U.S. DEPARTMENT OF ENERGY

SRS

Office of Environmental Management
Salt Waste Processing Facility
05-D-405

Presented by:

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Scope

This Salt Waste Processing Facility (SWPF) project scope included design, construction, and cold commissioning to safely separate the high-activity fraction from the low-activity fraction of the radioactive liquid salt waste stored in underground tanks at Savannah River Site (SRS).

All scope objectives and Key Performance Parameters (KPP's) for this project have been met.

Project Background, Mission, and Objectives

Background

- In 2002, Parsons was selected to design, build, and operate the SWPF for one year.

Mission

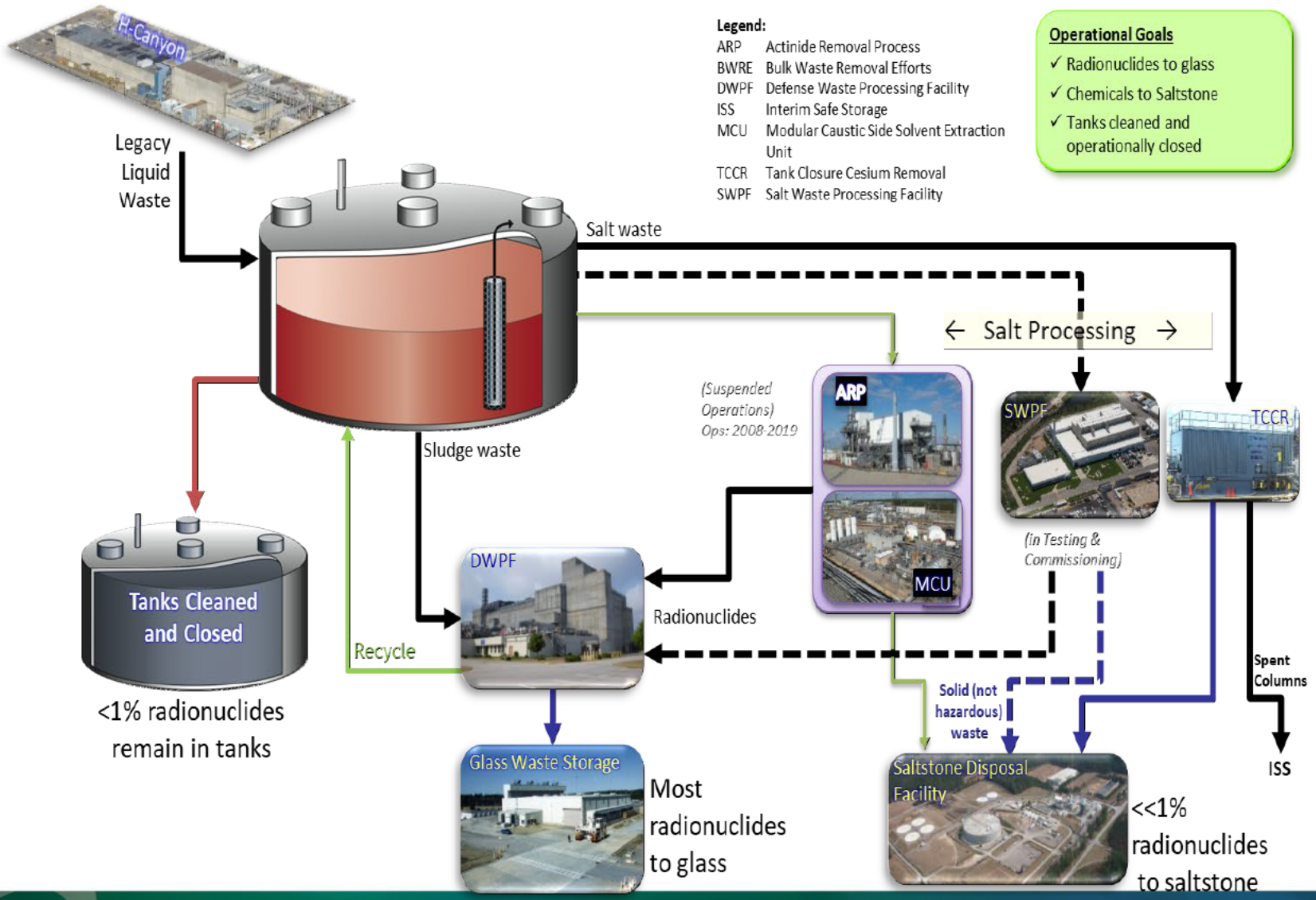
- Provide facility that reduces radioactive waste volume requiring vitrification that:
  - Separates low volume/high activity waste [Strontium (Sr), actinides, & Cesium (Cs)] for treatment at Defense Waste Processing Facility (DWPF)
  - Separates high volume/low activity salt waste treated and disposed of at the Saltstone Production Facility (SPF)

