

Lasers in the Nuclear Industry

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Lasers have emerged as a highly effective tool in nuclear decommissioning, offering precision, safety, and efficiency. The decommissioning process involves dismantling nuclear power plants, research reactors, and other facilities exposed to radiation, requiring careful handling of hazardous materials. Lasers provide a non-contact method for cutting, segmenting, and cleaning radioactive structures, making them invaluable in this complex process.

One of the key applications of lasers in nuclear decommissioning is size reduction—cutting large structures into smaller, manageable pieces for efficient storage and containment. Traditional cutting methods like mechanical sawing or water jetting can generate secondary waste and increase radiation exposure to workers. In contrast, laser cutting delivers a high level of precision, minimizing waste and reducing the radiation risks to human operators. This is especially beneficial in high-radiation environments, where remotely operated lasers can protect personnel from direct exposure.

In addition to cutting, lasers play a crucial role in surface decontamination. Radioactive particles often cling to surfaces, making effective decontamination essential. Laser ablation, which removes surface contaminants without damaging the underlying material, is well-suited for this task. This dry process generates significantly less waste compared to traditional chemical or abrasive cleaning methods.

Furthermore, lasers are highly versatile and can be integrated with robotic systems to automate decommissioning tasks. This reduces the need for human intervention in hazardous environments, enhancing safety overall.

This presentation will highlight several real-world applications currently in use as part of the broader Nuclear Decommissioning Strategy. It will also provide an overview of the challenges, solutions, and showcase photos and videos of the processes in action.