Nitrogen Removal Process Demonstration

Statement of Need
Department of Defense (DOD) manufacturing of munitions produces various nitroaromatic waste streams. Currently, these waste streams are handled through drumming and hazardous waste disposal. The Nitrogen Removal (NitRem) Process may provide a cost-effective and more environmentally acceptable method for treating these waste streams.

Identified Alternatives
This task required the National Defense Center for Environmental Excellence (NDCEE) to evaluate the NitRem Process and its ability to economically and safely treat various waste streams within the DOD industrial base and DOD commercial industrial facilities. The task requirements did not include the evaluation of other alternative technologies.

Demonstration and Justification
The NDCEE designed, fabricated, and installed a palletized NitRem Process unit at the Radford Army Ammunition Plant (RAAP) in Radford, Virginia. It was tested using wastewater that was contaminated with dinitrotoluene (DNT). The process reduced the amount of DNT in the influent wastewater from 120,000 parts per billion (ppb) to less than 50 ppb in the effluent water. As a result of this treatment, the State of Virginia allowed the effluent to be discharged directly into the New River without further treatment.

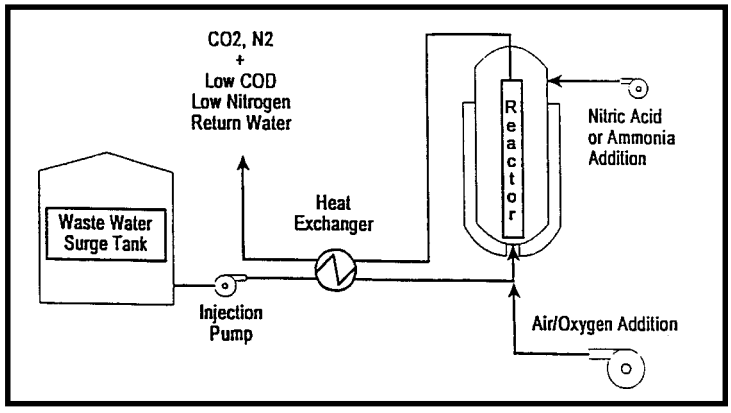
The RAAP generates approximately 1.5 million gallons of DNT-contaminated wastewater per year. Treating this wastewater using the NitRem Process can greatly reduce and/or prevent water pollution. This treatment will destroy DNT, trinitrotoluene (TNT), and other nitrated compounds in the wastewater before disposal.

Total annual cost savings at the RAAP will be approximately $1 million. Total annual cost savings for the DOD will be a multiple of millions of dollars depending upon the number of installations that use this technology on site for safe disposal of their DNT/TNT-contaminated wastewater.

Benefits
Further benefits of the NitRem Process include:
- Demands less energy than other thermal destruction systems
- Represents a new technology that is significantly more effective than the current processes
- Operates simply and efficiently
- Circumvents design, operation, and cost factors that are associated with catalytic processes
- Includes oxidation and reduction reaction sequences that specifically address the destruction of nitroaromatics.

Implementation
The palletized NitRem unit will be kept at the RAAP for future evaluation and demonstration. The NDCEE can, therefore, evaluate the NitRem Process for potential applicability to other DOD and industrial waste streams. The NDCEE can then transition this technology to any interested DOD facility or private industry.

Follow-Up
This task was completed during the FY97. The NDCEE is able to evaluate the applicability of this process at an unlimited number of sites. Once the process is approved and implemented at a new site, the NDCEE is able to provide follow-up support for at least six months. Disposition or transition of the palletized NitRem unit at any DOD site must be determined in consultation with the U.S. Army Armament Research, Development, and Engineering Center (ARDEC) as required.



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