U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Salt Waste Processing Facility Project Status and Path Forward

Pam Marks, Federal Project Director
Salt Waste Processing Facility

September 2018

SWPF Project Overview

Salt Waste Processing Facility (SWPF)

This critical facility will:

- Reduce radioactive waste volume requiring vitrification;
- Utilize the same actinide and cesium removal unit processes as Interim Salt Processing Facilities (Actinide Removal Project/Modular Caustic Side Solvent Extraction Unit);
- Process over 90% of Tank Farm liquid radioactive waste (~100 Mgal after dissolution); and
- Have a nominal capacity of 6 – 8 Mgal/year (or better!)

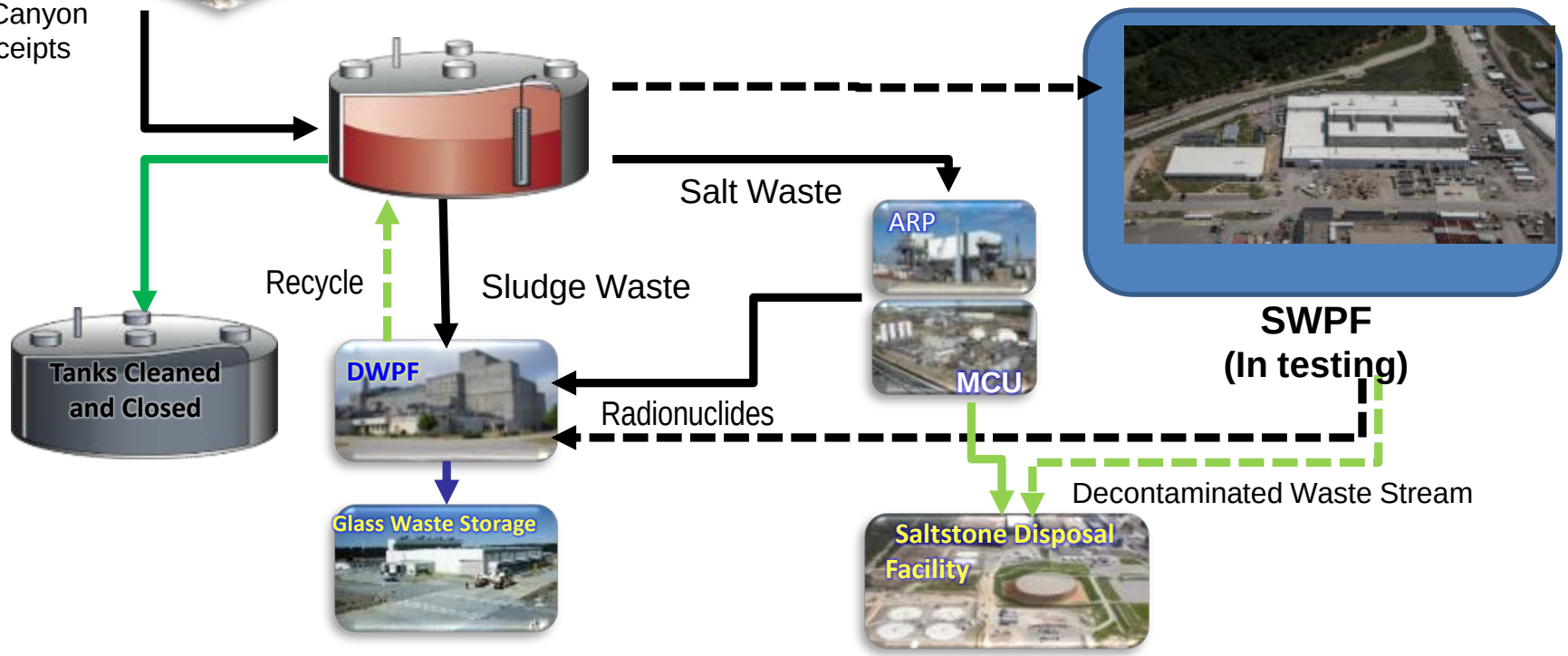
Liquid Waste System

Legend:

