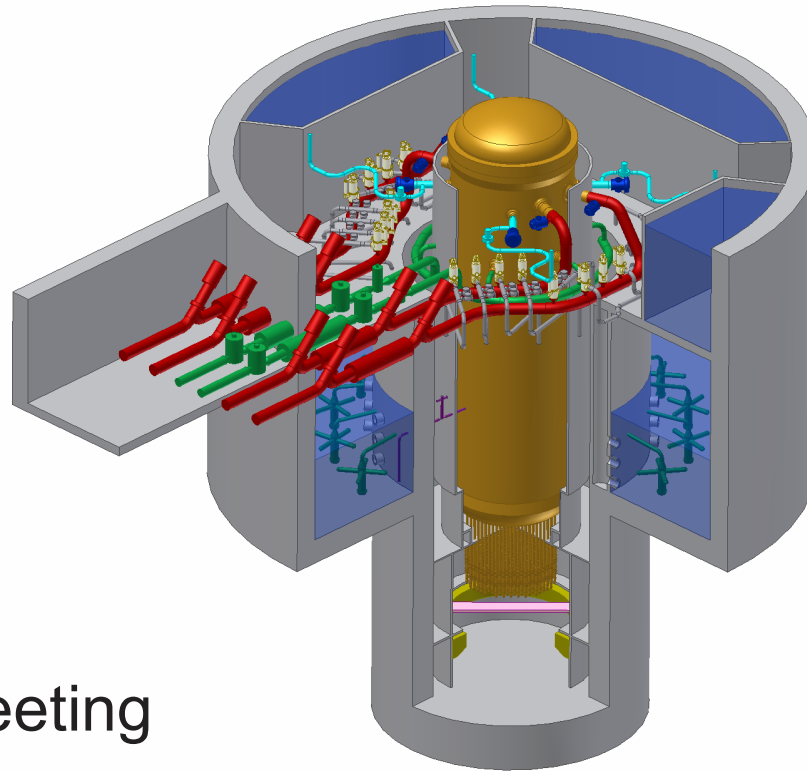


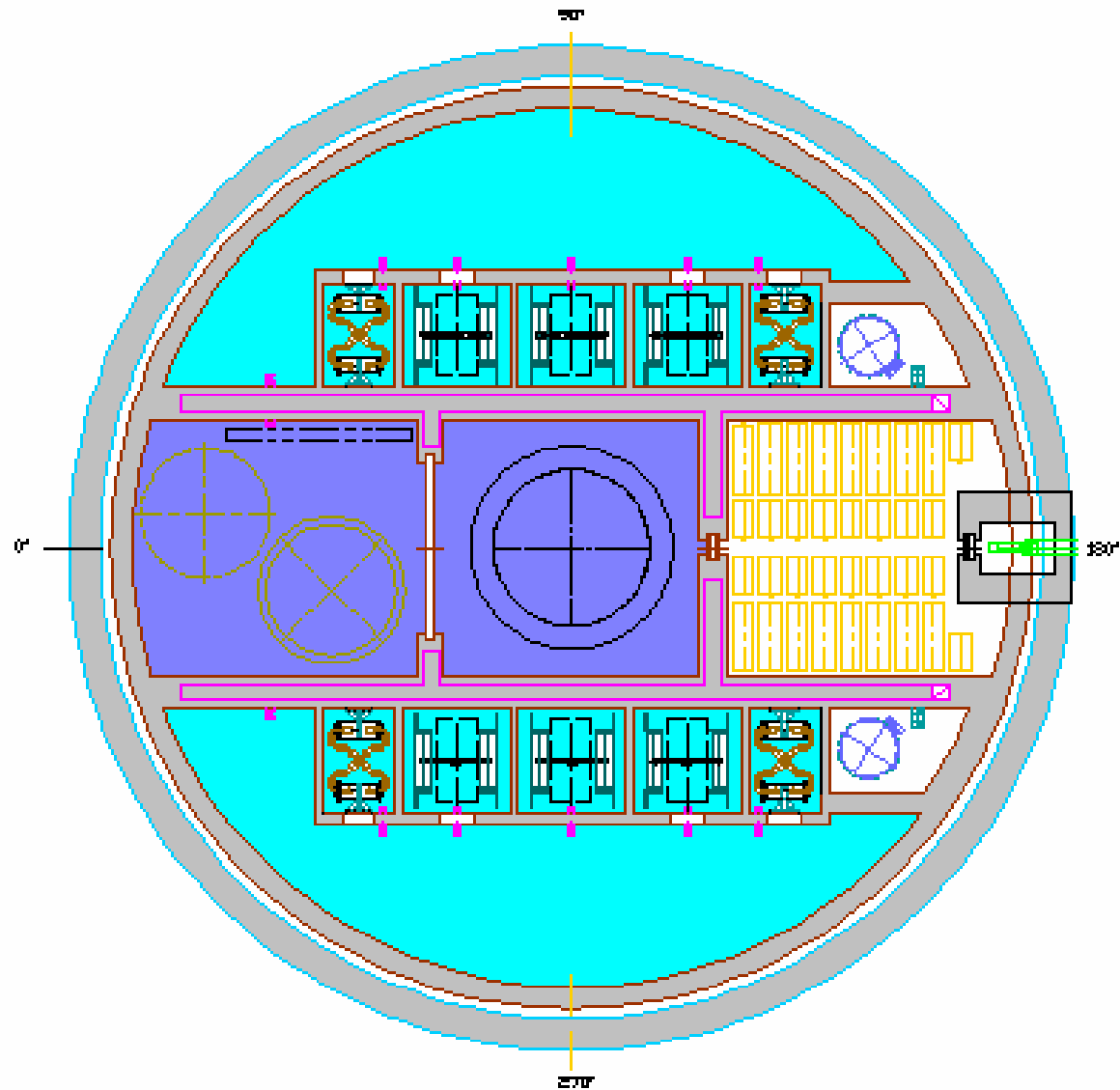
# IC and PCC Pool Water



ESBWR Pre-application Meeting  
October 12 and 13, 2004

# IC and PCC Pool Water

- The ESBWR design criteria for decay heat removal is 72 hours passively
  - > This is accomplished through the use of the Isolation Condensers (IC) and/or Passive Containment Cooling (PCC)
  - > All or most of the water required for this will be stored in pools located just beneath the refueling floor
  - > Sizing of pools is dictated by reactor isolation event since this results in all reactor heat being transferred to the pool water and none to the suppression pool
  - > Pool sizing is calculated based on the decay heat curve of ANSI/ANS 5.1-1994 plus 2  $\sigma$  (sigma)



FLOOR FL.26600

# IC and PCC Pool Water (cont)

- The ICs and PCCs are located in individual compartments
  - > The pool compartments are filled with demin water
  - > These compartments are connected at the top to a plenum that allows the steam generated to be exhausted to the Ultimate Heat Sink (atmosphere)
  - > These compartments are connected at the bottom to an outer pool through a pipe with a normally open manual valve
  - > This arrangement permits an individual compartment to be isolated so that maintenance can be performed without affecting the availability of the other heat exchangers

# IC and PCC Pool Water (cont)

- The outer pool is also filled with demineralized water
- The quantity of available demin water in these pools is sufficient to provide greater than 24 hours of decay heat removal
- To extend the passive decay heat removal capabilities to 72 hours, water from the Equipment Pool and Reactor Cavity is used to refill the IC and PCC pools
