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STEEPBANK MINE PROJECT APPLICATION

EXECUTIVE SUMMARY

April 1996

APPLICATIONS FOR APPROVAL

Suncor Inc., Oil Sands Group (Suncor) applies to the Alberta Energy and Utilities Board (EUB), pursuant to Section 14 of the *Oil Sands Conservation Act* (OSCA), to amend Approval No. 7632, as amended by Approval No. 7632A, and as may be further amended by the EUB pursuant to Application No. 960369 (the Fixed Plant Expansion Project Application), to include:

- approval to construct and operate the proposed Steepbank Mine and related modifications in access, ore transport, extraction and tailings handling to the existing approved scheme to sustain an increase in production to 6,209,000 m³ of synthetic crude oil and other oil sands products in each calendar year;
- approval to operate the proposed Steepbank Mine based on a twenty-year mine plan; and
- approval of the integrated conceptual reclamation plan for Lease 86/17 within the area of the existing approved scheme and the proposed Steepbank Mine.

Suncor also applies to the EUB pursuant to the *Hydro and Electric Energy Act* (HEEA) for approval for the construction, operation and connection of a power supply line and pursuant to the *Pipeline Act* (PLA) for approval for the construction and operation of hydrotransport, hot water, natural gas, diesel, tailings and recycled water pipelines, all related to the proposed Steepbank Mine.

Suncor also submits the Steepbank Mine Environmental Impact Assessment Report (Report) to the Alberta Director of Environmental Assessment (Director) for his review, pursuant to Section 48 of the Alberta *Environmental Protection and Enhancement Act* (EPEA) and for a decision, in due course, by the Director that the Report is complete pursuant to Section 51 of EPEA.

Suncor also seeks approval from Alberta Environmental Protection to modify the existing Fort McMurray oil sands plant for the manufacture of petroleum products as proposed in the attached application. Accordingly, Suncor applies as follows:

- pursuant to Sections 64 and 67 of EPEA, for an amendment to the consolidated approval, currently the subject of several applications, including Applications No. 017-95 (the Fixed Plant Expansion Project Application) and expected to be approved by the Director in May 1996; and
- pursuant to Section 11 of the *Water Resources Act* (WRA), for a licence to divert water courses in the course of mine development and operation and wastewater management of both the proposed Steepbank Mine and Lease 86/17 within the existing Fort McMurray oil sands plant.

If the consolidated approval is not issued by June 25, 1996 then Suncor applies, pursuant to Sections 64 and 67 of EPEA, for amendments to the existing approvals under EPEA, namely:

- Air Licence No. 92-AL-359, as amended;
- Water Licence No. 92-WL-147, as amended;
- Reclamation Approval No. OS-1-79, as amended.

This joint application has been developed to combine all information under the OSCA, the HEEA, the PLA, the EPEA and the WRA into one document to facilitate and expedite the regulatory review of the proposed Steepbank Mine project. Section A5.4 contains a checklist of the information requirements for the amendment to the approvals under OSCA and EPEA and the approved Terms

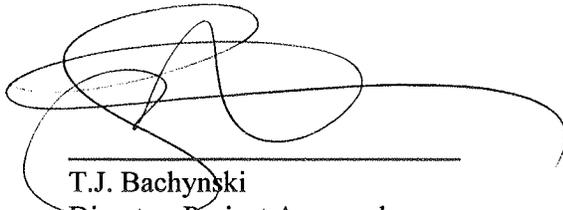
of Reference for the Environmental Impact Assessment. The pertinent information for the WRA application is found in Section C3.4, for the HEAA in Sections C4.1 to C7.5, inclusive, and the PLA in Section C4.1.

All communications on these applications should be directed to:

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Dated April 29, 1996 at Fort McMurray, Alberta

A large, stylized handwritten signature in black ink, consisting of several overlapping loops and a long horizontal stroke extending to the right.

T.J. Bachynski
Director, Project Approvals
Suncor Inc., Oil Sands Group

**SUNCOR INC., OIL SANDS GROUP
STEEP BANK MINE PROJECT APPLICATION
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A INTRODUCTION

Suncor Inc. is applying for regulatory approval to proceed with the development of the proposed Steepbank Mine, to be located across the Athabasca River from its current operations near Fort McMurray in the Regional Municipality of Wood Buffalo in northeastern Alberta. In April 1995 a disclosure document was released for the proposed mine. Since then, a comprehensive public and regulatory consultation and communication program and an environmental impact assessment have been underway in parallel with engineering feasibility studies.

This document comprises the Application for Approval of Steepbank Mine and serves to meet the requirements under the Alberta Oil Sands Conservation Act, the Alberta Environmental Protection and Enhancement Act and the Alberta Water Resources Act. It also includes the Environmental Impact Assessment.

1.0 CORPORATE OVERVIEW

In 1992 Suncor Inc. unveiled a strategic plan to improve its long-term profitability and to make its production costs competitive with those of Canada's top producers of conventional crude oil. The series of initiatives announced by Suncor was intended to make its oil sands business economically viable and environmentally responsible, and to ensure its oil sands operations could be sustained well into the twenty-first century.

It took Suncor three years and \$300 million to accomplish the business renewal strategy and to fulfill its commitment to ensure the long-term economic viability of its oil sands business. By the end of 1995 this strategy had achieved operating costs which averaged \$13.75 a barrel – nearly \$6 less than in 1992. Additional properties were acquired to ensure that oil sands ore will be available for at least fifty years. Shareholder confidence grew and the increase in cash flow facilitated the investment required to improve the plant's environmental performance, production capability and operational reliability.

In late 1994, Suncor announced its intention to open a new oil sands mine. Located on the east side of the Athabasca River, the site now proposed as Steepbank Mine was selected because of its proximity to Suncor's existing plant facilities and because core hole drilling during the winters of

1993 and 1994 confirmed the presence of a high-quality ore body. Close proximity to current operations provides environmental benefits by allowing Suncor to reduce energy use and to integrate reclamation plans for its current site and Steepbank Mine.

In developing the Steepbank Mine proposal, Suncor used the experience and technical know-how it has gained since the early 1960s to plan a mine that is cost-effective, technologically advanced, environmentally sound and will ensure high, reliable rates of production. By participating in a comprehensive consultation program Suncor is providing residents of the region with continuing opportunities to ensure the best decisions are made in the mine's design and that economic benefits are balanced with environmental responsibility. This commitment to addressing the needs of all community interests will result in a mine design which will reduce emissions, conserve energy, improve recovery rates, decrease water use and establish a new reclamation plan which eliminates the long-term storage of liquid fine tailings.

Estimated to cost \$336 million, Steepbank Mine is designed to operate for twenty years at a rate which will supply bitumen to produce 107 kbpcd of upgraded crude oil. In addition to maintaining Suncor's current workforce of 1400 full-time employees and 300 contractors, Steepbank Mine will create 1040 person-years of construction employment during the project's development. Incremental operation expenditures over the mine life are estimated at 6.4 billion dollars (\$1995). Suncor's desire to acquire goods and services from locally-owned businesses is expected to generate substantial growth opportunities for both the Regional Municipality of Wood Buffalo and the Province of Alberta.

After obtaining necessary regulatory approvals, Suncor will commence construction of Steepbank Mine in 1997 with commissioning in 2000.

1.1 SUNCOR INC.

Suncor Inc., a growing Canadian integrated oil and gas company with assets of \$2.4 billion, includes three operating groups and employs 2350 people.

The Oil Sands Group (based near Fort McMurray, Alberta) mines and upgrades oil sands and markets high-quality light, sweet crude oil and custom blends. The Resources Group (based in Calgary, Alberta) is involved in exploration and production of natural gas and conventional crude oil. The

Sunoco Group refines and markets transportation fuels, petrochemicals and heating oils in Ontario and Quebec.

Suncor is a publicly-traded company; its shares are traded on all Canadian stock exchanges and the American Stock Exchange.

1.2 SUNCOR INC., OIL SANDS GROUP

Suncor pioneered the commercial development of the Athabasca oil sands in 1962 as Great Canadian Oil Sands Ltd. (GCOS). When its plant came on-stream in 1967, it was the first commercial-scale oil sands venture in the world. In 1979, GCOS merged with other companies held by Sun Oil Company to form Suncor Inc.

Suncor's Oil Sands Group (OSG) is located within the Athabasca oil sands deposit, from which a viscous, tar-like substance called bitumen is extracted. At OSG the mine's ore body lies beneath an overburden of muskeg, sand, clay and silt. Large shovels excavate the bitumen-laden sand and heavy haulers carry it from the pit, dumping the ore into sizers to break up the lumps. From the mine ore enters the Extraction process, where bitumen is separated from sand. In the Upgrading plant bitumen is heated and cracked into three petroleum distillates, namely naphtha, kerosene and gas oil. These components are custom-blended into a variety of products ranging from light, sweet crude oil to diesel fuel. Energy for the operation is provided mostly by the Utilities plant. Fired mainly by coke produced in Upgrading, its boilers generate electricity, steam and process water for the entire site.

Alberta's oil sands represent one of the world's largest known petroleum resources. More than 300 billion barrels are ultimately recoverable - an amount similar in size to the proven reserves of Saudi Arabia and enough to supply all of Canada's oil needs for over two hundred years. Comprised of four major deposits located in northern Alberta (Athabasca, Wabasca, Cold Lake and Peace River), the oil sands cover about 77 000 sq km.

Throughout its history in the Fort McMurray area, Suncor has been in the forefront of innovative and practical technologies to develop the potential of the Athabasca oil sand deposit. Amid engineering challenges, fluctuating oil markets and turbulent economic events, Suncor has remained committed to developing the oil sands, which represent an abundant and increasingly important source of energy for Canada's future.

Suncor's commitment extends to the people who live in the Athabasca region. Since the early 1960s the company and its employees have supported the local community in the development of a mature community infrastructure. Suncor's partnership with the community continues: the company supports regional initiatives such as local health, welfare, educational, cultural and environmental activities.

1.3 ECONOMIC VIABILITY

Suncor's objective in 1992 was to undertake a series of initiatives to improve the long-term profitability of OSG, becoming competitive with Canada's top producers of conventional crude oil. The strategy included a change in mining technology; plant improvements; acquisition of additional leases; enhancement of revenues through product mix and custom blends; and improvements in environmental performance.

Three years after announcing its strategic plan, Suncor realized the following results:

- Cash costs per barrel were reduced from \$19.50 in 1992 to \$13.75 in 1995.
- Production was increased from 60 kbpcd of upgraded crude oil in 1992 to 79 kbpcd by the end of 1995.
- Revenues were increased.
- Additional oil sands properties were acquired, securing oil sand resources for seventy years.

When Steepbank Mine is fully commissioned by 2001, its higher rates of production and the introduction of new technology are forecast to provide OSG with additional improvement in the cost structure per barrel and therefore further improvements in economic viability.

1.4 ENVIRONMENTAL PROTECTION

Suncor Inc. is committed to excellence in implementation of standards of care for the environment which not only comply with legislated requirements but which also respond to the expectations of its communities, customers, government and the public, within the limits of technology and the company's ability to fund. Suncor has developed a "We Care" environmental policy which is incorporated into all aspects of its activities. OSG's environmental management involves continuous improvement through planning and disciplined implementation at all levels to eliminate, minimize or

mitigate (as appropriate) the impacts associated with its operations. Environmental conservation is an integral part of the operation.

Since 1992, when Suncor announced its intention to continue its oil sands business well into the twenty-first century, the company has undertaken the following environmental improvements:

- In 1994, an upgrade to the sulphur plant (at a cost of \$15 million) was completed, increasing sulphur recovery from 96% to 98%.
- Odour abatement was enhanced in 1995 with the installation of a vent collection and treatment system on diluted bitumen storage tanks, the secondary Extraction plant and the Naphtha Recovery Unit (NRU), at a cost of \$15 million.
- Further reductions of sulphur dioxide (SO₂) emissions will be achieved in 1996 with the start-up of a \$190 million facility to treat Utilities plant stack emissions. When combined with improvements in the sulphur plant this project will reduce overall plant-wide SO₂ emissions by approximately 75% from 1995 levels.
- Energy efficiency improvements have reduced greenhouse gas (GHG) emissions per unit of output by 13% over the period 1990 to 1994. Current plans include further improvements. While production will increase by 80% between 1990 and 2000, GHG emissions will increase by only 5%. In its submission to the federal government's "Canadian Climate Change Voluntary Challenge and Registry Program" Suncor states that it expects to further reduce GHG emissions to 1990 levels by 2005. Suncor is confident this will be achieved as soon as 2001 by measures developed through implementing a comprehensive GHG reduction management strategy (see Subsection C8.1.2).
- The application of new technology to consolidate tailings (produced by the Extraction process) commenced in late 1995. This technology, developed by Suncor, will produce tailings which can be reclaimed to a dry state.

2.0 PROJECT OVERVIEW

2.1 PROJECT SCOPE

Located across the Athabasca River from Suncor's current operations, the proposed Steepbank Mine is 35 km north of the City of Fort McMurray, Alberta and 27 km south of the community of Fort MacKay (see location map Figure A2.0-1). Although the mine is projected to open by 2000, Suncor expects it will take at least one year before the operation will support a production level of 107 kbpcd of upgraded crude oil.

The scope of the project includes all the activities required to construct and operate the new mine; to transport the ore; to modify current Extraction facilities (from 87 kbpcd to 107 kbpcd); and to produce a diluted bitumen product which will be transferred to the Suncor Upgrading facility for use in the production of upgraded crude oil. Also included are the management plan for all tailings produced by the Extraction plant and the ultimate reclamation plan for current and future tailings ponds.

2.2 NEED FOR THE STEEPBANK MINE

The currently-active Suncor lease (i.e., Lease 86/17) is expected to be depleted of oil sands ore by the end of 2001. In order to sustain its operation Suncor will require a replacement source of bitumen.

