Enclosure 2:

"Software Quality Assurance," PM-0815-16432, Revision 0, nonproprietary version

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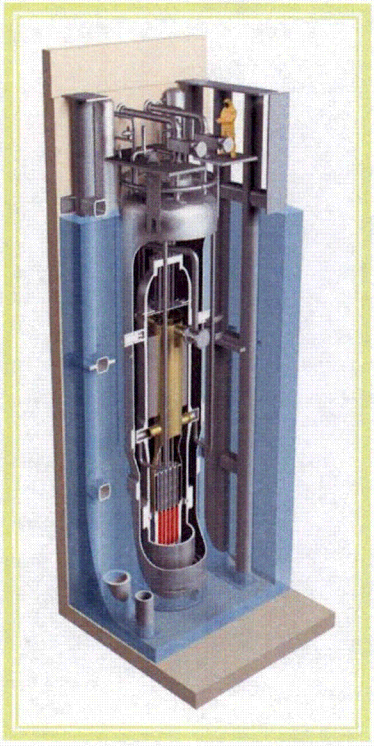
Software Quality Assurance



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Mark Burzynski (Engineering)

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PM-0815-16432-NP
Revision: 0

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Acknowledgement and Disclaimer

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Agenda

- Purpose
- Software Quality Assurance Compliance Plan
  - NQA-1-2008 and NQA-1a-2009
- Key digital regulatory guidance
  - use of IEEE Std 7-4.3.2-2003
  - secure development and operational environment
- Use of software-based regulatory guides
- Open discussion
  - level of detail
  - DSRS comments

Acronyms

ASME: American Society of Mechanical Engineers
BTP: branch technical position
DCD: design control document
DSRS: design-specific review standard
EPRI: Electric Power Research Institute
FPGA: field programmable gate array
IEEE: Institute of Electrical and Electronics Engineers
I&C: Instrumentation and Control
NRC: Nuclear Regulatory Commission
QA: Quality Assurance
RG: regulatory guide
SDOE: secure development and operational environment
SCMP: Software Configuration Management Plan
SIL: software integrity level
SQAP: Software Quality Assurance Plan
SVVP: Software Verification and Validation Plan
V&V: verification and validation

Purpose

- Ensure alignment that key DCD presentation of the software QA subject and NRC review findings will be based on RG 1.28 and endorsed by NQA-1-2008/NQA-1a-2009 and not BTP 7-14, since DSRS does not use it
- Discussion on level of detail to be represented in DCD Section 7.2.1 after discussion on alignment and selected topics

Software QA Compliance Plan (1/2)

- Main line of compliance for software QA:
  - compliance with Regulatory Guide 1.28, Revision 4, which endorses NQA-1-2008/NQA-1a-2009
  - NQA-1-2008/NQA-1a-2009 mandatory software development QA requirements
    - Part I, Requirement 3, Section 800 on Software Design Control
    - Part I, Requirement 11, Section 400 on Computer Program Test Procedures
    - Part II, Subpart 2.7 on Quality Assurance Requirements for Computer Software for Nuclear Facility Applications

Software QA Compliance Plan (2/2)

- Main line of compliance for software QA:
  - NuScale Topical Report NP-TR-1010-859-NP-A: Quality Assurance Program Description for the NuScale Power Plant
    - In Section 2.3.4, NuScale commits to compliance with NQA-1-2008 and NQA-1a-2009 addenda, Requirement 3, Sections 100 through 900 and the standards for computer software in NQA-1-2008 and NQA-1a-2009 addenda, Part II, Subpart 2.7.
    - NuScale Topical Report NP-TR-1010-859-NP-A approved by NRC (ADAMS Accession No. ML120680132)
  - Software QA requirements for digital I&C systems are implemented in PL-0302-973, Digital I&C Software Quality Assurance Plan

NQA-1-2008 and NQA-1a-2009 (1/4)

NQA-1, Part I, Requirement 3, Section 800 on Software Design Control addresses:

- 801 Software Design Process
  - 801.1 Identification of Software Design Requirements
  - 801.2 Software Design
  - 801.3 Implementation of the Software Design
  - 801.4 Software Design Verification
  - 801.5 Computer Program Testing
- 802 Software Configuration Management
  - 802.1 Configuration Identification
  - 802.2 Configuration Change Control
  - 802.3 Configuration Status Control

