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Transport and Disposal of a Gammacell 40 Irradiator containing Cs-137 Sources

This technical intervention involved the dismantling, packaging, transport, and disposal of a Gammacell 40 irradiator unit containing two sealed Cesium-137 (Cs-137) sources, each with an activity of 29 TBq. The irradiator was installed within the radiation-shielded bunker of a hospital facility and had reached the end of its operational life. The objective of the intervention was the safe removal of the sources and their return to the original manufacturer for final disposal, following all applicable national and international safety and transport regulations.

The operation was conducted using a certified Type B(U) container, model PO-02, which meets all international standards for the safe transport of high-activity sealed radioactive sources. Given the complexity and radiological risk involved, the intervention was carried out by specialized personnel with experience in the handling and transport of radioactive materials, under the supervision of radiation protection experts.

The process began with the preliminary securing of the work area, including radiological surveys and the setup of protective equipment and monitoring systems. Technicians first dismantled the outer metallic shielding (carter) of the irradiator, followed by the removal and disconnection of all internal electrical, mechanical, and control systems that served the unit. This phase also included the disassembly of auxiliary instrumentation and service components connected to the irradiator, ensuring that all potentially hazardous connections were safely deactivated.

Subsequently, attention turned to the core elements of the irradiator—the two source heads containing the Cs-137 sources. These components were carefully stabilized and secured to prevent any movement or risk of accidental exposure. The source heads were then disassembled using tools and procedures designed to minimize radiation dose to personnel, with continuous real-time dosimetry and shielding in place throughout the operation.

The sources were extracted from their original housing and each left in its respective head, in safe transport position. Once extracted they were immediately placed into the approved PO-02 transport container. The container was pre-verified for compliance and integrity, and the loading of the sources was executed following strict radiological protection protocols. After placement, the container was sealed and underwent a final series of radiological and structural checks to ensure that all regulatory conditions for transport were met.

The final phase of the operation consisted of the preparation and execution of the road transport of the radioactive package to the facility of the original source manufacturer. The transport was carried out in compliance with the specific authorizations obtained from the competent authorities. This included the submission of a prior notification as required by Article 186, paragraph 7, and Annex XXXIII of Italian Legislative Decree 101/2020, and the request for road transport authorization in accordance with paragraph 3.3 of Circular 162/96, which regulates the movement of radioactive materials in Italy.

Throughout all phases of the intervention, continuous radiological monitoring, environmental controls, and documentation were maintained to ensure full compliance with safety standards and to guarantee the protection of workers, the public, and the environment. This operation is a representative example of best practices in the decommissioning and secure transport of high-activity sealed radioactive sources, demonstrating the effective application of regulatory frameworks, technical expertise, and radiation protection strategies in the field of nuclear waste management.

Country or International Organization

Instructions

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