

Advancing safe and sustainable nuclear practices

Nuclear energy plays a vital role in North America's energy landscape, accounting for 15-20% of total energy generation. In Ontario, this figure rises dramatically to nearly 60%. As governments work to modernize aging power stations and expand capacity, nuclear power is set to become even more critical in delivering sustainable, low-emission baseload energy. Globally, the demand for cleaner energy solutions is driving the adoption of innovative technologies like small modular reactors, which offer a more accessible and cost-effective alternative to traditional reactors.

Beyond power generation, North America is home to several nuclear research facilities, including the Whiteshell Laboratory, located 100 kilometers from Winnipeg, Manitoba. These facilities, along with active reactors, produce radioactive waste: highly toxic byproducts with no alternative use and a long radioactive decay period. Strict regulations ensure the safe containment and isolation of this waste, tailored to its risk profile.

Given the complexity of nuclear waste management, automation and innovation are transforming the industry. These advancements not only enhance efficiency but also reduce the risk of exposure and minimize potential errors, paving the way for safer and more sustainable practices.

Our approach

Automation uses robots, sensors, and machines to perform tasks that would otherwise be conducted by humans. These systems operate at faster speeds, significantly boosting productivity. They are also specifically designed and calibrated to perform certain tasks, usually focusing on repetitive or manual tasks, allowing the work force to be upskilled while reducing the risk of injury and errors. Although even the best systems can occasionally malfunction, these instances occur less frequently than human error and enhance precision – an essential factor in nuclear waste management.

Additionally, automation supports predictive maintenance through data collection. Sensors and machines send real-time data to monitor and optimize equipment uptime, helping to prevent costly shutdowns or delays. This approach allows the system to become scalable, capable of expanding as the business grows, which can improve overall project performance and business outcomes.

Eclipse Automation is a leading provider of automation solutions, committed to addressing current challenges while designing scalable systems. We combine the immediate project needs with the potential for future growth, ensuring our solutions evolve alongside changing business demands.



Robots boosting productivity



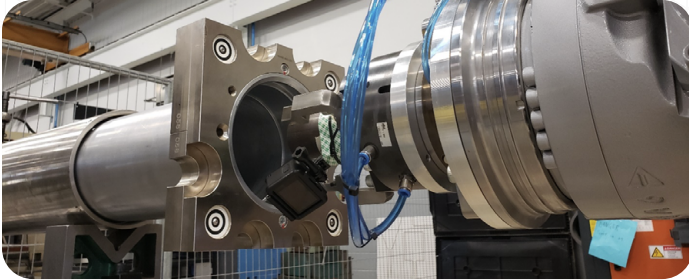
Nuclear research facilities



Leader in automation solutions

Whiteshell

Decommissioning and waste management at Whiteshell



Eclipse brought decades of nuclear expertise, combining industry knowledge with advanced automation to tackle the complex challenges of decommissioning, waste extraction, and recovery.

The Whiteshell facility housed a wide variety of contaminated materials, including gloves, lab coats, hand tools, and other radioactive waste. This waste ranged from low to elevated levels of radioactivity, requiring precise retrieval, sorting, and packaging to ensure safety and compliance.

To address these challenges, we collaborated with Whiteshell to design, manufacture, and assemble a custom retrieval system tailored to their needs. A remote manipulator system allowed operators to safely retrieve and sort waste without exposure to radioactive materials. Controlled from a secure room using hand controllers and live CCTV footage, the two-arm model enabled operators to oversee multiple objects or lift heavy items with ease. Mounted on a gantry system, the machinery could move across the facility to sort waste into low, intermediate, and high-level categories. The sorted waste was securely packaged in shielded storage cans for safe transport and long-term management.

Furthermore, the facility's remote location and extreme weather conditions posed additional challenges. Eclipse designed the equipment to operate reliably year-round, even in harsh winter conditions.

Another obstacle was the sheer weight of the machinery at over one million pounds (453,600 kg),

which made moving it between bunkers difficult. To overcome this, Eclipse partnered with Mammoet, a specialist in transporting heavy equipment. Together, they developed a self-propelled modular transporter with wheels designed for massive loads, enabling the machinery to move efficiently across the site.

The solution: Innovation and collaboration

Eclipse's deep expertise in the nuclear industry and automation allowed us to design and deploy a custom solution tailored to the complex waste management needs of the Whiteshell Laboratory. By understanding the technical requirements and operational goals, we developed scalable equipment capable of addressing the unique challenges of radioactive waste retrieval, sorting, and packaging.

Our innovative approach prioritized health and safety, environmental sustainability, and operational efficiency. The solution was designed to meet stringent industry standards while ensuring adaptability for future projects across North America's nuclear waste management sector.

The outcomes

Our commitment to client success extended beyond the delivery of custom equipment. We provided comprehensive training where personnel trained onsite at Eclipse facilities in Cambridge, Ontario, before the machine was finalized to ensure a smooth transition to active operations and minimizing operator errors. We conducted any integrated Systems Operations Testing with engineers and the client's team to ensure the equipment met all operational goals and to proactively predict and correct any errors. Finally, we added robust, advanced cybersecurity protections to mitigate risks associated with automated systems, which is a critical priority in the nuclear industry.

Eclipse Automation's ability to innovate and deliver tailored solutions resulted in a project that successfully addressed the client's needs while upholding the highest standards of safety, sustainability, and reliability.

Ready to get started?



Contact us today to see what's possible.

519-620-1906 | contact@eclipseautomation.com
www.eclipseautomation.com