Submission of

Alberta Environmental Protection
and
Alberta Health

in Relation to the

Muskeg River Mine Project Submitted by Shell Canada Limited

Before the

Alberta Energy and Utilities Board

ALBERTA ENERGY AND UTILITIES BOARD
APPLICATION NO. 970588

ALBERTA ENVIRONMENTAL PROTECTION
APPLICATION NO. 001-20809, FILE NO. 60330
AND
ENVIRONMENTAL IMPACT REPORT

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I. INTRODUCTION

1. This submission is being filed on behalf of Her Majesty the Queen in right of Alberta (Alberta) further to the Alberta Energy and Utilities Board (EUB) Application No. 970588, Shell Canada Limited (Shell) to be considered at an Alberta Energy and Utilities Board (EUB) public hearing to commence on November 16, 1998, at Fort McMurray.

2. Alberta will be represented by two participating departments, Alberta Environmental Protection (AEP) and Alberta Health (AH). Alberta's interest in the application is a consequence of legislation and regulation in relation to the environment, public lands, forestry, health and historical resources which are set out in detail under the heading "Alberta's Interest".

3. Alberta appears before the Panel respecting this application to assist in the EUB's evaluation of the Muskeg River Mine Project proposed by Shell. It will present information to the Panel about Alberta's roles and responsibilities, generally and specifically, with respect to this application. Alberta will make the Panel aware of specific issues with the application and indicate how they will be addressed as AEP and AH carry out their responsibilities.

4. The nature of the approvals sought from AEP are also set out in the section "Alberta's Interest". No decisions have been made with respect to applications made to AEP. Participation at this hearing is not meant to constrain or fetter any Alberta statutory decision-makers in fulfilling their responsibilities under the laws of Alberta. The *Environmental Protection and Enhancement Act (EPEA)* permits the consideration of evidence submitted to the EUB and requires the consideration of any EUB decision in any *EPEA* approval to be issued.

5. Alberta does not object to the proposed Muskeg River Mine Project provided the EUB finds that the project is in the public interest and that the matters raised in this submission are properly addressed. The position set out in this submission is subject to change as the hearing progresses. Alberta's final position will be presented at the hearing at the time of final argument.

II. ALBERTA'S INTEREST

6. AEP is responsible for the protection of the province's air, land, and water, and for the management and conservation of renewable resources such as forests, fish, and wildlife.

7. AEP has regulatory responsibilities for this proposed project pursuant to *EPEA*, the *Water Resources Act*, the *Public Lands Act* and the *Forests Act*. Shell has submitted an application under *EPEA* and the *Water Resources Act* and must receive approval before it proceeds with the project.

8. AEP undertakes its business and service through a community-based approach. The province has been divided into six administrative regions: North West Boreal, North East Boreal, Northern East Slopes, Parkland, Bow, and Prairie.

   The Muskeg River Mine Project is located in the North East Boreal Region which is administered through 3 services: the Environmental Service, the Natural Resource Service, and the Land and Forest Service.

9. Alberta Health's mission is to "improve the health of Albertans and the quality of the health system". Section 11 of *EPEA* provides for the co-operation between AEP and Alberta Health in promoting human health through environmental protection.

Environmental Protection and Enhancement Act

10. *EPEA* provides for the protection of the environment through seven core business strategies: project assessment/evaluation; approvals; monitoring; enforcement; pollution prevention; setting standards, objectives, and guidelines; and decommissioning and reclamation.

Project Assessment

11. The environmental assessment process supports the goals of environmental protection and sustainable development, and integrates environmental protection and economic decision making at the earliest stages of planning.

12. The process provides for the prediction of the environmental, social, economic and cultural consequences of a proposed activity and for assessment of plans to mitigate any resulting adverse impacts.

13. The process involves the public, proponents and provincial and federal government departments and agencies in the review of proposed activities.

Approvals

14. AEP's goal is to issue clear and enforceable *EPEA* approvals, registrations and authorizations based on sound science and technology to ensure environmental protection.

15. An approval under *EPEA* addresses reclamation, water releases, air emissions, waste disposal, and impacts on ambient air, water, land, fish, wildlife, and vegetation. The approval addresses all phases of an activity including pre-construction, construction, operation, decommissioning and reclamation.

Monitoring

16. AEP sets out its requirements for environmental protection in an approval, which includes monitoring and reporting for potential effects and environmental impacts.

17. Reports, periodic inspections and spot checks by departmental staff enable AEP to keep track of the company's environmental performance. Environmental monitoring is a means of ensuring that the issues identified in the assessment and approval process are effectively dealt with and are minimized. The department also operates a network of mobile and stationary monitoring stations to measure the quality of air, soil and groundwater and provides data on important environmental parameters.

Industry is required, through specific approvals, to participate in monitoring networks established by multi-stakeholder bodies such as the Wood Buffalo Environmental Association (WBEA).

Enforcement

18. AEP staff conduct regular and thorough inspections of approved oil sands operations. AEP also investigates complaints received from the public or other departments. As a consequence of either, AEP may take enforcement action to prevent or minimize environmental degradation.

Standards, Objectives and Guidelines

19. The department seeks to establish acceptable levels of protection for air, land and water resources by developing, with stakeholder involvement, protocols and environmental quality guidelines for key environmental parameters of concern to Albertans. The goal is to establish publicly accepted and scientifically sound guidelines that describe the environmental quality that will be maintained in Alberta and to prevent adverse effects on air, land and water resources.