NQA-1-2008 and NQA-1a-2009 (2/4)

NQA-1, Part I, Requirement 11, Section 400 addresses Computer Program Test Procedures

(c) Test procedures or plans shall specify the following, as applicable:

(1) required tests and test sequence

(2) required ranges of input parameters

(3) identification of the stages at which testing is required

(4) criteria for establishing test cases

(5) requirements for testing logic branches

(6) requirements for hardware integration

(7) anticipated output values

(8) acceptance criteria

(9) reports, records, standard formatting, and conventions

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NQA-1-2008 and NQA-1a-2009 (3/4)

NQA-1, Part II, Subpart 2.7 on QA for Computer Software addresses:

- 100 General
  - 101 Software Engineering
  - 102 Definitions
- 200 General Requirements
  - 201 Documentation
  - 202 Review
  - 203 Software Configuration Management
  - 204 Problem Reporting and Corrective Action
- 300 Software Acquisition
  - 301 Procured Software And Software Services
  - 302 Otherwise Acquired Software

NQA-1-2008 and NQA-1a-2009 (4/4)

NQA-1, Part II, Subpart 2.7 on QA for Computer Software addresses:

- 400 Software Engineering Method
  - 401 Software Design Requirements
  - 402 Software Design
    - 402.1 Software Design Verification
  - 403 Implementation
  - 404 Acceptance Testing
  - 405 Operation
  - 406 Maintenance
  - 407 Retirement
- 500 Standards, Conventions, and Other Work Practices
- 600 Support Software
  - 601 Software Tools
  - 602 System Software

Key Digital Regulatory Guidance

- RG 1.152, Revision 3, has two main sets of guidance:
  - IEEE Std 7-4.3.2-2003 endorsement
  - SDOE Guidance
- IEEE Std 7-4.3.2-2003, Section 5.3 has additional requirements that are necessary to meet the IEEE Std 603-1991 quality requirements for digital I&C
  - software development
  - qualification of existing commercial computers
  - verification and validation
  - use of software tools
  - configuration management
  - risk management

Use of IEEE Std 7-4.3.2-2003 (1/7)

- Software development
  - NuScale life cycle process defined in NuScale Digital I&C SQAP PL-0003-3975
    - based on ASME NQA-1-2008/NQA-1a-2009 and intent of IEEE Std 730-2002
    - satisfies IEEE Std 7-4.3.2 requirements for software development

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Use of IEEE Std 7-4.3.2-2003 (2/7)

- NuScale I&C Safety System Development Processes

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Use of IEEE Std 7-4.3.2-2003 (3/7)

- System and Programmable Logic Development Life Cycle Processes
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Use of IEEE Std 7-4.3.2-2003 (4/7)

- Qualification of existing commercial computers
  - NuScale QA Topical Report addresses general framework for commercial grade dedication
  - NuScale Digital I&C SQAP requires use of EPRI TR-106439, "Guidelines on Evaluation and Acceptance of Commercial Grade Digital Equipment for Nuclear Safety Applications“ (as accepted in Regulatory Guide 1.152, Revision 3)
    - satisfies IEEE Std 7-4.3.2 requirements for qualification of existing commercial computers

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Use of IEEE Std 7-4.3.2-2003 (5/7)

- Verification and validation
  - NuScale Digital I&C SVVP defined in PL-0302-11001
    - based on IEEE Std 1012-2004, as endorsed by RG 1.168, Revision 2, using independent V&V team with several important adaptations and exceptions
      - V&V Activities adapted to NuScale life cycle and FPGA technology
      - V&V Tasks adapted to FPGA technology
      - exceptions to specific documentation requirement details that conflict with NuScale standard documentation requirements or are inconsistent with the platform neutral strategy
    - satisfies IEEE Std 7-4.3.2 requirements for V&V

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Use of IEEE Std 7-4.3.2-2003 (6/7)