Suncor's business plan calls for an increase in production capacity in its upgrader to 107 kbpcd by 1998 (105 kbpcd marketable product after internal uses) from the current capacity of 79.5 kbpcd, to be achieved by modifications to the Upgrading and Utilities plants. Also included is expansion of Extraction capacity to 87 kbpcd. This expansion in fixed plant capacity, at a cost of \$309 million, will improve the environmental performance of the plant, increase plant reliability and efficiency, and will increase the production of marketable products.

Suncor's existing bitumen production operation is closely integrated with its Upgrader and Utilities plant. The Utilities complex generates electricity, steam and hot water which are used to significant advantage in the mining-extraction operation. Suncor has examined the options to support an expanded fixed plant capacity including acquisition of external supplies of bitumen. While Suncor may be receptive to competitively-priced external sources (particularly in the period 1998 to 2001) its base strategy is for self-sufficiency for the majority of its bitumen requirements. To do otherwise would

dissipate Suncor's unique energy integration advantages, its investment in Extraction and mining facilities, its technology, and the know-how and experience vested in its work force.

Steepbank Mine will contribute to the orderly development of the oil sands and to Canada's economy. In spring 1995 the Alberta Chamber of Resources National Task Force on Oil Sands Strategies published a report (Alberta Chamber of Resources, Spring 1995. The Oil Sands: A New Energy Vision for Canada) which determined that further development of the oil sands industry would have a positive impact on Canada's economy and that the industry's growth could be accomplished by a series of orderly, incremental expansions.

According to the report issued by the Task Force:

- There is an enduring market for oil sands bitumen and upgraded crude oil. Fossil fuels are expected to continue to provide transportation fuels and chemical feed stocks well into the next century for a rapidly-expanding human population.
- Markets for bitumen and upgraded crude are expanding in Canadian and United States refineries. Oil sands bitumen and upgraded crude can successfully replace and displace other sources. In particular, upgraded crude blends can now be customized to suit specific refinery needs.
- The oil sands industry is viable in an environment of low commodity prices. Existing operations are viable because infrastructure is in place and because continuous improvements have lowered production costs. Continuing application of science and technology provides opportunities for further reductions in operating and capital costs.
- The oil sands industry is one of Canada's most successful knowledge-driven industries. With reliable funding and strong, focused industry collaboration technological development will be the mainstay of risk and supply cost reduction.
- Development of the oil sands-based industry is an integral part of Canada's energy future. Bitumen and upgraded crude oil now account for 21% of Canada's total oil production.

-
- A significant emphasis on research is continuing to improve the industry's environmental performance.
 - Increased oil sands development will create both additional employment opportunities and new wealth for Canada unmatched by any other Canadian business.

The Steepbank Mine project affirms the Task Force's conclusions. Detailed planning and a comprehensive consultation program for the Steepbank Mine project have ensured the mine will be developed as a logical, orderly extension to Suncor's existing operation. New technologies will improve energy efficiencies and consolidated tailings will improve OSG's land reclamation strategy. An improved operating cost structure will provide economic stability despite fluctuating oil prices. Market analysis has ensured that customer demand for OSG's oil products is diverse and secure. And the \$336 million investment, along with operational benefits associated with running a twenty-year mine, will benefit Canada's economy.

2.3 OVERVIEW OF THE STEEPBANK MINE PROCESS

Prior to any construction or mining activities land will be cleared and prepared and commercial trees will be salvaged. Wet areas will be drained, and muskeg and topsoil removed and stored for reclamation purposes. Initial access (across the Athabasca River) for early activities in 1997 and 1998 will be via ice bridges in the winter and by barge in the summer. A bridge (dedicated to this project) to carry personnel, materials, heavy equipment, utilities and pipelines is expected to be available by mid-1999.

Facilities including a truck dump, crusher, hydrotransport and utility installations, and office and maintenance shops will be complete by 2000.

Pre-stripping of overburden will begin in 2000 using truck and shovel methods. The overburden will be hauled to dump areas or to construct dykes. Later in 2000 mining of ore will begin, using the same excavation methods. Mining will occur on both sides of the river until Lease 86/17 is exhausted (at the end of 2001). Thereafter, the new Steepbank Mine will be capable of sustaining the Suncor oil sands operation at 107 kbpcd of upgraded crude oil.

Suncor is currently seeking opportunities to accelerate the bridge construction in order to advance mine start-up. This strategy would allow sooner utilization of plant capacity and realize other economic and environmental benefits.

Figure A2.0-2 depicts a simplified flow diagram for Steepbank ore. The oil sand will be removed in two to three benches (each 15 m in height) and will be hauled to truck dumps located on the pit boundary. There it will be sized to less than 400 mm and conveyed to a surge bin, which provides about 45 min of surge capacity. The oil sand is removed from the surge bin by apron feeders and is conveyed to the cyclofeeder, which mixes the oil sand in warm water to an appropriate density. Cyclofeeder outflow is screened to less than 50 mm and is then transferred to high-capacity pumps for pipelining to the Extraction plant. A rejects circuit at the cyclofeeder crushes screened material. Any larger than 50 mm is sent to rejects for disposal while the remainder is sent to the slurry pumps.

The ore slurry is pumped to the Extraction plant (a distance of about 2.5 km) in a transit time of about ten minutes. Because the ore receives sufficient conditioning in the pipeline it can now be transferred directly to separation cells (by-passing existing Extraction conditioning drums). Bitumen froth is recovered from the separation cells and transferred to secondary Extraction (where upgrader diluent is added) and the froth is cleaned of fine minerals and residual water. The product is then piped to diluted bitumen storage.

Inputs to the bitumen production process include electricity, steam and hot water from Suncor's Utilities plant and diesel fuel and diluent from Upgrading.

Tailings (coarse sand, fine minerals, water and some hydrocarbon) from the separation cells are piped to the tailings pump house for conversion to consolidated tailings and then disposed in ponds in mined-out areas. Included in the consolidated tailings will be mature fine tailings recovered from existing ponds; thus, the existing inventory of fine tailings will be converted into consolidated tailings. Water released from the consolidating tailings is recycled for re-use in the Extraction process. Consolidated tailings from Steepbank Mine will be placed in available space on the current Lease 86/17 for the first eight years of operation and then in mined areas of Steepbank Mine.

Surface reclamation occurs as areas become available. Reclamation objectives are to re-establish forest vegetation common to the area. The final landscape will be capable of developing into a self-sustaining cover of forest vegetation which will provide a range of end uses.

Steepbank Mine will produce bitumen from a large ore body that has been identified east of the Suncor operation, across the Athabasca River. A twenty-year mine strategy has been prepared which outlines development of the ore body south of the Steepbank River, taking ore from Pit 1 (Lease 97, Lot 1 and Lease 25) for the first eight years followed by ore from Pit 2 (Lease 25, Lot 3, and Lease 19) (the mining sequence is illustrated in Figure C1.0-5). The area north of the Steepbank River and the remainder of Leases 25 and 19 are available for future mining and represent resource potential for fifty or more years at 107 kbpcd.

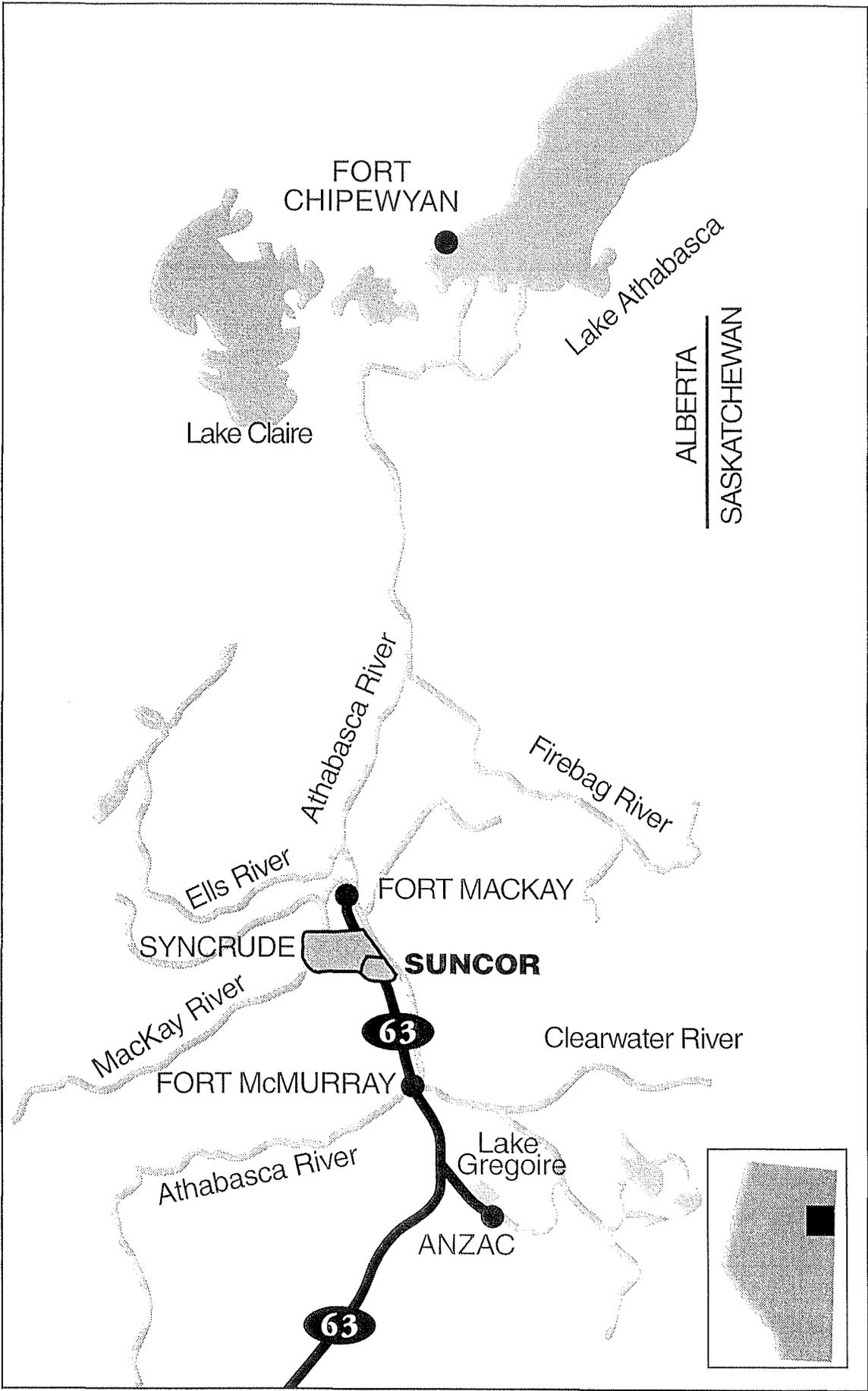
Suncor's Steepbank Mine plan recognizes the environmental sensitivity to disturbance of the areas surrounding the Steepbank and Athabasca Rivers. On the south side of the Steepbank River an undisturbed 100-m setback is maintained from the top of the escarpment. For the Athabasca River the mine plan removes ore out to the edge of the escarpment with the constraint that the intersection point with the escarpment will be well above the 1-in-100-year flood level. As this escarpment has a relatively gentle slope, the result is that the undisturbed setback from the Athabasca River exceeds 500 m along the length of Steepbank Mine, with the exception of a 2000-m length encountered in the third year of mining on Lease 97. In this area a minimum 70-m setback will be maintained. By 2009 the escarpment will be "rebuilt" with a dyke constructed from suitable overburden materials to an elevation approximately equivalent to the top of the current escarpment. The area will then be reclaimed. In the bridge access area a wildlife corridor will be provided under the bridge.

The strategy specified in this Application is the basis for the proposed mine approval. Detailed mine planning (based on substantially more core hole drilling and other information including consultation input) will optimize the strategy over the life of the mine.

Artist's renderings of Steepbank Mine for the years 2000, 2009, 2015 and 2030 are presented in Figures A2.0-3 to A2.0-6. These renderings are realistic representations of the mine strategy discussed above. Continuing revegetation and progression of waste dumps and dykes, infilling of ponds with consolidated tailings and advances of the mine and overburden faces are depicted in these figures. As well, relocation of facilities out of the river valley by 2030 is shown.