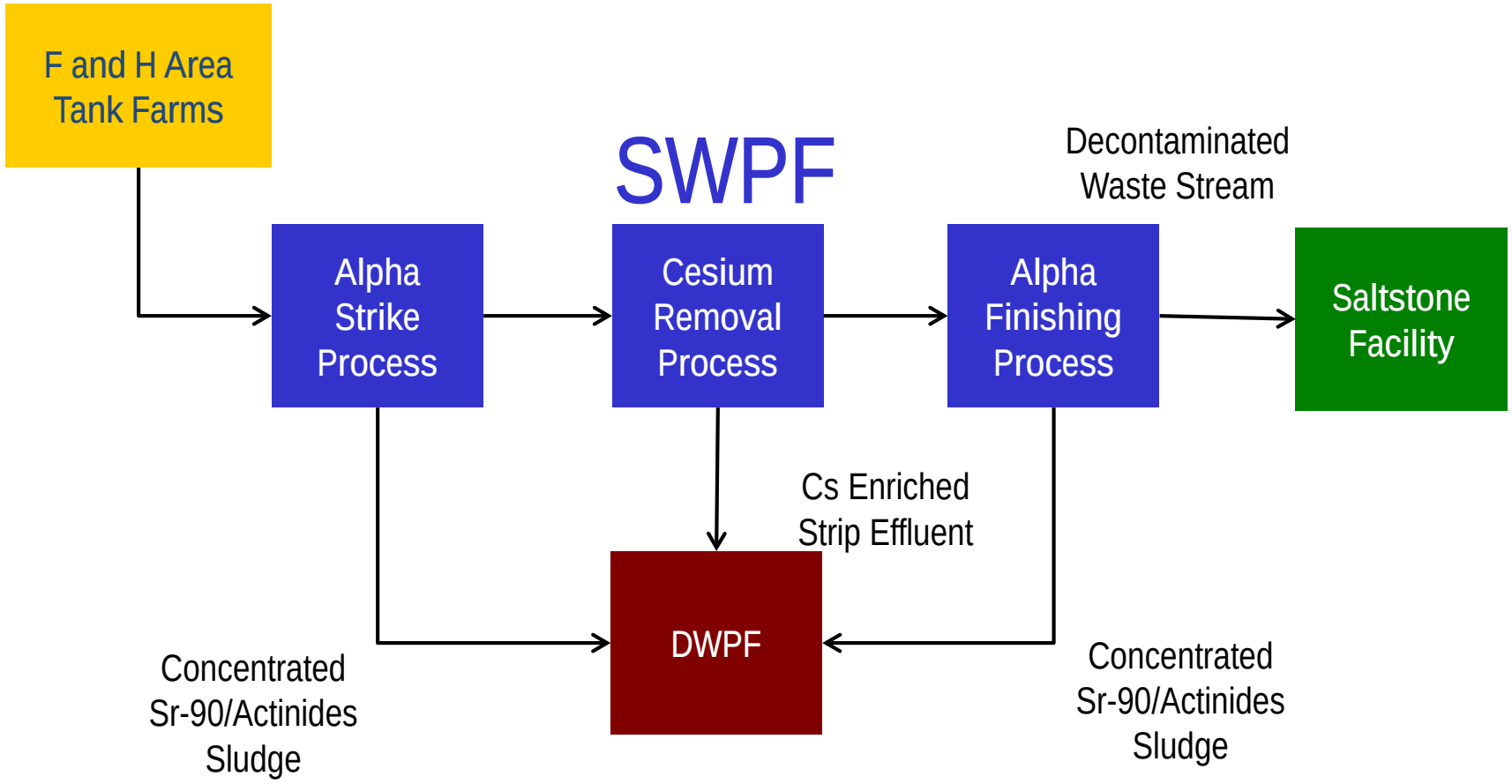
ARP	Actinide Removal Process
DWPF	Defense Waste Processing Facility
MCU	Modular Caustic Side Solvent Extraction Unit
SWPF	Salt Waste Processing Facility

