Supplemental information requirements Steepbank Mine project EUB application No.960439 AEP application No.020-95 and file No.27551.

EUB Alberta Energy and Utilities Board

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12 July 1996

Mr. T. J. Bachynski
Director, Project Approvals
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P.O. Box 4001
Fort McMurray AB T9H 3E3

Dear Mr. Bachynski:

SUPPLEMENTAL INFORMATION REQUIREMENTS
STEEPBANK MINE PROJECT
EUB APPLICATION NO. 960439
AEP APPLICATION NO. 020-95, AND FILE NO. 27551

The Energy and Utilities Board (EUB), Alberta Environmental Protection (AEP) and Federal Government Authorities have completed their respective reviews of the subject applications and require the following supplemental information:

1 PROJECT DESCRIPTION

1.1 Provide an update on the design plans for the Steepbank Mine and associated infrastructure. Include any recent changes to the development plan which may have implications for environmental protection and resource conservation.

2 MINE DEVELOPMENT

2.1 Provide the conclusions of the special tests undertaken to evaluate extraction recovery performance using ores from different depositional systems. Also describe the data obtained to define ore blending strategies and how Suncor would use the information for the operation of the Steepbank Mine *(Steepbank Mine Project Application, April 1996, Section C2.0, p.21)*.

2.2 Provide quantitative values for the conditions used to classify portions of the McMurray formation as overburden *(Steepbank Mine Project Application, April 1996, Section C2.0, p.25)*.

2.3 Describe the effect an improvement in bitumen extraction recovery would have on the average oil sands grade that could be economically processed (would lower ore cutoffs be feasible)? Discuss (in quantitative terms) the effect on project economics of adopting lower ore cut-off parameters (e.g. 3 metres ore thickness and 6 wt..% ore grade) in

conjunction with improved extraction recoveries (recent communication with Suncor has indicated that recovery efficiencies of 92.5% are achievable vs. 91% used in the application).

2.4 Provide a basal aquifer isopach map and dxf file for the Steepbank mine area and provide an estimate of the annual basal aquifer depressurization volumes and water chemistry. Describe Suncor's disposition plans for this water.

2.5 Outline the design considerations and construction procedures Suncor has examined to ensure external waste storage is minimized (in-pit optimization). Include comment on Suncor's discard storage contingency plans (e.g. alternative external storage areas) should either the proposed discard sites be unacceptable or the capacity reduced due to unfavourable geotechnical conditions. *(Note that the southeast limit of the south discard site cannot be approved until there is agreement on the location of the ore body limit)*

2.6 Describe the concerns that would lead Suncor to consider foundation liners for tailings Ponds 6, 7, and 8?

3 ORE HANDLING/PROCESSING

3.1 Comment on any pilot test activity or other data that Suncor has used to confirm that the proposed 2.5 km hydrotransport pipeline distance would provide for sufficient ore conditioning? What parameters (e.g. slurry temperature, fines content, slurry water:oil sand ratio) impact the required pipeline distance (for optimum recovery).

3.2 Does the current process design include provision for the adjustment of slurry water temperature?

3.3 What, if any, facilities would be required at the Steepbank mine site for extraction process chemical addition? How will chemical (caustic) addition be controlled?

3.4 Provide further details on the design and operation (particularly during winter months) of the pools used for the draining of the hydrotransport and tailings lines *(Steepbank Mine Project Application, April 1996, Section C4.0, p.68)*.

3.5 Comment on the validity of Suncor's existing semi-empirical model for forecasting fine tails accumulation volumes from the operation of the Steepbank mine *(Steepbank Mine Project Application, April 1996, Section D3.0, p.20)*.

4 TERRESTRIAL AND INFRASTRUCTURE

The information requirements for this application include a detailed reclamation plan for the valley development component and any other conservation and reclamation activities proposed within the first ten years of development. Please review the EIA terms of reference, and questions in this supplementary information request prior to submitting the plan. A complete submission will facilitate the timely review of the plan.

Conformance with Policy for Valley Development, Wetlands and Uplands

4.1 Suncor states that the West Overburden Dump will be partially located in a wetland area, Shipyard Lake *(Steepbank Mine Project Application, April 1996, Section C3.0, p.40)*. Given the intent of the Integrated Resource Plan to protect the values of the Athabasca River valley and the desirability of conserving existing slough/marsh wetlands, what location and design alternatives has Suncor considered, to minimize the impact of this dump?

4.2 Suncor states that while Pit 1 is being mined the discharge into Shipyard Lake will be reduced to near zero *(Steepbank Mine Project Application, April 1996, Section C3.0, pp.50,55 and Section E7.0, Fig. E7.0–2)*. Confirm whether the Shipyard Lake wetland will maintain its habitat for wildlife and waterfowl during this period. Also, provide a hydrological analysis and an assessment of the biological implications of a 52% reduction in water inflow and a 47 hectare reduction in size to Shipyard Lake following reclamation.

4.3 Suncor states that maintenance facilities will be developed in the new Steepbank mine between 1997 and 2000 *(Steepbank Mine Project Application, April 1996, Section C 3.0, pp.50 and Surface Drainage Plan Development, p.65)*. The maintenance facilities, including a heavy vehicle maintenance shop will be located immediatley north-east of the Shipyard Lake wetland.

a) will a hazardous waste containment station *(Steepbank Mine Project Application, April 1996, Section C8.0, p.123)* be included?

b) describe the construction and operational measures proposed to mitigate impacts to the wetland area, including:

- water quality impacts from run off or accidental waste disposal, and
- noise impacts on the wildlife and waterfowl which utilize the wetland and adjacent areas.

4.4 Suncor states that intercept drainage will be collected from the east side of Pit 1 and directed into Shipyard Lake for ultimate discharge into the Athabasca River *(Steepbank Mine Project Application, April 1996, Section C3.0, p.51 and Section E7.0, p.66).* If this discharge will be the same quality as the existing mining intercept discharge, will the quality and quantity of this water affect the viability of Shipyard Lake as a productive wetland?

4.5 Suncor's plan for the mine includes development within about 70 metres of the Athabasca River along a 2000 metre stretch of the river floodplain, terraces and escarpment *(Steepbank Mine Project Application, April 1996, Section C3.0, p.40).* With reference to the values of the Integrated Resource Plan and the intent to protect the Athabasca River valley ecosystem:

a) Why is the proposed buffer at its narrowest 70 m when the dyke toe is 500 m from the river? Demonstrate the need to disturb any lands between the toe of the dyke and the riverbank, addressing each component of development proposed to be located in this area, i.e. why is it necessary? Can it be relocated or the disturbed area reduced?

b) Document how the 70 m setback conforms to the wildlife (travel corridor) values identified in the Integrated Resources Plan. Demonstrate how wildlife would be able to continue to move in and out of the valley and along the valley floor during development and following reclamation of valley disturbances.

c) Document how the 70 m setback conforms to the floodplain (setback to the 1:100 year flood level) values in the Integrated Resource Plan. Demonstrate that development within the water flood and ice flood contours will be adequately protected from flood damage and that it will not worsen flood conditions in other floodplain areas (for example, due to placement of overburden or other terrain modification within the floodplain). Provide a revised Figure C 4.0-1 showing the impact area of a 1:100 year ice flood.