Objectives

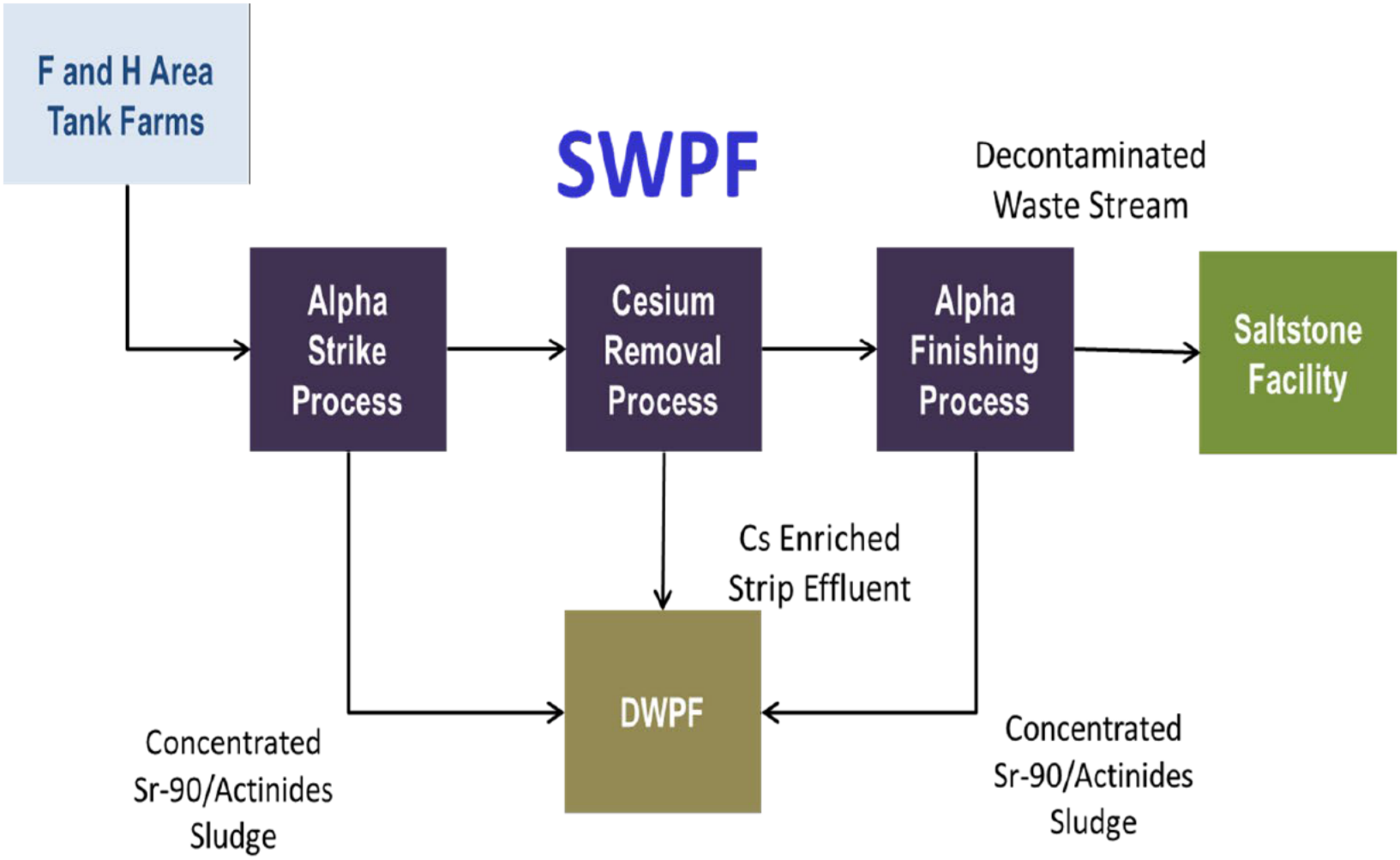
- Driving factor to meet State regulatory tank closure commitments
- Reduces the number of vitrified canisters thus reducing life-cycle costs
- Mitigates key Waste Disposition Program risks

