

Semi-Annual DNFSB Briefing on 242-A Evaporator Safety Bases

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management



P.O. Box 450
Richland, Washington 99352

Semi-Annual DNFSB Briefing on 242-A Evaporator Safety Bases

P. Schroder
Department of Energy - Office of River Protection

K. Subramanian
Washington River Protection Solutions

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The logo for the Office of River Protection, featuring the text "Office of River Protection" in a bold, sans-serif font, with a stylized, wavy graphic element behind the text.

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THE HANFORD SITE

Semi-Annual DNFSB Briefing on 242-A Evaporator Safety Bases

Paul Schroder, DOE-ORP, DOE-AMTWO
Karthik Subramanian, WRPS, Chief Engineer

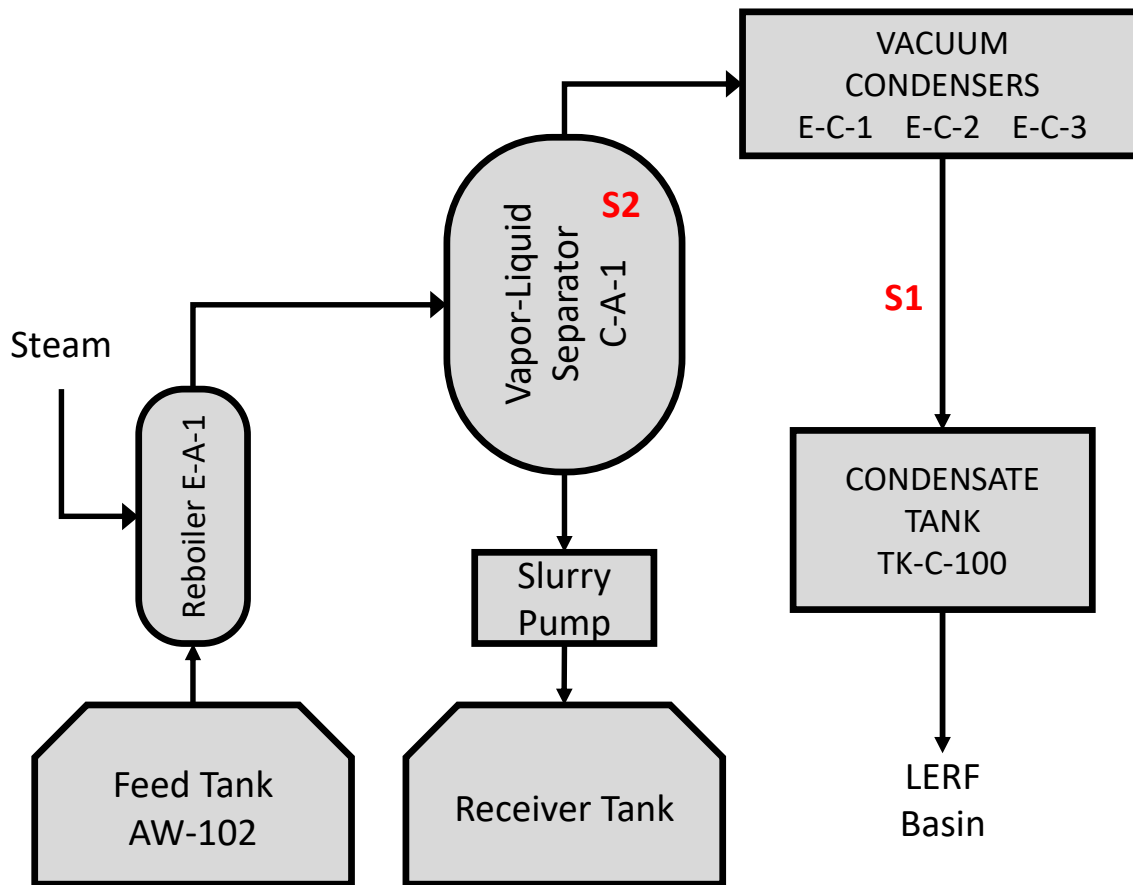
March 6, 2024

- Safety share
- Kick-off (DOE-ORP)
- Background
- Key Accomplishments
- Process/Hazards
- Implemented Interim Control
- Design Status
- Component Testing
- Overview Schedule