Decommissioning/Reclamation

20. *EPEA* promotes the concept of return of equivalent land capability, which is the ability of the land to support various land uses such as agriculture, forestry, wildlife, fisheries and recreation in the reclaimed landscape. The ability of the reclaimed land to support various uses must be similar to what it was before surface disturbance, but specific land uses may not necessarily be identical. This approach maintains future land use options. All approved oil sands operations must be certified that reclamation is complete before responsibility for managing the land is returned to the Crown.

Water Resources Act

21. The *Water Resources Act* deals with the management and allocation of water and regulates all activities which have an effect on watercourses or water bodies. A regulation under the *Water Resources Act* deals with the safety of fluid retaining projects, including tailing ponds. The *Water Resources Act* will be replaced by the *Water Act* as of January 1, 1999.

Wildlife Act

22. The *Wildlife Act* provides for management of Alberta's wildlife resources, primarily through the regulation of consumptive uses (hunting and trapping). Impacts to wildlife and wildlife habitat arising from industrial development are addressed by providing advice to those regulators issuing approvals.

Public Lands Act

23. The *Public Lands Act* authorizes the allocation of public land through mechanisms such as licences, permits and leases. It also provides for management of forest land use activities such as recreation areas, trails and land use zones. Provincial public land is administered either as Green Area or White Area. All public land within the Shell Muskeg River Mine application area is within the Green Area. The Green Area was established by Order in Council in 1948, to be managed primarily for forest production, watershed protection, recreation and other uses. Shell will require various dispositions under the *Public Lands Act* should the EUB approve the Muskeg River Mine Project.

Forests Act

24. Alberta's forests are owned by the province. The *Forests Act* provides for the management of Alberta's forest resources. This includes the conservation, utilization, and the return to acceptable levels of forest resources after industrial disturbance. The *Forests Act* allows the Minister to establish regulations that manage activities including land use, forest recreation, timber management, and exploration activities.

Forest and Prairie Protection Act

25. The *Forest and Prairie Protection Act* authorizes the Minister to make regulations that set standards for activities that may affect Alberta's forests. The regulations provide for the management of activities in forested areas, and set standards for debris disposal, pollution, soil erosion, the control of wildfire, controlled use of fire, and control of pest infestation of forest trees.

Fisheries Act

26. The *Fisheries Act* requires conservation and protection of fish and fish habitat. The *Fisheries Act* is a federal statute that outlines the powers, duties and functions of the Minster of Fisheries and Oceans for inland fisheries. AEP is responsible for management of fish under the *Fisheries Act.*

Public Health Act

27. Regulations pursuant to the *Public Health Act* state: that no person shall create, commit or maintain any nuisance. Nuisance is defined as a condition that is or might become injurious or dangerous to the public health or that might hinder in any manner the prevention or suppression of disease.

Historical Resources Act

28. The *Historical Resources Act* requires a proponent to assess whether the project will result in the alteration, damage or destruction of historic resources. Alberta Community Development, who administers this Act, can require action to protect any historic resources.

III. ALBERTA'S RESOURCE MANAGEMENT RESPONSIBILITY

29. Seven government policies apply to this project: the *Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan (1996)* (IRP); the *Oil Sands Mining: End Land Use Committee Recommendations (1998); Special Places (1995);* the *Fish and Wildlife Policy for Alberta (1982);* the *Fisheries Conservation Strategy (1997); Statement of Commitment to Support the Canadian Biodiversity Strategy (1995);* the *Recommended Wetlands Policy for Alberta (1994);* and the *Recommended Native Grasses and Legumes for Revegetating Disturbed Lands in the Green Area (1996).*

Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan

30. The Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan provides a comprehensive integrated approach to the management of public land and resources. It provides government direction, policy information and guidance for developing and assessing future actions by provincial government agencies and the private sector. Resource management areas (RMA) have been identified on the basis of a common landscape with common management goals, objectives and guidelines. The Muskeg River Mine Project is located within the Mildred-Kearl Lake RMA and portions of the supporting infrastructure are within the Athabasca/Clearwater RMA.

31. The management intent for mineral and surface material resources within the Mildred-Kearl Lake RMA is to promote and encourage the orderly planning, exploration and development of resources with emphasis on surface mineable oil sands reserves. Objectives of the RMA include the optimisation of regional and provincial economic and employment benefits. The recovery of other valuable mineral, aggregate and surface material resources during the mining and processing of oil sands is encouraged.

32. AEP has adopted the following land reclamation strategy guidelines for the Mildred-Kearl Lake RMA which will apply to the proposed development:

a) disturbed lands shall be reclaimed to a capability equivalent to that existing before disturbance. Where commercial forest is the reclamation objective, the capability will be measured in terms of meeting reforestation standards;

b) commercial timber harvesting potential would normally be replaced on a project basis;

c) following surface disturbance, the land should be reclaimed in a manner that re-establishes a watershed that resembles and functions as a natural system. The restructured soil profile shall be capable of supporting a variety of native vegetation;

d) revegetation to a mixed wood boreal forest, using native species, will be the primary means by which the land base is reclaimed. The reclaimed land base will be capable of supporting a variety of uses, including timber harvesting, extensive recreation, traditional native activities, wildlife habitat (including fisheries and waterfowl) and watershed protection;

e) reclamation shall:
- re-establish ecosystem connections between reclaimed areas and river valleys;
- use a wide variety of native tree species and understory vegetation;
- encourage the development of permanent ponds, sloughs and small lakes, with and without connecting streams, with and without adjacent meadows; and

f) oil sands operators should continue to contribute to research and development in land reclamation technology to reduce disturbance and protect the environment.

