

April 22, 2016

Turning noxious waste into harmless table salt?

Posted: Tuesday, April 19, 2016 12:15 am | Updated: 4:00 am, Tue Apr 19, 2016.

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The proposal by Elcon Recycling Services LLC for a toxic waste treatment plant in the Keystone Industrial Port Complex in Falls Township has received important coverage in the Courier Times. One subject that needs to be examined more fully, however, is whether this treatment process is effective and safe.

Elcon will be taking in as much as 210,000 tons annually of waste that contains various mixtures of poisonous organic compounds including solvents and pesticides, heavy metals and/or their toxic salts and, according to their permit application, wastes from extractive processes that will contain a variety of naturally occurring radioactive elements. They claim that their process will render all these extremely noxious wastes so harmless that they can be disposed of safely in ordinary landfills. As a chemist, I can say this is not true.

The Elcon process divides the toxic materials into three phases: Water-insoluble solids, volatile organic compounds, and the water soluble salts obtained from evaporating the water from an aqueous phase. Any of these phases may contain (or produce) deadly toxins that can poison the air, water and soil around the facility.

The solid phase is obtained by a “physico-chemical” separation such as is used in the first stage of purifying water containing sewage and other wastes. Depending on the sources of the waste shipment, it may contain toxic metal salts, other poisonous inorganic compounds, salts of radioactive elements such as strontium and uranium, and extremely toxic pesticides such as Endrin. The assumption that such dangerous materials will be diluted enough to be safely disposed of in standard landfills raises concerns.

Volatile organic materials will be removed by heating the solid wastes and separately heating the aqueous phase. The combined streams of organic vapors will be subjected to thermal oxidation. The process described by Elcon can produce the same kind of toxic products as incineration does, but lacks the controls and safeguards used to limit dangerous effluents from modern incinerators. Burning chlorinated organics is expected to produce toxic compounds such as poly-chlorinated biphenyls (PCBs) including dioxins. Burning perfluorinated organic compounds represents a risk that has not yet been thoroughly explored.

The exact products from thermal oxidation vary, depending on the organic compounds present and conditions used in the process. It won't be known exactly what each waste shipment contains, and we cannot predict what products might be formed from burning different mixtures.

Elcon has not presented any data to the public that demonstrates that the effluents contain nothing but carbon dioxide and water. The prevailing winds will distribute any effluents over the Delaware River and then over Trenton and its suburbs.

Once the volatile organic materials have been removed, the water will be evaporated from the aqueous solution. The salt residues will contain large amounts of ordinary table salt, but may also contain toxic bromine salts, radioactive strontium and radium compounds, soluble cadmium salts, and compounds of non-metallic elements such as arsenic and selenium. Selenious acid is highly soluble in water and extremely toxic to all types of aquatic creatures.

It is reported that representatives of Elcon have suggested that they would supply these "recovered" salts to municipal governments for use in melting ice from roads. This would show either a complete lack of understanding of the nature of these products or a shocking disregard for human safety and the health of the environment, including that of the Delaware River. Because they are water soluble, wastes containing any of these toxic materials should never be disposed of in ordinary landfills.

Contrary to the impression that Elcon appears to be perpetrating, the residues from their process are not as benign as distilled water. It is my view that government officials who are considering granting permission for the construction of this type of plant in any populated or environmentally sensitive area should seek out the advice of nationally recognized experts in the handling and treatment of toxic inorganic wastes as well as specialists in combustion of chlorinated and fluorinated hydrocarbons. To not do so would risk charges of culpable negligence in the event of any adverse health effects that can be traced back to the plant.

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