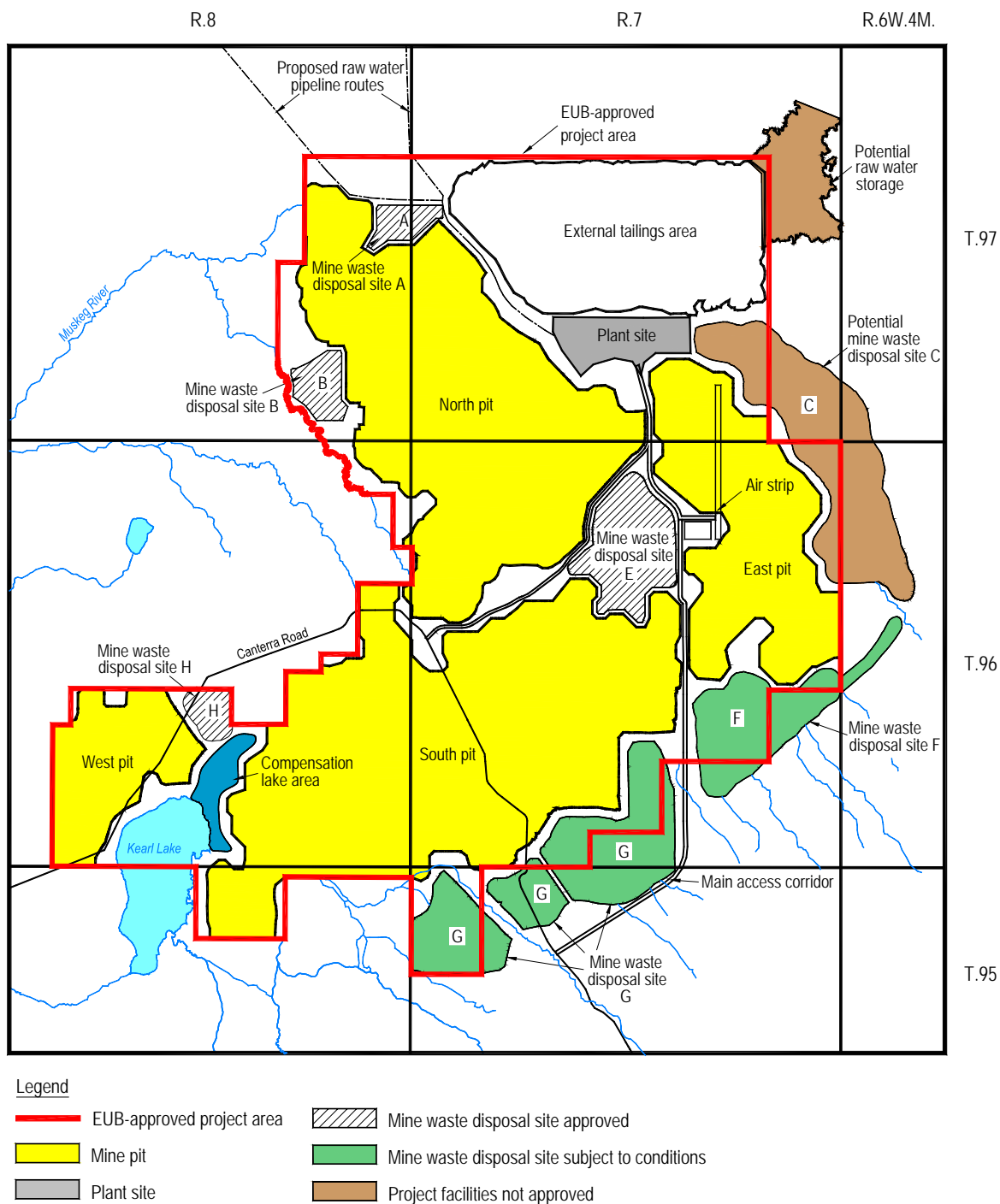


Figure 1. KOS Project Site Plan