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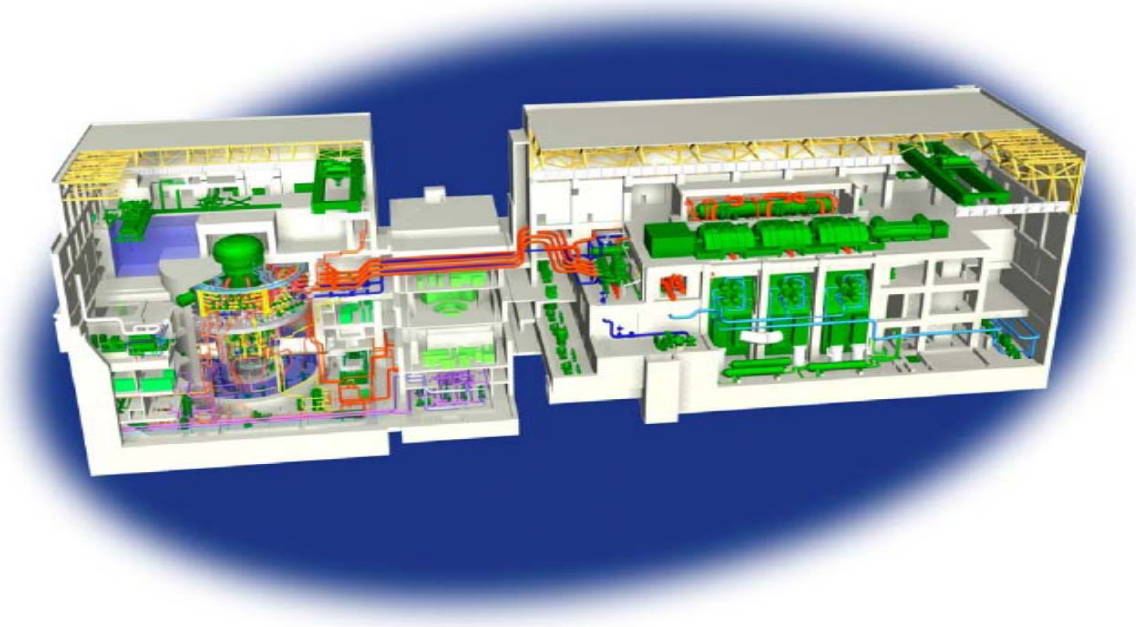
Toshiba's U.S. ABWR Design Certification Renewal



I&C Changes

January 31, 2011

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Currently Certified I&C Design

- The certified U.S. ABWR Design Control Document (DCD) Instrumentation and Control (I&C) design includes:
  - Common essential multiplexer system (EMS) to act as data highway
  - Safety System Logic and Control (SSLC):
    - Includes Reactor Protection System (RPS) and Engineered Safety Features (ESF) actuation
    - Implemented in a single, digital microprocessor-based platform

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Toshiba Renewal I&C Changes

- Toshiba's Renewal incorporates the following STP 3&4 COLA I&C design changes:
  - Updated I&C architecture:
    - Replaced obsolete Fiber Distributed Data Interface (FDDI) multiplexer communication technology with current data communication technology
    - SSLC design is separated into Reactor Trip and Isolation System (RTIS) and ESF Logic and Control System (ELCS)
  - RTIS/Neutron Monitoring System (NMS) and ELCS are implemented on diverse platforms:
    - RTIS and NMS use configurable logic device-based platforms
    - ELCS uses microprocessor-based platform
  - Simplifies and reduces complexity
  - Reduces likelihood and extent of common cause failure

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Toshiba Renewal I&C Changes (continued)

- Toshiba's Renewal includes STP 3&4 COLA Standard Departure STD DEP T1 3.4-1
  - Elimination of obsolete data communication technology
  - Elimination of unnecessary inadvertent ESF actuation logic
  - Clarification of digital control nomenclature and systems
  - Final selection of platforms
  - Testing and surveillance changes
- Toshiba’s Renewal includes all other I&C-related departures in the STP 3&4 COLA

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Toshiba Renewal I&C Changes (continued)

