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FOLLOW-UP ON COMMITTEE HEARINGS

Name of Committee: **Standing Committee on the Environment and Sustainable Development**

Follow-up required/Next steps:

The Chair of the Standing Committee on Environment and Sustainable Development has asked Environment Canada to provide the following information:

1. To explain EC's input in environmental assessments dealing with water quantity and to provide the scientific reports produced by EC related to inflow needs studies.

RESPONSE:

Environment Canada Water Advice for Oil Sands Environmental Assessments

In EC's submissions to the four previous Joint panels, water advice has been provided in the following areas:

- Water quality:
  - Cumulative effects on water and sediment quality as a result of oil sands development, the need for monitoring into the far future and an action plan to address adverse effects detected
  - Improve on-site monitoring programs to include water and sediment quality monitoring in pit lakes and wetlands that receive tailings or seepage flows from pits
  - Water quality objectives should be developed for specific sites or regions within the Athabasca Oil Sands Area, with particular emphasis on developing objectives for oil sands related toxic substances
  - Any tailings release or tailings seepage to any waters frequented by fish, or a place under conditions that may enter waters frequented by fish, may constitute violations of the *Fisheries Act*
- Water quantity:
  - Flow alteration resulting from mining and remediation should mimic as closely as possible, normal seasonal patterns
  - Reduction in flows and levels of water could impact the productivity of the Peace-Athabasca Delta and surrounding lakes.

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- Modeling:
    - Adequate baseline data should be collected prior to project initiation to ensure that hydrologic characteristics and water and sediment chemistry are completely characterized in all water bodies. This baseline is needed to establish adequate data for comparison to future monitoring; to evaluate the effectiveness of mitigation and the accuracy of predictions that were used for the project; and to allow for adaptive management
    - Modeling impact predictions should be updated as new data become available, and include public reporting as well as external scientific peer-review.

In the context of oil sands impacts, water quantity and flow are discussed by DFO in regards to water intake and dewatering and the resulting impacts on fish and fish habitat. EC's discussion of water quantity and flow focus on the potential impacts to surface water quality.

EC conducts science on water flows in the Athabasca River and the potential for downstream effects. That science is made available through EC's participation in collaborative and multi-stakeholder fora, as well as through publication.

The recommendations provided by EC are guided by the following desired outcomes:

- Regional and site-specific monitoring efforts are consistent with and linked to mitigation and action plans for any adverse effects related to water quality.
- Site- or region-specific water quality objectives are developed to address cumulative effects of deleterious substances on local and regional aquatic ecosystems, including the Delta and western Lake Athabasca.
- Research is initiated or continued to develop a better understanding of the fate and effects of toxic substances on aquatic life.

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2. To produce a copy of the Strategic EA advice provided by EC to the Ministry of Finance to promote investment in the oil sands in 1996-2002.

RESPONSE: Environment Canada did not contribute to a strategic environmental assessment on that subject

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3. Detailed explanation on the design of tailings ponds.

RESPONSE:

Tailings Ponds at Oil Sands Mines
General Information
Provided by Alberta Environment
Contact: Kem Singh, Regional Approvals Manager, Northern Region
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1) Production of Fluid Tailings

Oil sand tailings are waste streams that contain dispersions of bitumen, sand, clay, water and some contaminants of concern. Naphthenic acids are the primary source of toxicity. Tailings are contained in settling ponds which serve four basic functions:

- a place to store water for recycling,
- a settling pond (which through time allows water to separate from waste materials),
- a disposal area for coarse and fine tailings, and
- a place to contain contaminants such as naphthenic acids, residual bitumen, polycyclic aromatic hydrocarbons (PAHs), heavy metals and other anions and cations which result from leaching processes of water through oil sands and continual recycling. Many of these contaminants will be reduced over time by natural bioremediation processes.

Tailings ponds are part of the internal water system for mines – Alberta Environment does not allow the release of bitumen extraction process affected waters at this time. Tailings ponds provide up to 90% of a company's water needs for bitumen extraction from oil sand through the re-use of water in the ponds, reducing the amount of freshwater used.

2) Footprint and Distribution of Fluid Tailings

At this time there are 7 major tailings ponds and 7 sub-ponds in the region and there are more ponds proposed for approved facilities. However, some existing ponds will be reclaimed before these are constructed. The existing ponds cover 14,200 hectares or about 25% of current mine disturbance and are expected to more than double in footprint by 2020.

3) Management of Fluid Tailings

Any proposal to construct a tailings pond is examined by technical experts from a number of regulatory bodies including Alberta Environment, Alberta Sustainable Resource Development and the Energy Resources Conservation Board.

The proposed design and location of a pond is reviewed to ensure it is suitable from environmental, resource conservation and economic points of view. Ponds are constructed with groundwater seepage-capture facilities, and are closely monitored.

The Energy Resources Conservation Board regulates tailings ponds from the perspective of material management. Alberta Environment regulates tailings ponds from the perspective of water quality and reclamation and also geotechnical stability through its Dam Safety Branch.

The Energy Resources Conservation Board has recently issued a tailings Directive. The Directive requires increased monitoring and reporting associated with tailings ponds and requires operators to meet enhanced performance criteria for managing their tailings. The Directive lays out specific enforcement actions should targets not be met.

