THE TOXIC WATERS OF THE TAR SANDS INDUSTRY:

An Opportunity for Companies to Reduce Their Consumption of Tar Sands Fuel

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Put simply, tar sands (or "oil sands") operations are among the most environmentally destructive industrial developments in the world today. They have a devastating impact on water: poisoned rivers, water tables fouled with toxins, birds and fish killed, vast amounts of water consumed, and First Nation communities threatened. Any company with a concern for sustainability issues, including water conservation and protection, has a responsibility to move its vehicle fleet fueling away from tar-sands-derived petroleum — as many companies have already done.[1]

Tar sands deposits lie beneath peat wetlands and boreal forest in the Canadian province of Alberta. In a process similar to coal strip-mining operations, the land is scraped clear of centuries-old trees, peat, and topsoil; shovels and trucks the size of two-story buildings strip the earth as deep as 200 feet. Water treated with ammonia, cyanide, arsenic, and other chemicals is used to separate the bitumen (semi-solid petroleum) from the sand,[2] and the residual wastewater is stored in nearby toxic tailings lakes. Where deposits are too deep to be strip-mined, in-situ drilling separates the oil and sand by injecting high-pressure steam deep below the ground, melting the bitumen so it can be pumped to the surface. The extracted bitumen is either diluted with light hydrocarbons or partially refined to synthetic crude before being transported by pipeline or rail to refineries for processing into end products such as gasoline and diesel.

The tar sands industry is pursuing numerous pipeline proposals to increase access to US refineries and the international market. While tar sands production is currently about two million barrels a day, the industry is pushing for a staggering increase of more than three times that level by 2030.[3] This climate catastrophe can be averted if we can find ways to significantly decrease demand for tar sands fuel.

We've known for some time that the climate emissions associated with tar sands petroleum are much higher — by about 22 percent — than those from average conventional oil products in the US.[4] However, water overuse and pollution are serious consequences of tar sands operations that also deserve serious attention.

WATER OVER-USE AND TOXIC POLLUTION.

While nearly all oil production uses and pollutes at least some water in various ways, tar sands operations require at least three times as much fresh water per barrel of oil produced as conventional oil operations.[5]

The companies operating in the tar sands region of Alberta use about 150,000 acre-feet (the amount of water it takes to cover one acre to a depth of one foot) of water per year to steam-heat and melt the oil — an amount equivalent to the annual residential water usage of 1.7 million Canadians.[6] This process of extraction and production contaminates the water with large quantities of toxins including naphthenic acids, cyanide, phenols, and metals such as arsenic, cadmium, chromium, copper, lead, and mercury. After being used, 95 percent of the water is so polluted that it has to be stored in huge tailings lakes.[7] These bodies of water are vast, covering a total of 68 square miles, and can be seen from outer space.[8,9] About 11,000 cubic meters of toxic fluids are estimated to seep from the lakes into adjacent surfaces and groundwater each day.[10]

Tar sands expansion projects currently underway would increase water use by 50 percent. And if industry and government succeed in their goal of tripling tar sands production by 2030, fresh water usage will increase by an unsustainable 170 percent.[11]

A research study released in February 2014 by Environment Canada — the counterpart of the US Environmental Protection Agency — confirmed that toxic chemicals from the tailings ponds are leaching into groundwater and seeping into the Athabasca River. The analysis confirmed that toxic chemicals, including known carcinogens from the leaking tailings lakes, were present in the river and groundwater in the surrounding region. Additionally, naphthenic acids, one of the toxins produced in tar sands extraction, were found in the river nearly one mile downstream from the tailings ponds.

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University of Alberta researchers have found high concentrations of polycyclic aromatic compounds, or PACs, downstream from tar sands operations in the Athabasca River system.[12] These PACs, at elevated levels, are toxic to animal and river life. Some of these concentrations have been found to be within the range of toxicity to fish embryos.[13]

DESTRUCTION OF AN ECOLOGICAL JEWEL.

