

Updated NRC Staff Recommendations for ARDC 17 & 18

BOB Fitzpatrick NRR/DE/EEEB

October 11, 2016

Updated ARDC 17

Electric power systems.

Electric power systems shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for the systems shall be to provide sufficient capacity, capability, and reliability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant boundary are not exceeded as a result of anticipated operational occurrences and (2) vital functions that rely on electric power are maintained in the event of postulated accidents.

The onsite electric power systems shall have sufficient independence, redundancy, and testability to perform their safety functions, assuming a single failure.

Comments on ARDC 17

- This is the version DOE included in their guidance document (December 2014).
- After careful internal consideration of the above, NRC staff concludes that the DOE version ARDC-17 is well crafted and appropriate for its intended purpose.

Comments on ARDC 17 (2)

- The second paragraph provides for an onsite power system, not unlike onsite power systems of today, but tailored to the needs of the reactor design and with appropriate parts meeting the single failure criterion.
- The first paragraph establishes, without specificity, the need for another power source (akin to today's offsite power system) but affords the applicant free reign to choose and justify what that should be.

Comments on ARDC 17 (3)

- For any design certification that may claim the need for zero power to mitigate their spectrum of AOOs and accidents, keep in mind the power needs of the following functions:
 - post-accident monitoring
 - control room habitability
 - emergency lighting
 - radiation monitoring
 - communications...

Comments on ARDC 17 (4)

- For any design certification that can fully substantiate the claim of zero power needs, we are considering adding the following statement to the Rationale portion of the Regulatory Guide:

If electrical power is not required to permit functioning of structures, systems and components important to safety, the design is exempt from the above requirements. In this case, the functionality of structures, systems and components important to safety must be fully evaluated and documented in the design bases.

Comments on ARDC 17 (5)

- With the proviso of the previous slide, NRC staff believes there is no 'electrical' need for any tailored versions of ARDC 17 for various reactor designs.
- Design-specific nomenclature for 'pressure boundaries' etc. may be appropriate but the electrical content should remain unchanged.

ARDC 18

Inspection and testing of electric power systems.

Electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features, such as wiring, insulation, connections, and switchboards, to assess the continuity of the systems and the condition of their components. The systems shall be designed with a capability to test periodically (1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses and (2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system, and the transfer of power among systems.

Comments on ARDC 18

- This is the version DOE included in their guidance document (December 2014).
- The only change from the original GDC 18 is removal of the named specific power sources from the testing of the transfer of power between sources and substituting 'sources.'
- This is fully appropriate given the leeway provided to applicants in ARDC 17 for choosing the power sources.