FIGURES SECTION A2.0**FIGURES**

| | |
|--------|--|
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| A2.0-2 | Steepbank Mine Process Flow Diagram |
| A2.0-3 | Steepbank Mine in Year 2000 (From South) |
| A2.0-4 | Steepbank Mine in Year 2009 |
| A2.0-5 | Steepbank Mine in Year 2015 |
| A2.0-6 | Steepbank Mine in Year 2030 |



Location Map

Figure A2.0-1

STEEP BANK MINE

Process Flow Diagram

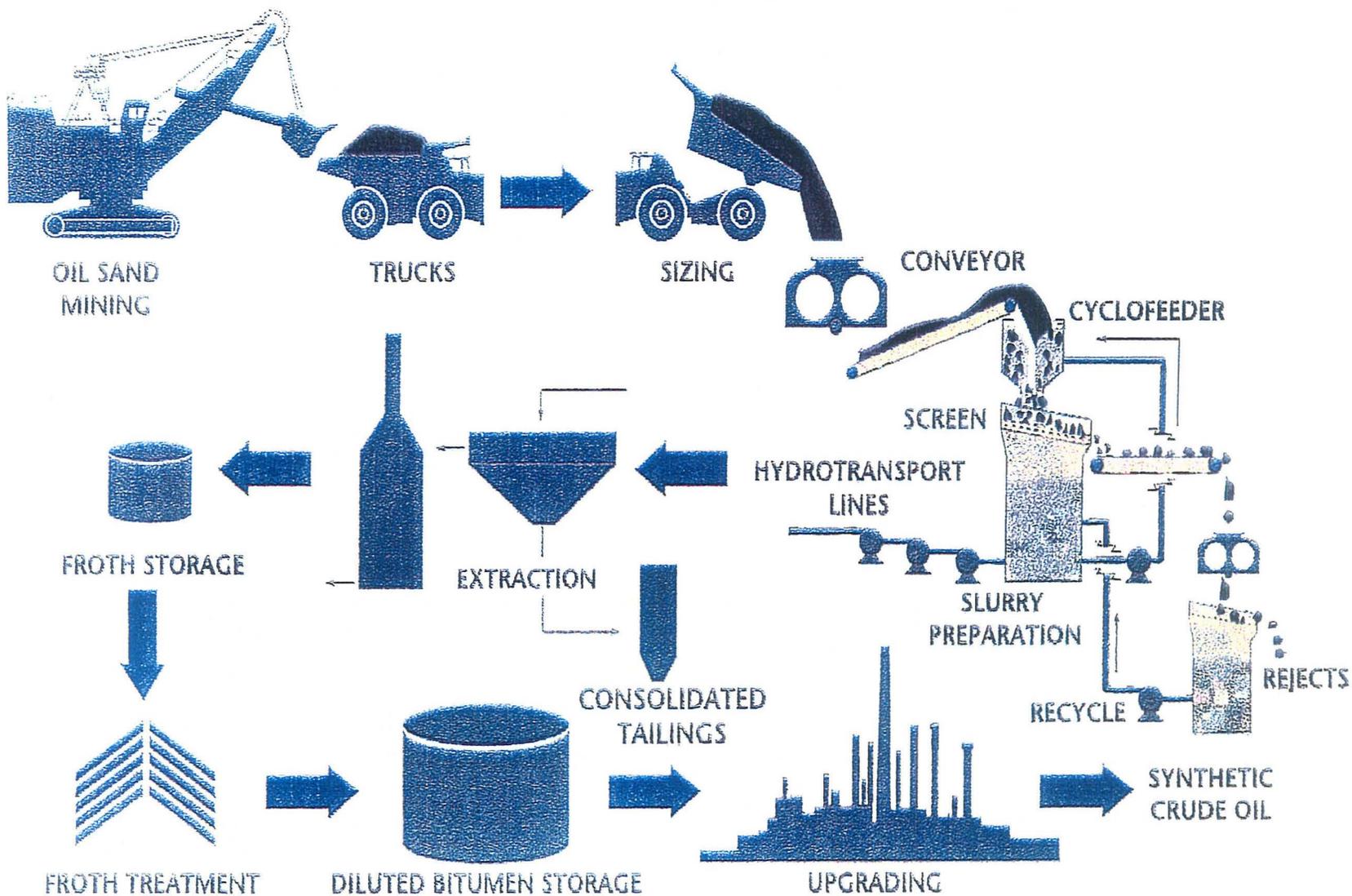


Figure A2.0-2

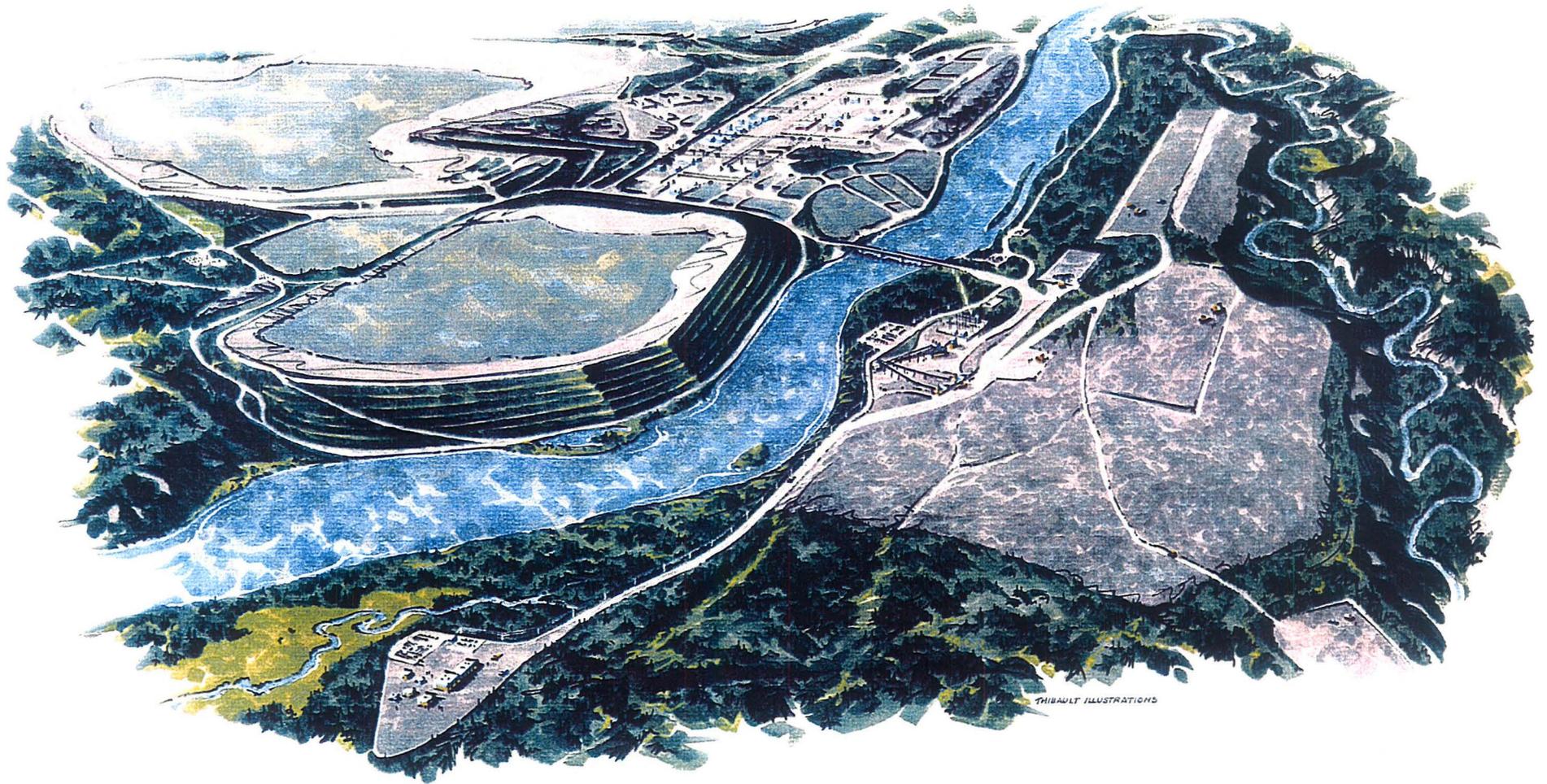


Figure A2.0-3 Steepbank Mine in Year 2000 (From South)

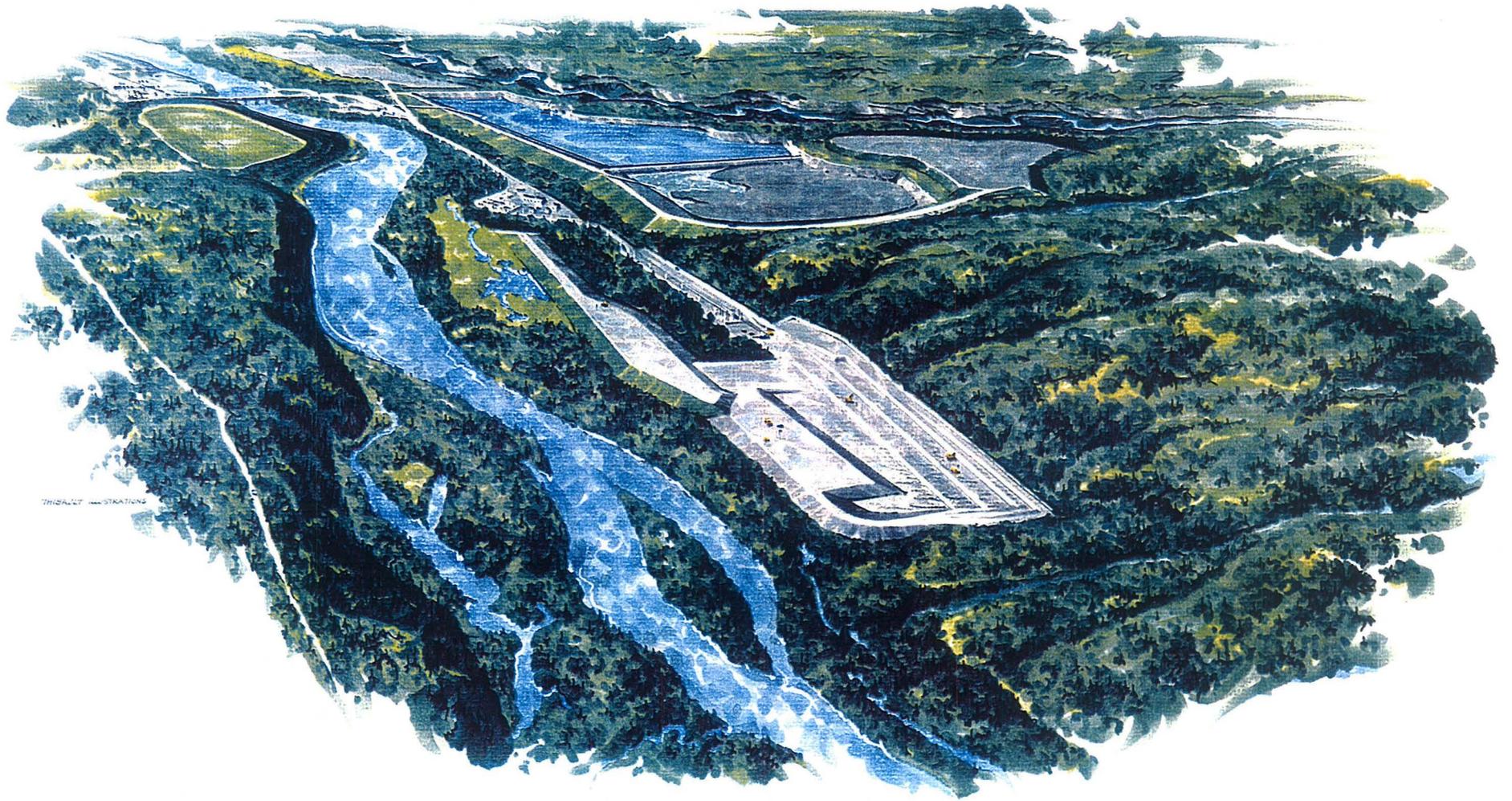


Figure A2.0-4 Steepbank Mine in Year 2009



Figure A2.0-5 Steepbank Mine in Year 2015



Figure A2.0-6 Steepbank Mine in Year 2030

3.0 PUBLIC CONSULTATION PROGRAM

3.1 SUNCOR'S POLICY AND OBJECTIVES

Suncor is committed to sharing information and encouraging open dialogue with individuals and groups that have an interest in, or are affected by, its operations. These communities of individuals and groups include:

- neighbouring and regional residents;
- special interest groups representing the broader public interest in individual development;
- government regulators;
- company shareholders;
- employees; and
- business associates.

The aboriginal communities in the region, as represented by First Nations and Metis governments, are essential to the consultation process because of the land-based nature of oil sands development.

Suncor defines public consultation as:

The communication of the company's strategic intent and the facilitation of dialogue with interested communities so their needs and concerns can be reflected in how Suncor manages, plans and develops its business.

This means that Suncor involves regional communities on an ongoing basis in discussions relating to its day-to-day operations and long-term plans. The company consults with these communities before detailed plans for projects requiring regulatory approval are finalized.

Suncor's objective is to have those affected by its activities agree that the best business decisions are made after their input has been fairly considered.

3.2 DESCRIPTION OF PROGRAM

In 1994, Suncor surveyed employees, community residents, public interest groups, government, business associates and the media to assess their level of satisfaction with existing channels of communication. These groups helped establish a process for consultation on matters relating to future oil sands development.

Suncor learned that interested parties wanted more interaction with the company, especially direct access to senior decision-makers regarding the company's strategic plans. Suncor responded by expanding the responsibility of its Vice-President of Human Resources to include community affairs.

Further, it was clear that these communities did not want to be over-consulted. They wanted an effective, efficient process given the surge in public participation programs generally. Suncor adopted a menu approach, ensuring that all information was available to interested parties on all aspects of its oil sands development. Each interested community selected its areas and level of interest and a three-pronged approach to consultation was developed based on:

- informative consultation,
- continuous consultation, and
- project consultation.

- Informative Consultation

To better inform the general public Suncor has held community forums, delivered twice yearly reports on future plans to 15 000 households in the region, and issued public disclosure documents outlining plans for the development of the Steepbank Mine project and the Fixed Plant Expansion project. Media releases and advertising has informed everyone concerned of Suncor's plans and how to get involved. Names and telephone numbers of contact people were provided in case more information was required. Copies of Suncor's materials are also available at the Fort McMurray Public Library and the Oil Sands Interpretive Centre.

- Continuous Consultation

Several communities wanted to be more involved in Suncor's day-to-day business and strategic development. Several meetings with representatives from these communities were held to exchange information and provide input on Suncor's activities. In response to their

continued interest, Suncor formed a Community Relations Committee, reporting to Vice-President, Human Resource Support and Community Affairs. This committee is responsible, on an ongoing basis, for Suncor's consultation effort with a focus on environmental performance, socio-economic matters, and health and safety.

- Project Consultation

Project-specific relationships were developed with those communities that indicated a desire to participate in future development.

Suncor made an early decision in a project-specific consultation to share information freely and in draft form with the widest audience possible. This would allow interested parties the maximum opportunity to provide their ideas and input for consideration by Suncor. Improvements could then be incorporated into the project. Communities have appreciated this approach and have agreed to review draft information for this purpose, knowing it may change as the project progresses. Through this process the parties have worked towards identifying opportunities and resolving concerns before filing this Application. The objective is to develop projects which reflect the combined efforts of Suncor and its neighbours to maximize the benefits for all concerned. When this Application for Approval is filed, no issue should be unresolved because of a lack of understanding of the project and of all parties needs.

For the Steepbank Mine project Suncor developed a framework which integrates community input into the Environment Impact Assessment process of project development; this framework is described in Section E1.0. Project consultation has progressed through a series of phases (from pre-feasibility to Application filing) as follows:

- i. Disclosure and project concept;
- ii. EIA terms of reference development;
- iii. project feasibility updates and EIA issues and methods review; and
- iv. EIA results and documentation.