d) Document how the 70 m setback conforms to the erosion (sensitive soils) and water quality values identified in the Integrated Resource Plan. Specifically, the riverbank at this location (70 m setback) is composed of oil sand which appears to be slumping towards the river. How stable is this oil sand and will disturbance cause it to accelerate its fall into the Athabasca River? How will surface run off along the 70 m setback be prevented from entering the Athabasca River if there is very little soil or vegetation at this location?

e) Document how the 70 m setback conforms to the recreation (aesthetics) values identified in the Integrated Resource Plan. Specifically, since there is little vegetation at the 70 m setback, what will Suncor do to ensure a visual buffer is provided to screen mining activities from river traffic?

f) If these values are being impacted, what mitigation is being proposed?

g) What will the impact on the project be, if the buffer (setback) is increased? Provide appropriate supporting information to explain the significance of the impact. Include additional plans and cross sections through the subject portion of the valley floodplain, terraces and escarpment to illustrate the alternative setbacks and their impact on the project.

4.6 The North Overburden Dump is shown in Figure C3.0–3 and discussed in the application *(Steepbank Mine Project Application, April 1996, Section C3.0 , pp.40,64).* With reference to the intent of the Integrated Resource Plan to protect the valley ecosystem:

a) What alternative locations or configurations have been assessed?

b) How do the development plans and the reclamation plan for the dump protect the Athabasca River valley ecology and aesthetics?

4.7 Suncor's ***Facility Site Rationale*** relies upon the "temporary nature" of impacts on the river valley ecosystem to justify the development of facilities in the Athabasca River valley *(Steepbank Mine Project Application, April 1996, Section C4.0, p.64).* With reference to the intent of the Integrated Resource Plan to protect the valley ecosystem:

a) What are the implications of locating the facilities (maintenance compound and access road, hydrotransport facility, transformer station) outside of the river valley, particularly since they will eventually be moved further into the Steepbank site as the project progresses?

b) What location and design alternatives have been assessed so that the project better conforms to the intent of the Integrated Resource Plan to protect the valley from disturbance? Provide a detailed rationale for each facility component with appropriate scheduling, economic, resource and design details.

4.8 Suncor has advised that it will submit a detailed reclamation plan for the river valley component of the Steepbank Mine by July 1996 *(Steepbank Mine Project Application, April 1996, Section D3.0, p.65),* to demonstrate that a satisfactory level of mitigation of the adverse impacts of development on the resources and values of the Athabasca River valley can be achieved, in accordance with Integrated Resource Plan objectives:

a) provide the detailed conservation and reclamation plan noted on p.65 of Section D3.0

b) include detailed plans and proposed performance criteria regarding materials handling, materials placement, contouring, revegetation as well as end use objectives,

comparisons of pre- and post-disturbance landscapes and proposed milestones for reclamation.

c) explain how the implementation of the plan during construction and operations stages and following relocation of valley facilities will mitigate the impacts of development on the river valley floodplain, river terraces and escarpment ecosystems and attempt to replace the existing natural ecosystems during reclamation. Identify the key indicators for successful mitigation of escarpment lands (be site specific), and how Suncor proposes to demonstrate to stakeholders the successful mitigation of mining through the valley break.

d) explain which aspects of the plan have been developed specifically to enhance the timing and maximize the success of reclamation in river valley floodplain, river terrace and escarpment sites. Include a discussion of Suncor's plans in relation to these possible mitigative strategies:

- terrain contouring, soil placement, erosion stabilization and revegetation of early stages of development (i.e. toes of dykes and dumps) while later stages are being constructed;

- selective soil conservation and replacement of mineral topsoil and subsoil material to enhance reclamation and revegetation of the valley area;

- "hot placement" of soils salvaged from river terrace and escarpment sites to comparable sites which are ready for soil replacement (as a means of preserving and returning terrain-suitable native species of non-woody plants); and

- terrain contouring to produce comparable aesthetics and micro habitat diversity to the original. Include a detailed discussion of the potential to construct dykes which resemble a natural landscape, while maintaining their geotechnical stability.

4.9 Suncor stated that environmental considerations were not a driving force in the decision of a proposed location for a new mine site because each alternative would entail similar environmental disturbances. Suncor also indicated that economic considerations, capital cost and technical risk exposure were the main considerations (*Steepbank Mine Project Application, April 1996, Section C1.0, p.6)*, and that maintaining a 100 metre setback from the valley break was considered, but rejected because 256 million tonnes of ore would be sterilized *(Steepbank Mine Project Application, April 1996, Section C1.0, p.15)*. Provide additional information to demonstrate the need to mine through the valley break as part of the Steepbank Mine project, including:

a) the impact on the viability of the Steepbank Mine project if the 100 metre setback were used as the limit of mining for the project. Include an evaluation of the sensitivity of the mine plan to averaging the cost of recovery for low strip ratio ore near and within the escarpment with higher strip ratio ores in upland areas.

b) the impact on the mine plan, scheduling and project viability of delaying the mining of the portion of the ore body located within 100 metres of the escarpment. Provide appropriate supporting information.

4.10 Clarify Suncor's commitment regarding the proposed 100 metre set-back from the Steepbank River as related to pit limits, overburden storage or other surface disturbance. What sensitivities (river-bank stability, visuals, wildlife etc.) is the buffer zone meant to address?

Tar Island Dyke

4.11 Suncor conceptually outlines reclamation activities for Tar Island Dyke *(Steepbank Mine Project Application, April 1996, Appendix IV, p.6, Table IV–4)*. To assist in understanding the reclamation schedule of the dyke:

a) discuss the implications to Suncor of accelerating the reclamation of Tar Island Dyke.

b) provide additional cross sections through the dyke, showing the existing materials and proposed changes.

4.12 Suncor has evaluated the impact of seepage from the dyke on water quality (*Athabasca River Water Releases Impact Assessment, May 1996).*

a) Confirm whether the rate of seepage from Pond 1 into the Athabasca River that was used to calculate the risk associated with this release was based upon all seepage pathways including, in the long term scenario, seepage directed through swales to the Athabasca River (*Athabasca River Water Releases Impact Assessment, May 1996, Table 3.1–1).*

b) Over the long term, seepage rates are expected to decrease and the quality of seepage water is expected to improve. Under what time frame will the rate of seepage be significantly reduced and the quality of seepage water improved? What variables will influence the rate of improvement?

4.13 Suncor discusses bank erosion and geotechnical stability in general terms in the application *(Steepbank Mine Project Application, April 1996, Section E4.0 , p.35 and Section D3.0, pp.8,52)*. Provide a detailed summary of Suncor's evaluation of the risk of

river erosion or other causes of destabilization producing slides on Tar Island Dyke, and the possible consequences for water quality in the Athabasca River.