- Use of software tools
  - NuScale Digital I&C SQAP incorporates tool requirements from ASME NQA-1-2008/NQA-1a-2009 and IEEE Std 7-4.3.2-2003
  - satisfies IEEE Std 7-4.3.2 requirements for Use of Software Tools
- Configuration management
  - NuScale Digital I&C SCMP defined in PL-0302-11002
    - Based on ASME NQA-1-2008/NQA-1a-2009 and IEEE Std 828-2005, as endorsed by RG 1.169 Revision 1
  - satisfies IEEE Std 7-4.3.2 requirements for Configuration Management

Use of IEEE Std 7-4.3.2-2003 (7/7)

- Risk management

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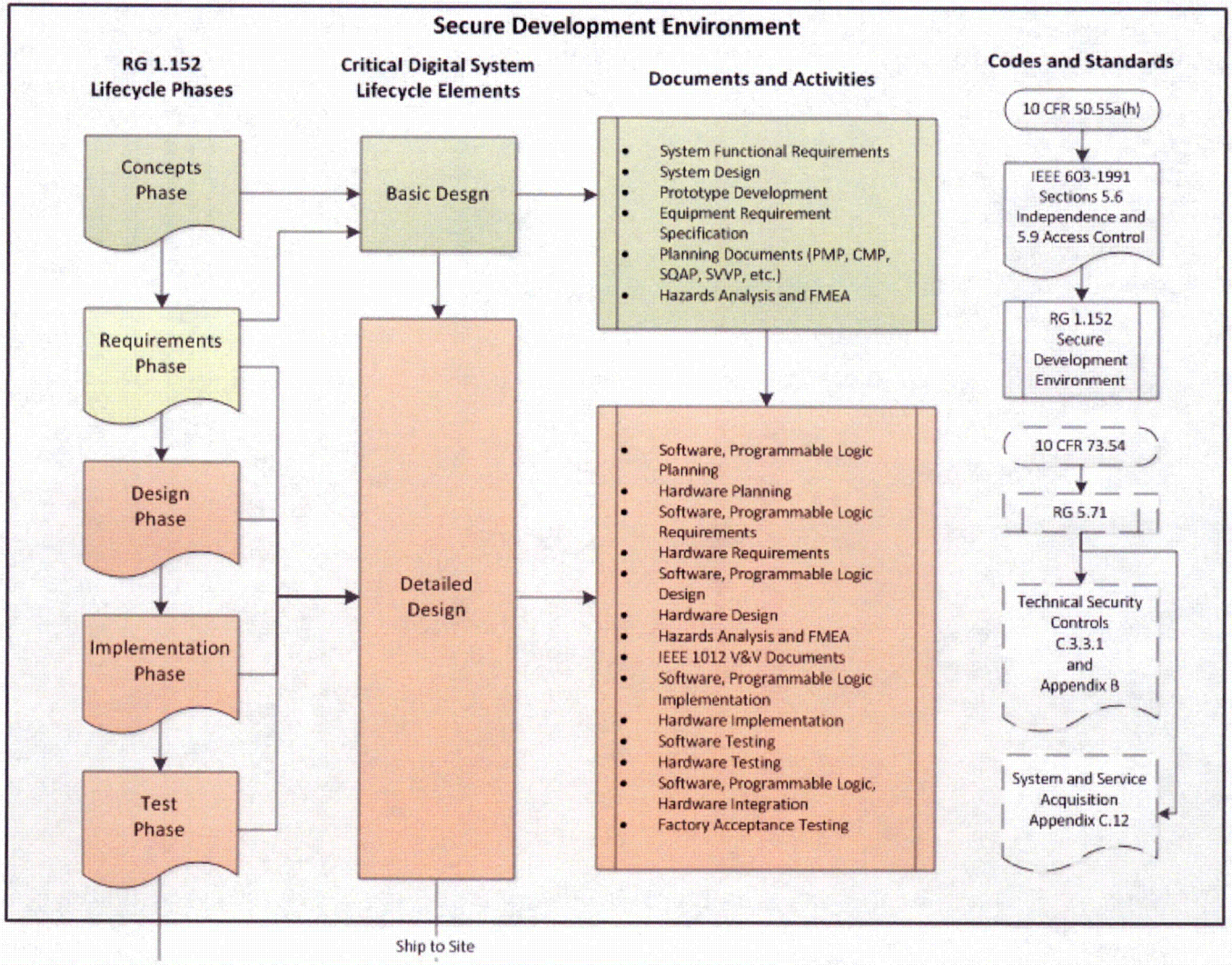
  - satisfies IEEE Std 7-4.3.2 requirements for Use of Software Tools