THE HANFORD SITE | Background

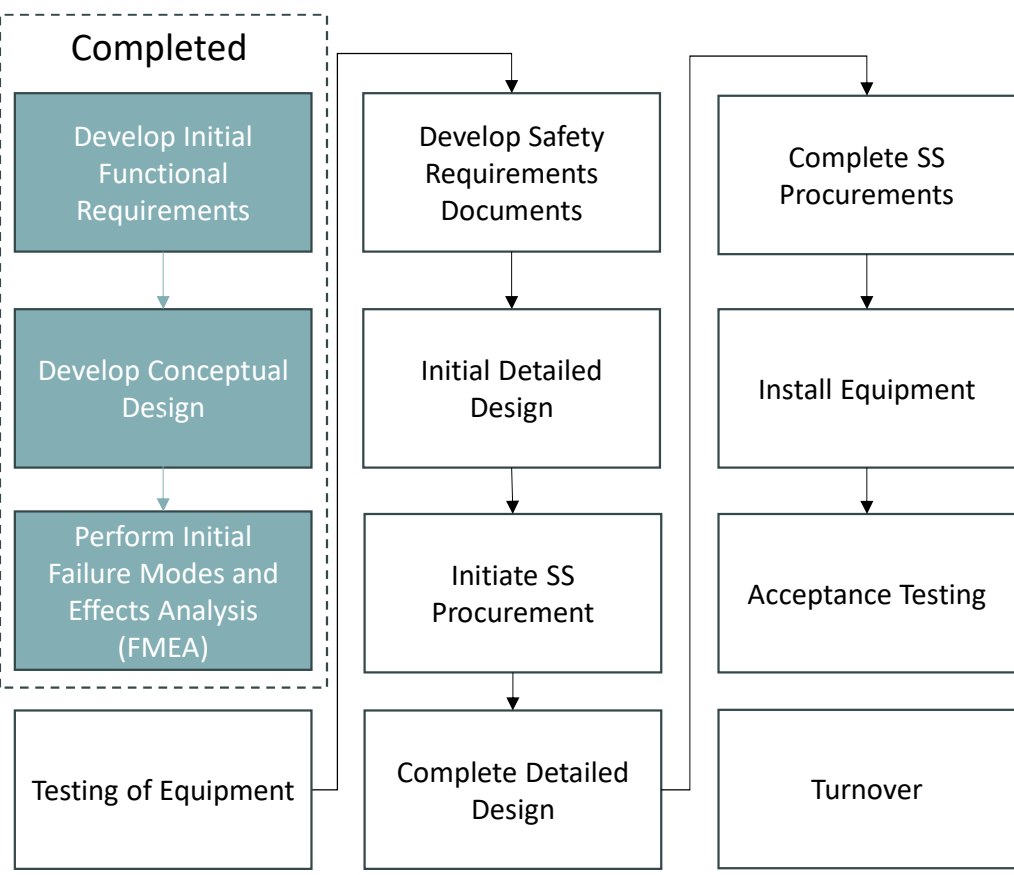
- 2021 – 2022: Series of Q/A sessions with DNFSB staff
- 7/19/2022: DNFSB letter regarding concerns
- 4/17/2023: DOE Letter to DNFSB with interim controls and planned improvements
- 6/27/2023: DNFSB letter requesting semi-annual briefings covering
 - Design, procurement, and installation of the planned improvements
 - Any emergent technical issues and funding constraints
 - Compensatory measures or interim controls to be used
- 9/19/2023: 1st DNFSB semi-annual briefing

- Interim controls (compensatory measures) implemented
- Detailed schedule for planned improvements developed
- Initial conceptual designs and failure modes and effects analysis (FMEAs) have been completed for the planned improvements
- Receiving equipment for testing
- There are no emergent technical issues or funding constraints currently identified