4.14 Suncor outlines plans to construct berms for tailings lines on the north side of Tar Island Dyke and to drive steel pilings for the west abutment of the bridge into Tar Island Dyke *(Steepbank Mine Project Application, April 1996, Section C4.0, pp.67,70)*. Provide more detailed information about these plans and the evaluations undertaken to ensure that the stability of the dyke will not be adversely affected.

Consolidated Tailings (CT)

4.15 Describe the preliminary findings of the 6 month commercial trial of CT technology in order to assess the probability of this technology to achieve dry tailings reclamation. Discuss the findings in terms of the surface settlement rates and other implications for reclamation. (*Steepbank Mine Project Application, April 1996, Section D3.0, p.32)*

4.16 The hydraulic conductivity of the settled fine tailings has been estimated at 10^{-6} cm/sec which is further reduced to 10^{-8} cm/sec when the fine tailings consolidate *(Steepbank Mine Project Application, April 1996, Section B1.0, p.15)*. Explain what methods were used to obtain these values.

4.17 Suncor chose its CT technology based on effectiveness, operational feasibility and cost *(Steepbank Mine Project Application, April 1996, Section D3.0, p.23)*. CT technology is being tested now at a field scale. What variations in the volume and quality of fine tails are manageable with Suncor's CT technology and associated tailings management plans? What alternative reclamation strategies will Suncor use if CT technology is not as successful as anticipated?

4.18 Suncor plans to "mitigate any risk of plant uptake of chemicals by capping less-desirable material (e.g. CT) with better quality materials." *(Steepbank Mine Project Application, April 1996, Section D3.0, p.71)*.

a) How and when will Suncor decide which materials will be used?

b) Which materials have the capability to minimize the potential for erosion to expose CT soils, and under which circumstances will they be used?

c) What depth of capping layer is necessary to minimize the risk to wildlife from exposure to plants grown on CT, or surface water run-off from CT deposits?

4.19 Suncor evaluated the health risk associated with chemicals in CT deposits. *(Steepbank Mine Project Application, April 1996, Section D3.0, p.72)*. In addition to evaluations of

potential toxicity, how has Suncor evaluated the physical and chemical properties of CT deposits, related to reclamation feasibility and capability?

a) What chemical and physical properties of CT have been evaluated regarding its suitability as a reclamation material? What ions (concentrations) are present in CT after consolidating in Pond 5? Have electrical conductivity and Sodium Adsorption Ratio been evaluated?

b) What is CT's structure and texture after settling and use under field conditions?

Conservation and Reclamation Plan (C&R)

4.20 The Clearwater Formation is excavated during Pit 02 mining of the Steepbank proposal *(Steepbank Mine Project Application, April 1996, Section C2.0, p.25, Figure C2.0–9)*. Does Suncor intend to selectively handle and stockpile this unsuitable reclamation material? How does Suncor intend to deal with this material in soil reconstruction?

4.21 Suncor states "Sodium Adsorption Ratio tests have been completed on a few selected overburden materials." *(Steepbank Mine Project Application, April 1996, Section C2.0, p.25)*. Provide the results of these tests.

4.22 Suncor states that about 65% of the reclaimed area will be returned to upland forest *(Steepbank Mine Project Application, April 1996, Section D3.0, p.10)*.

a) How will Suncor demonstrate that the reclaimed forests have the same productivity as pre-disturbance forests?

b) How will the reclaimed land base provide for the same conifer:deciduous ratio of forest species in the post-mining scenario?

4.23 Suncor states "For lease 86/17, this information (soils handling plan) has been provided in the Environmental Operating Approval Application in 1995" *(Steepbank Mine Project Application, April 1996, Section D3.0, p.60)*. Does this statement imply that soil reconstruction on lease 86/17 continues as outlined in this application, or will Suncor use the new forest capability system for unreclaimed land on lease 86/17?

4.24 Suncor's current soil reconstruction technique has been used on an operational scale since 1984 *(Steepbank Mine Project Application, April 1996, Section D3.0, p.61)*. This technique does not currently involve selective handling of mineral topsoil and subsoil materials. Will Suncor selectively handle different quality mineral topsoil and subsoil materials, for reclaiming upland areas, the river valley and the escarpment? If not, provide a detailed rationale explaining why topsoil and subsoil materials cannot or should not be selectively salvaged and replaced.

4.25 Suncor states "a detailed reclamation soils handling plan has not been developed for the Steepbank Mine because of the conceptual level of the mine plan *(Steepbank Mine Project Application, April 1996, Section D3.0, p.61)*. When will Suncor provide a detailed C&R plan for the Steepbank Mine outlining the soil salvage and handling operations for the next 10 years? Include in the plan detailed information on the location of soil stockpiles, stockpile volumes and suitability rating of materials.

4.26 Suncor provides conceptual information about the revegetation plan for the Steepbank Mine *(Steepbank Mine Project Application, April 1996, Section D3.0, pp.10,63)* Provide a conceptual land capability map depicting reclaimed lands on the Steepbank Mine (2020). Include:

a) percentages of each forest capability class, wetland areas and waterbodies.

b) the distribution of each area on the reclaimed mine site and a description of their use (e.g. end land use for end pit lake 07).

c) larger scale maps showing:

- the area and percent of each forest type, including grasslands,
- the forest capability of each forest type, and
- the ecosystem types in the pre- and post- disturbance landscape and how they relate to each other (i.e. how do they differ?) and to the forest types.

4.27 Suncor describes reclamation waters in part as waters which will not be controlled through human intervention under final reclamation conditions *(Steepbank Mine Project Application, April 1996, Section D3.0, p.9)*.

a) What range of precipitation and run-off conditions has Suncor evaluated in the design of the reclamation drainage system, to ensure that future erosion rates and water quality are consistent with pre-development drainage conditions and reclamation objectives?

b) Provide a summary of the evaluation methods, design parameters and results.

4.28 Suncor outlines a proposed sequence of reclamation activities, including wetlands *(Steepbank Mine Project Application, April 1996, Section D3.0, p.65)*. Provide a management plan and a schedule for the provision of the following information:

a) details supporting the viability of the wetlands proposed as part of the reclamation scheme. Include the size (average, range), number, location, water quality, water quantity and biological properties of the wetlands. Include conceptual water balances.

b) additional details and discussion to support Suncor's claim that impacts to existing wetlands will be fully mitigated or compensated by these proposed reclaimed landscape units.

4.29 Suncor states that lands will be reclaimed to equivalent or better capability *(Steepbank Mine Project Application, April 1996, Section D3.0, p.11)*. On p.75 Suncor appears to contradict the statement on p.11 by saying trees on reclaimed lands would be expected to grow slower than on undisturbed sites. Provide further discussion, document what forest productivity/growth rates on reclaimed lands at the Steepbank Mine are expected, and compare the anticipated productivity to pre- disturbance rates. Where appropriate, be site specific.

4.30 Suncor conceptually illustrates expected vegetation polygons at the end of reclamation *(Steepbank Mine Project Application, April 1996, Section D3.0, Figure 3.0–36)*. The future landscape appears to be simplified, in comparison to Figure 5.0–3 (current vegetation), with larger average polygon size. Provide a detailed comparison of the two landscape types (using spatial statistics and, if appropriate more detailed maps) and discuss the biological implications of the differences in complexity of the pre- and post-disturbance landscape.