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This Directive is the first step of a larger initiative by the Government of Alberta to deliver performance criteria for the reduction of fluid tailings.

4) Tailings Seepage

No impacts of seepage have been detected in the Athabasca River despite intensive investigations to do so and no ecological impacts have been found. All tailings ponds seep and there are no current feasible options to seal these structures completely (due to size, lack of clay, cost). The solution to the seepage is that tailings ponds must have seepage recapture systems. The effectiveness of these systems is ensured through a corresponding network of monitoring wells. All seepage recapture systems are working well. There are no detectable impacts of seepages entering the Athabasca River or other surface water bodies. For example, modeled seepages from Tar Island Dyke (the oldest tailings pond which is currently being reclaimed) would be diluted 40 million times if they enter the Athabasca River. Extensive monitoring confirms seepages, if they occur, are undetectable.

5) Fluid Tailings and Wildlife

While tailings ponds represent a potential threat to wildlife (e.g., waterfowl) due to toxicity issues posed by residual hydrocarbons and naphthenic acids in tailings waters, the government has effective and enforceable regulations to minimize these threats through the *Environmental Protection and Enhancement Act* (EPEA). All approval holders are required to submit a Waterfowl Protection Plan to the Director.

The Waterfowl Protection Plan must include information on (a) techniques/procedures used to minimize avian mortality at all tailings, composite tailings and waste ponds; and (b) a comprehensive program for monitoring and documenting avian mortality, timing of incidents, and species affected. The plans are reviewed by Alberta Sustainable Resource Development's Fish and Wildlife Branch and are coordinated through AENV.

More than 500 waterfowl died in the Syncrude Aurora tailings pond in April, 2008. This tragedy occurred because deterrents (propane-fired cannons) were not installed in time due to a late season snow storm. These deterrents have proven effective for over a decade with total avian mortality averaging less than 50/year from all sources of on-site mortality for all companies combined (note these numbers have increased recently due to an increase in overall tailings ponds). Significant improvements in bird deterrent systems are now available and have been implemented at some mines.

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are likely to become strong and trafficable at much faster rates than traditional tailings methods. Gypsum is readily available as a waste product of flu-gas desulphurization. This technology can be used to address some but not all of the accumulated mature fine tails that have not settled in existing tailings ponds. Suncor, Syncrude, Albian, Shell, CNRL, Petro-Canada all use or will use this technology.

Paste Technology – The addition of specific chemical coagulants to tailings water in thickener vessels prior to transport to tailings ponds has been demonstrated to enhance consolidation rates and dewatering of fine tails.

10) Alternative Tailings Technologies

Commercial bitumen recovery from surface mines has relied on variants of the "Clark Hot Water Extraction Process", an extraction process which performs for a wide range of oil sands ores and operating conditions. A consequence of this extraction process is the production of very large fine tails containment basins (tailings ponds). There are many proposed approaches for bitumen extraction which rely on alternative technologies and tailings management; some of these have reached the pilot and demonstration phases. Full scale commercial application of these technologies has not been demonstrated to date. The most recent summary of these technologies can be found in "Fine Tailings Fundamentals Consortium (1995)". An update to this publication is required.

The "counter-current drum separator" for extraction, a process demonstrated at the Fort Hills Demonstration Site, was the proposed extraction technology to be used by the Northern Lights Project (Synenco). Filtered tailings technology coupled with centrifugation was proposed for the Joslyn North Mine (Total E&P Canada Ltd.). Both technologies have been demonstrated to use less water and produce greater amounts of dry stackable tailings early in mine development thereby reducing the need for a large mine footprint occupied by soft tailings deposits such as those found in the existing mines. Synenco has withdrawn their mine application and Total E&P has indicated changes to their proposed technology are forthcoming.

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4. Details on the methods of compliance verification for oil sands operators with respect to section 36 (3) of the *Fisheries Act* and the "qualifications" of Alberta Environment inspectors with respect to the *Fisheries Act.*

RESPONSE:

With respect to the latter, we have confirmed that Alberta Environment inspectors are not designated as Fishery Inspectors under the *Fisheries Act*.

With respect to the former, Environment Canada and the Province of Alberta work under an administrative agreement in enforcing the *Fisheries Act*. Under that agreement, the Province, in carrying out their duties under relevant provincial legislation, commits to forwarding any information that they may become aware of that may indicate a *Fisheries Act* infraction to the EC Enforcement Branch, Alberta office. This applies to the oil sands sector as well.

Specifically concerning tailings ponds and potential leaching of waste, companies are required by their operating permits to maintain test wells to ensure that waste water is not leaching from the ponds. The sampling is done by private environmental consulting firms on behalf of the companies and reports are then sent to the Environment Alberta as proof of on-going compliance. To date, EC Enforcement has not received a referral from Environment Alberta indicating that they suspect any possible *Fisheries Act* violations.

Environment Canada Enforcement Branch is finalizing plans for on-site inspections at the four (4) facilities operating in the Fort McMurray area. These inspections will likely take place in May 2009, once the snow has melted. The Province will be advised of these plans and be invited to participate in a joint inspection.

Coordinated by: Pierre Boucher, Environment Canada, 819-953-5504
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