

USING PLASMA TECHNOLOGY AS A NEW PROVEN DEVELOPMENT FOR TREATING RADIOACTIVE WASTE ON AN INDUSTRIAL SCALE

Jan Deckers
Belgopress Belgium

Abstract

The operation and maintenance of nuclear power plants, the nuclear fuel cycle in general, research laboratories and pharmaceutical, medical and industrial facilities generate low-level radioactive waste which, along with the historical radioactive waste from past nuclear activities, needs to be treated and stored, awaiting final disposal. Plasma technology offers a very effective way of treating this waste with a high volume reduction factor (VRF), free from organics, liquids and moisture, and meets without a doubt the acceptance criteria for safe storage and disposal. By means of a plasma beam of approximately 5000°C, the inorganic materials are melted into a glassy slag, containing most of the radioactive isotopes while the organic material is gasified and afterwards oxidized in an afterburner and purified in an off-gas cleaning system.

This paper describes the principles of plasma, the different waste feed systems, off-gas treatment and operational experience and future plasma plants. More specifically, it presents the new full-scale plasma facility for the treatment of radioactive waste at the Kozloduy Nuclear Power Plant in Bulgaria for which construction and assembly was finalized end of August 2016. It also describes in more detail the Site Acceptance Tests (SAT) of this facility.

This facility is designed and built as an EPC contract by the Joint Venture Iberdrola Ingeniería y Construcción (Spain) and Belgoprocess (Belgium).