4.31 Suncor states that relatively small sinkholes of several tens of metres in diameter, similar to those encountered in Lease 86/17 Mine, are expected in the Steepbank Mine *(Steepbank Mine Project Application, April 1996, Section C2.0, p.25)*.

a) Confirm whether an objective of pre-production infill drilling will be to identify sinkholes, and summarize the actions which Suncor will take when a sinkhole has been identified. For example, will the existence of a sinkhole influence the materials or sequence of materials placed in a pit during reclamation?

b) Comment on the suitability of any pits underlain by sinkholes, to receive fine tailings, gypsum, coke and consolidated tailings. Summarize the containment characteristics of pits with sinkholes, as compared to pits where sinkholes are absent. Also, briefly compare the expected performance of water flows in relation to the sinkholes before mining, during operations and after reclamation of the pits.

c) Can sinkholes provide short-circuit pathways for water from the pits to the Steepbank River or the Athabasca River?

4.32 Discuss conceptual final reclamation plan following completion of the Steepbank mine. Discuss plans for the bridge and comment on the volume, disposition and reclamation of fine tails that would remain at the conclusion of mining.

Coke Handling and Storage

4.33 Suncor indicates a 40 % increase in coke production due to planned increases in plant production *(Steepbank Mine Project Application, April 1996, Section C7.0, p.104)*. Suncor also states that it "is evaluating the transfer of coke after 1999 to a site yet to be determined." *(Steepbank Mine Project Application, April 1996, Section B1.0, p.14)*.

a) Describe how the change in coke production will affect the maximum capacity of the coke stockpile, which is expected to be exceeded in 1999.

b) Provide a detailed schedule and plan for coke disposal.

c) Provide a detailed schedule and plan for reclamation if the coke stockpile remains on site.

Infrastructure and General Information

4.34 Suncor states that it will work with Alberta Transportation and Utilities and the Regional Municipality of Wood Buffalo to address any Highway 63 issues related to the Steepbank Mine project *(Steepbank Mine Project Application, April 1996, Section E3.0, p.26)*. Provide more information as to Suncor's plans to improve overall safety and operational concerns at the Highway 63 intersection. This should include a detailed design and estimated turning movements for the intersection. Indicate the timing for plan implementation and confirm Suncor's responsibility for the costs associated with the improvements, including engineering and design.

4.35 Suncor states that the limit of mining will be well above the 1:100 year flood level *(Steepbank Mine Project Application, April 1996, Section A2.0, p.10)*. Provide a more detailed contour map (1:20,000 scale) and cross sections through the escarpment area showing the proposed limit of mining in relation to the water and ice flood levels. In addition, advise whether Suncor expects to add provisions for flooding contingencies to its emergency response plan, before excavating close to the flood elevation.

4.36 Suncor outlines mitigation plans to protect aquatic habitats and water quality *(Steepbank Mine Project Application, April 1996, Section A4.0, p.33)*. Provide additional details to show how the physical habitat impacts resulting from construction of access roads, barge facilities or placement of the bridge piers will be mitigated.

4.37 Suncor indicates that storm water retention ponds will be constructed *(Steepbank Mine Project Application, April 1996, Section C3.0, p.50 and Figure 3.0–22)*. Provide the above-ground storage volumes of the retention ponds.

4.38 Suncor discusses spill prevention in relation to pipelines and the Athabasca River bridge *(Steepbank Mine Project Application, April 1996, Section C3.0, p.60 and Section C4.0, pp.69-71)*.

a) Provide details on the "catchment structure" at the expansion joints.

b) Provide information on how the bridge containment system will be tested.

c) How would leaks or spills be detected from the diesel line under the deck?

d) How will possible tanker truck ruptures on the bridge be contained?

4.39 Suncor describes wastes and waste management plans in general terms in the application *(Steepbank Mine Project Application, April 1996, Section C8.0, pp.121-123 and Section D1.0, p.1)*. Provide the following additional information:

a) In a Table, document the types and amounts of each solid waste and hazardous waste stream which will be produced by the mine development and processing of oil sands.

b) Identify any differences between the proposed waste streams (quantity or composition) and existing waste streams from the Suncor operations.

c) Classify each waste stream according to the Waste Control Regulation.

4.40 Suncor describes the Lease 86/17 Lease reclamation drainage scheme *(Steepbank Mine Project Application, April 1996, Section D3.0, p.57)* and indicates that, after reclamation, there will be three to four times as much water going down Poplar Creek as there is currently. There is a significant amount of erosion currently occurring east of Highway 63 bridge over Poplar Creek. Will the proposed drainage reclamation scheme address the current erosion condition and the potential for increased erosion as flow rates increase? What fisheries habitat will Poplar Creek have after reclamation (consider physical and chemical characteristics)?

Habitat

4.41 Suncor discusses plans for wildlife migration mitigation in relation to the access corridor *(Steepbank Mine Project Application, April 1996, Section A4.0, p.31 and Section C4.0, p.68)*. Provide specifications on the wildlife corridor under the east bridge access and an assessment of its effectiveness to provide wildlife movement through the river valley, particularly in light of other infrastructure in the immediate area such as the primary substation.

4.42 Suncor illustrates the expected changes in habitat *(Steepbank Mine Project Application, April 1996, Section E6.0, Fig. E6.0–2)*. In this figure, the expected decline in regional furbearer habitat does not appear to be explained in, or supported by, the discussion in the text.

a) Discuss and resolve this difference.

b) Provide a revised figure with more specific and descriptive categories (e.g. "woodland birds" or "semi-aquatic furbearers").

c) Reference this information to projected ecological land classification maps or reclamation plans, or provide additional maps showing where the reclaimed excellent, good and moderate habitat would be located and how the new scenario compares with existing conditions.

4.43 Suncor addresses the impact of the Steepbank Mine project on local and regional biodiversity *(Steepbank Mine Project Application, April 1996, Section E6.0, p.55)*. Describe the nature and degree of the reduction in biodiversity. If possible, be site specific. Explain how the reclamation plan for the Steepbank Mine project supports the goals of the Canadian Biodiversity Strategy.

4.44 Suncor discusses anticipated changes to aquatic habitat and associated reclamation plans *(Steepbank Mine Project Application, April 1996, Section E8.0, pp.76,77)*.

a) What effects are anticipated in Wood Creek due to increased flows and what mitigative measures are to be undertaken to minimize the effects (i.e. erosion)?

b) Comment on the potential for Leggatt and the unnamed creeks to be reclaimed to support a sport fishery.

c) Provide the results of the 1996 fisheries habitat study, which we understand has identified potential pike spawning sites in Shipyard Lake and the unnamed creek.