Oil Sands Mining: End Land Use Committee Recommendations

33. In June 1997, AEP established a committee whose membership included: the Oil Sands Mining Industry; the Alberta Energy and Utilities Board; and other stakeholders affected by oil sands mining.

34. In early 1998, the committee made recommendations to the Government of Alberta to assist decision making during the regulatory review and approval process. The purpose of the recommendations was to minimize impacts of oil sands operations on other users and industries (e.g., forestry) while at the same time respecting Oil Sands Mining as an important regional activity. Those recommendations that are of particular relevance to this project are:

a) Reclamation Plan Coordination

i. A regional organization should be established as an advisory board to provide a forum for co-ordination of reclamation plans to ensure: continuity of land forms and watershed systems across lease boundaries; productive capability of the landscape, equal to or better than pre-disturbance, is returned on a regional basis; land uses are located in areas or on land forms that make physical, biological, social and economic sense; and productivity objectives are met regionally.

ii. Industry, regulatory agencies, and stakeholders using existing reclamation guidelines that have been developed will continue to work together to develop guidelines to achieve the recommended end land uses (e.g., working groups for soils, vegetation, wetlands, and traditional land use).

iii. Adjacent oil sands operators must show evidence of reclamation plan co-ordination to obtain approval under *EPEA*.

b) Land Use Categories and Allocation

i. For major land use categories, reclamation should ensure the evolution of productive natural ecosystems with the objective of re-establishing a diversity and abundance of wildlife habitat types and qualities consistent with pre-disturbance levels. Oil sands reclamation shall comply with the wildlife objectives of the Fort McMurray-Athabasca Oil Sands Subregional Integrated Resource Plan.

ii. Natural Areas are an integral part of oil sands mining reclamation and are important to ensure biodiversity is maintained.

iii. Reclaimed lands for natural and conservation areas, and forestry will be established with consideration of biodiversity, aesthetics, traditional land uses, and general community hunting, fishing, trapping and gathering of plants.

iv. Additional associated end land use options deemed acceptable in natural and conservation areas are wildlife sanctuaries and management areas, and extensive recreation.

v. In support of Municipal Development Plans, each oil sands operation may consider within their proposed reclamation plans, reclaiming part of the disturbed area for uses such as agricultural, residential, commercial, and recreational development. These land use proposals will be assessed through the appropriate approval processes, including Alberta's *EPEA* reclamation approval process. Social, cultural and economic value to communities of the Regional Municipality of Wood Buffalo will be considered.

vi. Oil sands operations will return forested areas to productivity equal to or better than pre-disturbance levels, with at least an equal land area. To maintain biodiversity, the forested areas will be planted to a similar species mix as existed pre-disturbance. These forest stands are to be developed in contiguous blocks as appropriate for efficient forestry operation.

vii. Consideration may be given to increasing the forest harvest potential beyond pre-disturbance levels.

c) Priority of Establishing End Land Uses

i. Land reclamation and the establishment of end land uses will be carried out on a progressive basis with a minimum amount of elapsed time from disturbance to completion of a reclaimed landscape.

ii. Where oil sands mining has displaced pre-disturbance land uses, priority will be given to re-establishment of these land uses.

iii. AEP, Forest and Oil Sands Industry, and regional stakeholders will work to determine and understand the impact of the loss of productive forest lands. This includes an assessment of the impact of the loss of productive forest lands on Annual Allowable Cut from oil sands mining and identification of mitigative measures to minimize the impact on the forest industry.

iv. The Oil Sands Industry and interested stakeholders will work with Metis and First Nations people, within the Regional Municipality of Wood Buffalo, to develop reclamation guidelines for replacement of traditional land uses.

v. The regulatory process for new and ongoing projects must carefully consider traditional land uses in the impacted areas, and stipulate the following actions where appropriate:

- avoid creating the disturbance;
- re-establish the use elsewhere, if possible; and
- re-establish the use as quickly as possible on reclaimed land.

35. The End Land Use Committee Recommendations will be considered by the Director when making a decision pursuant to *EPEA*.

Special Places

36. Special Places is a Government of Alberta initiative which balances preservation of Alberta's natural heritage with: tourism and economic development; outdoor recreation; and heritage appreciation.

37. Alberta's strategy is to complete a network of Special Places that represent the environmental diversity of the province's six Natural Regions (20 sub-regions).

38. AEP and Alberta Community Development have reviewed the proponent's application with respect to Special Places and have determined that no sites nominated or designated as a Special Place will be impacted by Shell's proposed development, including the Cree Burn Lake archaeological site designated as HhOv 16.

Fish and Wildlife Policy for Alberta (1982)

39. General direction regarding outdoor recreation, wildlife resources, fisheries resources and regulatory aspects of fish and wildlife management is provided by the *Fish and Wildlife Policy for Alberta (1982)*. The primary consideration with respect to fish and wildlife populations is to protect them from severe decline and to maintain viable populations.

Fish Conservation Strategy for Alberta (1997)

40. A *Fish Conservation Strategy for Alberta* has been developed to guide the management of fish resources in a manner consistent with the federal *Fisheries Act* and the *Fish and Wildlife Policy for Alberta.*

41. The *Fish and Wildlife Policy* recognizes fish conservation and confers on AEP the mandate for protection of fisheries. Fisheries resource stewardship provides a healthy environment by sustaining the biodiversity, productivity, structure and functions of ecosystems. AEP's role is to sustain the abundance, distribution and diversity of fish populations at the carrying capacity of their habitats.

42. AEP has reviewed the application with respect to the above fisheries policies and concludes that the impact of the project on fish populations is acceptable.