SWPF- Salt Waste Processing Facility
Sr – Strontium
Cs – Cesium
DWPF – Defense Waste Processing Facility
SPF – Saltstone Production Facility

SWPF and the SRS Liquid Waste System



SWPF Process Overview



SWPF – CSSX/CCA

CSSX - Contactor Room

The Caustic-Side Solvent Extraction (CSSX) removes Cs from aqueous liquid waste via transfer to an organic solvent mixture that includes an extractant custom-designed to be highly selective for Cs.

Cold Chemical Area

The Cold Chemical Area (CCA) consists of process support equipment to store and transfer acids, caustics, process water, deionized water, and Monosodium Titanate (MST).

SWPF- Salt Waste Processing Facility
Cs – Cesium
MST – Monosodium Titanate

CSSX-Caustic-Side Solvent Extraction
CCA-Cold Chemical Area

SWPF – AFF/CPA

Alpha Finishing Facility

Alpha Finishing Facility (AFF) removes actinides and Sr by adsorption onto MST and filtration.

CPA-Operating Deck

The Operating Deck in the Central Processing Area (CPA) contains instrument racks and pulse mixer enclosure rooms that are above the dark cells. The process tanks in these cells contain the the High Curie Liquid Waste being processed by SWPF.

SWPF- Salt Waste Processing Facility
Sr – Strontium
CPA – Central Processing Area

AFF – Alphas Finishing Facility
MST – Monosodium Titanate

SWPF - Laboratory

The Analytical Lab is comprised of four individual labs:

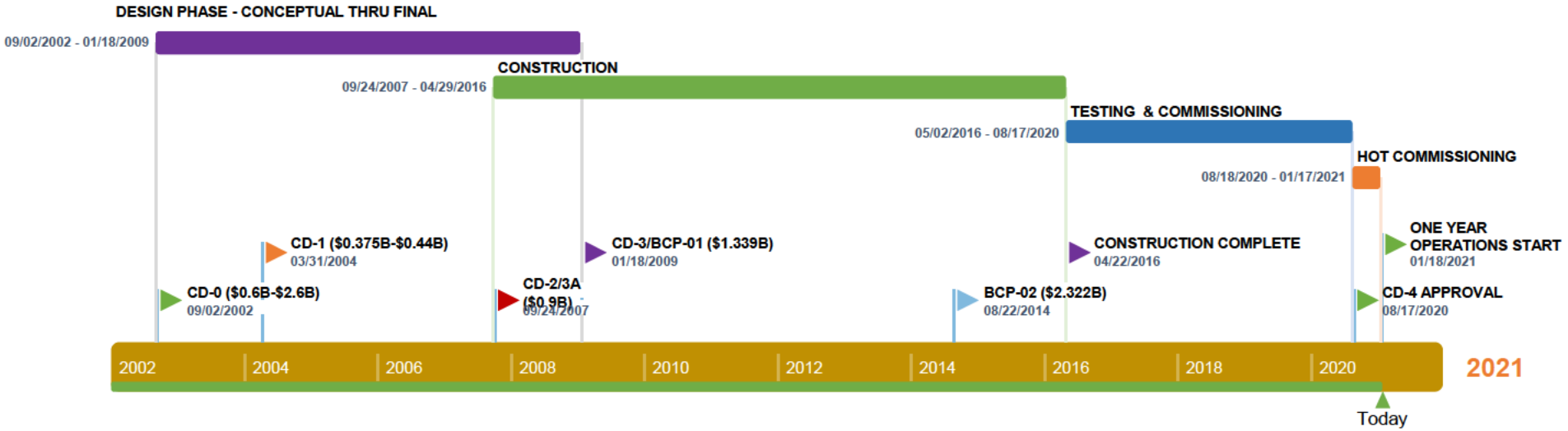
- Organic Lab
- Inorganic Lab
- Radiochemistry Lab
- Hot Lab

