



# Koeberg NPP: Severe Accident Management Improvements

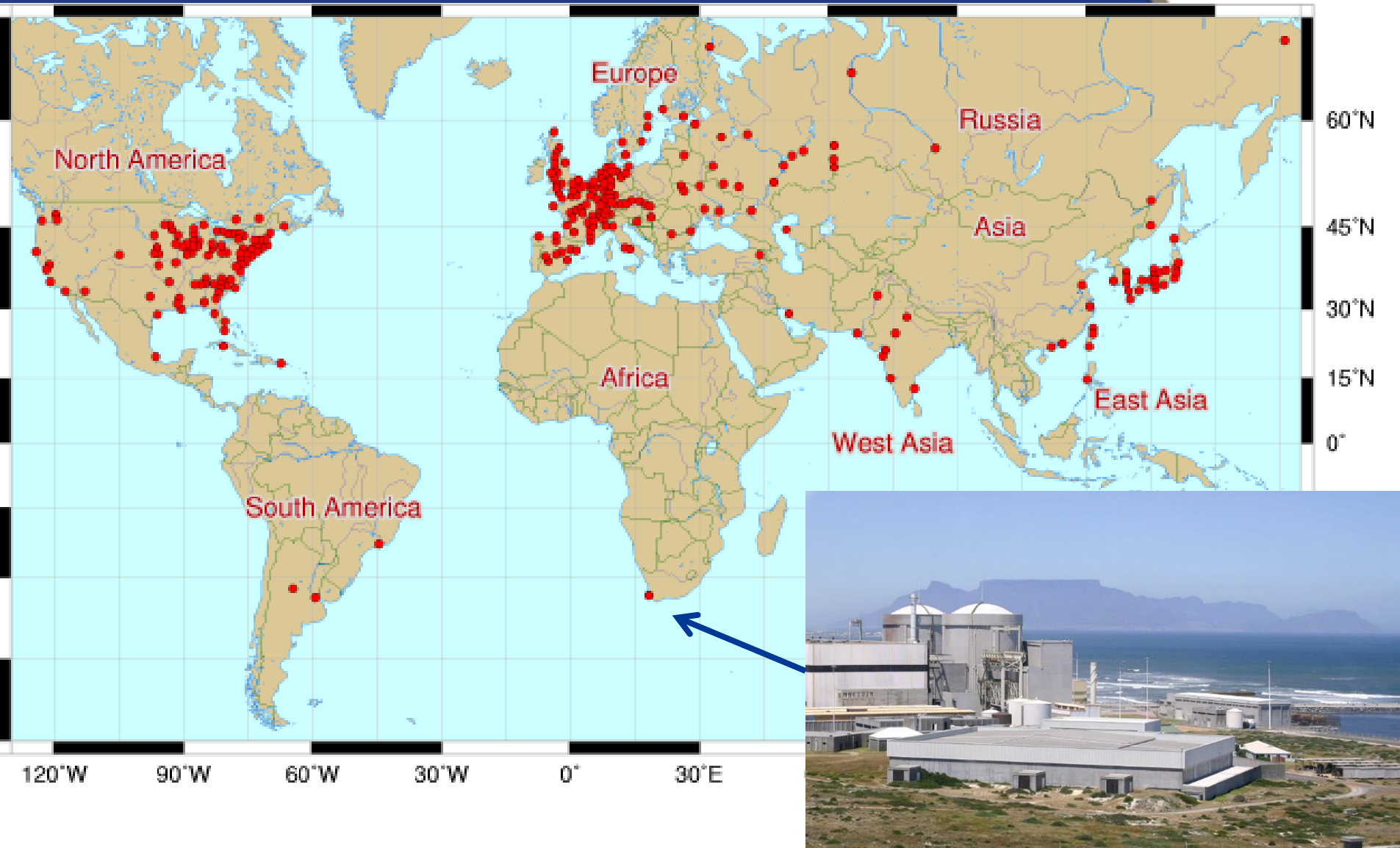
Rev 1

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Eskom

- Introduction (2 slides)
- Shutdown & Spent Fuel Pool Accident Management (2 slides)
- Extreme Hazard Accident Management (5 slides)
- Severe Accident Management Training (1 slide)

# Koeberg NPP

2 x 970 MWe PWRs commissioned in 1984 & 1985



- 1995: First implementation of Severe Accident Management Guidelines.
- 2006: Updated to include Reactor Shutdown accidents and Spent Fuel Pool accidents.
- 2012: OSART SAM review results:
  - No Recommendations or Suggestions,
  - 2 Good Practices.