- STP 3&4 COLA Supplemental Sections
  - COLA Tier 2 Section 7.9S on Data Communication Systems is provided as Section 7.9 in Toshiba's DCD
  - Supplemental sections on final platforms are not included in Toshiba's DCD:
    - Tier 2 Section 7.1S
    - Recently proposed Tier 2 Section 7DS

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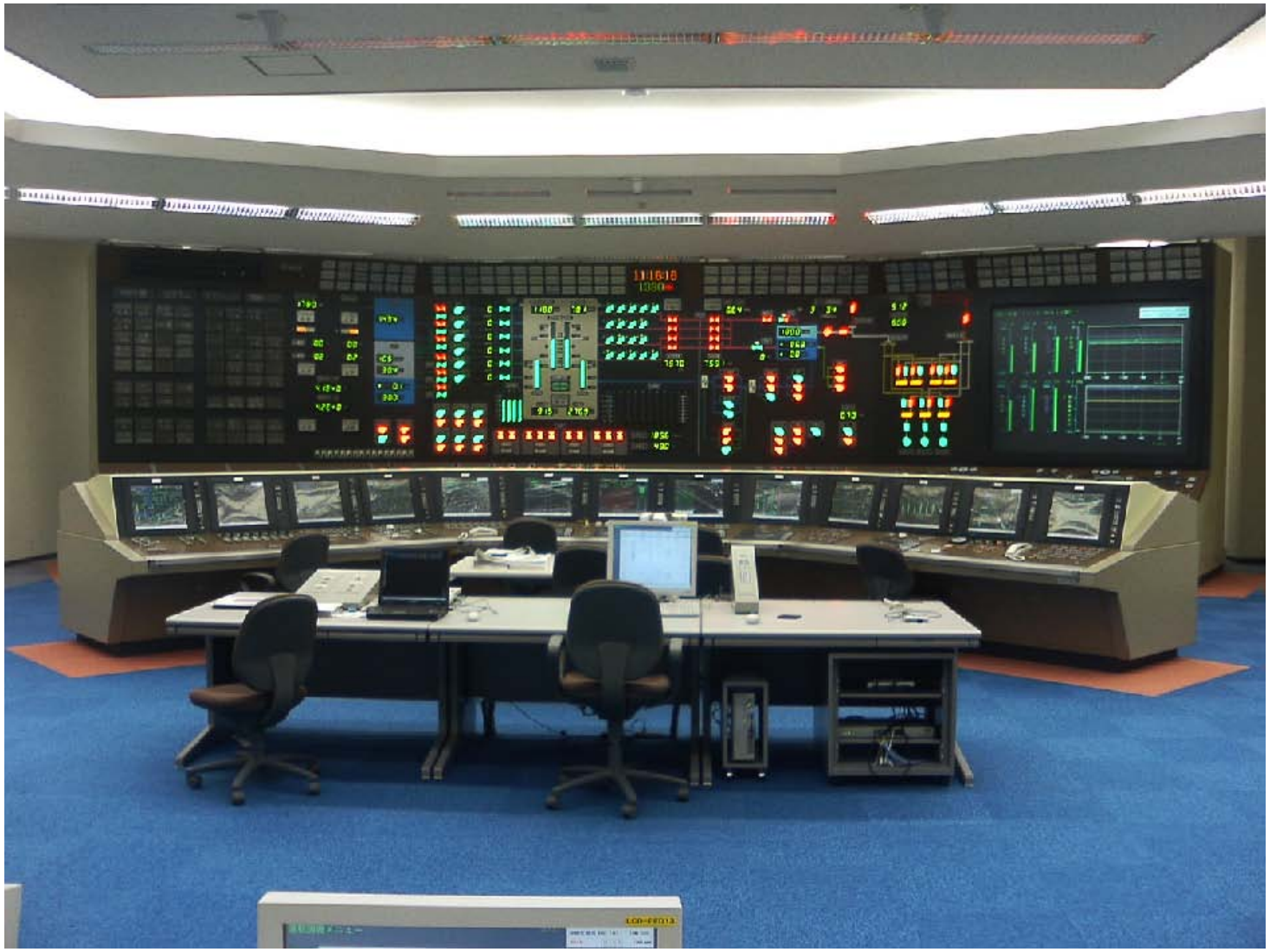
Japanese ABWR Main Control Room



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