



environmental
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INSPIRING CHANGE

To: National Pollutant Release Inventory
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1. Summary of modification requested

We request the addition of naphthenic acids to the National Pollutant Release Inventory.

2. Background on the substance

- a. CAS #: 1338-24-5
- b. Specific substance information (uses): Naphthenic acids are a byproduct of oil sands production and are primarily found in oil sands tailings.
- c. Proposed reporting thresholds for additions: We recommend the same reporting threshold as for Part 1 substances in Schedule 1 of the Canada Gazette Notice, which is no minimum concentration threshold when determining whether the manufactured, processed or otherwise used threshold is met (Canada Gazette, 2009).

3. Rationale

As a result of a judicial review of the NPRI program, mines are now required to report on the quantity and concentration of NPRI substances disposed of in tailings in addition to direct releases to air, water and land. This includes oil sands mines.

Following the change in reporting requirements, oil sands facilities report on a range of NPRI substances found in tailings, including polycyclic aromatic hydrocarbons, ammonia, zinc lead and arsenic (Environment Canada, 2009). However, because it is not currently listed as an NPRI substance, the facilities are not required to report naphthenic acids.

Yet Alberta Environment has acknowledged that naphthenic acids are the “primary source of toxicity” in oil sands tailings (Singh), and Environment Canada has also identified naphthenic acids are a primary source of toxicity in oil sands tailings (Shugart). It is therefore important that tar sands facilities be required to report naphthenic acids. Below is a more detailed rationale for the addition of naphthenic acids to the NPRI according the decision factors outlined by Environment Canada.

a. Does the substance meet NPRI criteria

1. *Is the substance manufactured, processed or otherwise used (M,P,O) in Canada?*

Naphthenic acids are a byproduct of oil sands extraction and, as such, are manufactured, processed or otherwise used in Canada. There are currently 840 million cubic metres of oil sands tailings (Alberta Energy Resources Conservation Board, 2010) stored in massive lakes in northern Alberta that cover 170 square kilometres. While there is no cumulative assessment of the amount of naphthenic acids stored in the tailings lakes, tailings have been reported to contain naphthenic acids at concentrations of 80-100 mg/L (S.S. Leung et al, 2003).

The problem is also growing quickly. Two-hundred million litres of oil sands tailings are produced each day, and the volume of tailings will increase by an estimated 30% between now and 2020 (The Pembina Institute, 2010).

2. *Is the substance of health and/or environmental concern?*

Naphthenic acids have been identified as an environmental and health concern. Environment Canada has identified them as the primary source of toxicity in tar sands tailings, as has Alberta Environment. Many scientific studies have demonstrated the environmental impacts of oil sands tailings, and point to naphthenic acids as the main source of toxicity (Leung et al, 2003; Bendell-Young et al, 2000; Gentes et al, 2006; Peters et al 2007; Pollet et al 2000; Rogers et al 2002; van den Heuvel et al, 2000; Young et al, 2007). Below are some examples, but not an exhaustive list, of the impacts of naphthenic acids:

- Naphthenic acids are toxic to mammals, causing liver and heart damage and brain hemorrhage at high doses and weight lose and liver enlargement from chronic exposure (Rogers et al, 2002). At lethal doses, naphthenic acids cause nervous system depression, convulsion and respiratory arrest leading to death in mice.

- Yellow perch eggs exposed to naphthenic acids showed increased rates of deformity and lower birth size than those not exposed (Peters et al, 2007).
- Nestling tree swallows exposed to oil sands tailings containing naphthenic acids show lower weight and are less able to withstand stress than those not exposed, decreasing their chance of survival (M-L Gentes et al, 2006).
- Naphthenic acids influence the community structure of aquatic microorganisms at concentrations beginning at 6-20 mg/L (S.S. Leung et al, 2003).

Fort Chipewyan, a community located downstream from the oil sands, is experiencing an elevated rate of cancer (Alberta Cancer Board, 2009). Community members and doctors working in the community have repeatedly raised concerns that the elevated cancer rates are linked to oil sands pollution, stemming from tailings leaking into the water, yet no comprehensive health study has been conducted to investigate the health impacts of oil sands on the community.