Table A3.0-1 lists the public consultation events to mid April 1996 and indicates the individuals or groups involved in each event. This list includes activities associated with Fixed Plant Expansion Project because many of the issues were common to both projects and the EIA must address

cumulative impact. Numerous other meetings were held (particularly with regulators) as part of doing business. All three forms of consultation described above are included in the table.

3.3 RESULTS OF CONSULTATION

3.3.1 Interested Groups and Communities

Suncor's prime interested groups and communities are:

- residents and leaders of the Regional Municipality of Wood Buffalo;
- residents and leaders of Fort McKay First Nation and Metis Local 122;
- residents and leaders of the community of Fort Chipewyan;

- local and provincial environmental groups, represented by the Oil Sands Environmental Coalition (OSEC) which includes:
 - The Pembina Institute for Appropriate Development,
 - Fort McMurray Environmental Association,
 - the Toxic Watch Society, and
 - the Environmental Resource Centre.

- regulatory agencies.

3.3.2 Agreements with Interested Communities

Agreements between Suncor and certain prime interested communities have been developed to better manage the public consultation process. For example, Suncor has:

- Signed a Memorandum of Understanding with the Fort Chipewyan community which demonstrates the parties' commitment to developing a long-term relationship, addressing ongoing consultation, mutual respect, business development and social and cultural support.

- Developed a Memorandum of Understanding with the Fort McKay community which is not, at the time of filing this application, signed by the parties. It is hoped that this agreement will be finalized soon.

-
- Entered into a consultation agreement on a fee-for-service basis with the Pembina Institute for Appropriate Development to provide advice to Suncor in connection with the February 1995 application to renew Suncor's environmental operating approval under the Alberta Environmental Protection and Enhancement Act.
 - Entered into consultation agreement with OSEC which defines the roles and responsibilities of each party in the pre-filing phase of the project-specific consultation process relating to the Expansion Project and the Steepbank Mine project. The agreement provides OSEC with financial support to effectively participate in this process. The objective of this agreement is to:
 - increase respective understanding,
 - improve the projects, and
 - ensure an effective, efficient regulatory review of the projects.
 - Signed a two-year agreement in February 1995 with representatives of Fort McKay First Nation to provide funds for an environmental director staff position. The director is employed by Fort McKay First Nation and is a resident of the community. The director works closely with Suncor staff to review approval applications, assess environmental impacts, and ensure that Fort Mckay's needs are identified.

Suncor hopes that these agreements will lay the foundation for long-term, open, mutually beneficial relationships.

Suncor does not want its consultation relating to this project to result in economic costs to others. However, Suncor will not fund duplication. All agreements with interested parties for participation in a consultation process will be public. Suncor believes it is in everyone's best interest to:

- provide the necessary financial resources in the pre-filing consultative stage to facilitate effective consultation;
- benefit from the ideas of others and identify opportunities for improvement; and
- clearly define, and, if possible, resolve concerns before filing an application for approval.

3.3.3 Issues Management Database

Early in the consultation process, Suncor developed an issues management database to record questions, opportunities and concerns raised by others and to track resolution of these matters.

Issues lists were used both internally and externally to promote detailed discussion on various aspects of the proposed project and to incorporate opportunities for improvement into the final design. Many of these questions and concerns have been pursued and resolved, in large measure because of everyone's willingness to share and review draft information and participate in a constructive manner in the pre-filing consultation. Access to the Suncor database for the status of any specific issue is available on request.

To manage the large number of questions and issues raised, the database was sorted into four main areas: Human Impacts, Suncor Business Development, Environmental Impact, and Technology.

Within each grouping a list of key issues was developed. A key issue is defined as one which has a high degree of concern or interest (or both) for the community. The key issues (arranged by area) are as follows:

Human Impacts

- impacts on human health, primarily air and water emissions;
- opportunities for First Nation and Metis communities (employment, business development);
- development of local economic opportunities (Regional Municipality of Wood Buffalo); and
- cumulative impact on infrastructure and community services due to a number of projects underway (Suncor, Syncrude, Solv-Ex).

Suncor Business Development

- long-term plans beyond Steepbank Mine; and
- alternative bitumen sources, e.g., in situ recovery.

Environmental Impact

- development in the river valley;
- air quality, emission level; and
- Athabasca and Steepbank Rivers ecosystem health.

Technology

- reclamation planning, particularly end land use;
- consolidated tailings technology;
- Athabasca River Bridge design and uses; and
- safety concerns regarding pipelines crossing the river.

These issues were addressed by various means: at the time raised, by follow-up, through project redesign and in the EIA.

3.4 OTHER RELATED CONSULTATION INITIATIVES

Suncor's Aboriginal Affairs staff is responsible for maintaining regular communication with aboriginal communities in the region to jointly pursue:

- socio-economic opportunities,
- environmental initiatives,
- education and training initiatives, and
- community cultural activities.

Suncor's Aboriginal Business Development Committee identifies business opportunities and works with Aboriginal communities to maximize the associated benefits for the communities.

Suncor is an active participant in the Fort McMurray Regional Air Quality Coordinating Committee (RAQCC), which deals with air quality issues in the region.

Suncor is an active participant on the Regional Stakeholder's Committee, chaired by Mayor Boutilier, which addresses the region's response to reduced sources of funding from external sources, particularly government. The mandate is to preserve or enhance services and programs to citizens in times of dwindling resources.

Suncor staff are currently working with regulators on the flue gas desulphurization project, operating licence renewals and the Fixed Plant Expansion Project regulatory approvals.

Suncor is participating in the Alberta Oil Sands Community Exposure and Health Effects and Assessment Program, which is managed by a community committee.

3.5 ON GOING PLANS

Suncor will continue with its open approach to public consultation. This approach has been successful, as indicated by the:

- willing participation of interested communities;
- number of requests for more detailed information;
- strong public attendance at community forums; and
- high number of opportunities and concerns identified, adopted or resolved before this application was filed.

Suncor will continue to:

- distribute the *Report to the Community* newsletter;
- hold community forums;
- meet with interested parties, both on a project-specific and continuous consultation basis,
- meet with the local MLA, MP and Chamber of Commerce; and
- host community events to explain business opportunities to the people of the region, including aboriginal businesses.

The events planned following the filing of this application are listed in Table A3.0-2. Suncor will continue to take a proactive approach to sharing information with, and seeking input from, all interested parties. Specific to the Steepbank Mine project, consultation will continue through the Application review process, mine construction and operation to ensure that the best ideas are explored and incorporated into the project.

Suncor will continue to meet with government agencies to contribute to improvements in the regulatory approval process, ensuring that the community can benefit in a meaningful way from Suncor's business success.

This integrated approval represents a new approach to regulatory approvals in Alberta. Suncor will facilitate a process which preserves the integrity of the regulatory approval regime and engages all interested parties in an effective, efficient regulatory review.

| TABLE A3.0-1 PUBLIC CONSULTATION FOR STEEPBANK MINE PROJECT | | |
|--|---|--|
| Event Date | Community | Activities |
| December 1994 | Whole Community | Survey on public consultation design |
| December 1994 | Community of Fort McKay | General consultation |
| 1 March 1995 | Regional Municipality of Wood Buffalo | Meeting with Mayor Guy Boutilier to update him on OSG's projects |
| 9 March 1995 | AEUB/AEP | Meeting with regulators to discuss various OSG applications and Strategic Growth Opportunities |
| 10 March 1995 | Adam Germain - MLA | Meeting to update MLA on the OSG projects |
| 16 March 1995 | Chamber of Commerce | Address to the Chamber of Commerce on the status of the OSG projects |
| 20 March 1995 | Fort McKay First Nation and Metis Leaders | General consultation regarding the process groups wished to follow for further consultation and update on OSG projects |
| 22 March 1995 | OSEC | General consultation regarding the process to be used for future consultation and update on OSG projects |
| 28 March 1995 | Fort Chipewyan Community Leaders | General consultation regarding the process the group wished to follow for future consultation and a general update of OSG projects |
| April 1995 | Whole Community | Steepbank Mine Disclosure Document issued |
| 1 April 1995 | Dave Chatters - MP | Meeting to update MP on OSG projects |
| 6 April 1995 | AEP | Meeting with Al Schulz regarding the approvals process |
| 13 April 1995 | Fort McKay First Nation and Metis Leaders | Meeting with the leaders to begin discussions on the Memorandum of Understanding |
| 27 April 1995 | Conklin Community | Meeting with community leaders to provide an update on OSG projects |
| 28 April 1995 | General Public - Fort McMurray | Open house for all OSG projects with focus on Steepbank Mine and EIA design |
| 2 May 1995 | Fort McKay First Nation and Metis Leaders | General consultation/discussion regarding the principles of consultation and reimbursement guidelines |
| 11 May 1995 | AEP/AEUB | Meeting with the regulators to discuss expansion and Steepbank Mine applications |

| TABLE A3.0-1 | | |
|---|---|---|
| PUBLIC CONSULTATION FOR STEEPBANK MINE PROJECT | | |
| Event Date | Community | Activities |
| 15 May 1995 | Federal and Provincial Regulators | Workshop on methodology and approach for the EIA |
| 15 May 1995 | Syncrude Canada Ltd. | Meeting with Syncrude management to discuss Application items common to both companies |
| 5 June 1995 | Adam Germain - MLA | Meeting with the local MLA to update him on OSG projects |
| 13 June 1995 | Fort McKay First Nation and Metis Leaders | Continuing discussion on the Memorandum of Understanding |
| 13 June 1995 | AEP/Provincial Government Representatives | Meeting including the Energy Minister, the Environment Minister and 25 MLAs from the Standing Policy Committee to update on OSG projects and business plans |
| 14 June 1995 | OSEC | General quarterly consultation meeting and update on OSG projects |
| 28 June 1995 | Fort Chipewyan Community Leaders | General consultation discussion and final Memorandum of Understanding review |
| 10 July 1995 | Fort Chipewyan Community Leaders | Meeting with the Chiefs and Metis Leader to sign the Memorandum of Understanding between Suncor and the Community |
| 12 July 1995 | Fort Chipewyan Community Leaders | Tour of the dyke area and the mine plus a general consultation update discussion |
| 19 July 1995 | Syncrude/ Suncor | Approval Applications co-ordination |
| 24 August 1995 | Adam Germain - MLA | Meeting with Adam Germain, Grant Mitchell, Debbie Carolson, Terry Kirkland, Mike Percy and MLAs from the Liberal Party to update them on the status of the OSG projects |
| 13 September 1995 | Pembina Institute | Meeting with Rob Macintosh and Rob Hornung on environmentalists' goals, mission, views on oil sands development; definition of sustainable development and eco-efficiency; and global warming. This preceded a presentation by Pembina on Reduction of Greenhouse Gases |

| TABLE A3.0-1 | | |
|---|---|--|
| PUBLIC CONSULTATION FOR STEEPBANK MINE PROJECT | | |
| Event Date | Community | Activities |
| 19 September 1995 | Adam Germain - MLA | Meeting to update MLA on OSG projects and business plans |
| 3 October 1995 | General Public - Fort McMurray | Public Forum (update on Steepbank Mine, expansion concept and EIA status) |
| 15 November 1995 | AEP/AEUB/ Syncrude | Senior management of each group met to discuss items of common interest in various applications from the companies |
| 17 November 1995 | Dave Chatters - MP | Meeting to update MP on OSG projects |
| 23 November 1995 | Anzac and Gregoire Lake (20 People) | Public Forum at Anzac Community Hall |
| 1 December 1995 | Fort Chipewyan | Quarterly communication meeting held with representatives from the Mikisew Cree Band, the Chipewyan Band and the Metis |
| 11 December 1995 | Fort McKay Elders First Nation | Meeting with the Elders of Fort McKay to initiate the consultation process |
| 13 December 1995 | Oil Sands Environmental Coalition (OSEC) | Update on Operating Approval, Steepbank Mine and Fixed Plant Expansion. Consultation schedule prepared together |
| 4 January 1996 | Fort McKay - Pete Ladoucer | Meeting to provide an update on projects and plan consultation schedule with Fort McKay |
| 10 January 1996 | Fort McKay - Pete Ladoucer | Planning meeting for a project description meeting and a community presentation of the projects |
| 16 January 1996 | Regulators OSEC | Project description meeting held in Edmonton |
| 24 January 1996 | Dave Chatters - MP | Meeting to review Disclosure Document and update MP on project consultation strategy |
| 24 January 1996 | Regional Municipality of Wood Buffalo | Meeting with Mayor Guy Boutilier to update both projects and schedules and to discuss consultation strategy |
| 24 January 1996 | Fort McKay First Nation | Project Description of the Fixed Plant Expansion; discussion of level of technical review desired |

| TABLE A3.0-1 PUBLIC CONSULTATION FOR STEEPBANK MINE PROJECT | | |
|--|---|--|
| Event Date | Community | Activities |
| 30 January 1996 | Regulators OSEC | Technical Workshops to discuss and resolve issues arising from the Fixed Plant Expansion Project prior to filing the Application |
| 30 January 1996 | Fort Chipewyan | Meeting in Fort Chipewyan with all communities to plan community presentations |
| 6 February 1996 | Environmental Resource Committee | Meeting in Fort McMurray to discuss projects with Directors of Alberta Environmental Protection and their staff |
| 8 February 1996 | Fort McKay First Nation | Community Forum for the residents of Fort MacKay to discuss the projects with Suncor people |
| 12 February 1996 | Regional Municipality of Wood Buffalo | Joint presentation with Syncrude to the "Citizens' Committee on Oil Sands Development" |
| 13 February 1996 | Fort Chipewyan | Community forum for the residents of all communities in Fort Chipewyan |
| 14 February 1996 | Regulators and OSEC | Review first draft of EIA results on Terrestrial and Valley Development |
| 15 February 1996 | Regional Municipality of Wood Buffalo | Review first draft of EIA results on socio-economic impacts |
| 20 February 1996 | Regional Municipality of Wood Buffalo | Presentation to the Regional Council to overview projects and schedule |
| 22 February 1996 | Regulators and OSEC | Review of first draft of EIA results on Eco-Health and Aquatics |
| 26 February 1996 | General Public - Fort McMurray | Review of first draft of EIA results on Human Health |
| 27 February 1996 | Regulators and OSEC | Review of first draft EIA results on Ecology and Human Health |
| 4 March 1996 | Regional Municipality of Wood Buffalo - Standing Committee on Oil Sands Development | Presentation on Suncor's response to the committee's issues |
| 7 March 1996 | Employees | <i>Beyond 2000</i> newsletter outlining the Oil Sands Group's growth and expansion plans mailed to employees |

| TABLE A3.0-1 PUBLIC CONSULTATION FOR STEEPBANK MINE PROJECT | | |
|--|---|---|
| Event Date | Community | Activities |
| 7 March 1996 | Oil Sands Environmental Coalition | Review of draft sections of the Fixed Plant Expansion Application |
| 11 March 1996 | Fort McKay First Nation | Meeting with Aboriginal Business Development Subcommittee in Fort MacKay to discuss business opportunities |
| 11 March 1996 | Fort McMurray Catholic School Board | Presentation on the projects focusing on community impacts, particularly on education |
| 12 March 1996 | Fort McKay First Nation | Discussion relating to their Letter of Concern written in response to the Disclosure Document for the Fixed Plant Expansion |
| 13 March 1996 | Adam Germain - MLA | Update meeting on Suncor's projects |
| 14 March 1996 | Regional Municipality of Wood Buffalo - Standing Committee on Oil Sands Development | Follow-up presentation regarding Suncor's position on committee's issues |
| 20 March 1996 | Aboriginal Business Development Subcommittee | Meeting in Conklin to discuss business opportunities |
| 26 March 1996 | Oil Sands Environmental Coalition | Review of draft application for the Fixed Plant Expansion |
| 28 March 1996 | Anzac Community | Aboriginal Business Development Subcommittee meeting in Anzac to discuss business opportunities |
| 15 April 1996 | Fort McMurray Public School Board | Presentation on Suncor's Oil Sands Group projects, focusing on community impacts and education |