Statement of Commitment to the Canadian Biodiversity Strategy (1995)

43. In 1995, Alberta, along with the governments of other provinces, territories, and Canada, committed to the Canadian Biodiversity Strategy as a guide for conserving biodiversity and ensuring the sustainability of biological resources. The Canadian Biodiversity Strategy provides a strategic framework of action to ensure the productivity, diversity and integrity of natural systems. Governments should use environmental assessments to determine the impacts of projects on ecosystems, species, and genetic resources and to recommend means for mitigating or avoiding these impacts. Governments should also determine the effects of cumulative impacts of human activities on ecosystems, species, and genetic diversity and to take appropriate steps to eliminate or reduce them to acceptable levels. Alberta implements the strategy through its legislation, policies, and programs as outlined in the document titled *Sustaining Alberta's Biodiversity: An Overview of Government of Alberta's Initiatives Supporting the Canadian Biodiversity Strategy.*

44. The Department is currently developing guidelines for assessing and mitigating losses in biodiversity.

45. Discussions regarding furthering the approach to biodiversity assessment and mitigation have been initiated with the Oil Sands Industry with respect to the current developments.

Wetlands Policy for Alberta

46. The goal of the Recommended Wetlands Policy for Alberta, which is approved for interim implementation, is to "sustain the environmental, economic and social benefits that wetlands provide, now and in the future". To achieve this goal the government has three major tools: it can protect wetlands from use, it can allow careful development of wetland resources, and it can require the restoration or creation of wetlands in areas where they have been lost.

47. AEP is participating in a multi-stakeholder wetlands subcommittee to define design criteria for the re-establishment of wetlands in the reclaimed landscape.

Recommended Native Grasses and Legumes for Revegetating Disturbed Lands in the Green Area

48. In addition to controlling erosion, native species are used for revegetation to maintain the genetic integrity of a site's native vegetation and to ensure appropriate habitat for wildlife after reclamation. These aims reflect the department's objective of managing resources within the framework of the landscape's ecology. The list of native grasses and legumes in the document are specific to designated natural regions and sub-regions of Alberta and apply in the Green Area.

49. AEP promotes these policy objectives by placing specific conditions in the approval requiring the use of native species for re-vegetation in the reclaimed landscape.

IV. ALBERTA'S APPROVAL PROCESS

Environmental Protection and Enhancement Act Approval Process

50. This oil sands mine and processing plant are designated as Division 3 and Division 2 activities, respectively, under Schedule 1 of the *Activities Designation Regulation* of *EPEA*. The Director responsible for issuing this approval is the Director, Environmental Service, North East Boreal Region.

51. The department provided terms of reference for environmental impact assessments (EIA) reports for the Shell Muskeg River Mine Project following the public notice provisions and procedural steps set out in *EPEA*. AEP reviewed the EIA reports and supporting documentation. AEP intends to participate in the EUB hearing to ensure that the Board understands the likely environmental consequences of these activities and how the department intends to manage them.

52. Through this process, Shell prepared the EIA that forms the basis of the application both to the EUB and to AEP. AEP, in its co-ordination role, ensured that all regulatory and interested agencies reviewed and had input into the EIA. The environmental assessment process ensures that the EUB and AEP Directors have the best available information upon which to make their decisions.

53. Shell filed an integrated application with AEP for regulatory approval, which combines *EPEA* and *Water Resources Act* regulatory review processes. When reviewing an application, the Director is required by *EPEA* to consider the decision of the EUB and may consider any information placed before the EUB in making a decision. AEP will not issue any of its approvals until the EUB has completed its evaluation and decided that the project is in the public's interest. AEP must be satisfied that the proposed Muskeg River Mine will meet AEP's requirements before it will issue any environmental approvals.

54. The Director decides whether to issue an approval and what conditions will be required. Before doing so, the Director considers any Statements of Concern filed by directly affected individuals. The Director may circulate the particulars of the proposed decision to the applicant and persons who filed Statements of Concern for their comment. If the Director approves the project, the approval will contain terms and conditions to protect the environment. The approval issued by AEP can be for a period of up to ten years, at which time a new approval is required.

Alberta Health's Process

55. EIA reports are reviewed by an interdepartmental Human Health Review team led by staff from Health Surveillance, Alberta Health. The population health risk assessment process is based on a multidisciplinary approach including epidemiology, toxicology, environmental health, engineering, social sciences, and biostatistics. Public Health recommendations may include health protection, health promotion, disease prevention, and exposure control strategies.

V. REGIONAL SUSTAINABLE DEVELOPMENT STRATEGY

56. Given the number of current resource development proposals in the Athabasca Oil Sands, it is important to continue to provide proper context for resource and environmental management. To provide clear direction and effective decision making for sustainable development and environmental management, AEP is committed to lead the development of a "Regional Sustainable Development Strategy" for the Athabasca Oil Sands.

57. The Strategy will not duplicate existing effort, nor impede important existing initiatives or projects. The Strategy must include consideration of the recommendations and findings of these other initiatives.

58. Management for regional sustainable development will require collaboration, communication and consultation among all stakeholders and with other initiatives. The following steps are anticipated for an effective management strategy:

a) outline and describe current initiatives, and resource and environmental management regimes;
b) analyze gaps in environmental and resource science and knowledge;
c) identify and prioritize research to fill gaps;
d) examine and enhance management regimes (goals, threshold, targets); and
e) implement effective monitoring, communication and decision-making.