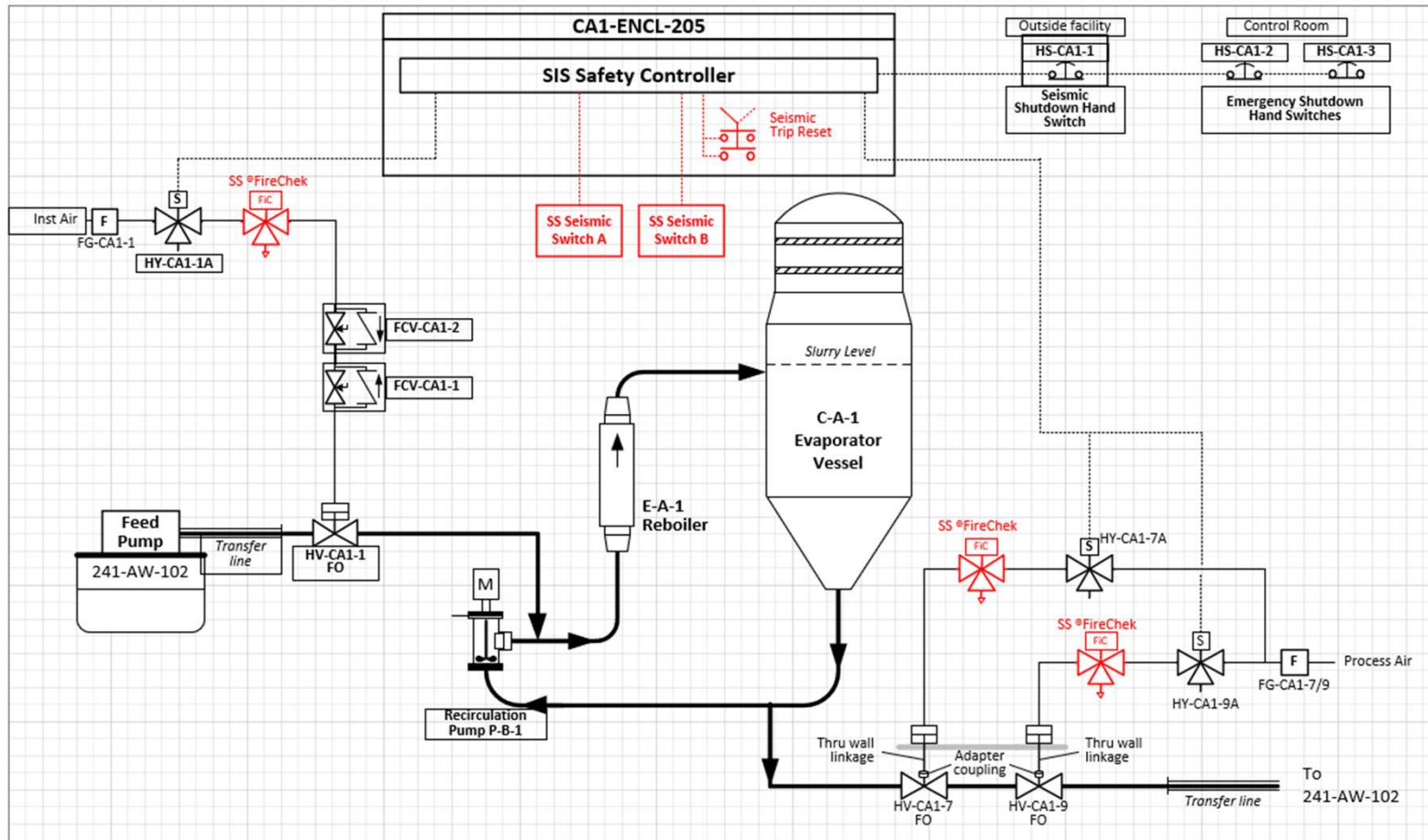


- *Interim controls are implemented in preparation for next Evaporator campaign*
- **S1**: Overflow of waste leading to flammable gas deflagration in Tk-C-100 or piping
- **S2**: Flammable gas deflagration in C-A-1
- **S3**: Seismically induced flammable gas deflagration
- **S1/S2**: Mitigation through dump of material from C-A-1 back to the feed tank utilizing appropriate safety significant (SS) components and safety instrumented systems (SISs)
- **S3**: Specific Administrative control (SAC) actuated manually via SS control room switches or seismically qualified SS external switch

- Specific Administrative Control (SAC) for Response to Seismic Events (upgraded from key element)
 - Two SS shutdown hand switches are located in easily accessible locations in the control room
 - Actuated manually using a seismically qualified SS seismic shutdown hand switch located on the southeast exterior concrete wall
- Combustible material SAC for Fires
 - Implemented in the 242-A Evaporator condenser room keeping the combustible loading below the temperatures at which the SS equipment can be affected
 - Removal of combustible materials such as rubber matting
- Defense-in-depth programmatic element for fire detection to respond at conservative temperature/temperature change to protect the solenoid functionality



