Cincinnati Sub-Zero

Case Study

Custom Cold Environmental Chamber Enables Safe Handling of Depleted Uranium Hexafluoride for Federal Energy Program

CHALLENGE

A U.S. Department of Energy (DOE) contractor responsible for the safe handling and chemical conversion of depleted uranium hexafluoride (DUF6) needed a solution for material conditioning and transfer. Operating across two federally managed sites in Kentucky and Ohio, the organization supports the nation's environmental and nuclear material management initiatives by converting DUF6 into stable, reusable chemical forms.

The DUF6 conversion process involves handling large, heavy-duty cylinders (48Y) containing over 12.5 tons of material. These cylinders must be carefully conditioned in a controlled environment for chemical conversion. The contractor required an advanced system to cool, transport, and monitor these cylinders with precision and safety across multiple facilities.

SYSTEM HIGHLIGHTS

- **Distributed Airflow System:** Ensures consistent temperature distribution across the cylinder surface.
- **Floor-Mounted Transfer Rails:** Provides guided movement of the cart for secure cylinder entry and removal.
- **Custom Rail-Mounted Electric Cart:** Designed with integrated load cells to monitor weight changes during the process.
- **Wireless Control Interface:** Load cells and drive systems include a wireless pendant for remote operation and safety.
- **Structural Compliance:** Chambers built to IBC 2000 standards, with PC-2 rating for chambers and PC-1 for transfer carts.



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SOLUTION

A custom-engineered CSZ cold chamber system was designed to meet the complex demands of DUF6 conversion. The scope of this project included:

- Four Large Walk-In Conditioning Chambers 578 cu. ft. designed for industrial-scale cylinder pre-processing.
- Temperature range of +90°F to -25°F to for precise material conditioning.
- Motorized Transfer Cart with Load Cells, built to safely move 48Y cylinders weighing up to 36,000 pounds in and out of the chambers.
- Full compliance with DOE safety and infrastructure standards.





This solution ensures precise environmental control, accommodates heavy material loads, improve process throughput, and enhance operator safety.

The delivered systems support the DOE's mission to convert DUF6 into hydrofluoric acid for industrial reuse or safe disposal. Our team is proud to support federal energy programs by providing innovative, high-performance environmental testing and handling systems for critical applications.