The regional initiative will include several key elements:

a) Priority - The Strategy will be developed on a priority basis to guide resource and environmental management and to complement the existing approvals and assessment framework currently in operation.

b) Co-ordination - AEP will co-ordinate its work and seek leadership from stakeholder participants in the existing efforts that are related to development in the Athabasca Oil Sands. Principles of public involvement will be followed to ensure meaningful participation by stakeholders.

c) Context - The Strategy will provide the context within which cumulative and future effects can be managed. It will be used in the review and approval of future projects.

d) Adaptive Management - The Strategy must keep pace with new information, including the management of facilities after approval. As new information is acquired, management will be adapted based on good science and public values.

59. AEP believes that the adoption of this management strategy will result in a greater understanding and better management of regional effects as they become known in the future. This will allow for better ongoing project management after approvals are issued.

60. At this time, AEP is encouraging broad EUB support of the initiative. The department is not advocating that the EUB take a specific action such as a condition of the EUB's approval. There will be other, more appropriate, forums in which to address this matter further with input from all stakeholders.

VI. PROJECT ANALYSIS

Management of Regional Air Quality

61. In addition to consideration of direct air emissions from the Muskeg River Mine Project, the management of regional effects of air emissions needs to be considered.

Departmental Position

62. Further modelling and monitoring will be needed to more precisely and accurately establish the effect of regional NO_x and VOC emissions on ambient ground-level ozone and NO_2 concentrations. This may occur through initiatives under the Wood Buffalo Environmental Association (WBEA) or may be recommended by staff to the Director as an *EPEA* approval condition. However, the predicted exceedance of the one-hour ambient ozone guidelines, by the maximum peak hourly concentration predicted by the modelling that Shell has submitted, and the predicted exceedance of the maximum annual average NO_2 guideline (in close proximity to the Muskeg River open mine pits), suggests that a precautionary approach towards minimization of emission of ozone precursors (i.e., NO_x and VOC) would appear to be warranted.

63. Further monitoring activities related to human health will be needed to improve future health impact assessments, further the understanding of the links between air quality and human health, and address cumulative effects issues. How these activities continue and in what form with whose support have yet to be determined. However, AEP and Alberta Health agree that proactive efforts to find acceptable options and solutions should be pursued. This may be appropriately pursued in a multi-stakeholder forum that includes the collection of long-term air quality and human health monitoring data.

64. In addition to this application and EIA report, there are other ongoing initiatives that are important to consider with regards to regional air quality management:

a) other project specific monitoring and studies, such as the Regional Aquatic Monitoring Program (RAMP);

b) initiatives being conducted by the Clean Air Strategic Alliance (CASA);

c) initiatives being conducted by the WBEA;

d) the Alberta Oil Sands Community Exposure and Health Effects Assessment Program (AOSCEHEAP);

e) Alberta Energy and Utilities Board and *EPEA* Approvals issued to existing facilities; and

f) the Regional Sustainable Development Strategy initiative.

These initiatives will provide data and information for use in the management of regional air emissions.

Acid Deposition

65. In addition to being key air pollutants, sulphur dioxide (SO_2) and nitrogen oxides (NO_x) are major contributors to acidic deposition. Acid deposition can affect ecosystems alone and in combination with other stress factors. Acidifying emissions are a concern in Northeastern Alberta due to the low buffering capacity of the bedrock and soils in the region and the amount of acidifying emissions from oil sands industry.

66. The expected trend in regional emissions for the Regional Development Review scenario is for SO_2 to remain roughly stable (10% increase from 1996 baseline levels) and for NO_x emissions to more than double (150% increase from 1996 baseline levels). Nitrate deposition may also cause changes in an ecosystem which are unrelated to acidification, as nitrogen can also act as a fertilizer. These effects may include changes in ecosystem structure, such as increased growth in some terrestrial and aquatic plant species.

Departmental Position

67. SO_2 emissions from the Muskeg River Mine Project are negligible due to the nature of the undertaking (mining and primary bitumen extraction). NO_x emissions from the Muskeg River Mine

Project are expected to total 11.9 t/d (10 t/d from fleet exhaust and 1.9 t/d from stationary plant sources).

68. Continued ambient monitoring in the region to determine the concentration of acidifying substances (SO_2, NO_x) in air is a critical component in the ability to quantify and assess any risk of acidification in regional soils and water bodies.

69. Enhancements to the monitoring program to ensure that all components of acid deposition (wet and dry deposition of sulphur, nitrogen, and base cations) that are being monitored should be a long-term goal for the region.

70. The proponent's involvement and expressed commitment to regional ambient and receptor monitoring activities through the WBEA and the RAMP is important. Continued participation in these programs may be recommended to the Director as an *EPEA* approval condition.

71. The interim critical loads are used as benchmarks in the evaluation of potential effects due to acid deposition. Application of these values in the EIA defines the areas most at risk of environmental acidification. This helps focus attention on the areas and receptors within these areas which require further examination either through increased monitoring or through other means. Other means may include, but not be limited to, a more detailed examination of the buffering ability of the receptors within the potentially impacted area, research into the potential effects in the area, and development of mitigation plans to correct the effects of acidification, should effects be detected. The applicant has made a number of recommendations and commitments on monitoring and future studies in the EIA report and supplemental follow-up information.

72. Staff may recommend to the Director that a condition of the approval include further long-term monitoring of sensitive lakes, terrestrial and aquatic ecosystems and other environmental receptors, particularly through forums such as WBEA and CASA. The results of such monitoring programs, and the outcomes of other initiatives through forums such as WBEA can be used to assess whether further mitigation of acidifying emissions will be necessary.

73. AEP is dedicating substantial resources to the CASA Target Loading Subgroup and their effort to derive a mechanism for the application of critical and target loads in Alberta.