- Initial conceptual design and failure modes and effects analysis (FMEAs) have been completed
- Identified critical characteristics and safety design requirements
- Received equipment for testing
- Beginning development of safety requirements documents



- Seismic Switches

- Selected Syscom seismic switches for the conceptual design
- These are the same model previously qualified at Hanford for safety service at K Basins
- Existing SIS controller shall be seismically qualified to replace existing seismic shutdown relays
- Critical characteristics include safety certifications & instrument trip accuracy
- Seismic switches are certified for safety failure rates that help ensure that the devices meet safety significant criteria

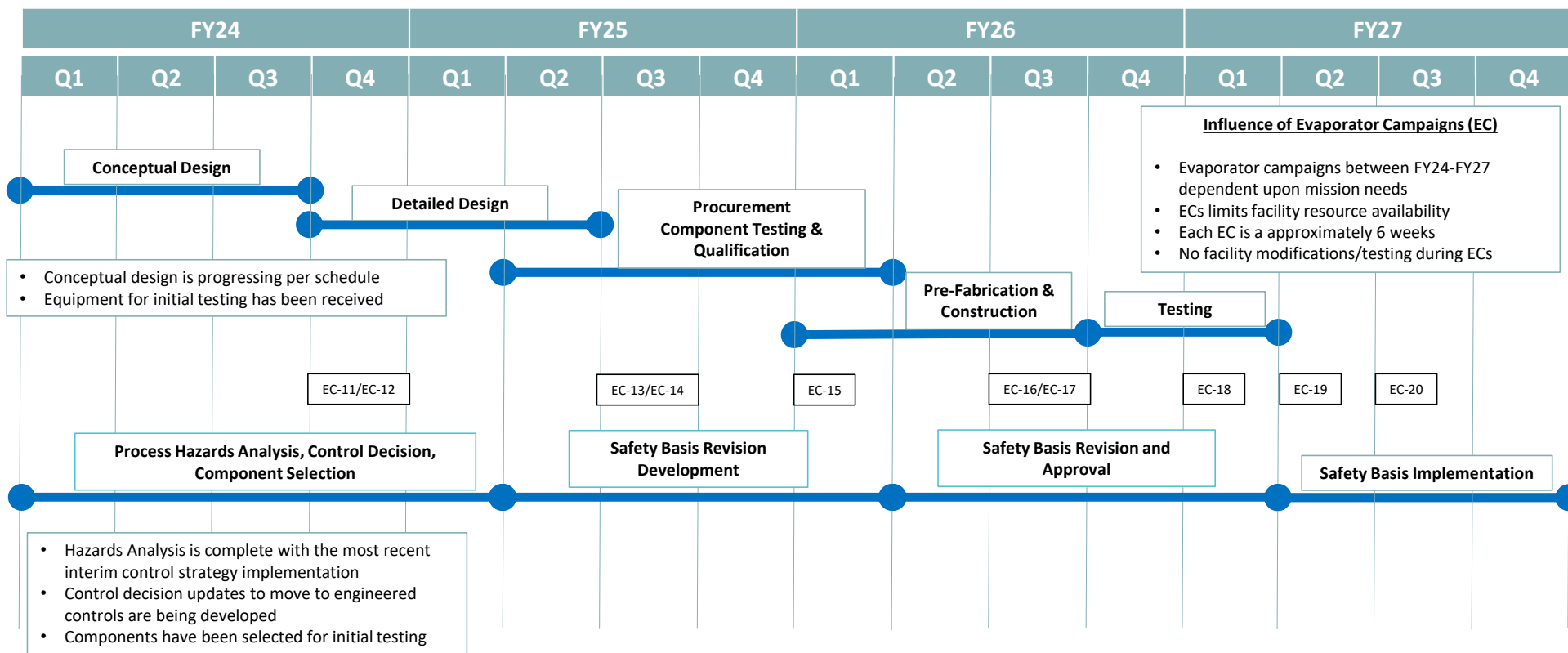


- Heat Activated Vent Valves

- Selected FireChek®* heat activated pneumatic shut-off valves for the conceptual design
- FireChek®* valves are Factory Mutual (FM) approved for but will require additional testing to meet SS criteria
- Critical characteristics include FM approval, device trip accuracy, system pressure and time to vent air

*FireChek is a registered trademark of Farrell Equipment & Controls, Inc.





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