SWPF

- ✓ Designed to Process more than 6 millions gallons per year
- ✓ Cs Decontamination factor > 40,000
- ✓ Technology is very mature
- ✓ No open Defense Nuclear Facilities Safety Board issues



SWPF Process Overview

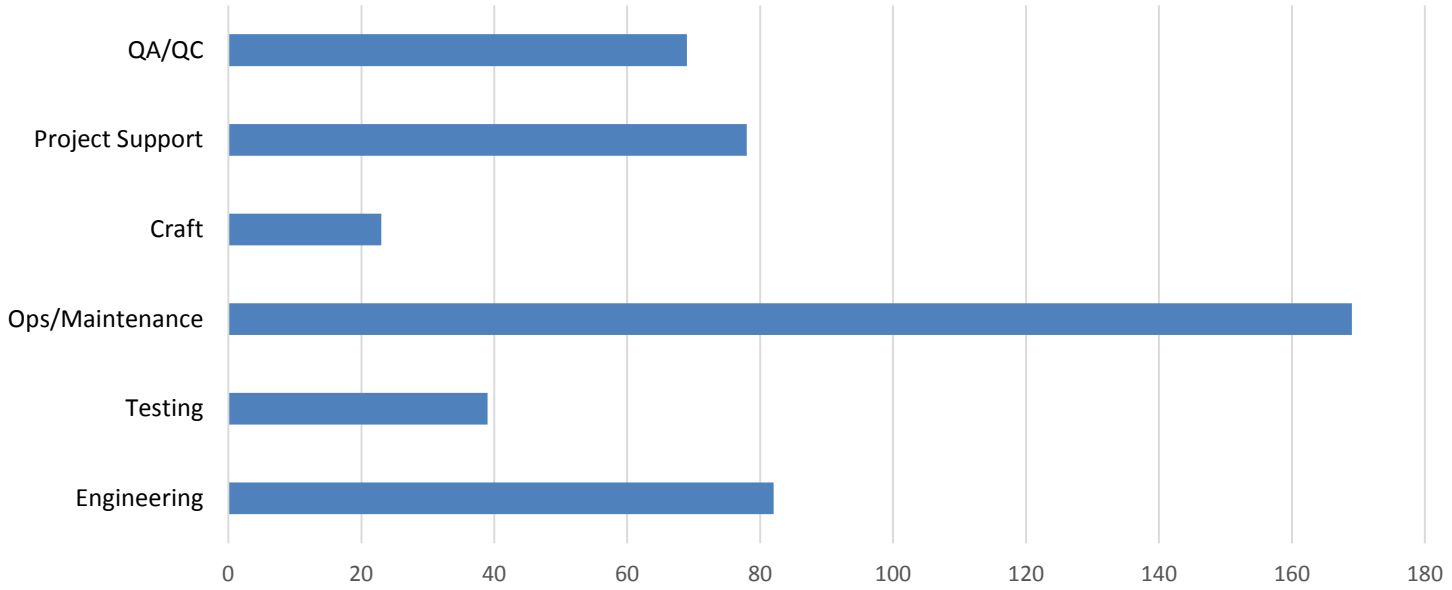


SWPF Facility Statistics

SWPF Stats			
Area	~140,000 sq.ft	Rebar	~4,600 tons
Basemat	8 ft. thick	Actuated Valves	~1,000
Concrete	~40,000 cubic yards	Manual Valves	~3,000
Pipe	~23 miles	Instruments	~1,500
Welds	~74,560	Tanks	85
Wire and Cable	~816,690 LF	Pumps	116

