

# Hydraulically Operated CEA Extension Shaft Coupling/Uncoupling Tool (SCOUT)

## Background

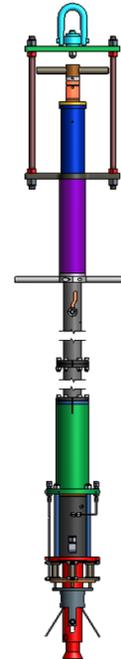
Westinghouse has developed the hydraulically operated control element assembly (CEA) extension shaft coupling/uncoupling tool (SCOUT), an innovative tool designed to improve the extension shaft coupling and uncoupling process at most Combustion Engineering-designed nuclear power plants. The mechanically actuated CEA extension shaft coupling/uncoupling tool has fulfilled the needs of the Combustion Engineering nuclear power plant fleet for many years.

The CEA coupling/uncoupling process typically occurs during critical path. If uncoupling or coupling is performed incorrectly, it can lead to either CEAs being removed from fuel assemblies during upper guide structure lift or the inability to raise the CEA out of the fuel during initial startup. This leads to increased outage time and the possibility of having to again disassemble the reactor vessel head.

## Description

The SCOUT is a semi-automated system that reduces the chance of human performance errors, and increases productivity and safety for both the workers and site equipment.

The SCOUT utilizes a hydraulic cylinder to pull the plunger-operating rod of the CEA extension shaft, replacing the existing manual ball screw design. Several features are included to keep the SCOUT positively latched onto the CEA extension shaft, eliminating the chance of accidental dropping. The SCOUT is powered by a stand-alone hydraulic unit and operated with the use of a user-friendly handheld pendant.



SCOUT full length (shown unlatched)

## Benefits

The SCOUT provides:

- A reduction of 30 to 50 percent in coupling/uncoupling time and accrued dose
- Fewer manual-tool operations to reduce likelihood of human performance errors
- All controls included on a handheld pendant for reduced worker fatigue
- Constant visual verification of extension shaft plunger height utilizing scribe lines



SCOUT and hydraulic unit (pendant shown as the yellow unit in the photo)

- Constant positive engagement of “L-slots”
- Fail-safe air cylinders for positive latch engagement on “J-slots”
- Flags for visual indication of engagement of “J-slots”
- Built-in spring hanger to reduce worker fatigue
- Minimized pinch points
- Plunger adapter handle grooves for visual verification of couple/uncouple indication
- Stronger materials for “L-slot” and “J-slot” pins
- Lightweight design and ease of assembly/disassembly for storage or shipping
- De-ionized water for hydraulic fluid to minimize cleanup efforts in the event of a hydraulic leak
- Requirement of only 120VAC, 15 amp electrical power and 80-110 psi supply air
- Minimal setup time
- Construction of corrosion-resistant, lightweight materials
- Pump and control box on a hand truck for ease of transport
- Hand truck handle that collapses for reduced storage space

## Deliverables

- SCOUT
- Hydraulic unit
- Handheld pendant
- Contingency release tool
- Westinghouse field operating procedure

## Experience

The SCOUT has been successfully operated at two nuclear plants in the United States as of November 2012.

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