

# Expecting the Unexpected

## Beyond Design Basis Events

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We do the right thing.

## SRS Tank Farm - Beyond Design Basis Event (BDBE)



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SAVANNAH RIVER SITE • AIKEN, SC • WWW.SRS.GOV

# Expecting the Unexpected

## Summary

Due to the impact of the recent earthquake in Japan, the URS Nuclear Safety Council recommended the performance of a review to determine the state of readiness for DOE Hazard Category 2 facilities ability to respond to both design basis and beyond design basis events.

# Expecting the Unexpected

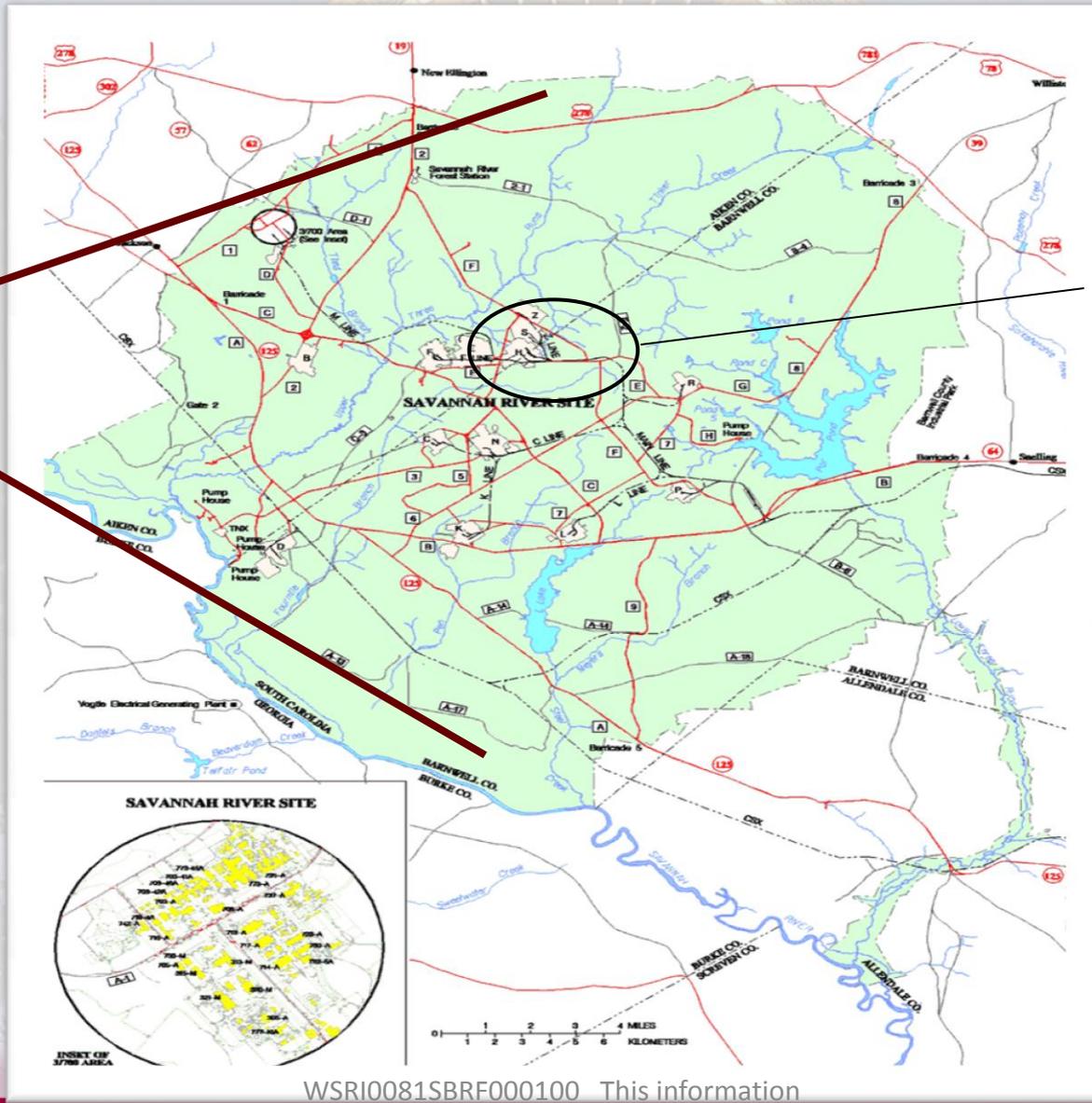
## Summary

A review was conducted by experienced teams of facility personnel for all URS-SRR operated facilities at Savannah River Site.