Salt Waste Processing Facility

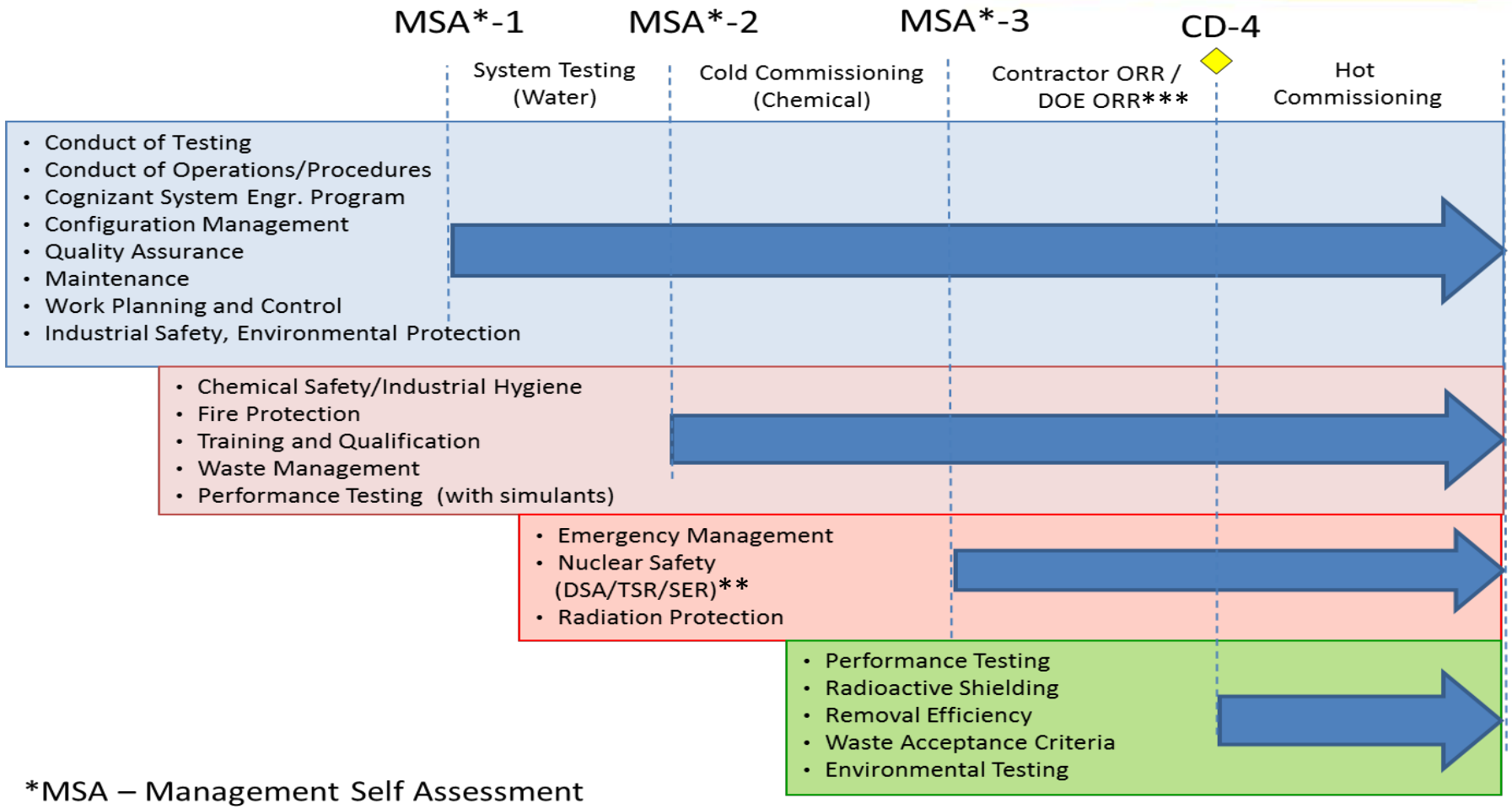
- Parsons is the contractor for the SWPF project (design, construction, testing & commissioning, and operations for one year)
- Current workforce of ~460



Additionally, there are 40 staff and 10 craft members working on Next Generation Solvent (NGS)