**TABLE A3.0-2
CONTINUING PUBLIC CONSULTATION - PLANNED ACTIVITIES**

| Target Date | Community | Activities |
|----------------------|---|--|
| April 1996 | Fort McKay First Nation | Meetings to review Fixed Plant Expansion Application concerns |
| April 1996 | Aboriginal Business Development Committee | Meetings in Janvier and Fort Chipewyan to discuss business opportunities |
| 17 and 18 April 1996 | Northern Alberta Development Committee, Northern Alberta Aboriginal Business Association, Regional Municipality of Wood Buffalo | Conference "On the Threshold" - an economic business development conference focusing on aboriginal businesses |
| 24 April 1996 | Oil Sands Environmental Coalition | Meeting to review Fixed Plant Expansion concerns |
| May 1996 | General Public | Newsletter <i>Report to the Community</i> Issue 3 |
| May 1996 | Janvier - First Nation | Community presentation to residents on Suncor's Oil Sands Group projects |
| May 1996 | Conklin - First Nation | Community presentation to residents on Suncor's Oil Sands Group projects |
| 1 May 1996 | Alberta Environmental Protection Energy and Utilities Board | Meeting to review Fixed Plant Expansion concerns |
| 16 May 1996 | Regional Municipality of Wood Buffalo - Standing Committee on Oil Sands Development | Presentation on Suncor's response to the committee's issues, specifically related to Steepbank Mine |
| May/June 1996 | Prime Communities | Application reviews |
| September 1996 | Fort McMurray Chamber of Commerce | Presentation to local business people by Suncor staff and major EPC contractors for Steepbank Mine contract work |

4.0 SUMMARY OF ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACT ASSESSMENT

4.1 INTRODUCTION

The Steepbank Mine Environmental Impact Assessment (EIA) was prepared to assess the impacts associated with the development, operation and reclamation of the Steepbank Mine, reclamation of Lease 86/17 and the net impacts associated with increasing plant production of upgraded crude oil to 107 kbpcd. It predicted impacts which could result from the projects, identified mitigations to avoid or reduce those impacts, and evaluated the residual effects. The EIA was conducted over a period of 18 months, and focussed primarily on issues raised by communities. It describes the assumptions used, is quantitative wherever possible, and explains the effects of Suncor's development in a regional perspective. In doing the regional impact analysis, cumulative effects of other oil sands developers (Synchrude and Solv-Ex) and forest harvesting (Al-Pac and Northlands) were also considered.

This section (A4.0) summarizes the environmental impact analysis and mitigation plans which are presented in Section E of this document and in greater detail in Impact Analysis reports that are referenced in this Application.

The EIA investigations focused on addressing the key concerns identified by the public and regulators. It also considered Alberta land use guidelines (draft Integrated Resource Plan for the Athabasca River corridor). Key concerns include:

- economic and employment opportunities for aboriginal communities;
- opportunities for local businesses;
- cumulative impacts on infrastructures and community services in the Regional Municipality of Wood Buffalo;
- effects on traditional uses and historical resources;
- health protection of local and regional residents and Suncor's employees;
- impacts of surface disturbance on the terrestrial ecosystem (terrain and vegetation), especially within the Athabasca and Steepbank river valleys;
- cumulative effects of oil sands development on wildlife populations, and the possibility that Suncor's river valley development could affect wildlife movement along the Athabasca River;
- protection of water quality;
- aquatic ecosystem health in the Athabasca and Steepbank Rivers; and
- effect of production increases on local and regional air quality.

4.2 SOCIO-ECONOMIC IMPACT ANALYSIS

Development and operations of Steepbank Mine will provide a number of economic benefits to the Wood Buffalo region, the Province of Alberta and to Canada. Development of the Steepbank Mine project will provide approximately 1000 work years of employment during construction, with a peak requirement of 435 jobs in 1999. Of importance to the Regional Municipality of Wood Buffalo and to Fort McMurray, operation of the Steepbank Mine will provide the continued employment of 1700 people (1400 Suncor employees and 300 contractors), as well as provide additional employment for an estimated 100 employees by the year 2010.

The additional employment created by the Steepbank Mine is expected to increase the population within Fort McMurray less than 1%, and local service agencies have indicated existing services and infrastructure have sufficient capacity to accommodate this growth. Community representatives have indicated that the continuation of employment will reinforce the existing high quality of life which exists within the Fort McMurray area.

Development of Steepbank Mine is expected to cost approximately \$336 million (\$1996), and over the life of the mine, \$6.4 billion will be spent on operating costs. These expenditures will create sizeable benefits for Alberta and Canada. Development expenditures have been estimated to generate \$324 million in income within the Canadian economy and \$209 million (65%) within the Alberta economy. Operating expenditures have been estimated to generate income of over \$7 billion within the Canadian economy, with \$5.8 billion (84%) in Alberta. In addition to purchases of goods and services, Suncor will continue to pay taxes to all levels of government and royalties to the Province of Alberta. Municipal taxes paid by the Suncor Steepbank project over its 25-year life have been estimated at approximately \$300 million.

Suncor has a purchasing policy which encourages the supply of goods and services from local suppliers. Currently, Suncor spends approximately half its annual goods and services procurement budget within the Fort McMurray area (\$90 million per year). This pattern is expected to continue through the Steepbank operations.

To enhance local socio-economic benefits and minimize negative impacts, Suncor will:

- provide housing for temporary construction labour force in a camp;

-
- work actively with Fort McKay, Fort Chipewyan and other local aboriginal communities to develop business opportunities in both the near and long term, and maximize employment and training opportunities;
 - maximize hiring of local residents in its workforce;
 - give preference to local suppliers and contractors when purchasing goods and services;
 - work actively with local organizations like the Regional Municipality of Wood Buffalo and other community organizations to minimize potential community impacts; and
 - co-ordinate activities with others on the Standing Committee on Oil Sands Development to minimize cumulative effects of industrial development.

The Steepbank Mine project will have substantial and positive economic impacts to the local communities, particularly when compared to the alternative of depletion of ore reserves in the existing mine, and retirement of the existing Suncor facility.

4.3 TRADITIONAL LAND USE

Steepbank Mine will impact existing traditional land uses on Leases 97, 19 and 25. A traditional use study of Steepbank Mine, undertaken by the Community of Fort McKay, confirmed that there are direct, on-site traditional uses of the area. Meanwhile, reclamation of Lease 86/17 will restore mined areas to landscapes suitable for a variety of land uses, including traditional land use.

Suncor will mitigate the impacts of Steepbank Mine development to existing land uses by:

- reaching an agreement with trappers who will be displaced from their traplines (completed); and
- using dry landscape reclamation so that traditional use of the land can be restored on all leases.

Suncor is committed to working with aboriginal communities in the region to design a final reclamation landscape that is sustainable and productive from a traditional use perspective.

4.4 HEALTH IMPACT ANALYSIS

Suncor considers the most important factor associated with its growth initiatives is that the health of the local community, future users of reclaimed landscapes and Suncor employees is not negatively affected.

Project-related activities that could possibly affect community health include changes in air and water emissions and chemicals associated with the reclaimed landscape.

To protect human health, Suncor will:

- improve most air emissions levels, especially for parameters that have potential consequences to human health;
- design and develop reclaimed landscapes that are safe for future users of the land. This will include early development of a demonstration landscape to provide additional data about CT reclamation;
- manage water discharges to ensure potential downstream water uses are protected; and
- participate in the Fort McMurray regional health study.

A health impact analysis of existing and future potential water discharges indicates these releases will not adversely affect downstream users. A similar analysis of the CT reclaimed landscape indicated health concerns to be very low, however the potential bio-accumulation of metals through vegetation to wildlife and humans needs to be further evaluated through field studies. The substantial reduction in air emissions will improve air quality. This in turn should reduce further concerns about air quality health impacts. The direct assessment of existing air quality health impacts will be monitored through the Regional Health Study.

4.5 TERRESTRIAL RESOURCE IMPACTS

The terrestrial environment (i.e., landforms, soils and vegetation) on the east side of the Athabasca River will be affected by the following mine development activities:

- construction of the access bridge;
- placement of ore transport facilities (truck dump and hydrotransport system), shop area, conveyors and infrastructure in the Athabasca River valley;
- mining of the Athabasca River escarpment and uplands;
- alterations to drainages on Lease 97, 19 and 25; and
- overburden disposal on the Athabasca River floodplain.

Suncor will implement mitigating measures to minimize the extent of landform and vegetation impacts, including:

-
- no disturbance of the Steepbank River valley;
 - maintaining a natural vegetation buffer along the Steepbank Valley escarpment and the Athabasca River bank. Some reduction in buffer width will be required in the vicinity of the bridge, barge landing and along limited sections of the access road;
 - minimizing overburden placement in the river valley so that the loss of Shipyard Lake wetlands area is small; new wetlands will be developed as part of the upland reclamation;
 - replacing the mined area of the Athabasca River escarpment with overburden dykes (not sand) which allows for more rapid and effective revegetation;
 - contouring dyke and storage area slopes where possible;
 - restoring vegetation on the overburden dykes to a diversity and community type compatible with non-disturbed vegetation communities;
 - managing flows into Shipyard Lake during mine operations to protect water quality and restoring natural drainage to this wetlands in the long term;
 - adopting a dry landscape reclamation strategy through the implementation of Consolidated Tailings (CT) technology for fine tails; and
 - moving all infrastructure, except the mine access road and bridge, from the Athabasca River valley by the year 2030.

Despite mitigation, there will be some landform alteration. After reclamation, the mined area of the Athabasca River escarpment will be somewhat more linear, and there will be topographic features created where overburden is disposed.

Revegetation of the disturbed areas will restore pre-development diversity and vegetation community types. It will, however, take some time for vegetation communities to advance into mature balsam poplar and white spruce forests.

The vegetation buffers and setbacks from the Athabasca River will minimize the visual impact of the development during mine operations. With removal of facilities out of the river valley by 2030, the only notable long-term visual impact will be the bridge and existing operations on the west bank of the river.

Overall reclamation of Steepbank Mine and Lease 86/17 with CT technology will allow the natural diversity of pre-development habitats to be restored. However, in the local study area there likely will be more deciduous forest and wetlands, and less peatlands. There is flexibility to adjust the mix of habitat types to meet preferences of land users and maintain sustainable ecosystems at the regional level.

The overall size of Shipyard Lake wetlands will be reduced from 150 to 110 hectares, however, its supply of fresh water will be maintained in both the short and long term. Although the Shipyard Lake wetlands habitat will be reduced, there will be an increase in wetlands habitat in the upland reclamation areas. In terms of a more regional context, this wetlands is not unique within the Athabasca River corridor.

After considering the primary mitigations noted above, and other mitigative measures explained in Section E and the detailed Impact Analysis reports, the project's impact on the terrestrial environment is generally considered to be moderate during the operation period, and low following final reclamation. None of the terrestrial impacts are regionally significant.

4.6 WILDLIFE HABITATS AND POPULATION IMPACTS

The upland Boreal forest ecosystem in the vicinity of Suncor's existing and proposed mines provides moderately-productive habitat for moose, terrestrial furbearers and breeding birds. Habitats in the Athabasca River valley are substantially more productive for most wildlife species and provide high quality overwintering habitat for moose and wolves.

Potential effects on wildlife populations due to Steepbank Mine, Lease 86/17 and production expansion developments could include:

- direct loss of habitat, especially high value habitats in the valleys of the Athabasca and Steepbank Rivers;
- fragmentation of habitats by restricting wildlife movement along the river valley;
- direct mortality during clearing and overburden removal; and
- accumulation of contaminants from plant air emissions and CT in plants and animals.

Some of the major wildlife impact mitigations that will be implemented by Suncor include:

- avoiding development in the Steepbank River valley or its escarpment;
- rapidly reclaiming disturbed vegetation, especially deciduous and mixed-wood communities;
- reclaiming CT landforms back to a mixture of wetlands and stands of deciduous and mixed-wood coniferous forests;
- maintaining vegetation buffers along the Athabasca River;
- incorporating a wildlife by-pass at the bridge; and
- reducing SO₂, particulate and hydrocarbon air emissions, and soil capping of CT deposits.

