

## DEVELOPMENT AND CONSTRUCTION OF A MOBILE ELECTRON BEAM ACCELERATOR TO TREAT AND RECYCLE INDUSTRIAL EFFLUENTS IN BRAZIL

In the world, there is a growing increase in the demand for water for human consumption, as well as the prioritization of the use of available water resources for public supply. The treatment of wastewater and industrial effluents by electron beam irradiation is a promising technique, however, not very widespread in Brazilian territory. The design and construction of a mobile unit by the Nuclear and Energy Research Institute (IPEN/CNEN), containing an electron beam accelerator of 0.7 MeV, 20 kW and 640 mm window is innovative to demonstrate the effects and positive results of this technology. The mobile unit will have as one of its main advantages the possibility of treating effluents in the place where the source is located, eliminating costs and bureaucratic problems associated with the transportation of waste, besides publicizing the technology in several places in the country. To implement the project, IPEN/CNEN has been consolidating partnerships with national and international companies. The resources for the development of the unit have been supplied by the Brazilian Innovation Agency (FINEP) and International Atomic Energy Agency, financing the "IAEA TC Project BRA1035 - Mobile electron beam accelerator to treat and recycle industrial effluents". The Institute has associated with a specialized company (Truckvan Industry) in an innovation project for the unit design and development. Several meetings have been realized with the company and the International Atomic Energy Agency experts, aiming the compatibility of the design and the exchange of information necessary for the project development. The idealized project divides the cart in the following modules: a) control room and laboratory for technical and scientific dissemination of the technology; b) industrial electron beam accelerator, hydraulic units, ventilation system, cooler and bunker with irradiation device; and c) transformer and power source supply. A 3D model study of the control room and laboratory space was done to facilitate understanding the internal distribution of the laboratory analysis equipment (Gas Chromatography Mass Spectrometry, Total Organic Carbon and UV-Visible Spectroscopy). The irradiation system with electron accelerators allows treating different types of effluents. Depending on the effluent, the amount of ionizing radiation energy required for treatment may vary, as well as the amount of treated effluent per day. For the construction of the mobile unit, the estimated cost is about US\$ 1.5 Million. The type of treated effluent, the treatment cost per m<sup>3</sup>/day and other information regarding the cost of maintenance and operation of the mobile unit are obtained from the Business Plan of the Mobile Unit.

### Affiliation

Nuclear and Energy Research Institute (IPEN/CNEN)

### Country or Int. Organization

Brazil

**Primary authors:** PAREJO CALVO, Wilson Aparecido (IPEN/CNEN); SOMESSARI, Samir Luiz (IPEN/CNEN); Dr LOPES DUARTE, Celina (IPEN/CNEN); Mr EDMUNDO SPRENGER, Francisco (IPEN/CNEN); FEHER, Anselmo (CNEN IPEN); Ms LAINETTI, Fabiana de Faria (IPEN/CNEN); Ms RACHE GASPAR, Renato (IPEN/CNEN); Mr BRAGA, Alcides (Truckvan Industry); Mr RODRIGUES, Marcos (Truckvan Industry); Dr OLIVEIRA SAMPA, Maria Helena (IPEN/CNEN)

**Presenter:** PAREJO CALVO, Wilson Aparecido (IPEN/CNEN)

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