Acid Deposition Modelling

74. The dispersion model used to estimate and predict acidic deposition in the region was CALPUFF. This model predicts exceedences of the interim critical loads for acid deposition in an area near the proposed mine.

Departmental Position

75. The level of conservativeness in the model's predicted potential acid input (PAI) values is undetermined. The precautionary principle suggests that, given that the CALPUFF model appears to be the best tool available at this time for predicting PAI from the projected emissions, the predicted PAI levels should be considered for environmental management decisions.

76. Staff may recommend to the Director that the results of the deposition modelling be verified, possibly through forums such as WBEA, by conducting further ambient monitoring to provide data to compare to deposition modelling predictions.

Oxides of Nitrogen (NOx) Emissions

77. High temperature combustion processes produce NO_x emissions. NO_x can contribute to ground level ozone, and can also be of concern in relation to acidification, vegetation effects, and human health. Total regional NO_x emissions are expected to increase in the future.

Departmental Position

78. Modelling submitted by Shell indicates that the maximum predicted hourly and daily NO_2 values are below the Alberta ambient air quality guideline, but the maximum annual value is above the ambient NO_2 guideline along the rim of the mine.

79. NO_x emissions should be controlled to the lowest practicable level through the use of the most appropriate pollution prevention and control technologies. Since regional NO_x emissions are projected to increase in the future, the potential effects of these emissions should continue to be studied through the initiatives that are presently being undertaken in the region.

80. Shell's proposed use of low NO_x burners in stationary combustion sources is consistent with AEP's policy for minimization. Shell has confirmed that the specific level of emissions meets the levels referenced in the *National Emission Guidelines for Commercial/Industrial Boilers and Heaters*, published by the Canadian Council for Ministers of the Environment (CCME). Shell indicated that detailed calculations for emissions and monitoring methods will be provided as engineering design and equipment selection progress, and that it will comply with all government requirements. Staff may recommend that the Director require Shell to submit these detailed calculations as a condition of an *EPEA* approval.

81. The modelling that Shell has submitted for predicting ambient NO_2 suggests that NO_x emissions from the mine mobile equipment should be further studied and minimised. Shell should vigorously pursue the work that it is undertaking in this area through optimising diesel fuel specifications, equipment performances and diesel engine design. The information should be shared with other stakeholders. Shell and other oil sands mine operators should consider an industry undertaking to review the minimization of emissions from mobile sources.

82. Future emission control equipment for heavy-duty diesel vehicles is scheduled to improve around the year 2006. A typical mine-fleet vehicle or engine may be replaced after the year 2006. Staff may recommend that the Director include a clause in the *EPEA* approval requiring the proponent to demonstrate all replacement vehicles will meet the latest vehicle emission standards and are equipped with effective emission control technology.

83. Potential effects of NO_x emissions are being addressed in the region through such initiatives such as the WBEA. The WBEA human health related monitoring sites include the monitoring of ground-level ozone. The ozone monitoring data which are collected at these sites may assist in clarifying whether any changes in ground-level ozone do occur due to increased regional NO_x emissions. The overall intent of the WBEA terrestrial environmental effects monitoring (TEEM) program is to allow detection of changes in the surrounding environment which are due to regional industrial operations. Direct effects of NO_x on vegetation are not well understood, however, the TEEM program may detect changes in the surrounding ecosystems that may occur due to NO_x exposure. This monitoring program will provide data and information for use in the management of regional air emissions.

Tailings Pond Emissions

84. Emissions of Volatile Organic Compounds and Total Reduced Sulphur compounds (TRS) from the tailings pond may be a concern to nearby residents. The southern edge of the proposed tailings pond is located 4 km north of Fort McKay.

85. In Shell's original submission, the emissions of VOC from the tailings pond were estimated through emission factors based on measurements made in 1987 at the Syncrude Mildred Lake Settling Basin. Shell's initial estimate of VOC emissions from the tailings pond was 1.5 t/d.

86. Shell's supplemental information submission indicates that recent work by Syncrude and Suncor suggest a much higher emission factor, which if applied to the Muskeg River Mine Project, would indicate potential VOC emissions as high as 7.4 t/day.

Departmental Position

87. The most significant environmental issues associated with the proposed development, should it be considered in the public interest by the EUB, are the uncertainty regarding potential air emissions from the proposed tailings pond and the absence of specific mitigation strategies in the event that unacceptable levels of emissions are detected.

88. Shell is proposing a different solvent process than the existing operation, so the emissions may differ from emissions from existing tailings ponds in the region.

89. Tailings pond issues revolve around the uncertainty regarding emissions and mitigation strategies. Shell has indicated that further steps would be taken to address the matter should monitoring and assessment of pond emissions identify health risks. However, the proponent has not identified specific interventions, which might be considered should they be required, nor has it described the circumstances under which it would respond, nor do they describe the monitoring data that would be used/generated to determine potential health effects.

90. Further information related to emissions will be available from tests currently underway at the Shell pilot plant. These results will be examined and considered as part of the review of the *EPEA* application. Staff may recommend that the Director require Shell to include installing additional solvent recovery equipment (such as providing back-up capability in the Tailings Solvent Recovery Units). Staff may also recommend that the Director require Shell to evaluate further measures to control and minimize emissions from the pond (such as pond segregation) as part of the detailed design phase of the project, and to report these evaluations to AEP.

Volatile Organic Compounds (VOC) Emissions

91. VOCs can act as a catalyst in the generation of ground-level ozone and can be of concern in relation to odours, human health, and environmental effects.