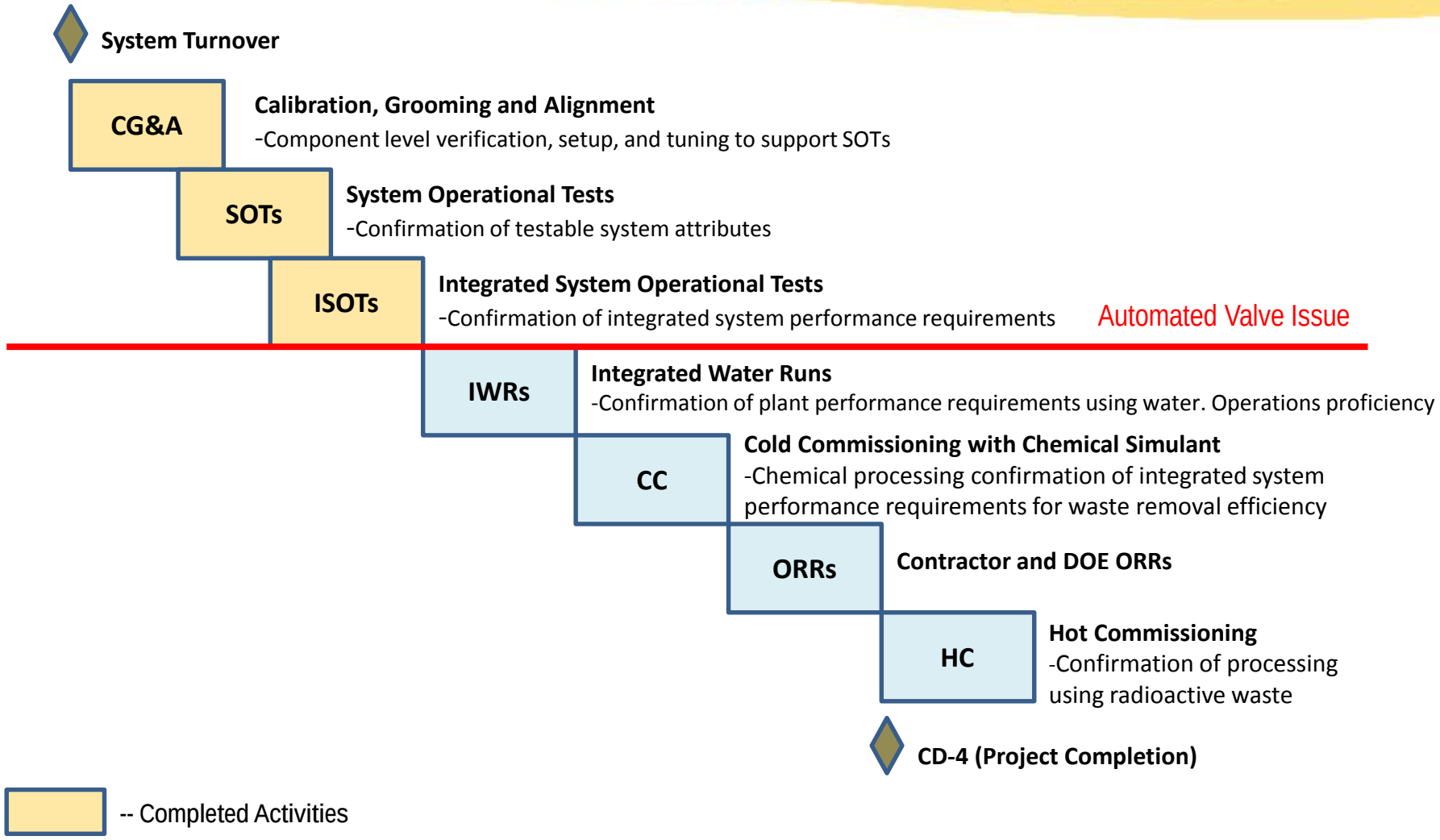
SWPF Testing & Commissioning Status

Testing & Commissioning Program: Safety Management Programs



*MSA – Management Self Assessment
**Documented Safety Analysis/Technical Safety Requirements/Safety Evaluation Report
***MSA-3 and ORR include integration with LW contractor

