

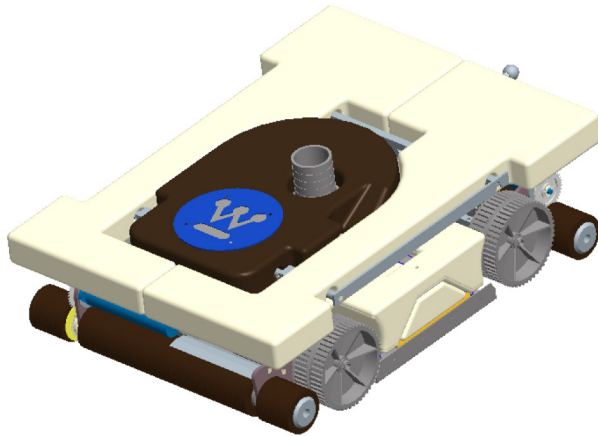
Underwater Decontamination Robot Reactor Vessel Pool Cleaning Services

Background

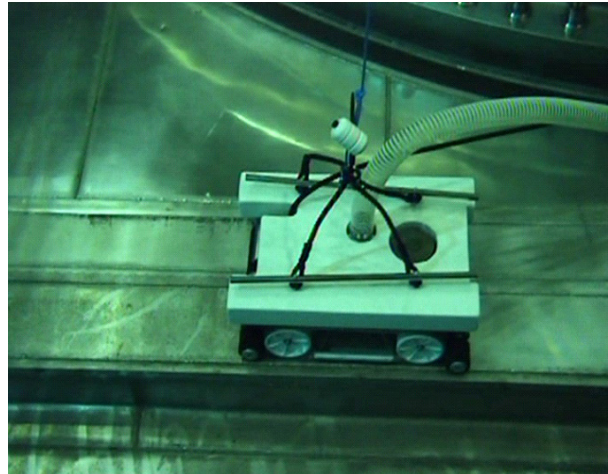
Nuclear utilities are constantly seeking improved methods and better tooling to decontaminate reactor vessel components. Westinghouse is helping to meet this need through development of the underwater decontamination robot (U-DEC™) pool cleaning system for both boiling water reactor (BWR) and pressurized water reactor (PWR) nuclear power utilities. Use of the U-DEC system equipment provides utilities the opportunity to decrease critical-path time while also reducing personnel dose.

Description

The U-DEC system is shipped in one Sea-Land® container (one truck). It has two individually driven decontaminating rollers. Setup and operation can be performed using as few as two personnel working on two shifts for 24-hour coverage. Access to an overhead crane is only required when moving the equipment into or out of the water. High maneuverability of the U-DEC system allows for easy access to cleaning surfaces. A reactor pool can be decontaminated in approximately one day. The U-DEC system may be operated in a recirculation mode or a once-through (flush) mode, depending on plant systems and cleaning requirements.



Underwater decontamination robot



Typical BWR shroud interface

Benefits

The U-DEC system design and technology provide innovative capabilities and benefits. Based on information from a Nordic BWR outage example, Westinghouse customers will benefit from using the U-DEC system in the following ways:

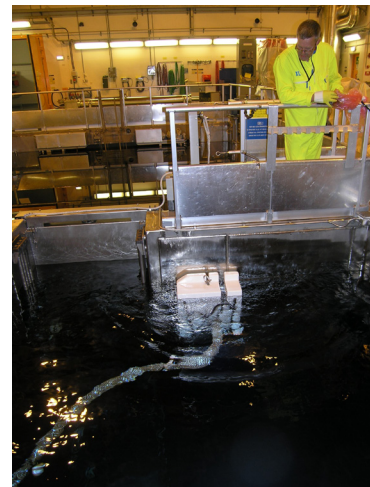
- Reduced outage time
 - Two previous site implementations demonstrated approximately three hours reduction on critical path compared to normal duration of manually performed pool decontamination
- Reduced dose
 - The manual decontamination team (six people) worked three hours less in the drained pool as a result of using the U-DEC system before draining the pool
- Improved ergonomics and working environment
 - Remote-controlled cleaning
 - No risk of falling, tripping or slipping
 - No specific need for personal protective equipment
- High maneuverability of the U-DEC system allows for easy access of cleaning surfaces
- Debris, cleaned from pool walls and bottom, and contaminated water are both evacuated by an integrated pump system
- Access to an overhead crane is only needed when moving the equipment into or out of the water

Experience

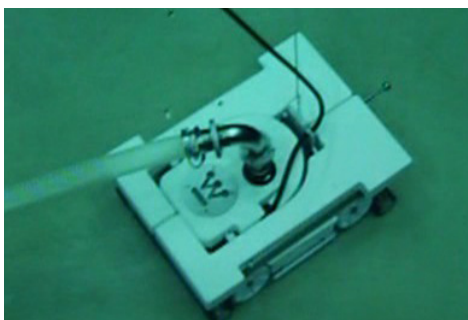
During a recent deployment of the U-DEC equipment, the following extract was obtained from the customer's outage log:

- Water level residue line cleaning
 - Water level residue line not cleaned before use of the U-DEC system:
200 – 3800 kBq/m²
 - Water level residue line cleaned with the U-DEC system:
>80 percent below 60 kBq/m²
- Wall cleaning
 - Walls not cleaned before use of the U-DEC system:
300 – 2600 kBq/m²
 - Walls cleaned with the U-DEC system:
>90 percent below 70 kBq/m²

In addition, areas where the U-DEC equipment was used for cleaning did not require additional manual decontamination.



U-DEC system refuel floor pool cleaning



U-DEC system cleaning top head



U-DEC system cleaning cavity walls



Underwater decontamination robot

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