

Chemical Decontamination and Fluid Handling Services



Westinghouse is a global industry expert in decontamination and fluid handling processes, with proven abilities in decontamination and remediation work.

The company has an exceptionally skilled resource base, and continues to build on that skill set through relationships with expert groups and research organizations.

The chemical decontamination process was developed for commercial use in the late 1970s and early 1980s and has been used by Westinghouse for more than 30 years.

The Richland Service Center specializes in a variety of applications ranging from individual component to full-system decontaminations offering the following benefits:

- Significant reduction in personnel and site radiation exposure
- Reduction in radwaste volumes and costs
- Free release of materials
- Improved productivity
- Improved conditions and schedules for facility decommissioning

Our fluid handling services cover a wide range of offerings and applications, including:

- Chemical water purification
- Water filtration and sludge removal
- Reverse osmosis
- Biological remediation
- Fuel pool cooling (augmented cooling or independent cooling)

Westinghouse products and services are a key piece of your decontamination, decommissioning and remediation portfolio.

Process Setup Area





Products

Fluid Handling Services

Chemical Water Purification

The chemical water purification process uses ion exchange columns to remove ionic contaminants from water by absorbing the contaminants onto ion-exchange resin. Through a mixture of cation and anion-type resins, fluids are purified. The resins remove metal ions, organic acids, organic bases and biomolecules and can act as a deep bed filter. We also provide off-the-shelf columns for different ion exchange media, offering fully customizable solutions.

Water Filtration and Sludge Removal

Westinghouse can apply numerous methods and filtration systems that have been developed in field applications. Our capabilities include the following:

Capabilities	Advantages
Fuel desludging	Quick setup
Spent resin filtration	Minimal footprint for the application
Micron & sub-micron filtration	Customizable to a wide array of filtration demands and volumes
Ultra-purification	



Filter/ion exchange skid



Pump skid

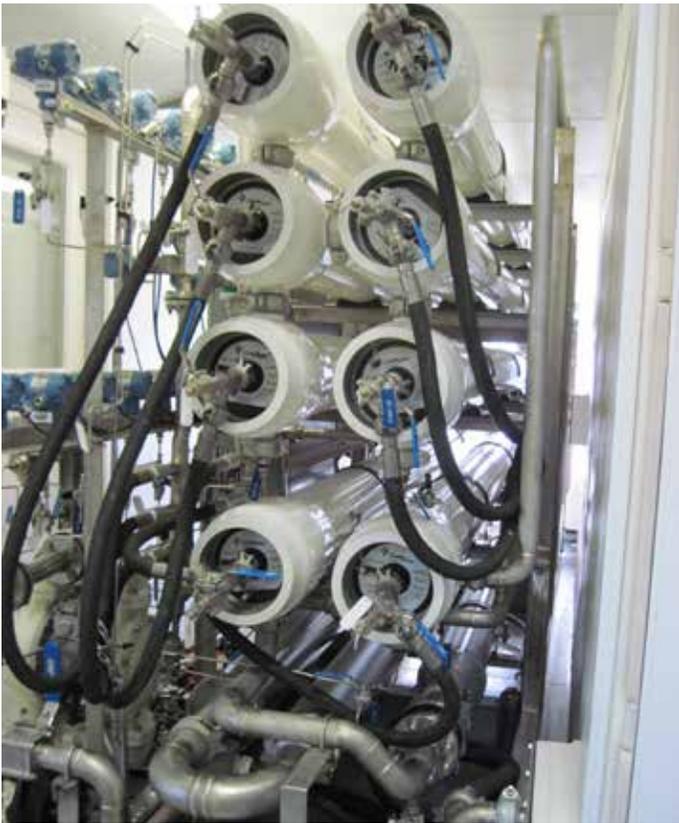


Filtration skid

Reverse Osmosis

The Westinghouse reverse osmosis (RO) system can be used to concentrate liquid waste to reduce its volume or purify a liquid stream to reduce contaminants. The RO system can operate at high pressures to concentrate spent advanced scale conditioning agent (ASCA) solvents and rinse waters, or at lower pressures to remove silica from borated water.

On its first project, the RO system reduced the waste volume inventory after an ASCA process application from 80,000 gallons of spent solvent and 80,000 gallons of rinse water to less than 15,000 gallons of concentrate which was shipped to a waste facility for disposal. The permeate met U.S. Clean Water Act Site National Pollutant Discharge Elimination System limits and was discharged through normal plant systems without the need for additional treatment.



Reverse osmosis filtration system

This unique system consists of portable equipment skids that are designed to be installed quickly and easily in convenient locations. The modular design of the pumps, filters and heat exchangers permits safe and reliable operation with redundant capability.