Testing and Commissioning Approach



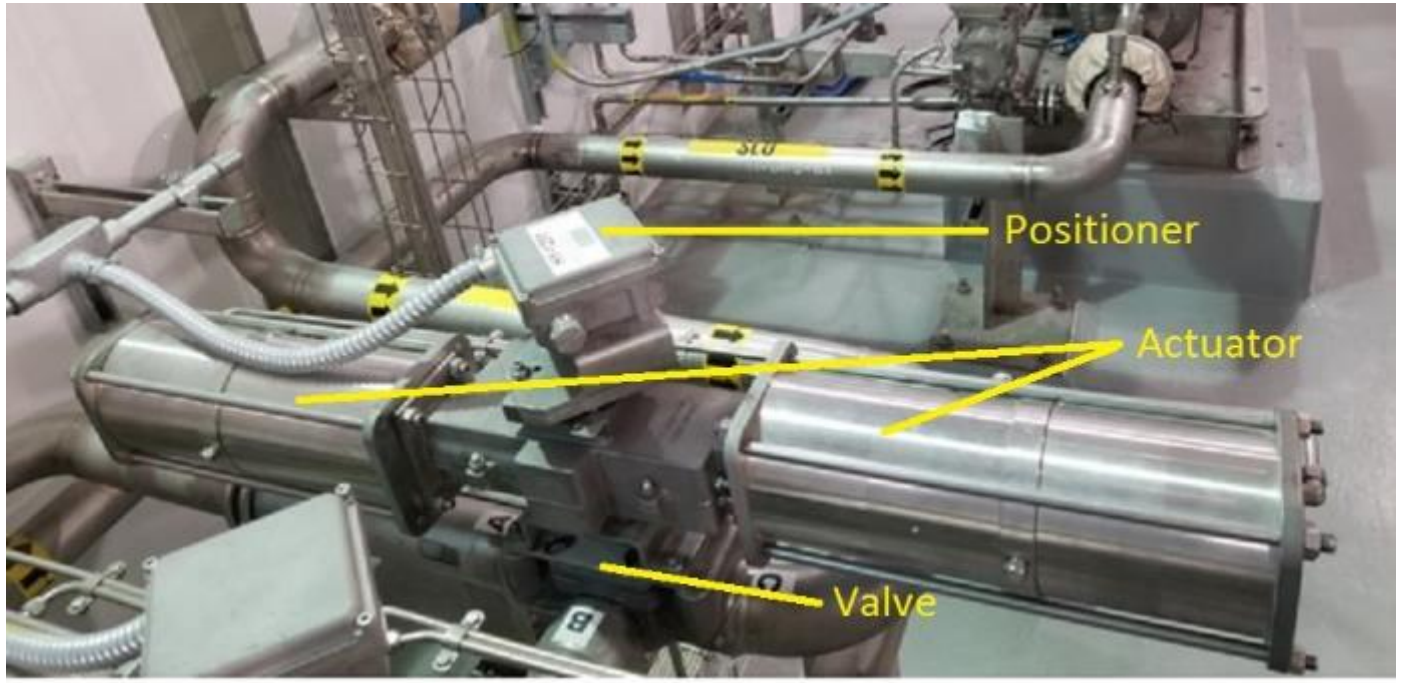
Valve Controller Issues

Initial Identification of Valve Controller Issue

- Valve controllers successfully tested during Calibration, Grooming, and Alignment (CG&A)
- During start-up testing, various performance issues were encountered with the Westlock EPIC valve controllers, which were initially attributed to human error
- The performance issues were generally manifested as intermittent loss of communication between the valve controller and the BPCS (Basic Process Control System) that resulted in the valve going to its failed state position and/or losing the ability to be repositioned by the BPCS
- A Post Incident Review of a tank overflow of water due to a controller issue lead to Operations initiating a tracking log of controller issues
- The tracking log revealed that the vast majority of the controller issues were limited to the Westlock EPIC model controller
- The identification of the EPIC controller issue resulted in an evaluation and technical report of the issue by Parsons, Westlock, and DeltaV technical experts

SWPF Air-Operated Valves

- SWPF Valve Stack-up consists of three components:
  - The Valve
  - The Air Operated Actuator
  - The Westlock Positioner/Controller (Operated from the control room via computer (DeltaV software)



SWPF Air Operated Valves (con't)

