

TREATMENT OF WATER, WASTEWATER, INDUSTRIAL EFFLUENT, SLUDGE, FLUE GASES AND SOLID WASTES

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Since 1992 this group is studying the feasibility to use the Advanced Oxidation Process by ionizing radiation on removing toxic and refractory pollutants (organic compounds) in industrial effluent, drinking water, solid wastes, and on destroying pathogenic microorganisms in wastewater, sludge and in historic documents. These studies are focused to become economically feasible the use of this technology in real industrial effluents that are recalcitrant when treated by conventional methods. For this purpose the laboratories of organic compounds analysis, toxicity studies performed with microcrustacean *D.similis*, bacteria *V.fischeri* and the guppy fish were implemented and a pilot plant was set up to optimize the efficiency of this technology. Studies together PETROBRAS for effluent treatment from petroleum production units for water reuse was carried out and the steps of this development were organic chemical analysis of real wastewater before and after irradiation; toxicity studies of raw and treated effluents; economic analysis of the process. It was made a comparison study with the EB treatment associated with Adsorption on Activated Charcoal to treat industrial effluents.

On going developments using irradiation process include:

- anionic surfactant degradation from industrial wastewater and sewage studying the toxicity behavior of decomposed surfactants;
- technical and economical feasibility studies of the sugarcane must irradiation to increase ethanol yield production;
- development of a new irradiation facility focusing on design and studies of economical feasibility of movable electron beam facility to treat hazardous industrial effluent;
- studies of degradation of hydrocarbons from petroleum in sea water;
- studies of package decontamination by pesticides degradation;
- soil remediation containing organic pollutants;
- studies of the decontamination of papers and historic documents;
- studies to use irradiation process to decontaminate the water ballast from international sailing vessels;
- experiments with real effluent from industries and effluents from Municipal Wastewater Treatment Plants (WWTP) (FIG.1) with the objective to acquire the necessary data in order to support the conclusions regarding to technical feasibility and cost studies of water treatment under optimized conditions such as: data on optimized operating parameters such as electron energy, dose, flow rate, current, accelerating voltage; data on wastewater composition and toxicity pre and post treatment; technical and economical information for feasibility studies for applications at a large scale and perform a model feasibility study for one particular case.

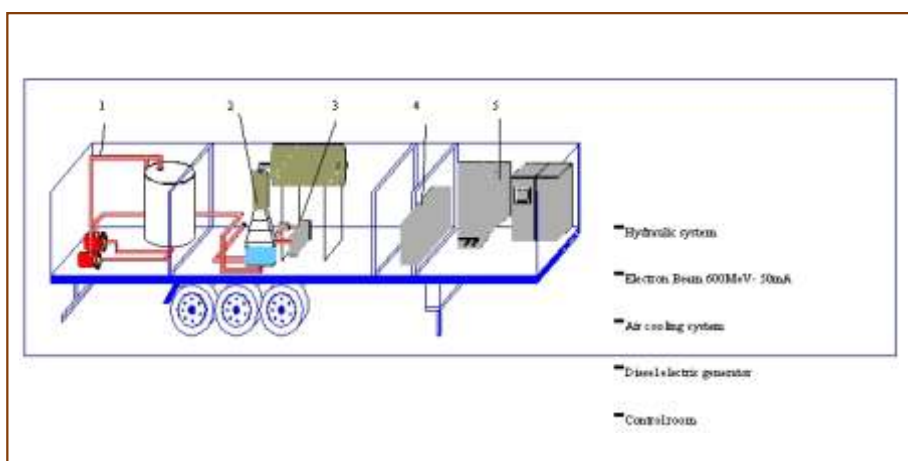


FIGURE 1 - Mobile EB Waste Water Treatment Facility.