Portable cooling towers

Biological Remediation

Westinghouse has a two-phased approach to combat biological fouling in cooling systems. The first phase uses an oxidation step that kills the majority of the organisms responsible for the bio-fouling. The second phase uses chelating agents in a reducing environment to decompose and remove typical cooling water scales comprised of inorganic metal oxides and cemented fouling detritus. An added benefit is decomposition of a large fraction of the protective biomass that permits unimpeded solvent access to the metallic corrosion products beneath.

Fuel Pool Cooling Systems

The transfer of fuel from the reactor to the spent fuel pool (SFP) is delayed until the decay heat reaches a point where the SFP cooling can handle the heat produced. To eliminate lost time and cost, Westinghouse developed a comprehensive program tailored to minimize reliance on plant systems for decay heat removal.

We can design and install these systems as temporary systems during outages for operational plants or as permanent replacements of installed equipment to support decommissioning activities such as “cold and dark” or isolating a nuclear island when normal cooling systems are out of service.

Chemical Decontamination

Chemical decontamination is used to support the as-low-as-reasonably-achievable (ALARA) principle by general dose reduction. Any size system, from full reactor plant to small waste tanks and drain lines (hot spots), can be decontaminated.

We can perform chemical decontaminations for operating nuclear plants, plants planning for decommissioning and decommissioned plants. Chemical decontaminations are proven to more than offset cost by reducing all of the following: dose to workers, waste classification of removed components, transport and burial costs, and the administrative burden of managing higher dose exposures.

System	Application	System Volume
Mini	Small systems and components	Up to 50 gal
Intermediate	Partial systems and components	Up to 1,000 gal
Standard	Partial or sub-systems	Up to 25,000 gal
Full	Large or full-systems	Up to 105,000 gal



Manway adapter



Off the shelf, field-ready equipment

Facilities

Along with our portfolio of field services, the Richland Service Center facility can be used for a variety of fabrication projects, chemical mixing, maintenance, repair of hot equipment and laboratory testing. The facility includes the following:

- 5,000 sq. ft. chemistry laboratory/testing building
- Clean fabrication shop and hot maintenance shop
- Radioactive material storage building with a 30-curie broad-scope radioactive materials license
- 11,000 sq. ft. radioactive material storage building (13-ton overhead crane)

Field Equipment

All Richland Service Center equipment is stored field ready and is designed for expedited mobilization. The equipment is skid mounted and modular to reduce the amount of time required for setup on-site. Engineers and technicians who fabricate and maintain the equipment also are trained and experienced in operating it in all field applications. Lessons learned from operating experience are quickly incorporated into equipment modifications or new system fabrication to address safety and ALARA concerns. Most skids also contain automated controls to further reduce operator exposure. Our equipment has the following advantages:

- We maintain enough field-ready equipment to perform multiple projects simultaneously
- Equipment is interchangeable, so it can perform a variety of services
- Small footprint to assist in space allocation
- Designed to be situated by either a standard forklift or overhead crane

Experience

Westinghouse has vast chemical decontamination and fluid handling experience in many different environments, including:

- More than 45 BWR sites worldwide
- More than 25 PWR sites worldwide
- Seven decommissioned sites in the U.S. and Europe
- Five National Laboratories and regulatory organizations

Operational Commercial Nuclear Sites

We have an exemplary record of providing chemical decontamination and related services to operational commercial nuclear sites. Our experience includes:

- More than 150 sub-system decontaminations
- More than 75 component decontaminations, including:
 - More than 40 reactor coolant pump decons
 - More than 10 heat exchanger decons
 - Piping and other components
- Completed two full-system decontaminations of operating plants
- Twelve temporary pool/system-cooling projects
- Nine systems chemically cleared of biological fouling
- Six pool/systems filtered for clarity or purity

Decommissioning Sites

We have executed projects at commercial sites during decommissioning activities. Our experience includes:

- U.S. Sites
 - Five full-system decontaminations
 - Three sub-system decontaminations
 - Three SFP temporary cooling systems
 - Two systems filtered for clarity or purity
- European Sites
 - Two full-system decontaminations
 - One sub-system decontamination

Department of Energy Sites

For the various nuclear sites in the United States and abroad operated by government entities, our services can be implemented as part of a strategy to overcome past, current and future nuclear and environmental challenges. Our experience includes:

- Five National Laboratories performing various activities:
 - Water filtration
 - Test loop decontamination
 - Assessments for chemical cleaning
 - Sub-system and component decontamination

For more information about Westinghouse's chemical decontamination and fluid handling services, visit our website at www.westinghousenuclear.com.



Mini Decon Skid (MSD)

[www.westinghouse**nuclear**.com](http://www.westinghousenuclear.com)