- Approximately 700 SWPF valves positioned by one of three types of Westlock Positioner:
  - ☑ FPAC Positioners (~75) – After initial troubleshooting all operating reliably
  - ☑ ICOT Positioners (~150) – After control board upgrades, all operating reliably
  - ☒ EPIC Positioners (~450) – Continue to experience temporary loss of communication and valve control with a number of these positioners
- On 3/16/18, Parsons issued a Westlock Controller evaluation technical paper after on-site consultation with Westlock and DeltaV technical experts. The paper concluded that the EPIC controller issues, in conjunction with Westlock deeming the product line no longer serviceable, indicated replacement was warranted.

Path Forward

- On 4/16/18, Parsons issued Letter Reference Number: 00-700-26486 , *Impacts of Realized Risk Associated with Westlock Controllers and Recommended Path Forward*. In this letter, three options were presented to address the controller issue:
  - **Option 1 – Phased Partial Replacement Approach** whereby a subset of EPIC valve controllers would be replaced to allow chemical introduction and systemization of the CSSX System. The remaining controllers would be replaced opportunistically
  - **Option 2 - Campaign Approach** to replace all EPIC controllers with ICOT or FPAC controllers, prior to introduction of chemicals into the plant
  - **Option 3 – Parallel Full replacement Approach** where EPIC controllers are replaced only as they fail to function or when they can be opportunistically replaced
- Option 2 was selected by Parsons as the safest approach and an approach which would provide significant collateral benefits to the operational posture of the SWPF
- DOE has concurred with this approach

Path Forward (con't)

- Switching all EPIC controllers to reliable ICOT/FPAC controllers requires the following:
  - Engineering Design Changes
  - Procurement of upgraded ICOT/FPAC controllers and installation materials
  - BPCS software changes – required to support the functionality of the new controllers
  - Work Packages:
    - Construction Work Packages for controller installation
    - Maintenance Work Orders for controller testing and tuning
- Status of the EPIC Controller Replacement Program:
  - Installation of replacement controllers commenced on 5/7/18
  - All needed replacement controllers, including spares, have been received from the vendor
  - As of 7/18/18, 185 controllers or ~41% of the total have been replaced and passed post maintenance testing

Path Forward (con't)

- Next Steps Include:
  - Develop new Target CD-4 date:
    - FPD to review and approve Parson's Baseline Change Proposal
    - Update Project Risk Register to reflect changes
  - Monitor replacement controller delivery/installation schedule
  - Negotiate contract modification
  - Implement Obsolescence Program

Note: The SWPF baseline CD-4 date of January 31, 2021 and the Total Project Cost of $2.3B approved by Deputy Secretary of Energy in August 2014 remains bounding. Impacts to both cost and schedule from the valve controller replacement are still well within the approved baseline.

Next Generation Solvent

SWPF Continuous Improvement Opportunity- Next Generation Solvent

- Parsons has successfully conducted full scale Caustic Side Solvent Extraction system testing with NGS
- MCU hot pilot plant is currently successfully implementing NGS
- NGS testing indicates that significant SWPF plant throughput improvement is possible
- NGS throughput enhancements could significantly accelerate critical path salt waste processing thereby facilitating large life cycle cost savings
- Baseline Change Proposal approved on 1/8/18
- Waste Water Permit application to allow installation connections to tanks and was issued in late June 2018.
- Building structural steel deliveries are complete and structural steel erection will be complete before the end of July 2018.
- 27.6% complete through April 2018
- Scheduled to Complete December 2018

NGS Building Pad Prior to Concrete Placement

NGS Building Pad During Concrete Placement (Concrete Pad Complete)

Looking to the Future/Path Forward

The SWPF Project is poised for continued success:

- Continued commitment to protection of the public, the worker, and the environment
- No significant technical or regulatory issues
- Consistent and strong management team – both DOE, Parsons, and SRR
- DOE, Parsons, SRR, SRNS, and SRNL working very well together for the integrated solution
- Savannah River Site uniquely positioned for a complete LW clean-up solution – once SWPF is operational all pieces will be in place