

Press Release

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Subject: Canadian Oil Sands Tailings Treatment and Site Redevelopment Waste-To-Energy Technology

WaterSmart Environmental, Inc. announces the development of waste-to-energy technology to revitalize Canada's oil sands industry. **Oil Sands** refer to worldwide **crude bitumen** (bitumen) deposits that occur in more than 70 countries. The largest bitumen deposits are in Canada followed by Venezuela. Bitumen is processed into synthetic crude oils. The synthetic crude oils, in turn, are pipeline transferred to refineries where they are processed into gasoline, diesel fuel, jet fuel, natural gas liquids, and other refined products of commercial value in the same manner as naturally occurring crude oils are refined.

Municipalities, pulp & paper mills, sugarcane factories, coal mining, and phosphate fertilizer production are well known to produce significant waste volumes. The waste volumes generated by oil sands bitumen production likely exceed the **combined wastes** of municipalities, pulp & paper mills, sugarcane factories, coal mining, and phosphate fertilizer production by a **factor of 10** to place a perspective on the volume of massive oil sands wastes.



Typical Oil Sands Tailings Ponds

Bitumen production continues around-the-clock. Trucks take the tar sand to crushers, where it is broken down into cantaloupe-size chunks. From the crushers, warm water is added to the sands which are piped to rotating drums where the sands and water are mixed further to reduce the chunks to golf-ball size. At the end of 2003, 32 companies representing 59 projects were operating in the Canadian oil sands according to the Alberta Department of Energy. Combined, these companies produced 938,000 barrels per day of bitumen with production on the increase.

Immense problems on the immediate horizon consist of:

1. **Dwindling supplies** of natural gas for extraction and upgrading,
2. **Dwindling supplies** of natural gas condensates to dilute bitumen for pipeline transport,
3. **Continuing increase** in the cost of natural gas,
4. The necessity to use **additional natural gas** for higher quality upgrading to satisfy marketplace demands,
5. The **increasing salinity** (decreasing effectiveness) of recycled extraction water,
6. The **increasing release of methane gas** from the tailings ponds, and
7. The **increasing improbability of future cost effective extraction of in-situ bitumen** representing 80% of the bitumen deposits.

Large amounts of process-affected water are generated from the extraction of bitumen from the oil sands in Alberta. The tailings are placed into settling basins prior to reclamation and consist of sand, clay, unrecovered bitumen, naphthenic acids (NAs) and polycyclic aromatic hydrocarbons (PAHs). All of the organic constituents can be anaerobically digested to produce methane gas. Methane gas is a near equivalent to natural gas.

In addition to the tailings, other area wastes consist of municipal solid wastes (MSW), sewage, cooling water, dyke (dike) seepage, site drainage, muskeg, overburden, mine runoff, and mine depressurization water, coke, and sulfur. A fine slurry mixture of the solid wastes with the liquid wastes can be anaerobically digested to produce methane gas. The liquid effluent from the digester can be separated into liquid fertilizer concentrate and reverse osmosis (RO) water. The saline free RO water can be used for high quality extraction water and steam production with excess going to the river. The methane gas can be used to augment or even replace the dwindling supplies of natural gas. Since the digester solids (digestate) still contain valuable minerals they can be processed to yield their Titanium and Zirconium minerals for sure, and possibly Tourmaline and Pyrite as well. After mineral recovery, the digestate will still contain clays. The clay constituent of the digestate as well as coke and sulfur wastes may be added to Alberta area phosphogypsum stacks from the phosphate fertilizer industry to produce cement. The cement can be used along with the clays, coke and sulfur wastes to make low cost concrete wall panels for the construction industry.

The inexpensive methane gas produced can be used at the project site for extraction, upgrading, and to power generation equipment. The inexpensive methane gas may also be used to revitalize the local phosphate and urea fertilizer industries. At the end of the day phosphogypsum stacks, tailings ponds, methane gas emissions, carbon dioxide gas emissions, MSW piles, coke piles, sulfur piles, and overburden waste piles begin to disappear while additional energy supplies are being produced.



Typical Alberta Phosphogypsum Stacks

The inexpensive anaerobic digestion produced methane would likely enable the full realization of in-situ oil sands making the entire Canadian crude bitumen production fully sustainable over the life of the entire bitumen deposits. The proposed total solution for site redevelopment fully complies with all Kyoto Protocols thus tending to reverse global warming. **Without the proposed or similar technology the promising crude oil production achievements to date will begin grinding to a stop as once affordable and plentiful natural gas becomes too expensive while becoming extinct.**

Canada's Pembina Institute (*The Pembina Institute*) refers to increasing oil sands production as a "fever". The following quotes reinforce the fever characterization:

- *"We must ensure that there is nothing, as we move forward to implement Kyoto, that in any way undermines or impedes the growth of projects like the oil sands and obviously their contribution to the prosperity of this country."* (Deputy Prime Minister Anne McLellan, 2002)
- *"Canada's position on GHG emissions reduction is ambivalent. It can be described as someone trying to ride two horses galloping in opposite directions. One horse pulls energy investments towards the fossil fuels sector, thus increasing GHG emissions. The opposite horse pulls programmes and policies aimed at reducing GHG emissions."* (Charles Caccia, former Chair, House of Commons Standing Committee on Environment and Sustainable Development, 2002)
- *"There is no environmental minister on earth who can stop the oil from coming out of the sand, because the money is too big. But we have to be very strict on environmental impact."* (Stephane Dion, Federal Minister of Environment, 2005)

The fever will become a fatality unless affordable and plentiful natural gas becomes available. The announced technology provides that solution in full compliance with all Kyoto Protocols thus promoting global cooling while sustaining oil sands crude oil expansion.

WaterSmart Environmental, Inc. is marketing its Kyoto Protocol compliant wastes-to-energy technology on an economic development platform to concentrated animal feeding operators and to municipalities. Animal farmers benefit by purchasing biodiesel, electricity, and natural gas (methane) at a 20% discount from retail. Municipalities also benefit by making biodiesel,

electricity, natural gas, and potable water available to its citizens and businesses at a 20% discount from existing prices. The technology is marketed on a build-own-operate basis thereby eliminating the necessity for local sales and property tax increases since project financing is entirely secured from the financial marketplace. Municipalities and Bitumen Mining Operations that embrace the waste-to-energy technology automatically become zero waste-to-landfill communities. The waste-to-renewable energy technology has been slowly developed over the last 10 years. It is just now being introduced to the international marketplace.

WaterSmart Environmental, Inc. is a provider of waste-to-energy, food independence, water independence, and energy independence technologies and a manufacturer of highly engineered water purification components and systems. The company designs and builds a wide variety of water treatment equipment including packaged water and wastewater treatment plants, UltraPac™ aerobic package plants, OAT™ Process anaerobic digesters with associated energy production, aerators, filters, Pur-iSep™ and SmartWater™ oil/water and solids/liquids separators, RainDrain™ perimeter trench sand filters for stormwater runoff, dissolved air flotation separators, air strippers, complete skid assembled aqueous waste treatment plants, FilterFresh™ skid mounted potable water production plants, skid mounted wastewater treatment systems for laundromats, commercial laundries, and car/truck wash facilities with water reclamation and reuse, softeners, demineralizers, activated carbon treatment equipment, and water purifiers for domestic and international markets.

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