92. VOC emissions from the Muskeg River Mine will mainly occur from the tailings settling basins and exposed mine faces.

Departmental Position

93. Due to the proximity of the tailings pond to Fort McKay, staff may recommend to the Director that Shell be required to provide back-up capability in the Tailings Solvent Recovery Units or to implement operational procedures that prevent untreated tailings streams from being sent to the tailings. This may help ensure appropriate minimization of VOC and TRS emissions from the tailings pond during all operating scenarios.

94. AEP considers that monitoring of the bitumen extraction process vents is a reasonable requirement to confirm that VOC emission control is not warranted or necessary. Staff may recommend that the Director require Shell to conduct such monitoring as an *EPEA* approval condition.

95. Staff may recommend to the Director that the *EPEA* approval require the design and construction of all above-ground storage tanks meet the requirements prescribed in *Environmental Guidelines for Controlling Emissions of Volatile Organic Compounds from Above Ground Storage Tanks* as published by the Canadian Council of Ministers of the Environment (CCME).

96. Further studies on the composition and quantity of individual organic compounds, and their potential environmental effects, would be desirable. This may occur through initiatives under the WBEA and may be recommended to the Director as an *EPEA* approval condition.

Particulate Matter (PM) Emissions

97. Particulate emissions are a concern from a human health and vegetation standpoint. Particulate Matter (PM) emissions from the proposed project will occur from mobile sources (trucks and mine equipment), stationary sources (plant stacks) and from disturbed areas (wind-blown sand and dust).

Departmental Position

98. Mitigative measures are available to reduce problems with particulate emissions from the mine. Staff may recommend to the Director that as a condition of an *EPEA* approval, Shell be required to apply these measures where appropriate.

99. Further follow-up on studying the effects of regional particulate emissions may occur through forums such as the WBEA.

Composite Tailings (CT) Technology

100. Composite tailing is a promising new tailings management system designed to reclaim fine tails deposits to a dry landscape.

101. CT technology requires further investigation and research to demonstrate it as a successful reclamation technique.

Departmental Position

102. The objective of reclamation in Alberta is to return disturbed land to equivalent land capability. To meet this objective, a dry landscape is preferred. CT technology, which produces a dry landscape, is the result of many years of co-operative effort between the oil sands industry, government and other stakeholders. This technology appears to be the best option currently available to reclaim tailings as dry land.

103. Although several issues remain with CT technology, AEP is optimistic that they can be resolved with further research, which will include field-scale demonstrations. Shell has committed to participate in ongoing industry-wide tailings research to assist in the full-scale implementation of this technology.

Staff may recommend that the Director require Shell to:

a) contribute research to evaluate composite tailings technology, including:
   - i) time required to consolidate tailings into a trafficable surface;
   - ii) suitable capping materials and depth of reclamation materials required to cover composite tailings deposits;
   - iii) stability of the reclaimed surface over time;
   - iv) characterization of composite tailings release water and means of treatment to ensure acceptable water quality, if required;
   - v) movement of salts from composite tailings release water during deposition and impact on plant development due to uptake of organic compounds, heavy metals and salts from composite tailings release water;
   - vi) seepage of composite tailings release water into groundwater and subsequent release to surface drainage systems;
   - vii) techniques for establishment of native ecosystems on the CT-affected reclamation areas;
   - viii) a schedule for the research; and
   - ix) a report on the results of the research.

b) construct watersheds and watercourses to collect and isolate CT affected waters.

End Pit Lake: Water Quality

104. There is uncertainty regarding the water quality in the end pit lake proposed by the applicant due to its potential great depth and the constituent water and residual tailings it may contain. The end pit lake will be a significant feature in the final landscape.

Departmental Position

105. AEP is prepared to conceptually accept an end pit lake from a reclamation perspective providing they do not impact downstream water bodies and meet the regulatory objective of equivalent capability.

106. The lake design as currently proposed appears to have limited fisheries potential. A lake developed for fisheries purposes must support the development of viable, self-sustaining fish populations that will create a recreational fishery suitable for human consumption. If end pit lake reclamation is being pursued for fisheries capability, more emphasis should be placed on creating productive fish habitat and maintaining water quality in the lake.

107. Staff may recommend that the Director require Shell to:

a) review options for final disposal of mature fine tails (MFT) and thin fine tails (TFT) other than in the end pit lake;

b) document the hydrological, physical, chemical and biological characteristics of the lake; including water quality, lake morphometry, littoral zones, fish habitat features inflowing and outflowing stream channels), and wildlife and waterfowl habitat features to demonstrate that the lake will meet the intended capability and will be self-sustaining in the long term;

c) optimize the lake design features to enhance fisheries and recreation potential, in particular:
   i) increase the extent of littoral zone;
   ii) decrease the mean depth and maximum depth of the lakes; and
   iii) do shoreline and beach contouring to enhance recreation use, public access and public safety;

d) continue to model the behaviour of the end pit lake and to substantiate that self-sustaining fish populations can be established to support a recreational fishery for human consumption, including consideration of:
   i) the expected water quality in the lake, including the potential for stratification and development of anoxic conditions in the deeper waters;
   ii) the potential water quality effects associated with the behaviour of CT release water under the anoxic conditions that may occur in the deeper water in the lake (e.g., possible H_2S production); and
   iii) the viability (self-sustaining populations, fish health, consumption by humans) of fisheries in lake that will receive substantial volumes of composite tailings release water;

e) monitor fish health to ensure that they are safe for human consumption;

f) monitor lakes established during reclamation to evaluate their performance;

g) develop contingency plans in the event that the lakes do not achieve their intended fisheries capability; and

108. In the event that acceptable water quality is not achievable within the planned schedule, staff may recommend that the Director require Shell to consider and develop other options that ensure that unsuitable quality water is not released offsite.

