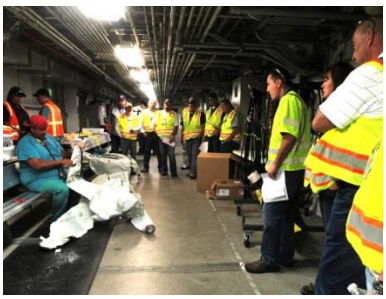
Adoption of Protective Equipment for Use Inside 242-Z at Hanford's Plutonium Finishing Plant Closure Project

Background:
The Department of Energy's Richland Operations Office (DOE) and contractor CH2M HILL Plateau Remediation Company (CH2M HILL) will leave a legacy of project delivery and risk reduction by safely and compliantly demolishing the Plutonium Finishing Plant (PFP) to its foundation. The Plutonium Finishing Plant was the primary facility for producing plutonium at Hanford from the 1940s to the 1980s and is nearing the final stages of cleanup, with the cleanup work now transitioning to some of the most complex and hazardous parts of the facility.

One of those facilities is the Americium Recovery Facility (242-Z), which is part of PFP. The Americium Recovery Facility was left heavily contaminated following a 1976 accident, in which an ion exchange column tank burst, showering an employee with plastic, glass, and radioactive material. The employee, Harold McCluskey, was in his 60s at the time and lived for 11 more years before dying from causes not related to the accident. The incident left the room highly contaminated, and few entries occurred over the years.

Cleanup:
From 2009-2011, cleanup of the Plutonium Finishing Plant and 242-Z received a boost thanks to funding from the American Recovery and Reinvestment Act. CH2M HILL employees entered 242-Z and began large-scale demolition efforts. They removed two of five glove boxes and associated piping. During this time, employees used supplied air systems and conventional personal protective equipment (PPE). High airborne contamination levels and conventional PPE limited stay times. Improved worker protection and increased efficiency for this work was needed.



Workers from the Department of Energy's Idaho and Hanford sites participate in a 2013 information exchange.

CH2M HILL assembled a team of PFP employees to research PPE options that would increase safety and efficiency at PFP, specifically inside 242-Z. The team represented a cross-section of PFP employees, including nuclear chemical operators, safety representatives, radiological control technicians, engineers and management. Upon learning of success performing similar high-hazard work at the Department of Energy's Advanced Mixed Waste Treatment Project (AMWTP) in Idaho, the team visited that site for a two-day information exchange.

The workers at AMWTP use a respirator called PremAire®, supplied by Mine Safety Appliances, that is fitted with a vortex cooling tube. Employees wear that respirator inside a fully encapsulating suit made by Rich Industries. The equipment offered improved protection from higher chemical and radiological concentrations and reduced heat stress on workers through the use of a vortex cooling tube.

Training and Application:
PFP employees returned to Hanford, continued to evaluate the equipment and recommended its use inside 242-Z. CH2M HILL management concurred with the workers' recommendations. In addition to

A CH2M HILL employee trains on equipment inside a mockup of the Americium Recovery Facility (242-Z) at the Hanford Site

procuring the suits and respirators, management purchased two Kaeser rotary screw breathing air compressors. None of this equipment had been used at Hanford before. Throughout the spring and summer of 2013, PFP workers developed advanced dress/undress training courses and trained coworkers on the equipment inside a full-scale replica of 242-Z, built at the Hanford Site's HAMMER Training Center.

In September 2014, workers entered 242-Z for the first time since 2011 to begin the final work toward cleaning out that room and preparing it for demolition. Stay times in the area are longer due to the increased protection from the high radiation levels (derived air concentration, or DAC) levels and the lower temperatures within the suit, protecting employees from heat stress.

A CH2M HILL employee wore specialized respiratory equipment and protective suits when entering one of the most hazardous rooms at the Hanford Site in September 2014, increasing protection from high radiation levels and heat stress.

More Information:
Department of Energy *OPEXShare:* Workers Refine New Equipment and Process Prior to Field Implementation
Video: Workers prepare to safely enter one of the most hazardous rooms at the Hanford Site

Technical Information:
Kaeser Rotary Screw Air Compressors

- Model ASD30T
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Provided by:
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Chesapeake, VA 23320
1-757-424-3967
Contact: Ray Ellis - ray@airsystems.com

Rich Industries Level B Outer Protective Suits

- Model 3907
- Hood-to-hood top seal on inside
- Hood top: 14 mil (.014") thick orange PVC
- 40 mil (.040") clear hood for 360 degree visibility
- Dow ® Barrier reinforced sleeves

- Enveloped knee pads with foam padding inserted to thickness as required
- One-way exhalation valves on all extremities
- Cooling tube for hood halo (cooling provided by vortex tube)
- Reinforced soles with Velcro® strap
- Front chest zipper/Velcro® configuration for entry/exit with double-pull lanyards

Provided by:
Rich Industries, Inc.
2384 Brightwood Rd SE
New Philadelphia, OH 44663
1-330-339-4113
Dave Patterson - info@richindustriesinc.com

Mine Safety Appliance (MSA) PremAire® Respirator System

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- FireHawk® slide to connect assembly regulator
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- 5 minute carbon escape bottle
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Paul Steiger - 1-509-939-1113