During the operational phase of Steepbank Mine, there will be a moderate local impact on wildlife populations caused by habitat loss from the mine's surface disturbance and placement of facilities, particularly in the river valley. Fortunately, the Athabasca River valley in the vicinity of Suncor does not provide a major movement corridor for overwintering moose and wolves, so the impact of the bridge and the valley infrastructure on wildlife movement should be minimal. A wildlife underpass will, however, be developed to ensure options for future wildlife movement. Improved air emissions from the Suncor plant should reduce potential habitat impacts due to vegetation stress.

In the longer term, reclamation of the river valley dykes and the CT deposits with a relatively high proportion of deciduous and mixed wood forest will restore the overall quality of habitat conditions for most species. On a regional basis, the combined reclamation and revegetation activities of the oil sands and forestry industries could actually enhance regional population levels of some species -- moose, for example -- with regional integration of reclamation and reforestation.

Projections of contaminant accumulation in plants and animals and associated toxicity due to use of CT as a reclamation material indicates a low potential for impact on wildlife populations. Large scale field demonstrations are planned to confirm this expectation.

4.7 ATHABASCA RIVER WATER QUALITY AND AQUATICS ECOSYSTEM IMPACTS

Studies conducted by the Northern River Basins Study (NRBS) indicate water quality in the oil sands reach of the Athabasca River is not generally impaired by upstream industrial and municipal developments. Investigations to identify the prevalence and potential cause of fish tainting from upgrader effluent are continuing. Aboriginal communities currently limit their catch of fish from the river because of concerns about poor taste. The Alberta Government advises limited consumption of river fish due to elevated mercury levels, however the mercury advisory is common to many Alberta rivers. The mercury source is thought to be natural.

Specific NRBS studies, done in collaboration with Suncor, found that fish in the lower Athabasca River have moderately elevated liver enzyme levels, which indicates that they are metabolizing and excreting hydrocarbons. Studies conducted as part of the Steepbank Mine EIA indicate the liver enzyme induction is caused primarily by the natural background hydrocarbon levels in the region and is not impairing fish health.

Potential effects to Athabasca River water quality, fish habitat or aquatic ecosystem health that could result from Suncor activities include:

-
- reduced river flows caused by river water withdrawal or diversion of natural groundwater or surface water flows from the mined leases;
 - physical habitat impacts resulting from construction of access roads, barge facilities or placement of the bridge piers;
 - sedimentation caused by mine site and river valley soil erosion;
 - accidental spills from the hydrotransport system and other pipelines crossing the bridge;
 - water quality changes resulting from release of operational (mine water, treated sewage and treated wastewaters) and reclamation (reclamation landform seepage and run-off) waters to the Athabasca and Steepbank Rivers; and
 - impacts resulting from drainage changes to Leggett and Wood Creeks, plus Unnamed Creek which drains to Shipyard Lake.

Mitigating measures that Suncor will implement to protect the aquatic habitats and water quality include:

- collecting all Steepbank Mine affected waters for return to Lease 86/17 and use as Extraction water;
- maintaining freshwater flows to Shipyard Lake during mine operations and long term re-development of surface drainages;
- maximum recycling of CT drainage waters back to the plant so that water withdrawal and effluent discharge to the Athabasca River can be minimized;
- improving the Upgrading and Utilities wastewater treatment system, including increased recycling of cooling water and eliminating some wastewater sources;
- designing the bridge deck and pipelines crossing the river to contain and collect any accidental spills;
- maintaining vegetation buffers along the Athabasca and Steepbank Rivers to control mine erosion;
- designing cofferdams and timing bridge pier construction to minimize impacts to fish; and
- developing a long-term reclamation drainage plan that maximizes the potential for natural treatment of run-off and seepage waters; and
- rapid revegetation of land disturbances for erosion control.

Water releases and aquatic habitat changes associated with Suncor's proposed development will not impair Athabasca River water quality, reduce fish abundance or affect aquatic ecosystem health. Downstream users will not be affected. The reduction of surface run-off and groundwater flows to the Athabasca and Steepbank Rivers during mine operation is negligible and will not affect fish habitat.

Similarly, bridge pier construction effects to fish habitat will be minimal and will not affect fish populations.

The wastewater effluent potential for tainting may be reduced by changes to the wastewater treatment system proposed as part of the Fixed Plant Expansion. Meanwhile, further investigation for the cause and extent of potential tainting compounds is being undertaken.

4.8 AIR QUALITY IMPACTS

Community concerns about air emissions from the Suncor facility focused on

- greenhouse gas emissions (i.e., CO₂);
- sulphur dioxide (SO₂), which can acidify surrounding soils and water bodies, and directly affect vegetation and human health;
- nitrogen oxides (NO_x), which contribute to ground-level ozone;
- hydrocarbon emissions which include volatile organic compounds (VOCs) which could cause odours, health impacts and ozone generation;
- sulphur compounds which could cause odours; and
- particulate emissions, which could affect vegetation and human health.

Through its program of continuous reduction of air emissions, Suncor will be able to reduce, or hold constant, air emissions from the plant even with the production expansion to 107 kbpcd -- an increase by more than one third. Major facility improvements (e.g., Flue Gas Desulphurization; improved diluent recovery) will enable the following achievements:

- SO₂ emissions will decrease to 22% of current levels;
- NO_x emissions will decrease to 97% of current levels;
- CO₂ levels will increase 1% - 2% above current levels;
- VOC emissions will decrease to 31% of current levels; and
- particulates from source emissions will decrease to 22% of current levels.

The air emission improvements summarized above will result in improved air quality in the vicinity of the Suncor plant and the oil sands region. Off-site odours should be reduced as a result of the odour abatement program. The Naphtha Recovery Unit will be modified so that diluent losses to ponds are no more at 107 kbpcd than at 79.5 kbpcd. The implementation of the Flue Gas Desulfurization (FGD) unit on the main stack will greatly reduce SO₂ and particulate emissions, thereby reducing potential

impacts to soils, vegetation and associated contaminant impacts. In the long term, concerns about fugitive hydrocarbon emissions from the tailing ponds will be reduced by adoption of CT technology; the full extent of the improvement can only be estimated after the technology has been fully implemented and monitored. Suncor is a participant in Canada's "Climate Change Voluntary Challenge and Registry Program" and is committed to restricting its greenhouse gas emissions at or below the 1990 level, even with the production expansion.

4.9 HISTORIC RESOURCES IMPACTS

Extensive on-site surveys of the area to be affected by Steepbank Mine development located two sites where isolated cultural artifacts were subsequently found. The potential for significant undiscovered sites within the area is limited and further mitigation requirements prior to mining are not considered necessary.

Suncor will assess and evaluate archaeological sites that are identified during construction and mining operations.

4.10 SUMMARY CONCLUSION

Suncor is committed to implementing mitigating measures that will ensure that the development of the Steepbank Mine, reclamation of Lease 86/17 and the Fixed Plant Expansion will not create significant impacts. There will be low to moderate local impacts during project construction and operation, however, these are to be expected for a resource development project of this scale. The Integrated Resource Plan guidelines for Athabasca River valley development can be satisfied. Reclamation of areas disturbed by mining activities will restore the Lease 86/17 and Steepbank mines to biologically productive and diverse landscapes. Because there is flexibility in reclamation options, future land users will be invited to participate in setting the long term reclamation goals.

5.0 APPROVALS GUIDE AND APPLICATION DESCRIPTION

5.1 APPLICATION SCOPE AND PURPOSE

Suncor Inc., Oil Sands Group is applying for approval to construct and operate the proposed Steepbank Mine and to make necessary modifications in access, ore transport, extraction, and tailings handling to sustain an increase in production to 6 209 000 m³ of synthetic crude oil and other oil sands products in each calendar year from its oil sands operation north of Fort McMurray. Secondly, approval is sought for the operation of the proposed Steepbank Mine, based on a twenty-year mine plan. Thirdly, this Application seeks approval for the integrated conceptual reclamation plan for Lease 86/17 within the area of the existing approval scheme and the proposed Steepbank Mine.

The new mine would begin operation by the year 2000 and would reach full capacity by 2001, by which time the reserves in the current mine on Lease 86/17 will be exhausted.

This Application describes the current operation and provides details of the proposed Steepbank Mine development and its incremental impacts. The downstream boundary of the Steepbank project is the inlet of the diluted bitumen transfer line at the oil sands plant. From there the bitumen product is transferred to the Upgrading plant at Suncor's oil sands operation.

5.2 REFERENCE TO APPLICABLE LEGISLATION

5.2.1 This Application

This application seeks approval from the Alberta Energy and Utilities Board (AEUB) and Alberta Environmental Protection (AEP) for both the construction and operation of the proposed Steepbank Mine and reclamation of Steepbank Mine integrated with reclamation of the current Lease 86/17 mine in accordance with the following legislation:

- Review and acceptance of Steepbank Mine Environmental Impact Assessment Report by the Director of the Environmental Assessment Division, AEP; under AEPEA;
- Amendment of Approval No. 7632 (as amended) under the Alberta *Oil Sands Conservation Act* (OSCA);
- Amendment of the existing Approval under the (EPEA) (referred to under Subsection 5.2.3 of this Application as the Consolidated EPEA Approval); or alternatively, to amend the existing Clean Air Licence (No. 92-AL-359 as amended), Clean Water Licence (No. 92-WL-147 as amended) and Reclamation Approval (No.OS-1-79 as amended); and

-
- *Water Resources Act* for diversion of watercourses in the course of mine development and operation, and wastewater management of both Steepbank Mine and Lease 86/17 operations. Suncor will submit the requisite Application for Licence pursuant to Section 11(1)(a)(b)(c) of the *Water Resources Act*, form WR1 (February 1994) in a separate transmittal.

By this Application Suncor also seeks approval from the AEUB pursuant to the following legislation in respect of related aspects of Steepbank Mine:

- *Alberta Hydro and Electric Energy Act*, for construction, operation and connection of a power supply line; and
- *Alberta Pipeline Act*, for construction and operation of hydrotransport, hot water, natural gas, diesel, tailings and recycle water pipelines.

5.2.2 Other Project Applications

Suncor is filing applications for approval of other aspects of the Steepbank Mine project under other statutes. The following is a list of identified federal and provincial application and approval requirements applicable to this project:

Federal

- *Navigable Waters Protection Act*, for construction of a bridge over the Athabasca River and other works in navigable waters; and
- *Radiocommunication Act*, for the installation and operation of towers and apparatus.

Provincial

- *Quarries Regulation Act*, for an operating permit for the operation of Steepbank Mine;
- *Surface Rights Act*, for removal of gravel;
- Part 17 of the *Municipal Government Act*, for a development permit from the Regional Municipality of Wood Buffalo for construction and operation of a new mine, facilities, buildings and bridge;
- *Water Resources Act*, for the construction of the bridge to Steepbank Mine;
- *Public Lands Act*, for surface rights (Licence(s) of Occupation and Mineral Surface Leases(s)) for Steepbank Mine and for the bridge, roads, facilities and all mining activities; and
- *Historical Resources Act*, for confirmation that facilities and activities will not adversely affect historical resources.

5.2.3 Associated Applications

Suncor has already submitted the following Applications associated with Suncor's current operation. These Applications are under review by the AEUB and AEP at the time of submission of the present Application.

- Application to AEP pursuant to EPEA (submitted in February 1995) for consolidation of Suncor's existing Clean Air Licence (No. 92-AL-359), Clean Water Licence (No. 92-WL-147) and Reclamation Approval (No. OS-1-79). Approval of this Application is contemplated by 25 June 1996 (the "Consolidated EPEA Approval").
- Application to AEUB and AEP (dated 29 March 1996) to expand production to 6 209 000 m³ of synthetic crude oil and other oil sands products in each calendar year by 1998 (the Fixed Plant Expansion Project Application). This Application includes the following:
 - (a) Application to the AEUB pursuant to the OSCA to amend Approval No. 7632 (as amended by Approval No. 7632A).
 - (b) Application to AEP to amend the Consolidated EPEA Approval or alternatively, to amend the existing Clean Air Licence, as amended and Clean Water Licence, as amended.
 - (c) Application to AEP pursuant to the *Water Resources Act* for a licence to alter Suncor's fresh water pond.
- Application to AEP for Fixed Plant Expansion Initial Construction.

5.3 THE APPLICANT

The official name and address of the applicant is:

Suncor Inc., Oil Sands Group
P.O. Box 4001
Fort McMurray, Alberta
T9H 3E3

Correspondence about this Application should be directed to the above address, to the attention of:
Terry Bachynski, Director, Project Approvals.

Phone: (403) 743-6892
Fax: (403) 791-8344
E-Mail: kwoods.sunosg2b@ccinet.ab.ca

5.4 APPLICATION FORMAT AND CROSS-REFERENCES

The scope of this Application has been described in Subsection 5.2.1. The following series of tables identifies locations within this Application of required information for Alberta Oil Sands Conservation Act approval, AEPEA approvals and the EIA Terms of Reference pursuant to AEPEA.