Hot Cell Manipulators

Radio Chemistry Lab

SWPF- Salt Waste Processing Facility

SWPF Timeline



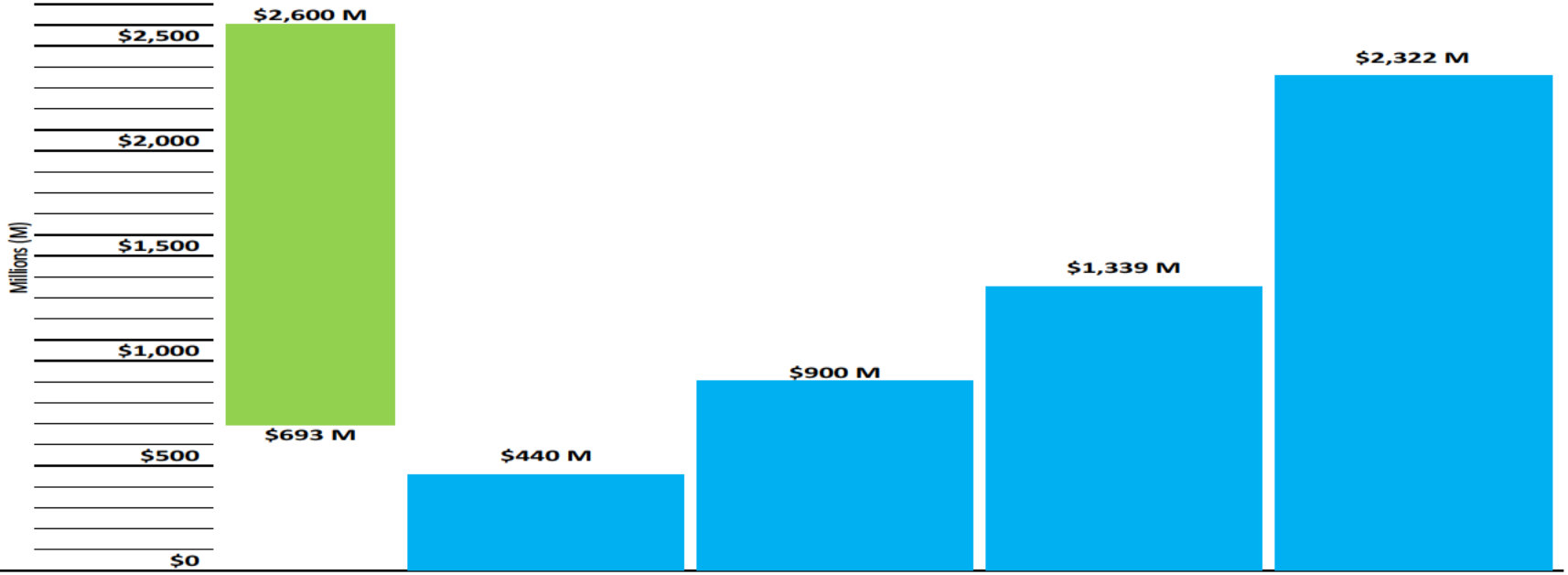
Critical Decision History

- CD-0, *Approve Mission N*eed, was approved by Carolyn L. Huntoon, Acting Assistant Secretary for Environmental Management on June 25, 2001
  - *Cost Range $600 Million (M) to $2.6 Billion (B)*
- CD-1, *Alternative Selection & Cost Range*, was approved by Kyle E. McSlarrow, Deputy Secretary of Energy on August 12, 2004
  - *Approval of SWPF employing the CSSX Process.*
  - *Cost Range $375 M - $440 M*
- CD-2/3A, *Approve Performance Baseline/Long Lead Procurem*ent, was approved by Clay Sell, Deputy Secretary of Energy on September 24, 2007
  - *Total Project Cost (TPC) $900 M*
  - *CD-4 Date November 2013*