# Presentation Outline

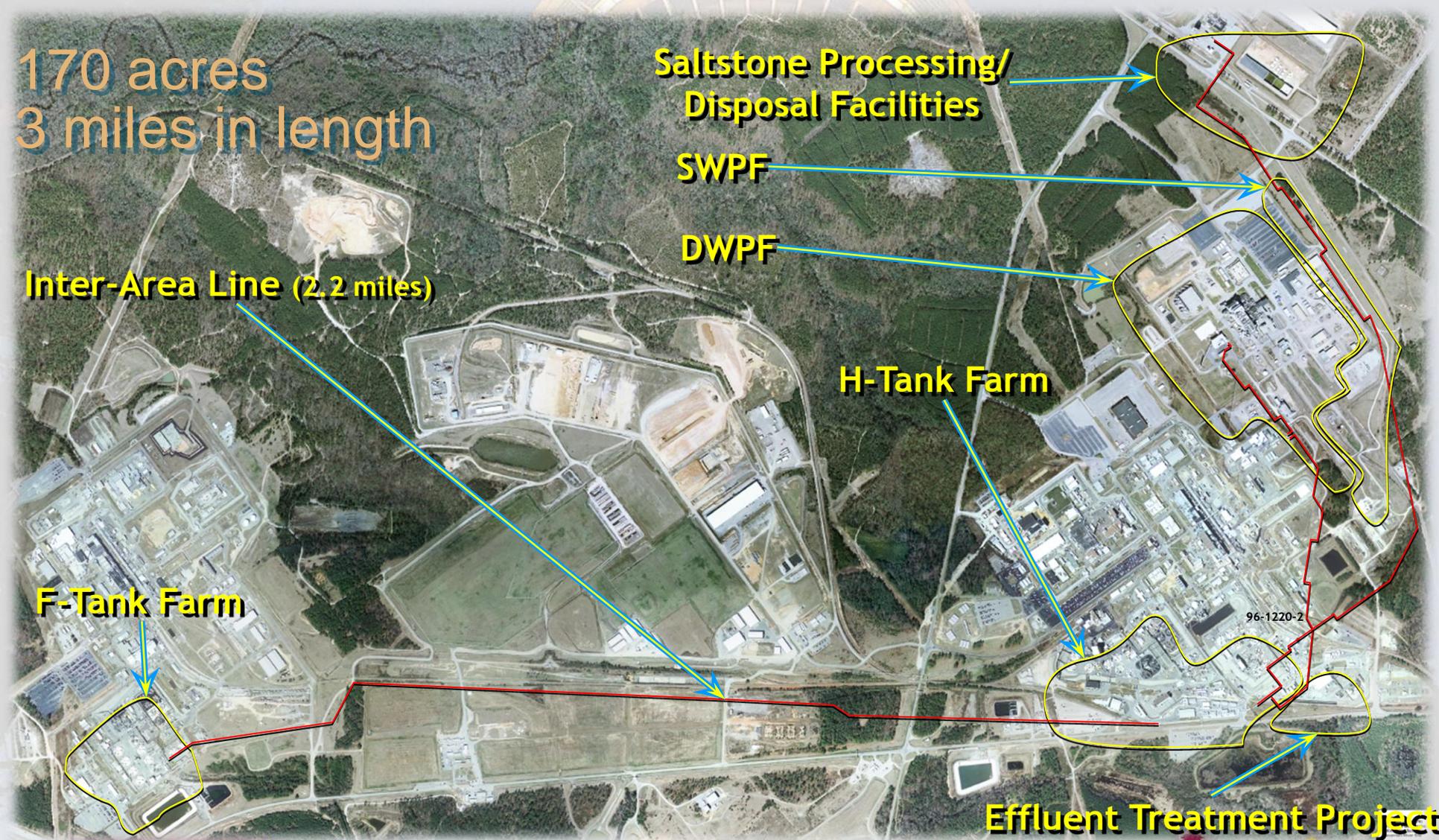
- Tank Farm Overview
- Tank Farm Beyond Design Basis Event Selection
- Tank Farm Beyond Design Basis Event Progression
- Tank Farm “Near Term Stable Condition”
- Recommended Improvements
- Conclusion