Information relevant to other approvals is provided in the following sections:

- *Water Resources Act*: Subsection C3.4
- *Hydro and Electric Energy Act*: Subsections C4.1 to C7.5
- *Pipeline Act*: Subsection C4.1

TABLE A5.0-1
AEPEA REGULATORY REQUIREMENTS FOR APPLICATION
CROSS-REFERENCED WITH THE SUNCOR APPLICATION

| AEPEA Regulation Clause | Regulation Information Required (Abbreviated) | Suncor Application Relevant Sections and Subsections |
|--|---|---|
| 3(1) a | Name and address of Applicant | A5.3 |
| 3(1) b | Location, capacity and size of the activity to which the Application relates | A2.0 |
| 3(1) c | Nature of the activity and the change to the activity (amendment, addition or deletion as the case may be) | A5.0 |
| 3(1) d | Where the Applicant requires an approval from the Energy Resources Conservation Board, the date of the written decision in respect to the Application | A5.0 |
| 3(1) e | An indication of whether an environmental impact assessment report has been required | A5.2.1 |
| 3(1) f | Copies of existing approvals that were issued to the Applicant in respect of the activity under this Act or a predecessor of this Act | B1.1 |
| 3(1) g | Proposed or actual dates for construction commencement, construction completion and commencement of operations | C3.1.12 |
| 3(1) h | List of substances, their sources; the amount of each substance that will be released into the environment as a result of the activity, the change to the activity or amendment, addition, deletion, as the case may be; the method by which the substances will be released; and the steps taken to reduce the amount of the substances released | C8.0 |

| AEPEA Regulation Clause | Regulation Information Required (Abbreviated) | Suncor Application Relevant Sections and Subsections |
|--|---|---|
| 3(1) i | Summary of the environmental monitoring information gathered during the previous approval period | Suncor 1995a |
| 3(1) j | Summary of the performance of substance release control systems used for the activity during the previous approval period | Suncor 1995a |
| 3(1) k | Justification for the release of substances into the environment as a result of the activity, the change to the activity or the amendment, addition or deletion, as the case may be | C8.0 E |
| 3(1) l | Measures that will be implemented to minimize the amount of waste produced, including a list of the wastes that will or may be produced, their quantities and the method of their final disposition | C8.0 |
| 3(1) m | Any impact, including surface disturbance, that may or will result from the activity, the change to the activity or the amendment, addition or deletion, as the case may be | C8.0 D E |
| 3(1) n | Confirmation that any emergency response plans required to be filed with the local authority of the Municipality or with Alberta Public Safety Services have been so filed | Emergency Response Information in Section C8.0 |
| 3(1) o | Confirmation that there are contingency plans in place to deal with any unforeseen sudden or gradual releases of substances to the environment | C8.0, Suncor 1995a |
| 3(1) p | Conservation and reclamation plan for the activity | D3.0 |

| AEPEA Regulation Clause | Regulation Information Required (Abbreviated) | Suncor Application Relevant Sections and Subsections |
|--|--|---|
| 3(1) q | Description of the public consultation undertaken or proposed by the Applicant | A3.0 |
| 3(1) r | Information required under any other regulation under the Act to be submitted as part of or in support of the Application | A5.0 |
| 3(1) s | Any other information required by the Director, including information addressed in a standard or guideline pertaining to the activity that is published or adopted by the Department | A5.0 |

TABLE A5.0-2
AEUB GUIDELINES (SEPTEMBER 1991) RESPECTING AN APPLICATION
CROSS-REFERENCED WITH THE SUNCOR APPLICATION

| AEUB Guideline | Guideline Information Required (Abbreviated) | Suncor Application Relevant Section(s) |
|--|--|---|
| 1.5.1 | Identification of act and section under which Application is made | A5.2 |
| 1.5.2 | Name and address of the Applicant | A5.3 |
| 1.5.3 | Statement of need and timing for the project | A2.2 |
| 1.5.4 | Overall description of the proposed scheme, including location, size, scope, schedule, pre-construction, start-up, duration and reasons for proposed schedule | A2.3, C3.0 |
| 1.5.5 | Description of the regional setting of the development; reference to existing and proposed land use | E5.0 |
| 1.5.6 (a) 1.5.6 (b) 1.5.7 1.5.8 | Requirement amended 25 January 1996 (see Table A5.0-3) | C |
| 1.5.9 | General description of storage and transportation facilities of the final hydrocarbon product | B1.6 |
| 1.5.10 | Proposed rate of production of the hydrocarbon product over the term for which approval is requested | A2.0 |
| 1.5.11 | Description of the subject oil sands owned by or leased to the Applicant | B1.1 |
| 1.5.12 | Description of status of negotiations held or to be held with the freehold, leasehold and mineral surface rights owners | C1.3 |
| 1.5.13 | Description of proposed energy sources with a comparison to possible alternative sources, rates of resource utilization; and description of sources and supply | C7.5 |
| 1.5.14 | Description or results of public information programs planned or initiated for the project | A3.0, E1.0 |
| 1.5.15 | Term of the approval sought, including expected start and completion dates of the scheme | A5.0 |

| AEUB Guideline | Guideline Information Required (Abbreviated) | Suncor Application Relevant Section(s) |
|-------------------|---|---|
| 1.5.16 | Name of person responsible for Application, to whom correspondence should be addressed | A5.3 |
| 2.1.1 (a) to (k) | Geological description | C2.0 |
| 2.1.2 (a) to (g) | Evaluation of the reserves within the project area, the mine site, tailings site, discard sites and surface facilities | C2.0 |
| 2.1.3 (a) to (c) | Description of the project layout and mining equipment selected | C3.0 |
| 2.14 (a) to (d) | Description of the mine development plans | C3.0 |
| 2.1.5 (a) to (e) | Description of the design, stability analysis, construction method and schedule of pit slopes and discard, including tailings | C3.0, D3.0 |
| 2.4.1 (a) to (d) | Separate description of the bitumen extraction, upgrading, utilities, refining, and sulphur recovery facilities | C5.0 B1.4, B1.5 |
| 2.4.2 | Overall material and energy balances, including information about hydrocarbon and sulphur recoveries, water use and energy efficiency | C7.0 |
| 2.4.3 | Quality of products, by-products and discard generated and a general description of their disposition | B1.4, D3.0, C8.0 |
| 2.4.4 | Manner in which surface drainage within the areas of the processing plant, product storage and discharge would be treated and disposed | C3.4, Suncor 1995a |
| 2.4.5 | Comparison of the proposed process, with alternative processes considered on the basis of overall recovery, energy efficiency, cost, commercial availability and environmental considerations; and reasons for selecting the proposed process | C5.3 |
| 2.4.7 | Sample set of production accounting reports for the processing facility, with each entry explained using flows from identified measurement points and calculated flows | C7.3 |
| 2.5.1 | Description of any facilities to be provided for generation of electricity to be used by the project | B1.5, C6.0 |
| 2.5.2 | Identification of the source, quality and quantity of fuels, electricity or steam to be obtained from beyond project site | C6.0 |

| AEUB Guideline | Guideline Information Required (Abbreviated) | Suncor Application Relevant Section(s) |
|---------------------------|--|---|
| 2.5.3 | Where energy resources from outside the project boundaries are to be supplied; a detailed appraisal of the options available to eliminate the need for such resources, with consideration for overall recovery, energy balances, costs, technical limitations and environmental implications | C6.0 |
| 2.6.1 | Description of air and water pollution control and monitoring facilities as well as a liquid spill contingency plan | C8.0, Suncor 1995a |
| 2.6.2 (a) | Description of the water management program including: (a) proposed water source and expected withdrawal; (b) source water quality control; (c) wastewater program; and (d) water balance for the proposed scheme | C3.4 C7.4 |
| 2.6.3 | Manner in which the surface drainage within the project area would be collected, treated and discarded | C3.4 |
| 2.6.4 (a) to (d) | Description of the emission control system | C8.1, Suncor 1995a |
| 3.1.1 (a) to (g) | Commercial viability information | A1.3, C1.8 |
| 3.1.2 (a), (c) and (d) | Description of project capital and operating costs | C1.8 |
| 3.2.1 | Summary of quantifiable public benefits and costs incurred during both construction and operation and how they pertain to Alberta and Canada | A4.0 E3.0 |
| 3.2.2 | Summary of non-quantifiable public benefits and costs incurred each year during construction and operation of the project and how they pertain to Alberta and Canada | A4.0 E3.0 |
| 3.3.1 | Appraisal of the economic impact of the project on the region and on provincial and national levels | A4.0 E3.0 |
| 3.3.2 | Discussion of any initiatives undertaken to accommodate regional economic priorities | A4.0 |
| 3.3.3 (a) to (d) | Assessment of direct and indirect employment opportunities | A4.0 E3.0 |

TABLE A5.0-3
MAPS REQUIRED IN SUPPORT OF AN AEUB
APPLICATION FOR STEEPBANK MINE
AMENDMENT, 25 JANUARY 1996

| AEUB Map Number | Description | Suncor Application Figure No. |
|------------------------|--|--------------------------------------|
| 1 | Topographical map showing the final pit limits, dumps and facilities (DXF file) | C3.0-1 |
| 2 | Geological evaluation methods (wells and other methods) (DXF file) | C2.0-4 |
| 3 | Contour map of criteria (TV/BIP) used to define pit limits (DXF file) | C2.0-20 |
| 4 | Mine sequence plan showing mine advance for each of the first six years and then every three years thereafter | C3.0-4 to C3.0-15 |
| 5 | Typical plans and cross-sections for pitwalls, dykes and dumps (Detailed cross-sections for dykes and dumps will be required for specific dyke/dump applications.) | C3.0-16 |