  - > This accomplished by the opening of remote manual valves
  - > The water in the Equipment Pool and Reactor Cavity is condensate grade
    - Condensate has minimal amounts of radioactivity

# IC and PCC Pool Water (cont)

- Condensate is used in the Equipment Pool and Reactor Cavity since this area is subject to contamination during refueling
  - > Complete decontamination of these pools after each outage is not necessary or practical
  - > There is a very small probability that the condensate water would ever have to be used
  - > Greater than 24 hours provides plenty of time to establish normal cooling or to refill the outer pools
    - Demineralized Water
    - Fire Water (on site)
    - Fire Truck

# Summary

- Condensate water is used in the ICs of existing domestic BWRs either from the start or shortly after initiation
- The ESBWR improves on this through the use of demin water for the greater than the first 24 hours
  - > use of condensate grade water to extend the passive capability of the plant to 72 hours is acceptable
  - > There is a very high probability that alternate means of decay heat removal are available prior to the demin water being used up
    - Normal shutdown systems
    - Pool refill capability
  - > The minor radiological releases that would result from the use of condensate would be well within the regulatory limits

# Requested NRC Actions

- NRC to provide an opinion on the acceptability of a manual operator action to open the valves to allow condensate from the Equipment Pool and Reactor Cavity to refill the IC and PCC pools
  - > Operator action post 24 hours is acceptable
  - > Use of condensate is acceptable in a post 24 hour time period