- Baseline Change Proposal - 1 (BCP) and CD-3, *Approve Start of Construction or Execution*, was approved by Jeffrey F. Kupfer, Acting Deputy Secretary of Energy on January 12, 2009
  - TPC $1,339 M
  - CD-4 Date October 2015
- BCP-2 approved by Daniel Poneman, Deputy Secretary of Energy on August 22, 2014
  - Current Baseline, BCP-2
  - TPC $2,322 M
  - CD-4 Date: January 31, 2021
- CD-4, *Approve Start of Operations or Project Completion,* was approved by Mark Menezes, Deputy Secretary of Energy on August 17, 2020
  - TPC $2,269M

CD – Critical Decision
M – Million
B – Billion
SWPF – Salt Waste Processing Facility

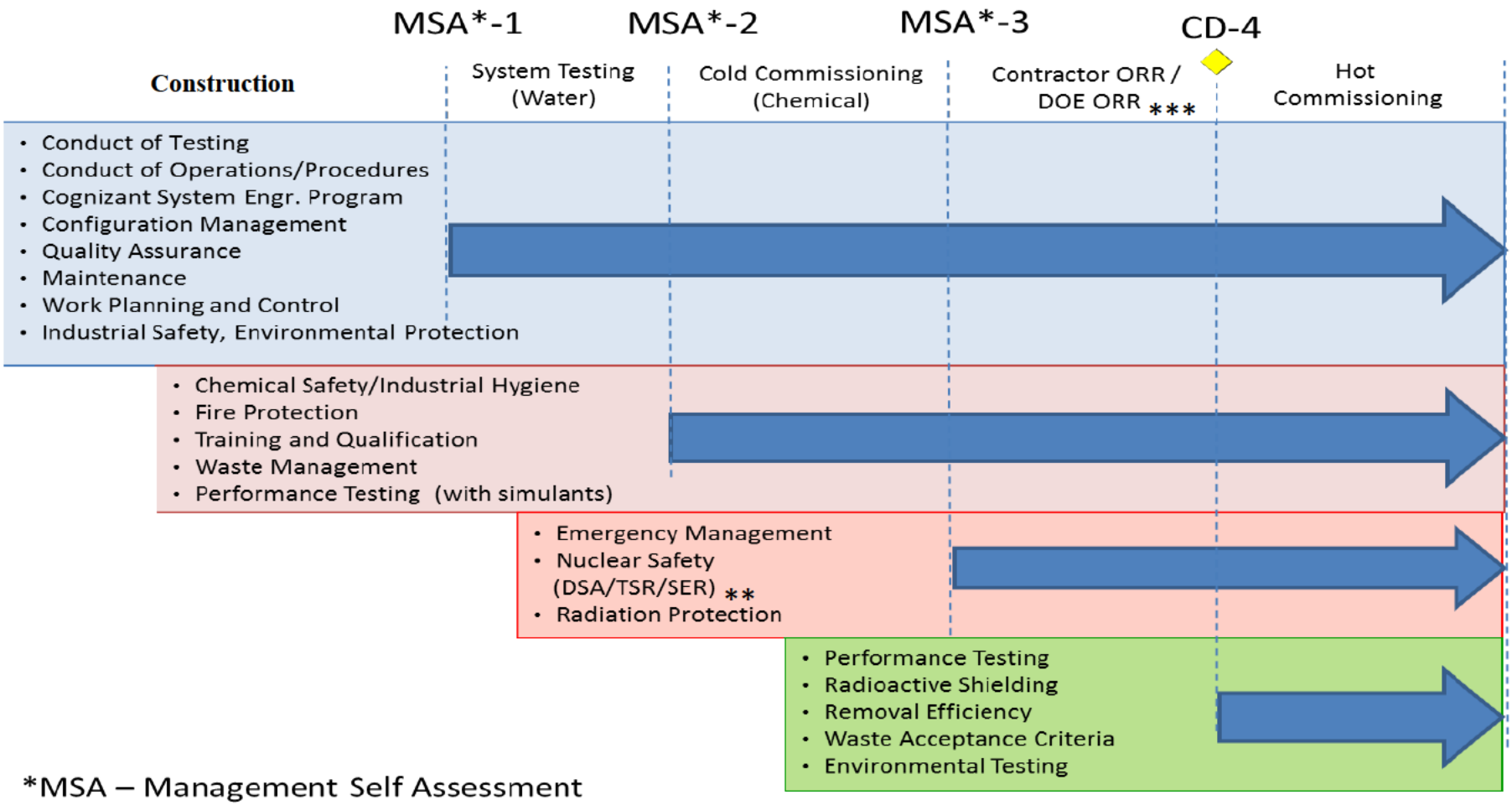
CSSX – Caustic-Side Solvent Extraction
TPC – Total Project Cost
BCP – Baseline Change Proposal