5 WATER RELEASE

Discharge and Treatment Methods

5.1 Suncor states that using consolidated tailings (CT) technology will result in the need to discharge tailings release water to the environment. Suncor intends to apply for approval to discharge this stream following the completion of treatment technology evaluations, but before expected storage capacity is exceeded. Suncor will ensure that treated water

quality is environmentally acceptable and meets regulatory standards *(Steepbank Mine Project Application, April 1996, Section D2.0, p.3 and Section D3.0, pp.48,50).*

a) If a future application for CT wastewater release was not approved, what options would be available to Suncor? Will Suncor be providing alternative approaches to releasing CT wastewater?

b) Discuss the potential for recycling CT wastewater, indicating known and possible constraints to the complete recycling of CT wastewater and the studies that are underway and contemplated to address these constraints.

c) AEP policy (as substantiated in Oil Sands Water Release Technical Working Group) requires secondary treatment of process affected waters. Thus, even in the absence of projected water quality impacts, it is expected that some form of secondary treatment will occur on any CT release waters in the future. Suncor has not been explicit in its commitment to this principle, although it has recognized that some form of treatment "may" be necessary to prevent impacts. Does Suncor understand and is Suncor committed to this requirement?

Effects Assessment

5.2 Suncor indicates that effluent discharges from pulp mills, municipalities and Syncrude have been considered in the analysis of water quality. Explain how Suncor's calculations and predictions take these other discharges into account, and confirm whether the methods and results account for future releases from other oil sands developments. What assumptions were made? For instance, was any increase of contaminants considered from Syncrude?

5.3 Suncor stated that "..Since future chemical concentrations in water releases to the Athabasca River are predicted to be lower than current conditions, future populations of fish should continue to be healthy" *(Steepbank Mine Project Application, April 1996, Section E8.0, p.7).* Provide further documentation to support this statement.

5.4 Provide a table of all water related studies that are ongoing and proposed, giving scope, start and completion dates.

5.5 Provide time series graphs of wastewater concentrations/loadings for ammonia, chromium, copper, and cyanide *(Athabasca River Water Releases Impact Assessment, May 1996, p.23).* Table 4.1–3 could not be located as referenced. What plans does Suncor have to monitor these substances in the future?

5.6 Provide time series graphs of wastewater concentrations/loadings for aluminum, mercury, phenols, molybdenum, and strontium *(Athabasca River Water Releases Impact Assessment, May 1996, p.23)*. What plans does Suncor have to monitor these substances in the future?

5.7 Molybdenum exceeded the chronic guideline after a 10% dilution *(Athabasca River Water Releases Impact Assessment, May 1996, Table VI–10)*. What is the impact of this compound?

5.8 Provide time series graphs for each of the background river substances that indicated potential to exceed in-stream guidelines, either naturally, or as a result of Suncor's discharges *(Athabasca River Water Releases Impact Assessment, May 1996)*.

5.9 Table 4.2–2 could not be located; it appears the reference should be 4.2–1 *(Athabasca River Water Releases Impact Assessment, May 1996, p.26)*. Please verify.

5.10 Provide an explanation of the information and assumptions made in Tables VI–4, VI–5 and VI–6 *(Athabasca River Water Releases Impact Assessment, May 1996)*.

5.11 In Figure F3.0–7, why has chronic toxicity increased for the 2020 scenario relative to earlier scenarios? *(Aquatic Issues Associated With the Steepbank Mine, April 1996)?*

5.12 Suncor provides information on reclamation waters in the application *(Steepbank Mine Project Application, April 1996 Section D3.0, pp.70,71)* and in two supporting documents. Suncor states that wetlands provide partial treatment of CT release water, and that further assessment and monitoring is required. The associated water release document presents data to show that CT release waters are unlikely to impact the Athabasca River, but does not assess potential impacts on intermediate surface waters such as Ruth Lake. Provide a management plan and schedule to:

a) predict water quality in the surface waters on the CT deposits/reclaimed tailings ponds at pertinent stages in their evolution (e.g. at completion of infilling with CT, after capping with sand and muskeg, in the long term).

b) investigate what will be done with the CT release waters in the earliest stages of evolution of the CT deposit/reclaimed pond when water quality will presumably be the worst.

c) assess the implications of high sulphate concentrations in the CT release water for sulphate-reducing bacterial metabolism, potential production of hydrogen sulphide, and consequent secondary effects on other aquatic biota in these waters?

d) assess water quality impacts of proposed release waters on local surface water bodies (e.g. Ruth Lake) at pertinent stages in the evolution of the reclaimed landscape.

Characterization of Treatment and Discharge Streams

5.13 Provide a detailed discussion on why the assumptions made regarding CT wastewater contaminants are considered to be conservative or worst case.

5.14 Indicate when a thorough characterization of CT wastewater will be available to verify the conservative assumptions employed in the Steepbank Mine application. Indicate the earliest date when this information can be provided, and explain how the information will be used in the evaluations required to support a future application for approval to discharge CT release waters.

5.15 Suncor states that sources of reclamation waters include run-off and seepage from coke piles and gypsum storage (*Steepbank Mine Project Application, April 1996, Section D3.0, p.10*). Summarize the quality and quantity of such waters and the anticipated impacts associated with them.

Treatment and Control Processes

5.16 What is the probable source of copper, mercury, molybdenum, ammonia, cyanide and chromium in the wastewaters and can it be reduced through source control (elimination or replacement of any process chemicals used)?

5.17 The water supply and treatment system and the sewage treatment system *(Steepbank Mine Project Application, April 1996, Section C3.0, pp.59,60 and Section D2.0, p.3)* will not be approved until detailed designs and specifications are submitted for review and approval. Provide either a detail design and specifications for the water supply and treatment system and the sewage treatment system or a time frame for when the information will be provided.

Assessment and Risk Evaluation Methods

5.18 Suncor has indicated that it did not screen for aesthetic compounds *(Athabasca River Water Releases Impact Assessment, April 1996)*. What compounds were not screened and why? Clarify whether any streams resulting from the mine expansion, controlled or otherwise, result in Alberta Surface Water Quality Objectives for aesthetic compounds being exceeded.

5.19 Confirm that the use of the "maximum" concentration of wastewater substances provided a conservative value to use for the screening assessments *(Athabasca River Water Releases Impact Assessment, April 1996, Appendix VI)*. For example, if there were only two values available, the maximum value of those two would not provide a conservative estimate for screening estimates. Note that the procedures manual recommends the 99th

percentile of the substance value (where the predicted percentile is based on an adequate amount of data at least, and preferably greater than 10). If data are not adequate, the reasonable potential multiplier approach should be used. Verify that where substance values were all non detectable, that there were adequate data to follow the assumption that the substance could be excluded from further analysis; or that adequate rationale otherwise exists.

5.20 Suncor states that AEP's Procedures Manual protocol was followed to derive a chemical specific wasteload allocation and that median, low-flow background data was used *(Athabasca River Water Releases Impact Assessment, May 1996, p.22)*. The Procedures Manual states that the selection of background contaminant concentrations and river flow conditions is case specific and that median low flow is appropriate in most cases. However, it also indicates that certain substances such as nutrients must be evaluated at appropriate conditions. Suncor should verify (or present arguments) that these compounds were assessed under appropriate conditions.