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## Accident Severity

Normal Operation    Transient    **Loss of cooling or Inventory**    Core Uncovery    **High Containment Radiation**    Vessel Failure    Containment Failure

Main Control Room

Operating Procedures    Emergency Operating Procedures (I.RRA-2 & 3)

Technical Support Centre

Technical Support to Control Room    Severe Accident Management Guidelines (SAGs 3 to 7 & SCGs)

Local on-site actions

Support Guidelines: Local Action Sheets (e.g., LAS-46, LAS-62 & LAS-64)

Emergency Control Centre

Emergency Plan



Normal Operation    Transient    **Loss of cooling**    Pool Boiling    **Fuel Uncovery**    Zircalloy oxidisation    Radioactive Releases

**Operating / Incident Procedures**

**Emergency Operating Procedure (I.PTR)**

**Severe Accident Management Guidelines (SAG-8)**

**Technical Support to Control Room**

**Support Guidelines: Local Action Sheets (e.g., LAS-46, LAS-55 & KEP-89)**

**Emergency Plan**

Main Control Room

Technical Support Centre

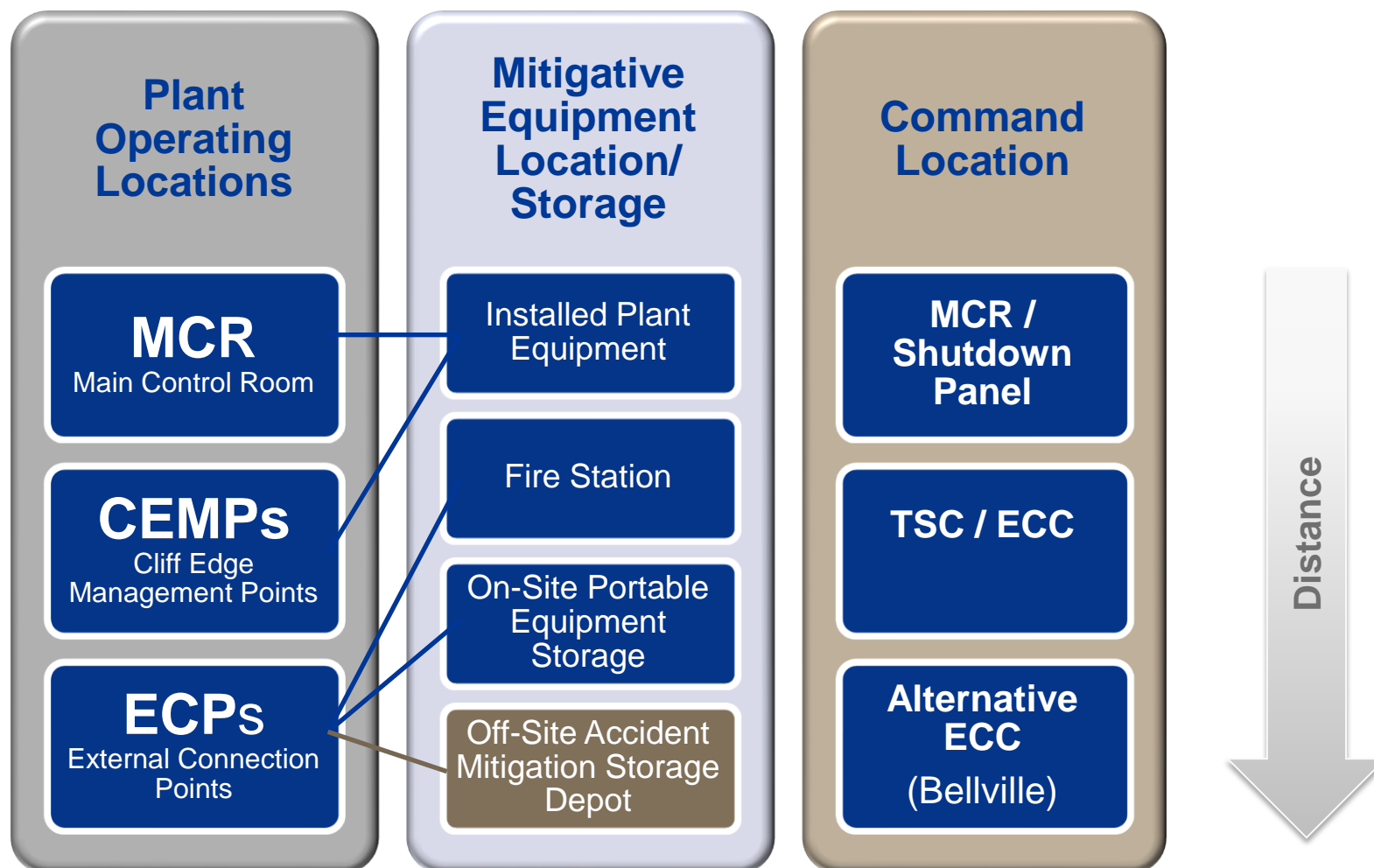
Local on-site actions

Emergency Control Centre

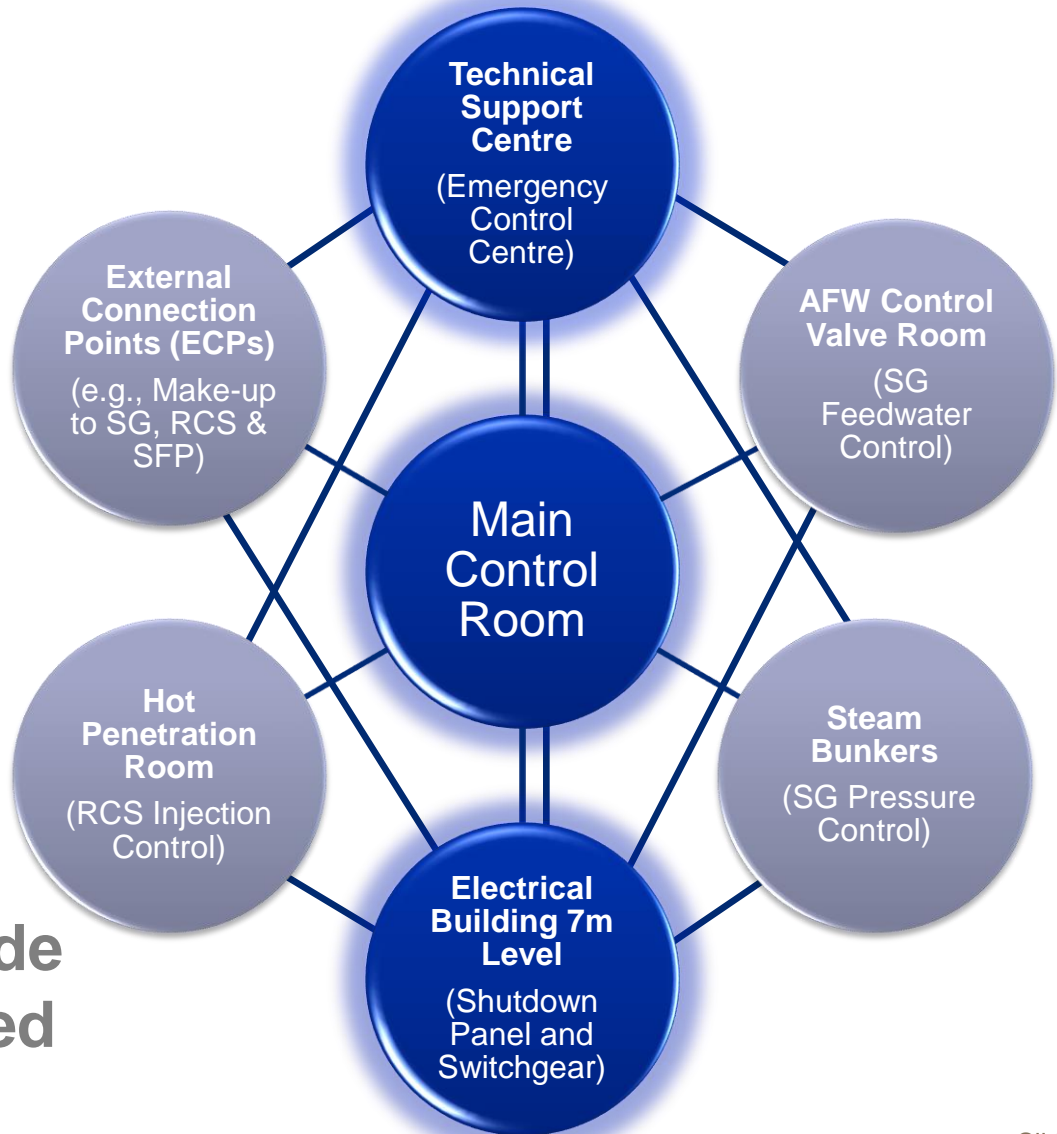
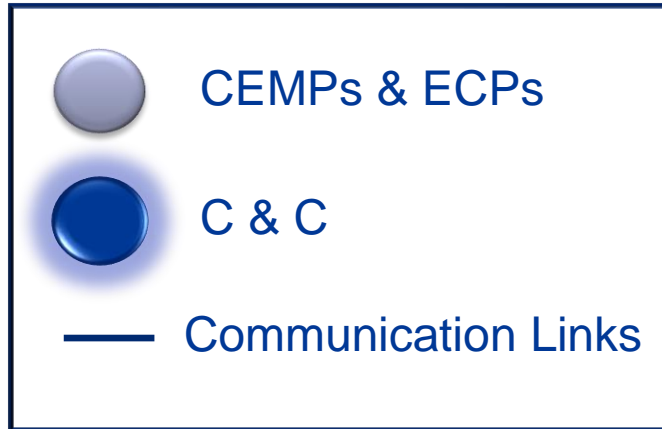
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- **Extreme Hazard Accident Management (5 slides)**
- **Severe Accident Management Training (1 slide)**