Cost Basis for Increases



	CD-0	CD-1	CD-2	BCP-1/CD-3	BCP-2
Approval Date	Jun-01	Aug-04	Sep-07	Jan-09	Aug-14
Average Annual Throughput	6 Mgal/yr	6 Mgal/yr	6 Mgal/yr	6 Mgal/yr	6 Mgal/yr
Nameplate Capacity		7.3 Mgal/yr	7.3 Mgal/yr	7.3 Mgal/yr	7.3 Mgal/yr
Contract Type	M&O (DEAR)	CPIF (FAR)	CPIF (FAR)	CPIF (FAR)	CPIF/Cost Cap (FAR)
NPH Performance Category	PC-3	PC-2	PC-3	PC-3	PC-3
Quality Requirements	NQA-1	ISO-9001	NQA-1	NQA-1	NQA-1
Changes		•J-Area Utiliies Added •Alpha Finishing Facility Added •Lab Added	•35% Design Estimate •ISO-9001 to NQA-1 •PC-2 to PC-3	•90% Design Estimate •95% Risk Confidence Level	•Delay for ASME Vessels •NQA-1 Vendor Performance •Incorporates Construction Cost Cap •Increased Estimate for Commissioning •Cost Escalation for Schedule Delays •Potential DOE Liabilities •Remained at 95% Risk Confidence Level