TABLE A5.0-4
EIA TERMS OF REFERENCE
CROSS-REFERENCED TO SUNCOR APPLICATION

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|-------------------------------------|--|---|
| Public Consultation | | |
| 1.2 | Inform the public | A3.0 |
| 1.2 | Document consultation measures | A3.0, E1.0 |
| 1.2 | Record suggestions and concerns | A3.0, E1.0 |
| 1.2 | Demonstrate how concerns addressed | A3.0, E1.0 |
| 1.2 | Document contact with aboriginal peoples | A3.0, E1.0 |
| Proponent's Submission | | |
| 1.3 | Glossary of terms | Glossary |
| Project Overview | | |
| 2.1 | Brief history of Suncor operations | A1.2 |
| 2.1 | Describe Suncor and key developers/operators | A1.1, A1.2 |
| Development Plan Summary | | |
| 2.2 | Processing/treatment facilities | C5.0 |
| 2.2 | Buildings and infrastructure | C4.0 |
| 2.2 | Transportation, utilities, access routes | C4.0 |
| 2.2 | Mining operations | C3.0 |
| 2.2 | Stages of development: construction, operations, reclamation | C3.0 |
| 2.2 | Development schedule for each component | C3.0, C3.1.12 |
| 2.2 | Timing of key construction, operational activities | C3.1.12 |
| Mine Area and EIA Study Area | | |
| 2.3 | Legal description and boundary, existing and proposed leases | B1.1 |
| 2.3 | Maps or equivalent showing proposed mine development area, pits, dumps, infrastructure, topographic features, wetlands, watercourses, existing and proposed areas of disturbance | C3.1.3 |
| 2.3 | Identify the study areas | E2.0 |
| 2.3 | Rationale for study area boundaries, by component | E2.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--------------------------------------|---|---|
| EIA Summary | | |
| 2.4 | Summary of results (address i. to v.) | A4.0 |
| 2.4 | Regional, temporal and cumulative effects | A4.0 |
| 2.4 | Impact significance - magnitude, extent, duration, frequency, reversibility - quantitative predictions where possible | A4.0 E11.0 |
| 2.4 | Maps, charts and illustrations - components, existing conditions, implications of development | E |
| Regulatory Approval | | |
| 2.5 | Legislation, policies, approvals: provincial, municipal, federal | A5.0 |
| 2.5 | Regulatory framework - post-EIA stages | A5.0 |
| Project Description | | |
| 3.1 | Describe existing Suncor operation, proposed changes | B, C |
| 3.1 | Map of all existing and proposed project facilities | Fig. C3.0-2 |
| 3.1 | List activities with potential for environmental effects, by development stage | E |
| 3.1 | Discuss timing uncertainties and alternatives | C3.1.12 |
| 3.1 | Extent of surface disturbance; clearing for mining, access, pipelines, utilities, site preparation | C3.1.3 |
| 3.1 | Activities in river valley; extent and duration of disturbance | C3.0 |
| Project Need and Alternatives | | |
| 3.2 | Project need | A2.2 |
| 3.2 | Project alternatives, environmental implications | C1.0 |
| 3.2 | Rationale for selected alternative | C1.0 |
| 3.2 | Component selection; technical, geotechnical, economic, environmental criteria; rationale for selection of components; and rationale for location of components | C1.0, C5.3 |
| 3.2 | Alternative technologies and methods: substance release | C1.0, C5.3 |
| 3.2 | Alternative technologies and methods: to reduce the area and duration of disturbance in sensitive areas | C1.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--|--|---|
| Process Description | | |
| 3.3 | Mine: material balances, energy balances, flow diagrams | C7.0, C5.2 |
| 3.3 | Processing oil sands: material/energy balances, flow diagrams | C7.0 |
| 3.3 | Short-term and long-term mining plans | C3.0 |
| 3.3 | Hydrotransport operations | C5.0 |
| 3.3 | Future development and design efforts | C5.0 |
| 3.3 | Chemical inputs: quantities and regulatory class | C5.2.1, C5.2.3 |
| Utilities, Transportation, Other Infrastructure | | |
| 3.4 | Infrastructure routing and location: components served, responsibilities, regional implications | C4.0, E3.0 |
| 3.4 | Utilities components; amount and sources of energy, water needs and sources; energy and water efficiencies | C7.0, C6.0 |
| 3.4 | Linear developments: alignments, route selection | C4.0 |
| 3.4 | Access: regional and local road implications: Highway 63; with document input from Municipal District and provincial authorities | E3.0 |
| 3.4 | Access: control of access, east side of Athabasca River | C4.2 |
| 3.4 | Needs for road-building materials: sources | C3.1.11, C2.0 |
| 3.4 | Design and route of pipelines; spill control measures, alternatives considered, hydrotransport lines | C4.0 C5.5 |
| Emissions to Atmosphere | | |
| 3.5 | Type, volume, sources of emissions from components of integrated operation: fugitive emissions, upset conditions | C8.0 |
| 3.5 | Compare current and expected regional emissions | E |
| 3.5 | Emission control technologies: best available, best practical, best achievable technology | C5.0, C8.0 |
| 3.5 | Control technologies for volatile, hazardous, odorous species | C5.0, Suncor 1995a, Suncor 1996c |
| 3.5 | Life-cycle "greenhouse gas" emissions | C8.1.2 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--|---|---|
| Water and Wastewater Management | | |
| 3.6 | Water and wastewater balance | C3.4 |
| 3.6 | Water management plan | C3.4 |
| 3.6 | Water requirements: normal, seasonal, emergency conditions | C7.0 |
| 3.6 | Water storage, treatment, sources, withdrawal minimization | C3.4 |
| 3.6 | Balance of options for treatment, storage, recycling and discharge of process-affected waters | D3.0 |
| 3.6 | Volume and quality of effluents: extraction, upgrading, tailings management, discharges from management works | C3.4 |
| 3.6 | Characterize each liquid waste stream | C3.4 |
| 3.6 | Describe wastewater treatment systems | C3.4, Suncor 1995a |
| 3.6 | Discharges from reclamation sites | C3.4 |
| 3.6 | Mitigation strategies to protect river water quality | C3.4 |
| 3.6 | Monitoring plans for hydrology and water quality | C3.4 |
| Solid and Hazardous Waste | | |
| 3.7 | Characterize and classify mine and processing waste | C8.1, Suncor 1995a |
| 3.7 | Waste management plan | C8.1, Suncor 1995a |
| 3.7 | On-site disposal areas: location, timing | C8.1, Suncor 1995a |
| 3.7 | Hazardous wastes | C8.1, Suncor 1995a |
| 3.7 | Waste minimization plans | C8.1, Suncor 1995a |
| 3.7 | Alternatives for storage or reuse/ recycling of coke, sulphur, gypsum; fine tailings as raw materials | C8.1 |
| Monitoring, Operating and Contingency Plans | | |
| 3.8 | Environmental protection programs: existing, new | B4.0, Suncor 1995a, C8.1 |
| 3.8 | Environmental monitoring programs: existing, new | B4.0, Suncor 1995a, C8.1 |
| Environmental Information Assessment Requirements | | |
| 4.1 | "Road map" and brief outline of assessment methods | E1.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|-------------------------------|--|---|
| 4.1 | Environmental hazards and constraints considered | E |
| 4.1 | Validation of data from previous studies, limitations of data | E |
| Land Use | | |
| 4.2 | Applicable land and resource use policies, management schemes: implications, constraints to development | E1.0 |
| 4.2 | Unique sites, special features, natural areas, recreational facilities: expected impacts | E |
| 4.2 | Existing land uses | E |
| 4.2 | Impact on land uses: mitigation | E |
| 4.2 | Pre-development and post-development landscape: aesthetic impact | E5.0 |
| 4.2 | Impact on public access: implications for recreation, traditional uses, other uses | E3.0 |
| 4.2 | Non-energy natural resources | E5.0 |
| 4.2 | Surface lease changes to extent and timing of occupation | B1.1 |
| 4.2 | Document consultations with existing land users | A3.0, E1.0 |
| 4.2 | Implications for natural resource management: government agencies, other community members | E |
| 4.2 | Land use by aboriginal peoples: document consultations | E3.0, E10.0 |
| 4.2 | Regional activities and cumulative land use impacts | E |
| Athabasca River Valley | | |
| 4.2.1 | Describe the valley, resources and current land uses | E3.0, E5.0 |
| 4.2.1 | Summarize criteria and guidelines in draft IRP | E1.0 |
| 4.2.1 | Environmental conditions: defining physical and biological characteristics, diversity of characteristics | E5.0 |
| 4.2.1 | Explain how environmental protection needs of the valley are reflected in development, operation and reclamation plans | D3.0, E5.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|---------------------------------------|---|---|
| 4.2.1 | Proposed objectives for reclaimed landscape: target physical and biological parameters and land uses | D3.0 |
| 4.2.1 | Proposed methods to measure and demonstrate success; responsibilities: timing, milestones, uncertainties, consequences, contingencies | D3.6 |
| Climate, Air Quality and Noise | | |
| 4.3 | Baseline climate and air quality conditions | E9.0 |
| 4.3 | Characterize existing air quality: key parameters | E9.0 |
| 4.3 | Air quality modelling: selection, constraints, results | E9.0 |
| 4.3 | Identify activities that affect air quality | E9.0 |
| 4.3 | Air quality impacts | E9.0 |
| 4.3 | Air quality monitoring: project, zonal | E9.0 |
| 4.3 | Impacts on provincial and federal commitments regarding “greenhouse gases” | E9.0 C8.1.2 |
| 4.3 | Noise impacts | E6.0 |
| Surficial Geology and Soils | | |
| 4.4 | Map of surface topography, deposits, drainage | E5.0, E7.0 |
| 4.4 | Integrate data with ecological land classification | E5.0 |
| 4.4 | Describe site geology and soils | E5.0 |
| 4.4 | Characterize sensitivity of soils and terrain to disturbance | E5.0 |
| 4.4 | Identify activities which may cause soil contamination | E5.0 |
| 4.4 | Classify soils and overburden for reclamation purposes | D3.0, E5.0 |
| 4.4 | Assess impacts: disturbance, terrain changes, contamination, erosion potential | D3.0, E5.0 |
| 4.4 | Discuss mitigation: soil salvage, contamination mitigation, erosion prevention/ minimization | D3.0, E5.0 |
| 4.4 | Identify constraints on vegetation restoration due to soils | D3.0, E5.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--|---|---|
| 4.4 | Soils for reclamation activities: availability, location, use, volumes, organic materials, storage and handling | D3.0, E5.0 |
| Vegetation and Forest Resources | | |
| 4.5 | Describe and map vegetation communities | E5.0 |
| 4.5 | Integrate data with ecological land classification | E5.0 |
| 4.5 | Integrated ecological land classification map | E5.0 |
| 4.5 | Identify primary vegetation species of each landscape unit, those used for wildlife food or shelter, indicator species for environmental effects: relative abundance | E5.0 |
| 4.5 | Identify amount of land disturbed, nature of vegetation communities affected, sensitivity to disturbance | E5.0 |
| 4.5 | Impacts on vegetation: amount, nature and duration of changes, implications for wildlife and other users | E5.0 |
| 4.5 | Conceptual objectives for post-development vegetation; compare pre-development and post-development vegetation | D3.0, E5.0 |
| 4.5 | Mitigation plan for site clearing: timing, run-off, water quality | C3.4, E5.0 |
| 4.5 | Mitigation plan for overall disturbance: vegetation communities, rare and endangered species; returning self-sustaining habitat equivalent to pre-disturbance conditions; maintaining biological capability and diversity | E5.0 |
| Wildlife | | |
| 4.6 | Use of the project area by wildlife: include seasonal use, special-use areas (calving, nesting, movement corridors) | E6.0 |
| 4.6 | Rare and endangered species: occurrence, habitat needs | E6.0 |
| 4.6 | Sensitivity to disturbance | E6.0 |
| 4.6 | Impacts on wildlife, wildlife utilization, habitat quality, during development, mining, following reclamation: site-specific, local, regional: cumulative effects | E6.0 |
| 4.6 | Map of habitat for key indicator species | E6.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--------------------------------------|--|---|
| 4.6 | Impact of bridge and other infrastructure on wildlife movement in the Athabasca River valley; alternatives | E6.0 |
| 4.6 | Wildlife impact mitigation plan: activities, schedule, learning from the past, compliance with provincial and federal policies for wildlife habitat | E6.0 |
| Surface Water and Groundwater | | |
| 4.7 | Describe surface hydrology before and after project | C3.4, E7.0 |
| 4.7 | Summary of baseline water quantity data | E7.0 |
| 4.7 | List mining and development activities which affect hydrology | C3.4, E7.0 |
| 4.7 | Identify temporary, permanent changes to flows, diversions or disturbances: extent, duration, proposed mitigation | C3.4, E7.0 |
| 4.7 | Effect of changes on hydrology: timing, volume, peak flow, significance for downstream basins, implications for vegetation, soil erosion, water quality, habitat quality | E7.0 |
| 4.7 | 1:100 year flood plain, potential for flooding: project design and contingency plan implications | C3.0, E7.0 |
| 4.7 | Effects on stream bed or shore of Athabasca River, Steepbank River and smaller streams: mitigation measures | E7.0 |
| 4.7 | Surface water monitoring program | E7.0 |
| 4.7 | Describe the groundwater regime | E7.0 |
| 4.7 | Effects on groundwater | E7.0 |
| 4.7 | Options to manage and protect groundwater | E7.0 |
| 4.7 | Interrelationship with surface water: effects | E7.0 |
| 4.7 | Implications of groundwater effects for terrestrial and riparian vegetation, wildlife, aquatic resources: mitigation | E7.0 |
| 4.7 | Water supply availability, seasonal fluctuations, impact of withdrawal on water sources and other users | E7.0 |
| Aquatic Resources | | |
| 4.8 | Existing fish resources and habitat | E8.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|----------------------|---|---|
| 4.8 | Map of fish habitat: sensitive areas, spawning, rearing, overwintering habitats, seasonal use, movement pattern | E8.0 |
| 4.8 | Critical life stages and requirements for key species; rationale for choice of key species | E8.0 |
| 4.8 | Identify construction and operation activities which may affect fish habitat, fish resources, riparian areas | E8.0 |
| 4.8 | Effects : nature, extent, duration; mitigation; residual impact | E8.0 |
| 4.8 | Adherence to provincial and federal policies for fish habitat | E8.0 |
| 4.8 | Monitoring plans: habitat quality, mitigation effectiveness | E8.0 |
| 4.8 | Increased fishing : management strategy, access control | E8.0 |
| Water Quality | | |
| 4.9 | Describe water quality before and after the project | E8.0 |
| 4.9 | Baseline water quality | E8.0 |
| 4.9 | Seasonal variations in water quality: existing, expected | E8.0 |
| 4.9 | Activities which may influence water quality: construction, operations, reclamation stages | E8.0 |
| 4.9 | Effects of activities on water quality; mitigation; residual effects for each stage, including post-reclamation | E8.0 |
| 4.9 | Predict water quality in downstream reaches, basins; compare to baseline water quality and Surface Water Quality Guidelines: significance of any non-compliance | E8.0 |
| 4.9 | Regional activities and cumulative effects | E8.0 |
| 4.9 | Water quality monitoring program | E8.0 |
| Reclamation | | |
| 5 | Detailed reclamation plan for Lease 86/17 and Steepbank Mine project | D3.0 |
| 5 | Effect of mining activities in new mine on reclamation on current mine site | D3.0 |
| 5 | Part 8, <i>Guide to Preparation of Applications and Reports for Coal and Oil Sands Operations</i> | D3.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|-------------|---|---|
| 5 | End land use objectives | D3.0 |
| 5 | Species for permanent revegetation: rationale for species selected for reclamation use | D3.0, Suncor 1995a |
| 5 | Timing of reclamation and return of lands to Crown | D3.0 |
| 5 | Material balance in relation to mining activities | D3.0 |
| 5 | Summary of mine and processing wastes in reclaimed landscape: how and where placed, environmental pathways and fate of contaminants released: timing of effects | D3.0 |
| 5 | Aquatic components of post-reclamation landscape: function, projected aquatic habitat map, effects of reclamation | D3.0 |
| 5 | Hydrological assessment for Lease 86/17 | E7.0 |
| 5 | Comparison of pre-development and post-reclamation aquatic landscape: effect of differences: diversity, quality, productivity and aesthetic character | E8.0 |
| 5 | Reclamation plans for terrestrial components: materials, erosion control, terrain modelling, land stability, revegetation, relevant research | D3.0, Suncor 1995a |
| 5 | Projected ecological land classification map, effects of reclamation, comparison of the pre-development and post-reclamation landscape: vegetation species, diversity of landscape units, effect of change on users | D3.0 |
| 5 | Type and distribution of commercial timber species in reclaimed landscape | E5.0 |
| 5 | Performance objectives for reclamation: physical and biological parameters: key milestones, how performance is measured and success demonstrated to community | D3.6 |
| 5 | Ability to achieve a reclaimed landscape comparable in character, quality, diversity and usefulness | D3.6 |
| 5 | Reclamation constraints: timing, materials, natural processes and cycles, need for research and development, biodiversity considerations and constraints | D3.0 |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|-----------------------------------|--|---|
| 5 | How development and reclamation will maintain biodiversity and promote restoration of equivalent capability for habitat | D3.0, E5.0 |
| Heritage Resources | | |
| 6 | Document heritage resources review and consultation with Alberta Community Development | E10.0 |
| Socio-Economic Information | | |
| 7 | Describe social impacts: employment, training, procurement, population changes, demand for local services, infrastructure, regional and provincial benefits, trapping, hunting and fishing | A4.0, E3.0 |
| 7 | Describe economic impacts | A4.0, E3.0 |
| 7 | Describe employment and business opportunities | E3.0 |
| 7 | Describe the workforce: construction, operations | E3.0, C3.0 |
| Public Health and Safety | | |
| 8 | Aspects of the project with health and safety implications | E4.0 |
| 8 | Change in exposure to contaminants | E4.0 |
| 8 | Plans to study environmental conditions and implications for human health | E4.0 |
| 8 | Summary emergency response plan: public input to plan | C8.0, Suncor 1995a |
| 8 | Mitigation and emergency contingency plans for public safety | C8.0, Suncor 1995a |
| 8 | Uncertainties and risks: contingency plans | C8.0, Suncor 1995a |
| Issue Groups | | |
| 2, 3 | Project definition and alternatives | C1.0 |
| 2, 4.2.1 | Siting: valley development | C1.0 |
| 2, 3 | Siting: components and infrastructure | C1.0, C4.0 |
| 2, 3, 4, 5, 8 | Substance release: water | C8.0 |
| 2, 3, 4, 8 | Substance release: air | C8.0 |
| 2, 3, 4, 5 | Land use | E3.0 |
| 2, 3, 4, 5 | Renewable resource management | E |

| EIA Section | Environmental Assessment Topic or Issue (Abridged) | Suncor Application Relevant Section(s) |
|--------------------|---|---|
| 2, 4, 5 | Fish and fish habitat | E8.0 |
| 2, 4, 5 | Wildlife | E6.0 |
| 2, 7, 8 | Health and social issues | E4.0 |
| 2, 3, 4, 5, 8 | Reclamation, site water management, land stability, site waste management, groundwater and soil protection, ecosystem risk management | C3.4, D3.0 |
| 2, 3, 7 | Economic definition | A4.0 |
| 2, 4, 7 | Public involvement opportunities | A3.0 |

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