# High-Level Extreme Hazard Mitigation Philosophy

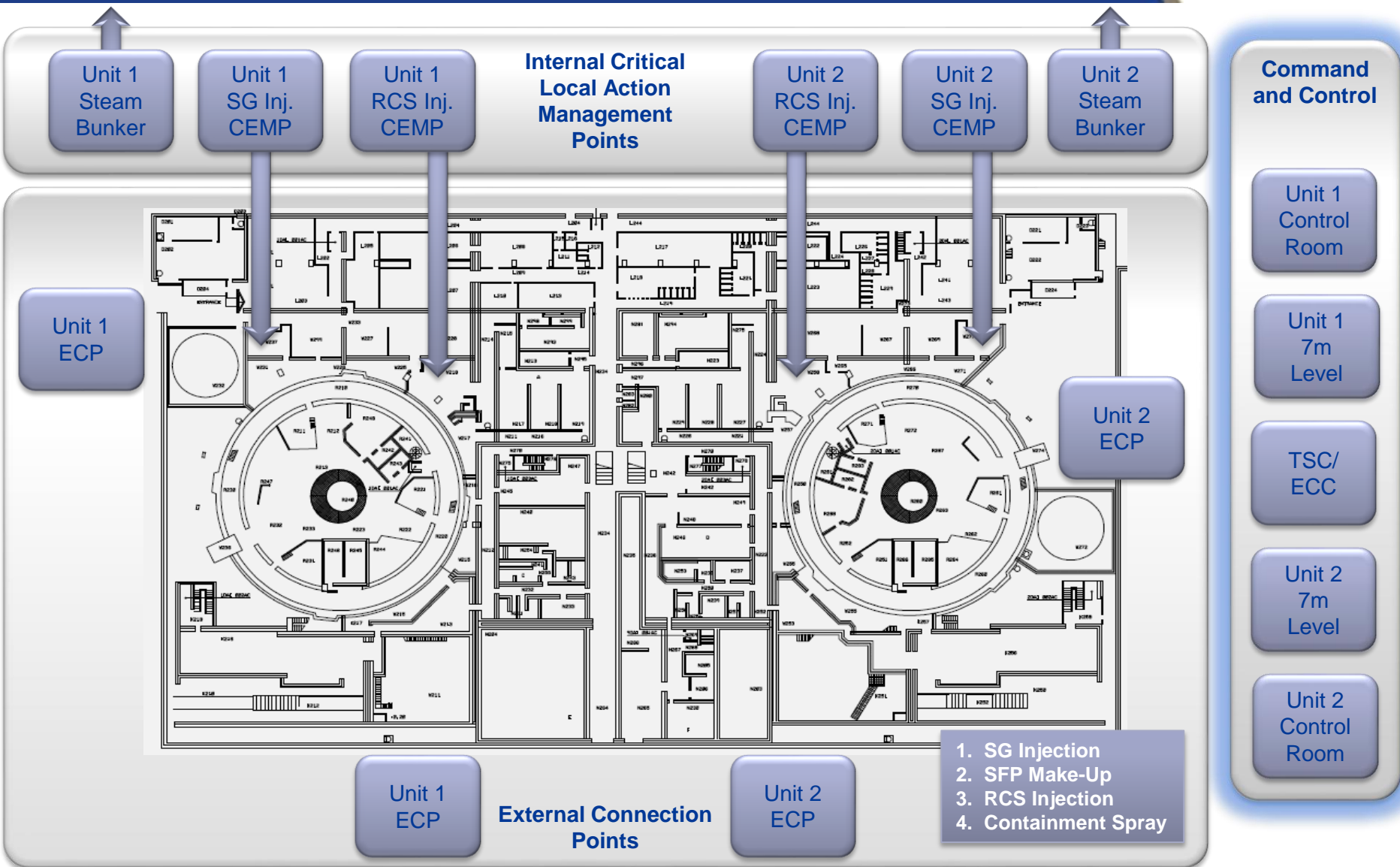


# Cliff Edge Management Points (CEMPs) External