Phased Approach to Operational Readiness



*MSA – Management Self Assessment

**DSA/TSR/SER Documented Safety Analysis/Technical Safety Requirements/Safety Evaluation Report

***MSA-3 and ORR include integration with LW contractor

Performance Indicators

SWPF Performance Indicator Summary
April 2019

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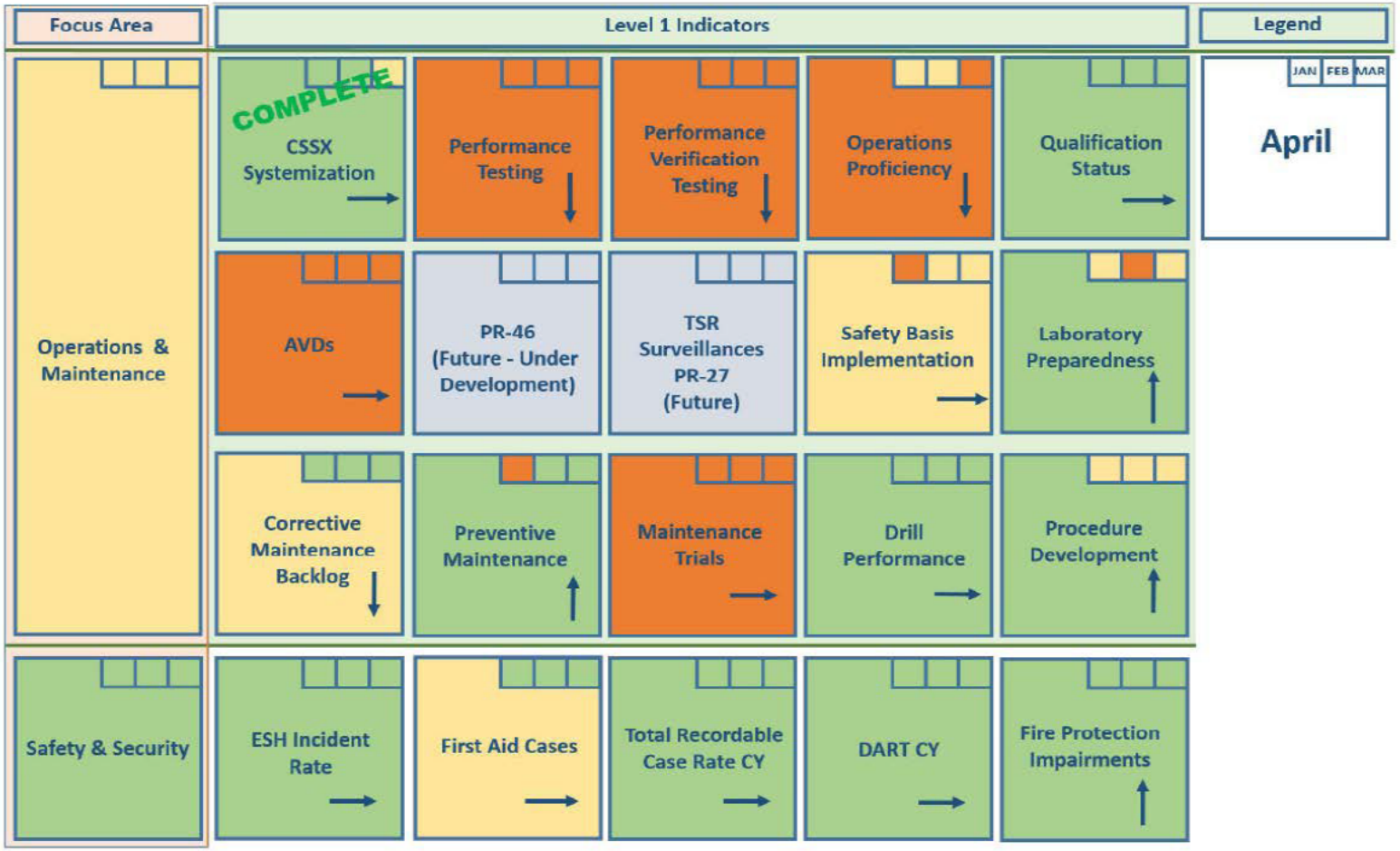

Key Performance Parameters

KPP established at	Met KPP for		
CD-2/Latest BCP	CD-2	BCP-1/CD-3	BCP-2
Demonstrate the ability to process at a throughput rate of 7.3 Million gallons per year (Mgal/yr).	YES	YES	YES
Demonstrate the ability to produce waste products that are within the established limits of the Waste Acceptance Criteria (WAC) and/or Documented Safety Analysis (DSA) of the receiving facilities of the Defense Waste Processing Facility (DWPF) and Saltstone Production Facility (SPF) WAC.	YES	YES	YES
Successful Cold Commissioning - The following tests will be conducted during Cold Commissioning to validate compliance: a. Chemical Sampling to Assess Product Compliance. b. Peak Throughput Performance Testing. c. Other Cold Commissioning Performance Testing (off-normal conditions, non-routine operations, maintenance, and environmental testing).	YES	YES	YES