3. *Is the substance released to the Canadian environment?*

The main source of naphthenic acids is the production of oil sands. In natural surface waters in the Athabasca region, naphthenic acids are found at a concentration of 1-2 mg/L. In oil sands tailings, naphthenic acids can exceed 100 mg/L (S.S. Leung et al, 2003).

Oil sands companies are now required to report on NPRI substances contained in tailings ponds, and tailings ponds contain significant quantities of naphthenic acids, therefore naphthenic acids should be included in the list of substances that must be reported in tailings.

However, there is ample evidence that oil sands tailings, and therefore naphthenic acids, are released into the environment beyond the tailings ponds. The containment areas for tailings ponds in the oil sands are built from materials the companies excavate from the surrounding area – earthen materials – and are not lined. In their project proposals, companies assume that tailings ponds will systematically leak into the surrounding area.

Environmental Defence released a report that for the first time publicly estimated how much contaminated water the tailings ponds leak (Environmental Defence, 2008). The report compiled company data from environmental assessment reports to conservatively estimate that the tailings ponds already leak four billion litres each year, with projections that this figure could reach over 25 billion litres within a decade should proposed projects go ahead.

There are also documented cases of contaminated tailings water reaching surface water, including:

- An environmental assessment Shell Canada Ltd. projected that contaminated tailings from its operations would reach Jackpine Creek (Alberta Energy Utilities Board, 2004).
- An academic study from the University of Waterloo estimates that Suncor Energy's Tar Island pond had been leaking almost 6 million litres a day into the Athabasca River (Barker et al, 2007).
- Another incident is documented in correspondence between the Alberta government and Syncrude, and in an assessment commissioned by Syncrude from Golder Associates (Syncrude Canada, 2007; Golder Associates 2009). It is clear that contaminated tailings

materials leaked into Beaver Creek, a tributary of the Athabasca River, over a number of years.

- Another incident of leakage into surface water concerns Suncor's South Tailings Pond leaking into McLean Creek. A study on the issue, in part by a Suncor engineer (Stephens et al) admits that the leakage into the creek will not be stopped, but rather than the company would try to manage the concentrations of deleterious substances in the creek.

Furthermore, two recent research studies demonstrated that chemicals contained in oil sands tailings – including polycyclic aromatic hydrocarbons, lead, mercury, cadmium – are in snow and water downstream of the oil sands facilities, and that several exceeded what is considered a safe level (Kelly et al, 2009; Kelly et al, 2010). While these two studies did not look at concentrations of naphthenic acids specifically, they show that pollution from oil sands tailings is being released into the environment.

b. Do facilities contribute significant releases of the substance

There is no cumulative assessment of the quantity of naphthenic acids released by the oil sands industry because it is currently not tracked or reported publicly. Approximately 1.5 barrels of mature fine tailings are produced per barrel of oil sands. In 2008, oil sands mining produced 856,000 barrels of oil per day, resulting in 1.284 million barrels of tailings produced each day (Grant, 2008). These tailings contain naphthenic acids at a concentration of 80-100 mg/L, meaning that up to 20.4 tonnes of naphthenic acids are produced each day and nearly 7,500 tonnes each year by oil sands facilities. Given the evidence that tailings ponds leak into the surrounding environment, it is important facilities to track and report on both naphthenic acids that are stored in tailings ponds, and the amount released to the water through leakage.

c. Does inclusion of the substance support one or more of the objectives of the NPRI?

Given that naphthenic acids have been identified by the federal and provincial governments as the main source of toxicity of oil sands tailings, inclusion of naphthenic acids in the NPRI will allow tracking of releases, provide a better understanding of the risks posed by oil sands tailings and support voluntary and regulatory measures to reduce the toxicity of oil sands tailings and minimize the threat to the environment and human health posed by tailings ponds.

d. Is the substance reported elsewhere? If it is, is there additional value in reporting to the NPRI?

Naphthenic acids are not publicly reported elsewhere in Canada. The United States Environmental Protection Agency, however, has placed naphthenic acids on the hazardous substances list of the Comprehensive Environmental Response, Compensation and Liability Act (known as Superfund), which requires tracking of naphthenic acids.

4. Proposed Timing for the Change

We recommend that facilities be required to report on naphthenic acids beginning in 2012 or sooner.

5. Industrial Sectors Affected

Oil sands mining facilities will be the primary sector affected to the best of our knowledge. There are currently 5 facilities reporting to the NPRI in this category.

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