# Savannah River Site



General Separations Area

# Liquid Waste Facilities



170 acres  
3 miles in length

Inter-Area Line (2.2 miles)

Saltstone Processing/  
Disposal Facilities

SWPF

DWPF

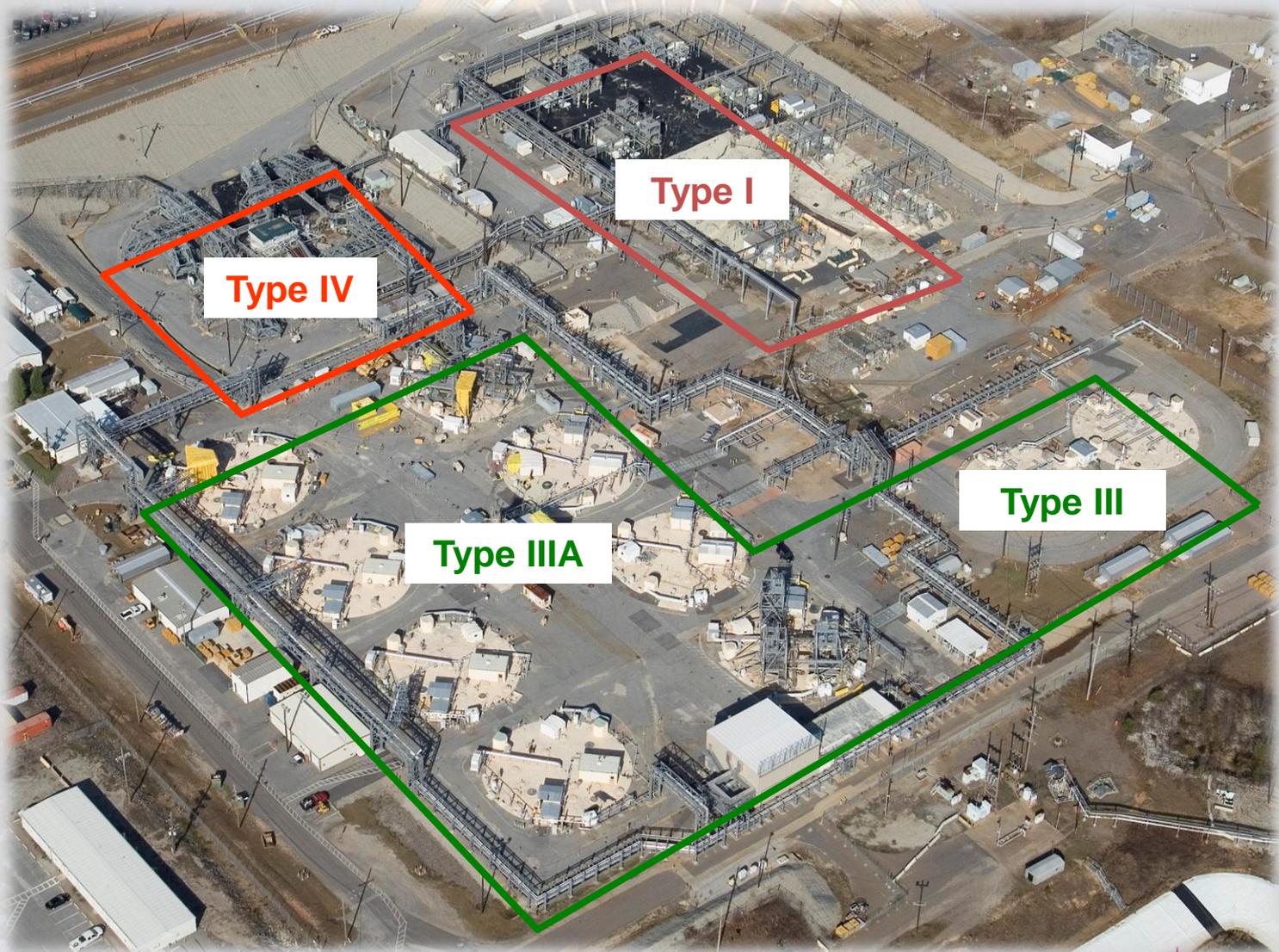
H-Tank Farm

F-Tank Farm

96-1220-2

Effluent Treatment Project

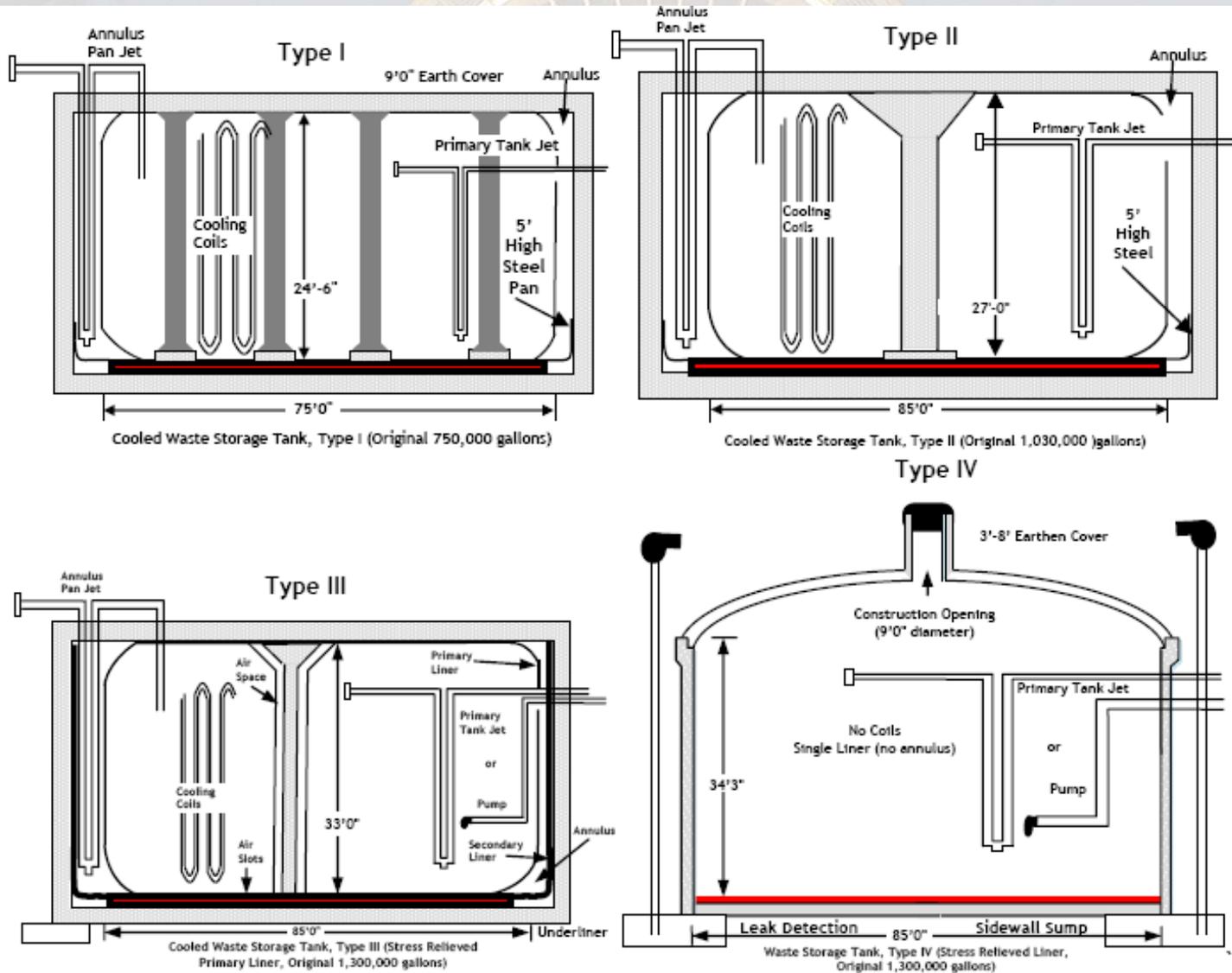
