

February 6, 2013

Dr. J. Sam Armijo, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: RESPONSE TO ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
RECOMMENDATIONS ON CHAPTER 7, "INSTRUMENTATION AND
CONTROLS," OF THE DRAFT DESIGN SPECIFIC REVIEW STANDARD FOR
THE MPOWER™ INTEGRAL PRESSURIZED-WATER REACTOR

Dear Dr. Armijo:

On November 16, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff provided a presentation to the Advisory Committee on Reactor Safeguards (ACRS) Digital Instrumentation and Controls (I&C) Systems Subcommittee on the draft design specific review standard (DSRS) Chapter 7, followed by a similar presentation to the ACRS main committee during the 600th meeting on December 16, 2012. During these sessions the NRC staff presented its proposed guidance for reviewing the I&C design of the Babcock and Wilcox mPower™ nuclear power reactor. Based on those meetings, you provided a letter dated December 18, 2012, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML12346A353), containing recommendations pertaining to Chapter 7, "Instrumentation and Controls," of the draft DSRS for the mPower™ integral pressurized-water reactor (iPWR) (ADAMS Accession No. ML13023A181).

The ACRS's letter included the following recommendations:

Recommendation 1: The Draft DSRS for mPower™ iPWR Chapter 7 Instrumentation and Control Systems should be issued for industry and public comment.

Staff Response: The staff will issue Chapter 7 of the mPower™ DSRS for formal public comment, along with the rest of the DSRS sections. This approach is consistent with the internal office-level procedure for preparing, issuing, and updating DSRSs for iPWRs.

Recommendation 2: The mPower™ I&C DSRS provides a review standard that is likely to be applicable to large reactor designs, as well as other small modular reactors (SMRs).

Staff Response: The NRC staff developed Chapter 7 of the DSRS as an innovative initiative specifically for the Babcock and Wilcox mPower™ design review; however, the staff agrees with the ACRS that the staff will gain experience and lessons learned from the use of the mPower™ DSRS that it can apply to new, large light-water reactor designs. Additionally, staff expects that it will develop subsequent DSRS Chapter 7 guidance for other SMRs using a similar review framework.

Recommendation 3: Section 7.0, Instrumentation and Controls – Introduction and Overview of Review Process, Acceptance Criteria and Review Process, and Section 7.2.9 - Control of Access Review, should be revised as indicated in the discussion.

Staff Response: Regarding Section 7.0, “Instrumentation and Controls—Introduction and Overview of Review Process, Acceptance Criteria, and Review Process,” ACRS commented on the level of detail in the application necessary to make a safety finding. To address this recommendation, the staff will provide guidance to clarify the level of information sufficient to describe the functional I&C system architectural description. The staff agrees that such level of information should help the applicant establish a clear and sound licensing/safety basis at the time of design approval while avoiding detailed hardware specifications.

During the December 6th, 2012, meeting, ACRS raised a concern regarding the review of external control of access to I&C safety systems and associated guidance in Section 7.2.9 of the DSRS. Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(h), “Protection and Safety Systems,” addresses safety-related I&C systems and incorporates by reference Institute of Electrical and Electronics Engineers (IEEE) Std. 603-1991. Section 5.9 of IEEE Std. 603-1991 addresses administrative controls of access to safety system equipment. The Committee’s recommendation relates to the concern of control of access through data communication links between the main control room (MCR), technical support center (TSC), or emergency support center (ESC). While the MCR, TSC, and ESC may contain some safety-related I&C systems, they mainly consist of nonsafety-related I&C systems. As part of the staff’s safety review, the staff ensures independence between safety-related and nonsafety-related I&C systems in accordance with General Design Criterion 24, “Separation and Protection of Control Systems,” and IEEE Std. 603-1991, Section 5.6. Specifically, any failures and corrupted data from nonsafety-related I&C systems do not prevent the safety-related I&C systems from performing their safety functions during anticipated operational occurrences and design basis accidents. In accordance with IEEE Std. 603-1991, Section 5.9, the staff also ensures that the safety systems include provisions to support implementation of administrative controls for the control of access to the safety-related I&C systems. The NRC staff will evaluate whether these regulatory requirements are met and will document this within a safety evaluation report that makes use of the mPower™ DSRS.

The staff agrees with ACRS concerns regarding communications between digital systems, particularly if any of those communications could present the potential for systems outside the control of the facility to access critical digital assets within the facility. 10 CFR 73.54, “Protection of Digital Computer and Communication Systems and Networks,” addresses cyber security for critical digital assets at nuclear power plants. The staff considered the challenges posed by digital communications to the security of critical digital assets into the development of 10 CFR 73.54 and its associated guidance document, Regulatory Guide 5.71, “Cyber Security Programs for Nuclear Facilities.”

As stated in 10 CFR 73.55(a)(4), “Applicants for an operating license under the provisions of part 50 of this chapter or holders of a combined license under the provisions of part 52 of this chapter, shall implement the requirements of this section before fuel is allowed onsite (protected area).” Also stated in 10 CFR 73.55(b)(8), as part of the requirements of the section, licensees shall establish, maintain, and implement a cyber security plan in accordance with 10 CFR 73.54. As required in 10 CFR 73.54(e), an applicant must submit a cyber security plan that describes cyber security program elements and criteria that the applicant will implement at

its facility. The implementation of the cyber security measures described in the approved cyber security plan, including the defensive architecture that establishes formal communication boundaries, will be subject to NRC inspection prior to initial fuel load. Should the applicant determine that digital equipment within a facility's MCR, TSC, or ESC is a critical digital asset, that equipment would need to be protected from cyber threats in accordance with the applicant's approved cyber security plan.

Regarding Section 7.2.9 of the DSRS, "Control of Access, Identification, and Repair," the staff will include guidance to assess the I&C safety system architecture and confirm that the applicant has provided sufficient administrative control of access to ensure the reliability of the data transmitted between the I&C safety systems and nonsafety I&C systems. Consistent with existing regulations for the safety review of I&C systems, staff does not review the control of access of nonsafety systems such as communication architectures and networks to other nonsafety-related plant systems during design certification reviews, unless such communication architectures and networks have an impact on the reliability of the safety systems.

Recommendation 4: The diagrams of the overall architecture, as called for in Appendix B, Item 3, should be expanded to provide examples of the desired level of detail as was done for defense-in-depth in Item 4.

Staff Response: The staff agrees with this recommendation and will revise Item 3 of Appendix B, "I&C System Architecture," to provide examples of the desired level of detail expected regarding the overall I&C architecture.

In addition to the responses to the recommendations above, the staff will evaluate the observations and suggestions that the ACRS provided during the November 16, 2012, ACRS Digital I&C subcommittee meeting and incorporate them as appropriate. Following issuance of the DSRS for formal public comments and resolution of the comments, the staff will schedule a meeting with the ACRS to discuss the final version of Chapter 7 of the DSRS.

The NRC staff thanks the ACRS for its time and its valuable input, and looks forward to working with the Committee in the future.

Sincerely,

/RA M. Johnson for/

R. W. Borchardt
Executive Director
for Operations

Docket No.: PROJ0776

cc: Chairman Macfarlane
Commissioner Svinicki
Commissioner Apostolakis
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The NRC staff thanks the ACRS for its time and its valuable input, and looks forward to working with the Committee in the future.

Sincerely,
/RA M. Johnson for/
 R. W. Borchardt
 Executive Director
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