5.21 It is not clear how the spatial mixing plots in Figures 4.2–x, and VI–x were constructed *(Athabasca River Water Releases Impact Assessment, May 1996)*. Clarify how the calculations were done, including a discussion on how or if the "10% of river width" relates to 10% fraction of flow and spatial zones.

5.22 What tracer studies were employed to calibrate the mixing models and are these available?

5.23 The discussion on human health risk characterization indicates that only the determination of whether the reclaimed landscape poses risk was conducted - inferring that operational phase and wastewater discharges are not being characterized *(Athabasca River Water Releases Impact Assessment, May 1996, p.6)*. Please clarify whether the risk assessment included operational and off-site (receiving water) analyses.

5.24 Regarding wasteload allocation, it is stated that predicted concentrations are compared to health-based drinking water criteria. Later discussion indicates that EPA human health based criteria were also considered *(Athabasca River Water Releases Impact Assessment, May 1996, p.56)*. Were only "drinking water criteria" considered?

5.25 *Athabasca River Water Releases Impact Assessment, p.64* alludes to the health based drinking water criteria of 0.025 mg/L. Page 57 similarly refers to a drinking water criteria of 0.05 mg/L. Are these different jurisdictional criteria?

5.26 If the WLA assessment using EPA human health criteria were used, then it could be stated that an assessment associated with ingesting raw water and aquatic organisms was done according to USEPA human health carcinogen and non-carcinogen wasteload

allocation screening procedures *(Athabasca River Water Releases Impact Assessment, May 1996, p.89)*. This should be clarified as the use of these criteria are recommended in the Procedures Manual.

5.27 Table VI–12 is mislabelled *(Athabasca River Water Releases Impact Assessment, May 1996)*. The title suggests these EPA criteria are only non-carcinogens, while the column label suggests carcinogens only.

5.28 Most of the sampling was carried out during the summer of 1995 *(Aquatic Issues Associated With the Steepbank Mine)* Large forest fires were raging during sampling. These could have affected some of the sampling results (e.g., high total suspended solids, potential increase in organic substances). Provide discussion of these potential effects. This discussion would facilitate interpretation of future monitoring results.

5.29 A number of laboratory studies were done in relation to tainting potential, such as toxicity testing in the laboratory and exposure of fish to determine tainting *(Athabasca River Water Releases Impact Assessment, May 1996)*. Provide the following information regarding exposure conditions:

a) the source of Athabasca River water used in the lab studies is not described. Was it upstream or downstream of Tar Island Dyke (TID), how far removed.

b) the dilution water for the TID seepage exposure of various trophic levels is not specifically stated. It is assumed that it was laboratory water (as for the fish tainting studies).

c) the reference to the location of field exposed fish for the tainting study is that it was upstream of the oil sands operations. Was the site upstream from oil sands deposits or was it a site representative of "natural background conditions".

d) the effects of control laboratory water and Athabasca River on toxicity/tainting should be compared. This comparison should be used to put the TID seepage tests with laboratory water in context. That is, what is the toxicity/tainting expected to be when TID seepage mixes into the Athabasca River (a condition that was not tested in the laboratory).

5.30 In Table 3.2–1*(Athabasca River Water Releases Impact Assessment, May 1996, p.12)*, is the refinery wastewater the treated effluent?

5.31 Clarify the assumed effluent toxicity used to generate the predicted in-river TUc's in Figures 4.2–1 to 4.2–5. *(Athabasca River Water Releases Impact Assessment, May 1996, p.26).*

5.32 Provide the sites and results for benthic sampling of natural substrates discussed in Section 4.3.1.1 Benthic Invertebrates *(Athabasca River Water Releases Impact Assessment, May 1996, pp.28,29)*. Suncor suggests that effects were absent and that this is generally consistent with results of previous benthic surveys. In fact, some previous surveys found localized effects of Suncor wastewaters. Provide discussion on how follow-up studies were designed to verify that the original localized effects are no longer present.

5.33 Table VI–11 *(Athabasca River Water Releases Impact Assessment, May 1996)* should have been referenced. With respect to copper toxicity, a statement on hardness should be included; the recent monitoring near the lease indicate a water hardness of about 110 mg/L calcium carbonate ($CaCO_3$). Discuss this matter.

5.34 Minesite drainage to the Athabasca River is shown for the present and future scenarios *(Athabasca River Water Releases Impact Assessment, May 1996, Figures 3.3–1 to 5)*. Note that reference to Table 5.2–1 for the water quality type codes cannot be located. Clarify.

5.35 Clarify why reclamation waters are "not amenable to comparison with ambient water quality criteria" *(Steepbank Mine Project Application, April 1996, Section D3.0, p.9)*.

5.36 Provide a list of groundwater sampling parameters *(Steepbank Mine Project Application, April 1996, Section D2.0, p.3)*.

5.37 For the Steepbank Mine, Suncor claims that any seepage water that passes through the dyke can be collected and contained in the mine drainage system *(Steepbank Mine Project Application, April 1996, Section D3.0, p.41)*. Suncor indicates that new impoundment facilities are designed to be constructed of low-permeability overburden materials that will not need engineered seepage control structure for stability. Provide the supporting information for these statements.

5.38 Suncor has indicated that several water samples have been collected and analyzed to determine background water quality concentrations for various chemicals *(Steepbank Mine Project Application, April 1996, p.42 of Section D3.0)* Provide the complete results of these analyses.

5.39 Suncor states that the level of toxicity of CT release water was found to be lower than that of current recycle water *(Steepbank Mine Project Application, April 1996, Section D3.0, p.48)*, indicating that the creation of CT may be responsible for the reduced toxicity.

a) Provide a review of the detailed mechanisms involved for the reduction of toxicity in the CT process.

b) Is it possible that toxic materials could be more concentrated in CT, given reduced toxicity of release water? If so, how will these changes influence long term water quality in groundwater systems?

5.40 Results of the 1995 work showed that toxic waters from current dyke seepage and CT release can be treated in wetlands *(Steepbank Mine Project Application, April 1996, Section D3.0, p.49)*. Describe the mechanism involved in this treatment and how long it will take to complete the treatment.

6 AIR QUALITY

Environmental Effects Monitoring (Biomonitoring)

6.1 Suncor currently participates on the Regional Air Quality Coordinating Committee (RAQCC) Environmental Effects Subcommittee, and has been supportive of the Ecological Effects Monitoring working group under the Clean Air Strategic Alliance (CASA). In order to develop successful new monitoring programs, it may be desirable that the results from previous programs that have been completed, or are ongoing, be made available for review by the RAQCC or CASA Committees. Indicate whether Suncor is willing to release pertinent data upon request by either committee.

Ground Level Ozone

6.2 In the application *(Steepbank Mine Project Application, April 1996, Section E9.0, p.87)*, and the associated impact analysis report *(Impact Analysis of Air Emissions Associated with the Steepbank Mine, April 1996, pp.41,122,128)*, ground level ozone is briefly discussed, and reference is made to ambient air concentrations of ozone in the region which exceed the 24-hour guidelines. Provide further discussion to clarify the proportions of ozone in ambient air attributed to natural sources and activities related to Suncor operations.