# F-Tank Farm



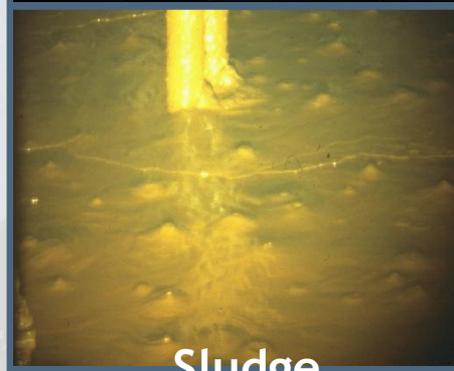
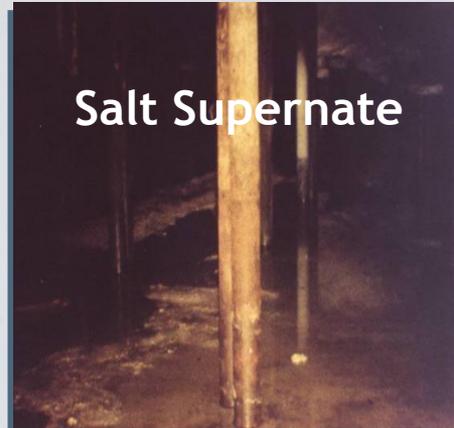
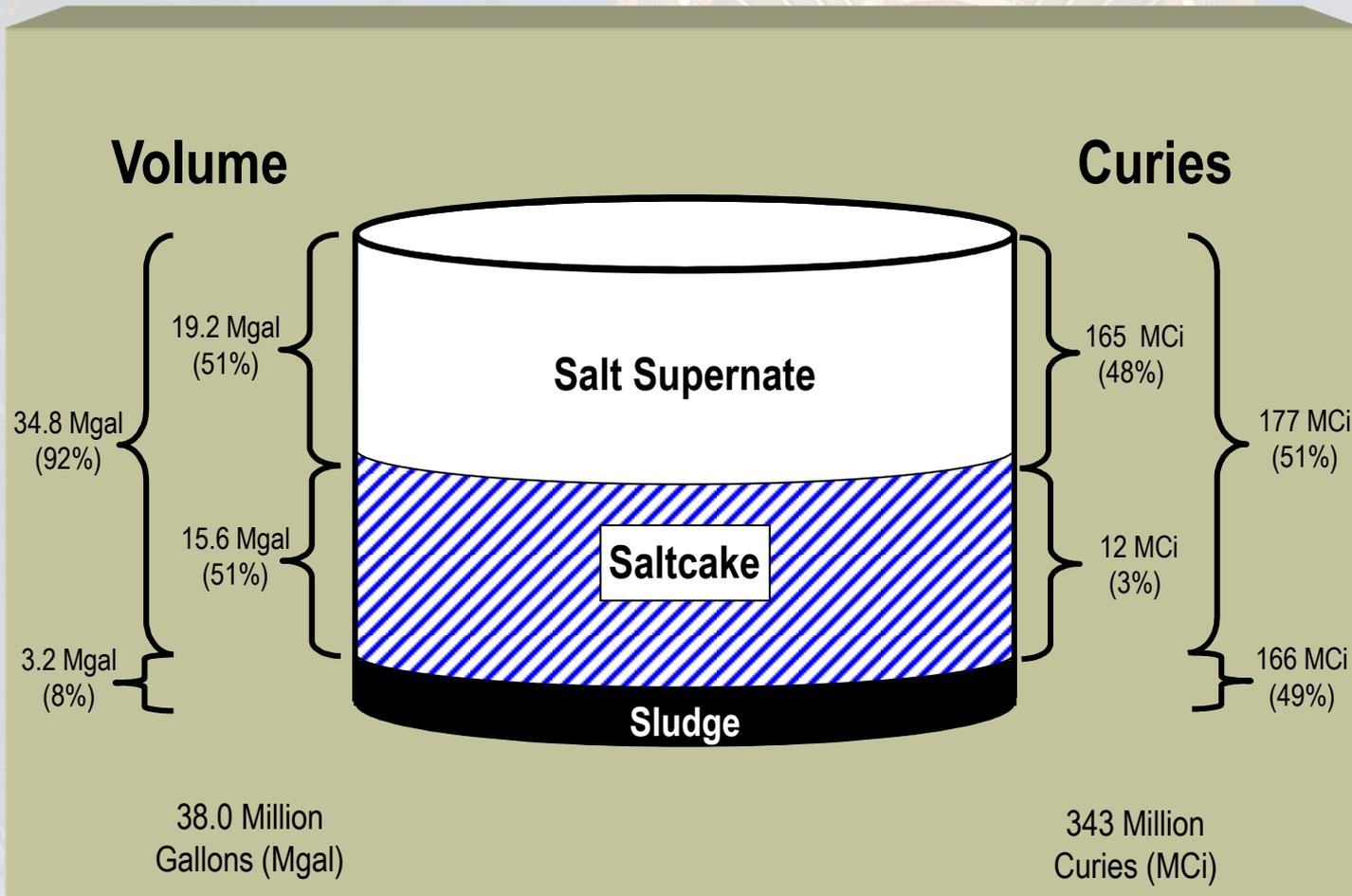
# H-Tank Farm