Connection Points (ECPs)



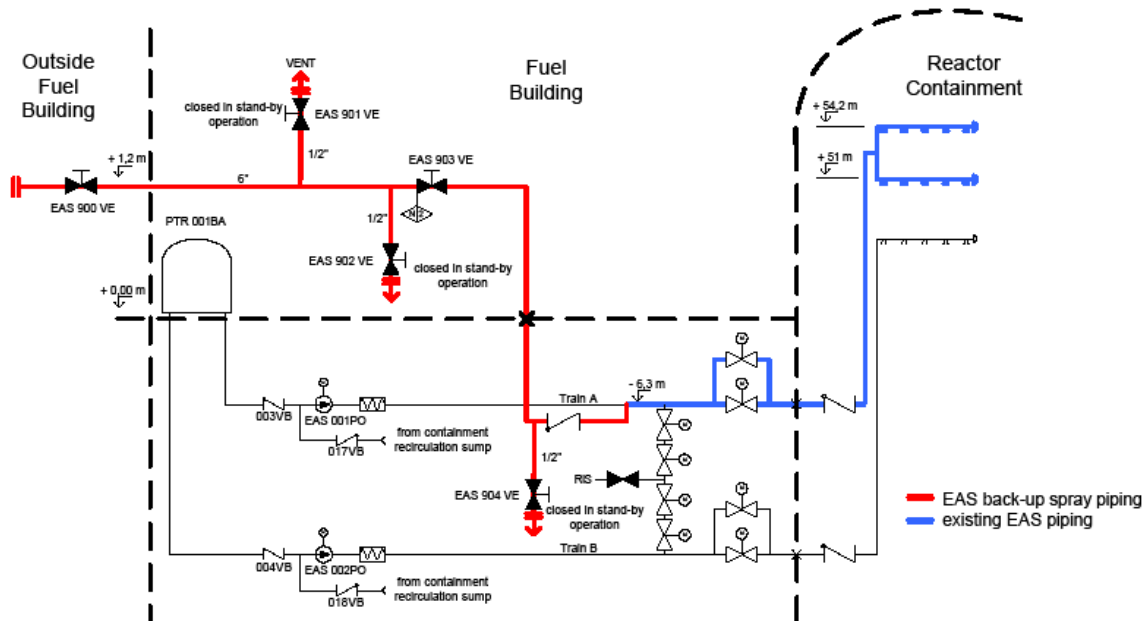
**CEMPS & ECPs provide decentralised hardened mitigation**

