

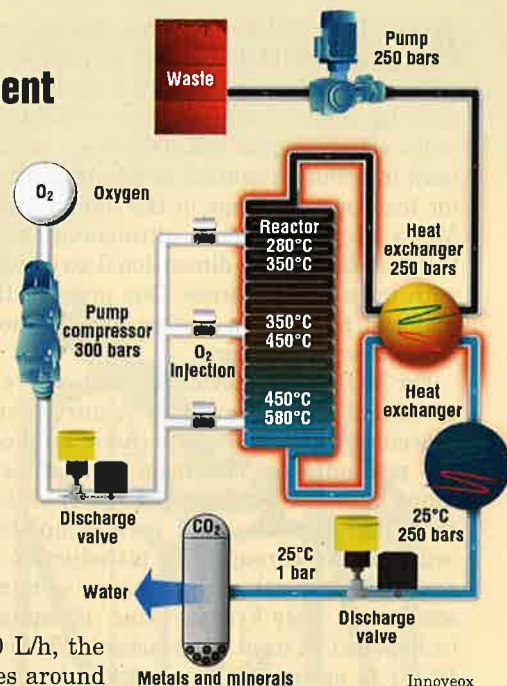
Supercritical water oxidation for organic waste treatment

A novel method for treating industrial liquid waste employs supercritical water infused with oxygen to destroy organic compounds. Developed by Innoveox (Paris; www.innoveox.com) and based on technology patented by the French government research organization CNRS (www.cnrs.fr), supercritical water oxidation (SCWO) offers a lower-cost, environmentally friendly alternative to traditional waste-treatment methods like incineration, landfilling or chemical treatment.

The Innoveox method works by subjecting virtually any "pumpable" organic industrial waste — including organic hazardous wastes, used oils, petroleum waste, solvents and others — to temperatures between 350 and 550°C and pressures of 221 bars with oxygen present (diagram). Under the reactor conditions, water becomes supercritical, and organic material becomes soluble in the fluid. The organic waste, with chemical oxygen demand (COD) values in the range of 25–250 g/L, rapidly breaks down via oxidation to yield purified water, carbon dioxide and energy. Inorganic material precipitates in the form of metal oxides and mineral salts.

The one-reactor method is cost-competitive with alternatives and can lead to significant cost savings depending on the nature of the waste and the location of the facility. Water and carbon dioxide can be re-used, and remaining inorganics can be harvested for valuable catalyst metals. "The only energy input is for preheating the waste," says Patrick Lemaitre, sales and marketing director, Innoveox.

Although Innoveox completed an industrial SCWO unit in Southwest France that is capable of treating 99.9% of industrial waste at a rate of 100 L/h, the company's business model revolves around custom-assembling SCWO units at a customer site, and providing waste treatment as a service, explains Lemaitre. The initial targets include petroleum refineries, chemical plants and pharmaceutical manufacturing facilities. In the short term, Innoveox plans to build four SCWO units, each with ten times the capacity of the prototype, at customer sites outside France.



Biodegradation system for VOCs poised for expansion

A system that utilizes existing biological wastewater-treatment facilities for destruction of biodegradable volatile organic compounds (VOCs) and other organic hazardous air pollutants (HAPs) has been demonstrated at three U.S. petroleum-refining and chemical facilities, and the developer has plans to extend the U.S. patent-pending treatment approach to eight additional facilities in coming months.

Environ International Corp. (Arlington, Va.; www.environcorp.com) developed the treatment method, known as VOC BioTreat, as an alternative to incineration or activated-carbon VOC treatment systems. The VOC BioTreat protocol has demonstrated the ability to meet VOC and HAP handling requirements in U.S. state and federal emissions regulations.

VOC BioTreat works by piping VOC off-gases into an existing wastewater treatment tank that contains activated sludge at

depths of greater than 18 ft. Microbes in the tank break down VOCs as they bubble up through the tank. VOC BioTreat can be retrofitted into existing wastewater treatment facilities for somewhat lower capital costs as compared to installing thermal oxidizers or activated-carbon VOC treatment systems, but the annual operating costs are less than 10% of conventional systems.

In addition to the VOC BioTreat technology, Environ has developed a test method to confirm the performance of the proprietary technology within a plant setting. "The ability to reliably test for VOCs is critical for acceptance from the regulatory authorities," commented Carl Adams, lead researcher and Environ's global practice leader for industrial wastewater management. The VOC BioTreat technology recently received the grand prize for research excellence in the American Academy of Environmental Engineers' E3 competition.

Underground pipes

A hand-held device for locating buried pipe will be commercialized by Sensit Technologies (Valparaiso, Ind.; www.gasleaksensors.com) under license from Gas Technology Institute (GTI, Des Plaines, Ill.; gastechnology.org). GTI says the technology is expected to save industry millions of dollars by helping to reduce the damage to buried pipes.

The device, which uses acoustic technology, can detect metallic and non-metallic pipes (including plastic), says Kiran Kothari, program manager for GTI. In tests, it has located small-diameter pipe at depths up to 5 ft in various ground conditions, including concrete, tar and grassy soil.

'New' F-T technology

Three engineering contractors — CB&I Lummus UK Ltd., Jacobs Engineering Group Inc., and The Shaw Group — have been selected to promote the commercialization of a fixed-bed Fischer-Tropsch (F-T) process developed by BP (www.bp.com)

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Note: For more information, circle the 3-digit number on p. 62, or use the website designation.