# Waste Tank Types



# SRS Composite Inventory



# BDBE Selection

- Beyond Design Basis Seismic Event
  - Station Blackout
  - Loss of Communication
  - Egress Routes
- Other NPH Events not expected to be as severe
  - Tornado/Wildland Fire provide time to respond prior to impacting facility and don't impact full facility (F and H Area)
- Site wide response and conditions being developed with SRNS

# BDBE Reference for Discussion

Seismic Event Occurs at night causing

- Control Rooms are either collapsed or not habitable due to safety concerns
- Power, steam and air have failed (no diesels start)
- Phone systems (land and cell) have failed
- Hand held radios remain available (only in facility)
- Staged portable ventilations systems are not available due to structure collapse of storage building.
- Staffing is at minimum TSR staffing (injuries have impacted ½ of normal operations staff).

# BDBE Event Facility Conditions

- Type IV Tank Tops Collapse – minor liquid release
- Waste Transfer Siphons are occurring – spilling waste into boxes and above ground
- CCW Siphons are occurring – spilling waste above ground
- Wastes Tanks, Evaporators, MCU, ARP, and Pump Tanks are leaking – spilling waste into secondary containments (Annuli, Cells)
- Pump Pits, MCU, ARP, Diversion Boxes, and Evaporator Cell Covers have cracked and pieces have fallen into the cells damaging other equipment
- Elevated structures (cranes) have fallen and impacted Waste Tank and other equipment
- Cold Chemical Storage Tanks are leaking

# Near Term Stable Conditions

- Personnel accountability performed. Medical treatment provided to injured personnel.
- Communication established with site emergency response organization.
- Leaking waste tanks are identified and Spill Contingency Plan initiated.
- Transfer siphons and chromate cooling water siphons are stopped.
- Waste Tank Ventilation is established on Priority 1 and 2 Tanks.
- Electrical power is isolated from transfer pumps and mixing pumps.
- Steam is isolated from transfer system and evaporators.

## Recommended Facility Improvements

- Procure/Install outdoor emergency lighting
- Procure and stage “Emergency Trailers” containing communications devices, respiratory protection, PPE, dosimetry, procedures, drawings, decontamination facilities, portable hydrogen monitors, rad/IH monitoring equipment
- Develop alternate methods to stop CCW siphon
- New transfer system designs should include passive siphon breaks
- Evaluate need to stage Spill Contingency resources
- Evaluate alternate methods for ventilating Priority 1 Tanks

# Procedural Improvements

- Procedures built assuming support systems are available
- Procedures built based on design basis lacks sufficient flexibility for BDBE
- Procedures are not clear who has authority when communications with Senior Management is delayed and timeliness is important

# Conclusion

- In the current state of readiness, reaching a Stable Condition in response to a Beyond Design Basis Earthquake would be:
  - Expected to be slow, and require shift personnel to develop plans
  - Would require offsite resources and equipment
- Implementation of corrective actions would result in a quicker response and minimize the need for offsite resources.
- Additional drills integrating other site organizations are necessary to determine site readiness.