KPP – Key Performance Parameter
BCP – Baseline Change Proposal
PARS II – Project Assessment and Reporting System II
SPF – Saltstone Production Facility

CD – Critical Decision
Mgal/yr – Million Gallons Per Year
DWPF – Defense Waste Processing Facility

Cost and Schedule Baseline vs. Actual

	CD-2 Baseline	BCP-1/CD-3	BCP-2	CD-4 Actual
TEC	$726 M	$1,173 M	$1,569 M	$1,524 M
OPC	$174 M	$166 M	$753 M	$745 M (est.)
TPC	$900 M	$1,339 M	$2,322 M	$2,269 M (est.)
MR/ Contingency	$108 M*	$275 M*	$336.1 M*	$53 M (est.)
Schedule Contingency	14 Months	31 Months	26 Months	5 ½ Months (est.)
Schedule (CD-4)	11/30/2013	10/30/2015	01/31/2021	8/17/2020

*Imbedded in the TEC and OPC.

- The Variance at Completion (VAC) is $53 M (est.) below the TPC.
- The SWPF Project is 5 ½ months (est.) ahead of schedule.
- CD-4 Actual of $2,269 M (est.) includes:
  - Performance Measurement Baseline (PMB) of $2,014 M (est.)
  - Fee of $87 M (est.)
  - DOE Costs of $168 M (est.)

CD – Critical Decision
BCP – Baseline Change Proposal
TPC – Total Project Cost
VAC – Variance at Completion
M – Million
MR – Management Reserve

CD-4 Pre-Requisites

Requirements	Forecast/ Completion Date
DOE ORR Corrective Actions Closure Package	08/05/2020
DOE ORR Final Report Issued w/ Cover Letter	02/26/2020
DOE ORR Preliminary Results	02/14/2020
Project Completion Criteria Preliminary Results	02/07/2020
Operational Release Plan	12/13/2019
Environmental Management System	12/06/2019
Key Performance Parameters (KPPs)	12/06/2019
Contractor Evaluation Documents	11/12/2019
Implementation Verification Review for DSA/SER/TSR/HA	11/08/2019
Project Transition to Operations Plan	10/17/2019
Safety Evaluation Report (SER)	10/02/2019
Documented Safety Analysis (DSA)/Technical Safety Requirements (TSR)	09/23/2019
Authorization Agreement (Ready for Issue)	05/02/2019
Hazard Analysis Report (HA)	06/27/2018
Code of Record	Complete

CD- Critical Decision
KPPs – Key Performance Parameters
TSR – Technical Safety Requirements
HA – Hazard Analysis
DOE ORR – Department of Energy Operational Readiness Review
DSA – Documented Safety Analysis
SER – Safety Evaluation Report

Project to Program Transition

- Contract Structure clearly distinguishes Project Scope and Cost vs Program Scope and Cost.
- DOE Transition from Project to Program planned early in Commissioning Phase
  - Formal Staffing Transition Plan approved by management (June 2017)
  - Key Technical SME's cross-trained between SWPF and Waste Disposition
  - Assistant Manager of Waste Disposition member of SWPF Line Management Review Board
  - SWPF FPD/DFPD – AM/D-AM WD transition meetings conducted
- Monthly Integration meetings conducted with DOE, SRR and Parsons

Project Closeout

- **Post CD-4 Activities (90 Days post CD-4)**
  - Submit all CD documents to HQs
  - Finalize PARS II Reporting
  - Submit Lessons Learned Report
  - Submit Initial Project Closeout Report

- **Project Closeout Activities**
  - Submit Final Project Closeout Report
  - Document Facility Sustainment Goals
  - Update Facilities Information Management System
  - Update Ten Year Site Plan

KPPs – Key Performance Parameters
AFF – Alpha Finishing Facility
TPC – Total Project Cost
HQs – Headquarters
ATO – Authorization to Operate
M – Million
DCPT – Design Capacity Performance Test
CD – Critical Decision
PARS II – Project Assessment and Reporting System II