# High-Level Extreme Hazard Mitigation Overview



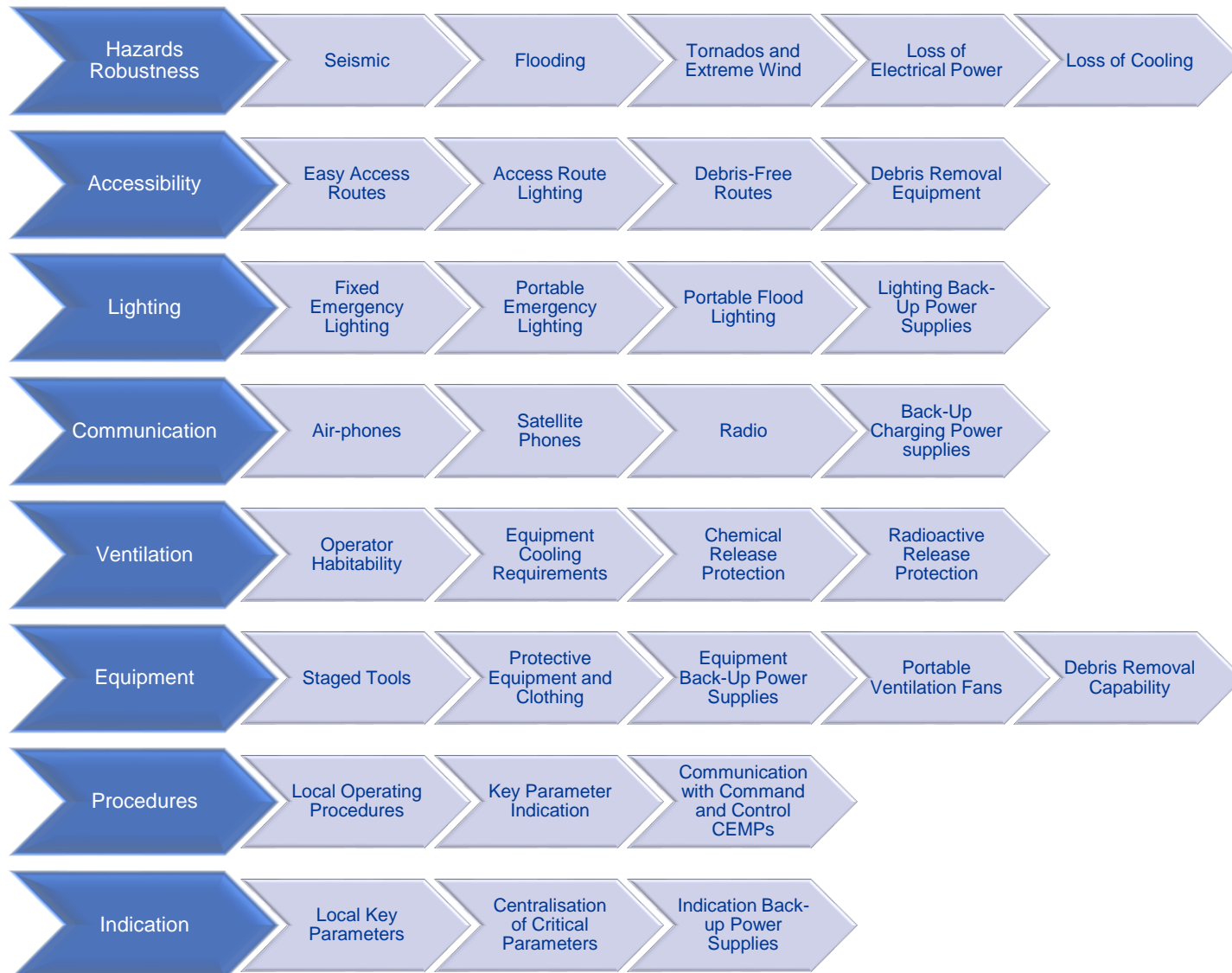
# External Connection Points (ECPs)

- Containment Spray (& RCS injection) external connection point for the use of mobile equipment.



- Similar connection points are provided for the SGs and the SFP.
- Diesel generator connection points planned.

# CEMP (& ECP) Design Considerations



- Introduction (2 slides)
- Shutdown & Spent Fuel Pool Accident Management (2 slides)
- Extreme Hazard Accident Management (5 slides)
- **Severe Accident Management Training (1 slide)**

## Formal Program for SAMG User Qualification:

- Initial Qualification Training:
  - Classroom site-specific training with table top exercises with specified entry requirements related to the number of years of experience in accident management,
  - TSC equipment familiarisation.
- Annual Exercises and Drills:
  - Severe Accident Management exercises,
  - Emergency Response (including SAM) exercises,
  - Exercises scope multiple units, reactor shutdown states and the spent fuel pools.
- Annual Classroom Training:
  - Classroom training with table top exercises,
  - Plant walk downs of Local Action Sheets and plant equipment used in SAM.