Total Hydrocarbons (THCs) and Volatile Organic Compounds (VOCs)

6.3 In the application, THCs and VOCs are mainly discussed as groupings of compounds. Suncor has stated that the overall emission of these compounds is expected to decline *(Steepbank Mine Project Application, April 1996, Section E9.0, p.84 and Table E9.0–1)*. However, we note that individual THC and VOC compounds do not have equal effects on the environment, as some compounds may have effects at very low levels, whereas others are not bioactive. Does Suncor presently have any plans to study and characterize the THC/VOC composition (i.e. presence and amounts of individual compounds) in the main air emission streams from the facility (e.g. tailings ponds, Hydrotransport Cyclofeeder, flares, main stacks)?

VOCs and Odorous Emissions from Ponds

6.4 Table C8.0–2 presents a comparison of current and future VOC emissions *(Steepbank Mine Project Application, April 1996, Section C8.0, p.116)*. Provide a brief discussion on why VOC emissions are predicted to increase from the Tailings Ponds and Upgrading areas.

6.5 Suncor states *(Steepbank Mine Project Application, April 1996, Section C8.0, p.116)* that "field measurements of pond emissions have indicated that ponds are a much less significant contributor to current VOC emissions from the plant than originally thought". Provide the following additional information:

a) the basis for the original assumption that pond emissions were a significant source of VOC emissions.

b) the type and amount of field measurements that have been done which now indicate that the pond are a much less significant contributor of emissions, and

c) an indication of the likely precision of the Tailings Ponds emission values in Table C8.0–2, as well as the likely precision of the other emission values listed in the table.

Potential Emissions from Consolidated Tailings (CT)

6.6 Suncor states *(Steepbank Mine Project Application, April 1996, Section C8.0, p.116)* that "in the longer term it has been suggested that anaerobic production of noxious vapours or volatilization of hydrocarbons from CT deposits might occur". Has Suncor done any monitoring during its commercial CT trials to establish the type and amount of air emissions that occur during the materials handling operations to produce CT, during the discharge of the CT slurry, and from the CT deposit pond? What type of further monitoring does Suncor anticipate doing in this regard?

6.7 Two major consolidated tailings disposal ponds (Ponds 7 and 8) will be established at the Steepbank Mine *(Steepbank Mine Project Application, April 1996, Section C3.0, p.41)*. Comment on the potential of hydrocarbon and odorous emissions from the ponds. With regard to the topographic location of the ponds, under poor atmospheric dispersion conditions (valley trapping), could emissions from these ponds affect the ambient air quality in Fort McMurray or Fort McKay?

Integrated Mines Tailings Plan - Effect on Air Emissions

6.8 The effect that the tailings management plan will likely have on air emissions is discussed by Suncor *(Impact Analysis of Air Emissions Associated with the Steepbank Mine, April 1996, p.74)*. Please clarify the following:

a) the effect on total hydrocarbon (THC) and total reduced sulphur (TRS) emissions that is expected to occur due to the Extraction Plant 4 effluent being directed to Pond 2/3, rather than Pond 1, and

b) the point in time when a decision will be made whether to connect the CT mixing tank to the site vapour collection system and whether to carry out CT deposition under the water surface, and why these decisions cannot be made now.

Naphtha Losses to the Tailings Ponds

6.9 In a number of places in the application (*e.g. Steepbank Mine Project Application, April 1996., Section A4.0, p.34*), Suncor states that the Naphtha Recovery Unit (NRU) will be modified so that diluent losses to ponds will be no more at 107 thousand barrels per calendar day than at 79.5 thousand barrels per calendar day. However, it is not specifically stated how this will be accomplished. Describe the modifications to the facility that are proposed to achieve this commitment. If a number of options are presently being evaluated, please advise us when the evaluation will be completed, and provide a base case scenario for achieving the commitment (e.g. installation of a second NRU).

Emissions from Hydrotransport Cyclofeeder

6.10 The Hydrotransport Cyclofeeder will be a new source of air emissions associated with the Steepbank Mine *(Steepbank Mine Project Application, April 1996, Section D2.0, p.2)*. Does Suncor have any monitoring data on Cyclofeeder air emissions, based on either the pilot scale work that Suncor has done, or based on the work that other oil sands operators (Syncrude) have done? Provide a discussion on the feasibility of installing an emissions control system to reduce VOC emissions from the Cyclofeeder. If an emissions control system is not included in the initial installation, will it be feasible to retrofit a control system at a later date, if concerns about emissions are identified during actual operation?

Air Emissions from Mine Operations

6.11 Explain with respect to Section 8.1, whether emissions of VOCs, total reduced sulphur compounds, or odours are expected to occur directly from the open mine or from any aquifer depressurization waters. Also indicate whether particulate emissions (dusting) are

expected to occur during the oil sand ore crushing and handling that is described on p.74 of Section C5.0, and whether any control measures will be necessary.

Opportunities To Reduce Naphtha Losses

6.12 Suncor has stated in the application that diluent (naphtha) losses to ponds will be no more at 107 thousand barrels per calendar day than at 79.5 thousand barrels per calendar day. Has Suncor considered the feasibility of any plant modifications that could reduce the absolute amount of naphtha losses, and thereby reduce air emissions associated with the ponds? Specifically, has Suncor considered whether the absolute volume of naphtha losses could be reduced by either:

- the installation of a second NRU, or
- the use of any other equipment/procedures in addition to, or instead of, the existing NRU system in order to recover naphtha?

Diluent Quality - Odour Abatement

6.13 Diluent losses (quantity) to the tailings ponds are discussed in the application, but the effect of diluent quality on the potential for off-site odours does not appear to have been discussed. As part of the Steepbank Mine Project, will any mitigative activities be necessary to ensure that recent improvements to control diluent quality are not compromised? Has Suncor considered any alternatives to the present diluent (sour naphtha) which might reduce or eliminate the diluent as a potential source of odours?

7 HUMAN HEALTH

7.1 Suncor is designing an experimental study of toxicity arising from low level exposure to napthenic acids (*Impact of Human Health Issues Associated with the Steepbank Mine, April 1996, p.74*). Describe the proposed study design and explain how the results will be used to reduce uncertainty about the potential for toxicity.

7.2 Discuss Suncor's plans to monitor fish tissue for potentially toxic organic and inorganic chemicals representative of surface water releases during the proposed approval period. How will Suncor use and communicate the results?

7.3 Suncor has conducted fish tainting studies. What related studies are planned for the future to verify current findings and hypotheses? Describe how they will be conducted to:

a) further assess the potential for fish tainting from Suncor's surface water releases;

b) enable measures to be taken to prevent increases of fish tainting as a result of Suncor's surface water releases; and

c) involve stakeholders in the design and execution of programs related to the above studies.

7.4 Suncor intends to construct a CT reclamation demonstration site and may be planning to study bioaccumulation in edible plants at that site (*Impact Analysis of Human health Issues Associated with the Steepbank Mine, April 1996, p.75*). Clarify Suncor's intentions regarding the "small scale experimental platform to quantify bioaccumulation of metals", including which potentially toxic organic and inorganic chemicals will be monitored and the associated milestones.