The Athabasca River, which runs through the region where the tar sands industry is operating, is one of the most beautiful and ecologically important river systems in North America. It starts in Jasper National Park, on the huge ice fields straddling the Continental Divide in the Canadian Rockies. It then flows hundreds of miles through prairies and farmland into a region of boreal forest, one of the largest intact forest ecosystems left on earth and a critical terrestrial storehouse of carbon. (Boreal forest captures and stores almost twice as much carbon as tropical forest.) Finally, the water flows northward into the Peace-Athabasca Delta, the world's largest inland freshwater delta, and spreads through Wood Buffalo National Park, a UNESCO World Heritage site that has the world's largest herd of free-roaming wood bison and is one of two known nesting sites for whooping cranes. It then empties into immense Lake Athabasca, the source of the Mackenzie River system that leads to the Arctic Ocean.

Throughout the area where tar sands are extracted, the Athabasca River and Lake are used as an industrial sewer, with vast amounts of water consumed and dumped with toxic chemicals into toxic tailings lakes that leak millions of cubic liters of toxic water each day.

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RISK TO HUMAN HEALTH.

While many of the human health impacts of tar sands water pollution are just beginning to be understood, bioaccumulation in the food chain appears to be occurring. Most vulnerable to these impacts are the region's First Nation communities, who rely on fishing and hunting for a significant portion of their diet. Dr. John O'Connor, a family doctor in the First Nations community of Fort Chipewyan, reported that his patients had high rates of a rare and incurable bile-duct cancer, likely caused by the water and air pollution from the tar sands operations.

BIOACCUMULATION IN THE FOOD CHAIN

"There are piles of papers; peer-reviewed published scientific studies have been done that reveal a burden on the environment," O'Connor said. "This burden includes a sizable amount of carcinogens that get into the food chain, into the water and the air. These toxins have been linked with cancer." Indeed, further government studies have confirmed cancer rates 30 per cent higher than normal in Fort Chipewyan communities.[14]

IMPACT ON WILDLIFE.

Local communities and many First Nation people have found fish with growth deformities and other abnormalities. While more scientific study is necessary, there is no doubt that oil production is the biggest threat to the aquatic health of the Athabasca River system. Since the 1970s, the total summer flow of the river downstream from the tar sands has declined by nearly one third.[15] The water flow in the Athabasca River is expected to decrease by 30 percent by 2050 as a result of climate change,[16] but the amount of water that provincial regulators allow to be withdrawn from the river for tar sands operations has nearly doubled in the past 12 years.[17] The impact of this water diversion is most pronounced in the winter, when river flows decrease and aquatic life must survive tenuously under a thick cap of ice. Further decrease of those levels will endanger the growth and reproductive cycles of fish and other aquatic life.[18]

Because tailings lakes are fed with warm toxic liquids, they remain ice-free in the winter when all natural lakes in the area freeze over. Consequently, and because the area is located along a major migratory flyway, birds and animals sometimes mistake these toxic lakes as open water ponds and alight on the lakes and drink from them. Tar sands operators normally position air cannons or scarecrows at their tailings lakes to deter wildlife, but these measures are not always successful. In April 2008, at least 1,600 ducks died in one incident.[19] However, it is believed that most birds that land on the lakes are quickly dragged down by the thick liquid and sink out of sight so quickly that the true number of bird kills cannot be calculated.[20]

INEFFECTIVE INDUSTRY RESPONSE.

The local and federal governments have delayed research on the health and environmental impacts of the tar sands and have pushed back against local whistleblowers. For more than four decades, the management of tar sands tailings was purely voluntary, with no government regulations. In response to mounting public concern, the Alberta provincial government finally announced new rules in 2009 requiring companies to take a series of steps to minimize the liquid tailings and capture and dry a portion of their tailings waste. But four years later, regulators released a report showing that not a single tar sands company was in compliance with the rules managing the reduction of tailings lakes. The authorities said they would not enforce penalties or fines on the operators because the rules were simply "overly optimistic" when they were set in 2009.[21]

The Canadian Association of Petroleum Producers says, "The oil and gas industry... takes strict measures to protect both surface water and groundwater quality [and] strict regulations restrict water withdrawal when river flow is low." The tar sands industry also claims it is trying to reduce the volume of toxic tailings. While some steps have been taken to reduce water consumption and tailings leakage, nearly all of the water used to produce tar sands oil remains too poisonous to be safely returned to the ecosystem. As long as the tar sands industry continues to expand, the volume of toxic tailings continues to grow dramatically, with pollution spreading into the Athabasca River and beyond.