109. An end pit lake is not a compensation requirement of AEP for loss of fish habitat; however, the establishment and maintenance of fish populations suitable to sustain a recreational fishery are the responsibility of Shell. If a naturally reproducing sport fishery cannot be developed in the end pit lake, Shell will be required to contribute financially to a stocking program that would maintain the fisheries resource on a sustainable basis.

Closure Planning

110. Continuity of landform, watershed, and vegetation communities across oil sand mine closure landscapes are necessary for the development of natural appearing sustainable and biodiverse landscapes.

Departmental Position

111. The mine plan will require landscape design to ensure that the reclaimed landscape is characteristic of adjacent landscapes. This will require integration of mine plan designs with adjacent mines and the surrounding environment.

112. Mine closure landscapes should be designed to be visually acceptable through adopting criteria similar to local natural landscape design.

113. The aboriginal community has identified vegetation species important to their traditional land use patterns. The plant species to be established in the reclaimed landscape and the time frame for re-establishment need to be better identified.

114. Staff may recommend that the Director require Shell to:

a) include micro and macro topographical considerations into the mine design and progressively incorporate them into construction from the beginning;
b) design landforms which are characteristic of the natural landscape of the area;
c) design watercourses that will be self-sustaining and will provide controlled drainage in the reclaimed landscape characteristic of the natural drainage patterns of the region;
d) progressively construct as riparian areas and watercourses, any lease drainage that will survive into the reclaimed landscape;
e) cooperate with adjacent oil sands operators to design seamless reclamation landforms, watersheds and vegetation communities across lease boundaries;
f) conduct research and monitoring to determine the reclamation materials, including a variety of native topsoils and subsoils and application techniques, needed to establish self-sustaining biodiverse ecosystems containing a range of native vegetation;
g) conduct research to determine key starter plant species for each ecosite phase, define limiting soil and environmental or physiological factors, and develop techniques for successful establishment; and
h) determine plant species of priority to aboriginal peoples, and provide a timely plan for the establishment of those species.

Equivalent Land Capability

115. Shell proposes to reclaim the disturbed mine area to a Forest Capability Class distribution which is different than that existing in the pre-disturbed landscape. The result will be a highly homogeneous reclaimed landscape with a substantial change in the overall distribution of terrain and soil features. Shell's view is that the reclaimed soils will provide wider diversity and enhanced productivity than those in the pre-disturbed landscape.

Departmental Position

116. Return of equivalent land capability is a requirement of *EPEA* and is an objective of the Fort McMurray – Athabasca Oil Sands Subregional IRP.

117. Reclaimed landscapes should reflect the pre-disturbance distribution of land capabilities.

118. Staff may recommend to the Director that Shell reclaim disturbed lands equivalent to the pre-disturbance land capability distribution.

Cumulative Impact on Wildlife

119. There is uncertainty about the cumulative impact of individual and multiple oil sands developments on wildlife. The habitat loss/gain approach for assessing impacts needs to be expanded to understand the implications to local and regional wildlife population.

Departmental Position

120. Because of the extent of the affected land base, and new proposals for additional developments, the impact of oil sands mining projects must be more clearly evaluated in the temporal context throughout the lifetime of each project. The Cumulative Effects Assessment for wildlife would be improved if it also predicted and evaluated the impacts of lost reproductive potential and recruitment into local and regional wildlife populations over time.

121. This information would promote a better understanding of the implications of multiple mine developments, and enable more informed management decisions regarding game and non-game species of concern in the region.

122. The Department has met with the applicant to discuss these concerns. Shell has committed to providing additional information to reduce the uncertainties regarding cumulative impacts to wildlife.

VII. CONCLUSION

Alberta Environmental Protection's and Alberta Health's Position

123. The position of AEP at the filing of this submission is that AEP does not oppose the proposed project. This submission has identified a number of environmental matters which AEP intends to address through a variety of environmental protection strategies identified in the discussion on Alberta's Interest, including conditions in an AEP approval, should one be issued.

124. The most significant environmental issue associated with the proposed development, should it be considered in the public interest by the EUB, is the uncertainty regarding potential air emissions from the proposed tailings pond and the absence of specific mitigation strategies in the event that unacceptable levels of emissions are detected. Alberta Health and AEP recommend that:

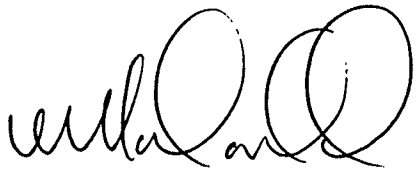
a) additional solvent recovery equipment, such as providing back-up capability in the Tailings Solvent Recovery Units, be incorporated into the design of the project, and that further measures to control and minimize emissions from the tailings pond be evaluated in the detailed design of the project;

b) further measures to control and minimize emissions from the tailings pond, such as pond segregation, be evaluated in the detailed design of the project, and findings of this evaluation be reported to AEP; and

c) the EUB assist them in requiring the applicant to undertake prompt mitigation should unacceptable levels of tailings pond emissions become evident.

125. The issue of regional air emissions and the desire to address all regional potential environmental effects in general, through an appropriate multi-stakeholder forum has also been noted. AEP requests that the EUB continue to support and assist the Department's initiative to develop a Regional Sustainable Development Strategy.

ALL OF WHICH IS RESPECTFULLY SUBMITTED this 2nd day of November, A.D. 1998.



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