7.5 Reductions in emissions of odorous chemicals such as VOC's are proposed as part of the Suncor fixed plant expansion *(Impact Analysis of Air Emissions Associated with the Steepbank Mine, April 1996, pp.75-81)*. What is Suncor's view regarding provisions for the enhancement of the odour response protocol during the proposed approval period, to address odorous sulphur chemicals (e.g. hydrogen sulphide, carbonyl and dimethyl sulphide, dimethyl and carbon disulphide and mercaptans)? Discuss the need for monitoring of odorous sulphur chemicals in the communities of Fort McMurray and Fort McKay.

7.6 Discuss the evaluation of lead, hexane, benzene, toluene, and trimethyl benzene for inhalation pathways in relation to the USEPA risk based concentrations (RBC) *(Athabasca River Water Releases Impact Assessment, May 1996, p.77)*. Does Suncor presently have any plans to monitor concentrations of specific volatile organic compounds, polycyclic aromatic compounds, sulphur compounds and metals near the proposed mine?

8 MINE/WORKER SAFETY

8.1 Submit a detailed plan (certified by a professional engineer) outlining procedures for the safe control of the angles on benches, berms and general slopes in the pit, overburden dumps, and impoundment dykes.

8.2 Provide plan showing the location of the haul roads and associated emergency escape roads. If, in Suncor's opinion, emergency escape roads are not necessary, provide the procedures for safely stopping out-of-control vehicles.

8.3 Provide details of the arrangement of loading, hauling and drilling equipment on the working bench. Indicate the maximum height shovels excavating overburden and oil sands can reach.

8.4 Provide an analysis which demonstrates that the integrity of impoundment dykes will not be affected by the blasting of ore and overburden.

8.5 Provide the location of explosives magazines.

8.6 Provide Suncor's safety procedures for workers crossing the Athabasca River on the ice bridge or by barge (drowning and hypothermia hazards must be addressed).

9 PIPELINE APPROVAL REQUIREMENTS

9.1 In order to meet EUB application requirements for the requested pipeline and related surface facilities approvals, a completed schedule 1, 3, and 3.1 (as outlined in EUB Guide G-56) must be submitted (including fees). In support of these completed schedules, the information outlined in Audit Requirements (Unit 3, page 28 of Guide G-56) must also be available to the EUB upon request.

9.2. The following information is required to address safety issues and environmental matters related to the pipelines and surface facilities, including the river crossing:

a) Consideration of installing leak detection system (for the diesel line) as per the CAPP guidelines to detect leaks and initiate prompt shutdowns of the facilities.

b) Consideration of installing automatic isolation valves and/or check valves at the river crossing prevent backflow and minimize spill in case of a pipeline failure.

c) Comment on the possibility of external coating damage as a result of pipe movement, and consideration of external corrosion control measures for any bare pipe.

d) Comment on the effects of thermal expansion or contraction of the pipelines, and consideration of appropriate measures to allow for adequate thermal expansion or contraction.

e) Comment on the possibility of overpressure on the system as a result of a line plug or a change in ambient air temperature, and consideration of installing appropriate shutdown or pressure relieving devices for overpressure protection.

f) Comment on the possibility of third party damage on the pipelines and consideration of placing warnings signs at appropriate locations.

g) Where the pipelines are in proximity to electrical transmission lines, comment on the effects of fault currents, induced potentials or interference, and consideration of appropriate measures to reduce such effects.

10 QUESTIONS AND COMMENTS FROM FEDERAL AUTHORITIES

10.1 The Canadian Coast Guard (responsible Federal Authority) has, for the purposes of its review, defined the project scope as the construction and maintenance of the bridge across the Athabasca River and any construction related works, accesses, storage areas or other undertakings directly associated with the bridge. Suncor is asked to respond to the following concerns and questions that have been identified through the Canadian Coast Guard's referral of the application to appropriate Federal Authorities:

a) "The proposed barge loading area, bridge structure, as well as the infrastructure directly south of the bridge appears to present an impediment to wildlife trying to negotiate the bridge wildlife underpass. In addition, the road from the hydrotransport area to the service area will increase disturbance to habitat immediately adjacent to the Athabasca River proper. Environment Canada recommends that important wildlife travel corridors be protected in the proponents mining strategy and that movement of wildlife along the Athabasca River corridor continue unabated. Environment Canada recommends that a continuously forested zone of undisturbed habitat (not less than 100 m in width; no sections less than 200 m and more than 400 m in length) should be maintained."

b) "The initiatives that the proponent intends to incorporate into the bridge design to mitigate environmental impacts (page 70-71, Steepbank Mine Project Application) appear appropriate for countering potential adverse environmental effects. Ongoing refinement of the mitigation is expected to resolve current residual concerns related to sedimentation and erosion during the bridge construction."

c) "C4.2 - Athabasca River Bridge - Dialogue is continuing between DFO-HMD and Suncor regarding the proposed bridge. Outstanding issues consist of: rationalization of the west abutment in the Athabasca River, potential effects of river construction and river works on downstream hydraulic conditions, potential increases in downstream erosion, provision of a sediment control plan and suspended solids monitoring program. Some specific comments regarding the bridge proposal follow:

- The current plans for the bridge indicate that the west abutment will extend approximately 75 m into the channel of the Athabasca River. This is an issue of concern as the abutment will constrict the river channel, increase local water velocities, may increase local erosion on Tar Island Dyke or on opposing bank of the river, and will entail a significant amount of infilling and instream construction with the potential attendant release of significant amounts of suspended solids into the river. Given these potentially adverse conditions, Suncor is requested to further rationalize the proposed design of the west abutment.

- Dealing further with the current bridge design, Suncor has not provided a comprehensive mitigation plan for construction of the abutments and coffer dams particularly with regard to sediment control. Suncor has indicated that construction of the west abutment and pier #1 may proceed as early as the late fall/early winter of 1996. this is a time when the Athabasca River runs relatively clear, when spawning migrations are underway and when fish have evacuated the tributaries to overwinter in the Athabasca River. A comprehensive sediment control plan, including appropriate monitoring, will be required before construction can proceed in the Athabasca River."

d) "E2.2.2 - p.18 - It is noted that the current cumulative effects analysis includes Syncrude, Suncor, Solv-Ex, ALPAC and Northern Forest Products. What about the other pulp mills operating on the system? Can a cumulative effect assessment be done on a regional basis particularly when dealing with watershed issues?"

Processing of Suncor's applications will resume upon receipt of the above information. If you have any questions concerning the above items please contact myself at 297-3382 or Mr. Rick George of Alberta Environmental Protection at 427-8954. Any questions regarding **Section 10 - Questions and Comments from Federal Authorities** can be directed to Mr. John Woodward, Canadian Coast Guard at (519) 383-1868. To support a more timely and efficient review of Suncor's response to this letter, Suncor should consult further with myself, Mr. George and Mr. Woodward regarding the distribution of the additional information.

Yours truly,

T. G. Abel, P.Eng.
Supervisor,
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TA/tga
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