Existing tailings ponds will be a toxic legacy on the northern Alberta landscape for decades to come, continuing to leach chemicals into the surrounding water table. Industry and government talk about the potential for reclamation, but to date only 0.2 percent of disturbed land from tar sands production has been certified as reclaimed. This reclamation cannot restore the land to its original ecological integrity and comes at an enormous cost.[22]

TAR SANDS + TOXIC WATERS BY THE NUMBERS

- **Number of poisonous chemicals released by tar sands industry into freshwater systems each day:** at least seven.
- **Amount of wastewater that seeps from toxic tailings lakes into adjoining ground each day:** 11,000 cubic meters.[23]
- **Amount of water used by tar sands operations compared to conventional oil:** three times more.[24]
- **Amount of land disturbed by tar sands development that has been certified as reclaimed:** 0.2 per cent.[25]
- **Number of barrels of fresh water used per barrel of tar sands oil produced through mining:** two to four.[26]
- **Size of toxic tailings lakes:** 68 square miles.[27]
- **Expected growth in freshwater use by 2030:** 170 percent.[28]
- **Net increase in tailings waste produced per year:** 50 million cubic meters.[29]
- **Number of oil sands companies complying with 2009 Alberta regulations on tailings waste management:** zero.[30]

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STEPS TO TAKE TO REDUCE OR ELIMINATE USE OF TAR SANDS FUEL.

More than one-third of US carbon pollution comes from oil use, and America's biggest corporations with large vehicle fleets are among the biggest users of transportation fuel. Fuel efficiency, a transition to hybrid and plug-in electric vehicles, and other fuel-saving measures are vital to reduce carbon emissions and other environmental and health impacts. At the same time, companies should ensure that their vehicles are fueled with as little tar-sands-derived fuel as possible.

1. Either through the fuel RFP (request for proposals) or separately, companies with large vehicle fleets should require their transportation and fuel vendors to provide a comprehensive list of refinery sources of origin for the fuel being used to move vehicles and transport products. They should then check these refineries against the map and list of refineries at *RefineryReport.org*.
2. Companies should provide transportation and fuel vendors with a list of tar-sands-free refineries and inform them that the company has a preference for fuel from these refineries. If logistical barriers prevent access to tar-sands-free product, the next best choices are refineries using minimal tar sands feedstock. Companies should give preference whenever possible to vendors that have confirmed they can supply fuel from tar-sands-free refineries.
3. Where fleet drivers purchase fuel directly from retail stations, reliance on tar sands can be reduced by purchasing from companies that historically have sourced little to no fuel from tar sands refineries. The company can encourage and incentivize its drivers to fuel at these stations where realistic.
4. Companies should publicly commit to a preference for procuring, whenever possible, lower-carbon fuel or fuel from tar-sands-free refineries. The action reduces the company's emissions and environmental impact and better aligns the company's practice with its sustainability commitment. The public statement sends an important signal that there are actionable concerns about the environmental destruction, water over-consumption and pollution, and health and climate risks associated with the tar sands and high-carbon fuel industries.

For assistance in implementing these steps or to discuss tar sands in vehicle fleets, people may contact the Sierra Club and/or ForestEthics. For some companies, additional research may be necessary to identify appropriate tar-sands-free bulk fuel providers as well as tar-sands-free retail gas/diesel stations. The Sierra Club and ForestEthics are looking for corporate partners to support this research and apply the results to fleet fueling practices.

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