



# HLW Overpack Automated Welding System



## Automated Welding System

### Description

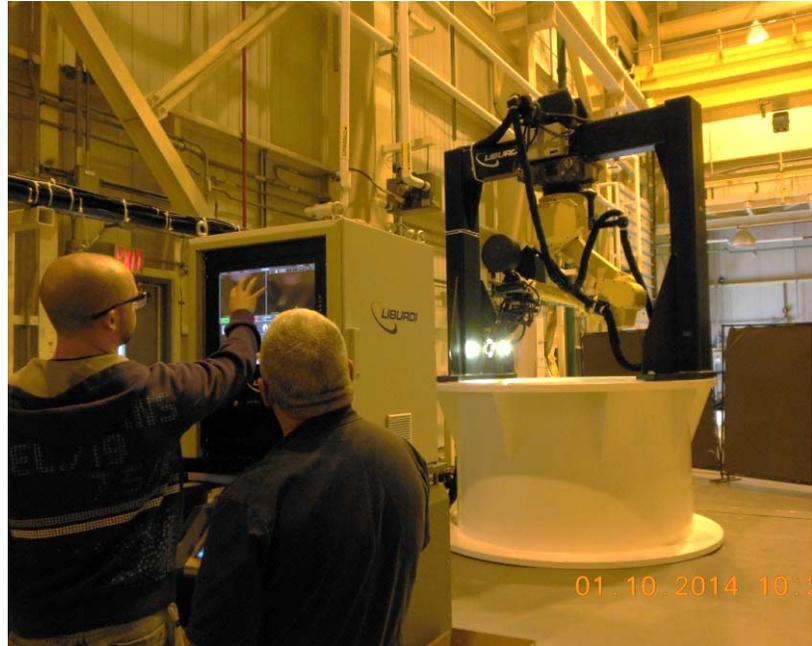
- Off-the-shelf system modified and constructed by Liburdi Automation for welding the WVDP's HLW Overpack lids in place
- Argon gas is used as a shield gas to produce a continuous high-integrity Tungsten Inert Gas (TIG) stainless steel weld
- Liburdi TIG welder head integrated with off-the-shelf articulating robotic arm
- Weld head is capable of delivering 500 Amp (600 Amp peak) electrical current
- Computer control console station integrates welder head/robotic arm assembly with pre-programmed operational controls
- Lead and lag rad-hardened weld cameras that are viewable from control console monitors

### Robotic Arm Features

- Off-the-shelf robotic technology applied for use in a radiological environment
- Range of motion on 6 pivot points enables precise weld head positioning

### System Benefits

- Repetitive precision welding that produces a high-integrity HLW Overpack seal
- Remote technology prevents radioactive exposure to welder operator



The HLW Overpack Automated Welding System is pictured above in a mockup used for operator training.

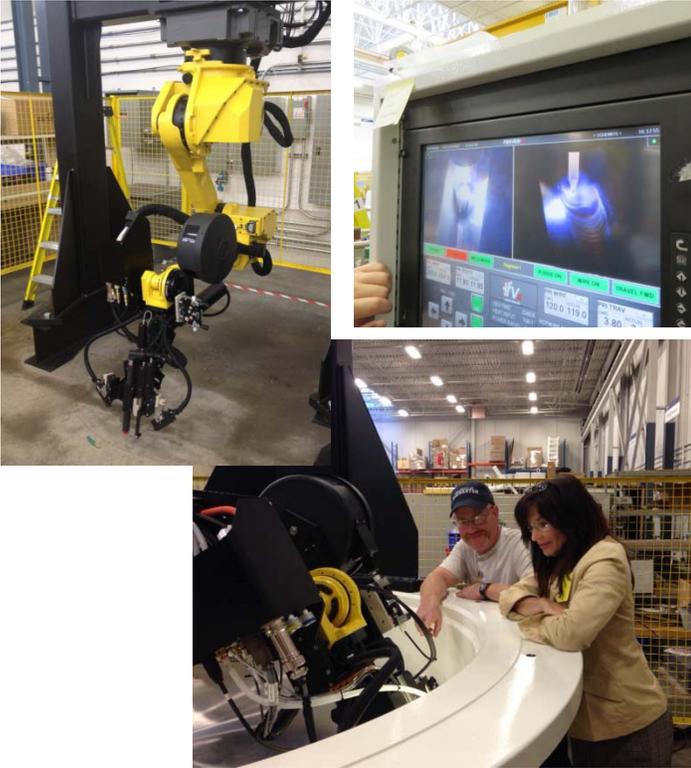
The West Valley Demonstration Project (WVDP) is preparing to package and relocate 278 canisters of vitrified high-level waste (HLW) from inside the Main Plant Process Building (MPPB) to a new on-site storage location. During canister packaging, five HLW canisters will be inserted in a single stainless steel Overpack that has been preloaded into a steel-lined concrete Vertical Storage Cask. The Overpack lids will be welded shut prior to relocating the Storage Cask assemblies to interim storage at the WVDP.

A robotically-operated Tungsten Inert Gas (TIG) welder has been specially designed and fabricated to seal the WVDP Overpacks closed. The welding process will be guided by qualified operators, who will control welder setup and operation using a touch screen computer control module. The computer interface is capable of monitoring and controlling welder amperage, voltage, travel speed, wire feed speed and the hot wire current. The articulating robotic arm's movement is also controlled by the computer control panel.

The welding process will involve multiple passes around the lid/Overpack joint to weld the container shut. The weld integrity will be verified and inspected to meet Quality Assurance parameters.



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The Automated Welding System (top left); The weld is viewed and recorded on a display terminal (top right); and a close-up of the arm and welder head in a welding mockup (above).



The Overpack lid (top photo) will be welded in place to provide a secure shipment-ready package.

## The Overpack Welding Process

Following remote loading of the HLW canisters into Overpack/Vertical Storage Cask assemblies, qualified operators will weld the stainless steel containers shut to form a secure, robust shipment-ready package. The following major welding steps will occur after the HLW canisters and the Overpack lid are in place:

- A removable shield plate is installed inside the Vertical Storage Cask on top of the Overpack lid
- The Overpack/Vertical Storage Cask assembly is moved to the Welder Station
- The robotic welder arm assembly is secured in place on the top of the Vertical Storage Cask
- Computerized manipulation (with operator oversight) of robotic arm locates and positions the welder head using 10 pre-programmed location points on the Overpack lid circumference
- The lid is welded in place with approximately 12 lbs. of stainless steel weld material deposited during approximately 5 welding passes around the lid perimeter. Each pass takes one hour to complete
- After the robotic arm/welder assembly is disengaged, the shield plate is removed and the cask lid installed and bolted into place prior to relocation to interim storage

### Automated Welding System Attributes

- Fully integrated robotic arm and welder head that provide a precision weld
- Dual camera setup delivers real-time visuals of leading and lag weld areas
- Pre-programmed welder operation parameters offers repetitive welding precision
- Full robotic operation that distances operators from welding sequence and minimizes exposure to radiological source

The West Valley Demonstration Project (WVDP) is a U.S. Department of Energy-led environmental remediation project located approximately 35 miles south of Buffalo, NY. CH2M HILL Babcock & Wilcox, LLC, (CHBWV) was formed to meet the specific requirements of Phase 1 decommissioning of the WVDP. The limited-liability partnership combines the experience and capabilities of CH2M HILL Constructors Inc. (CH2M HILL), Babcock & Wilcox Technical Services Group, Inc. (B&W), and Environmental Chemical Corporation (ECC).