SDOE (1/4)

- NuScale controls implemented in PI-0302-10247, Critical Digital System SDOE Plan
  - an SDOE Vulnerability Assessment will be performed during the basic design stage to identify design requirements that will be verified or added to the requirements specification for each system

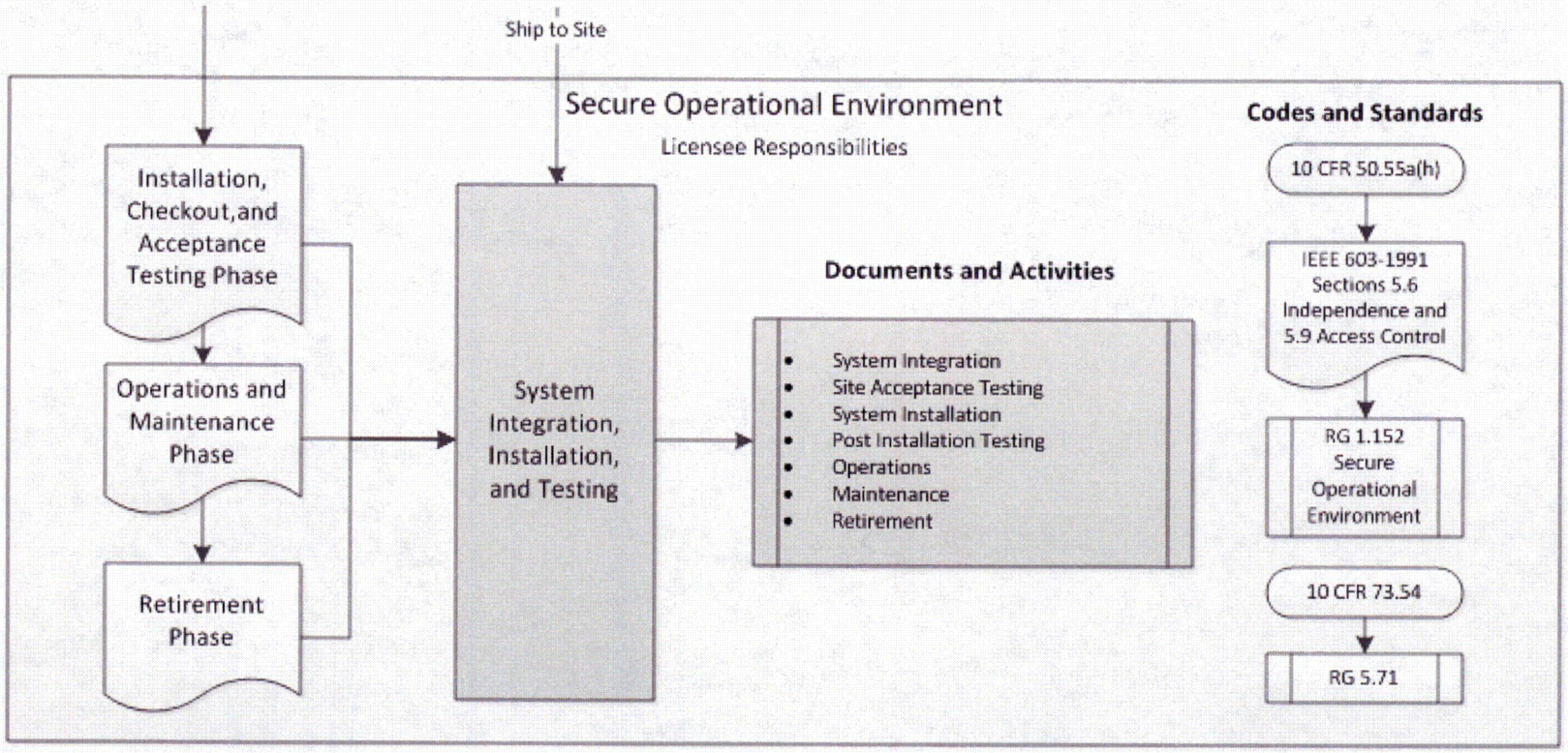
SDOE (2/4)

- NuScale SDOE scope



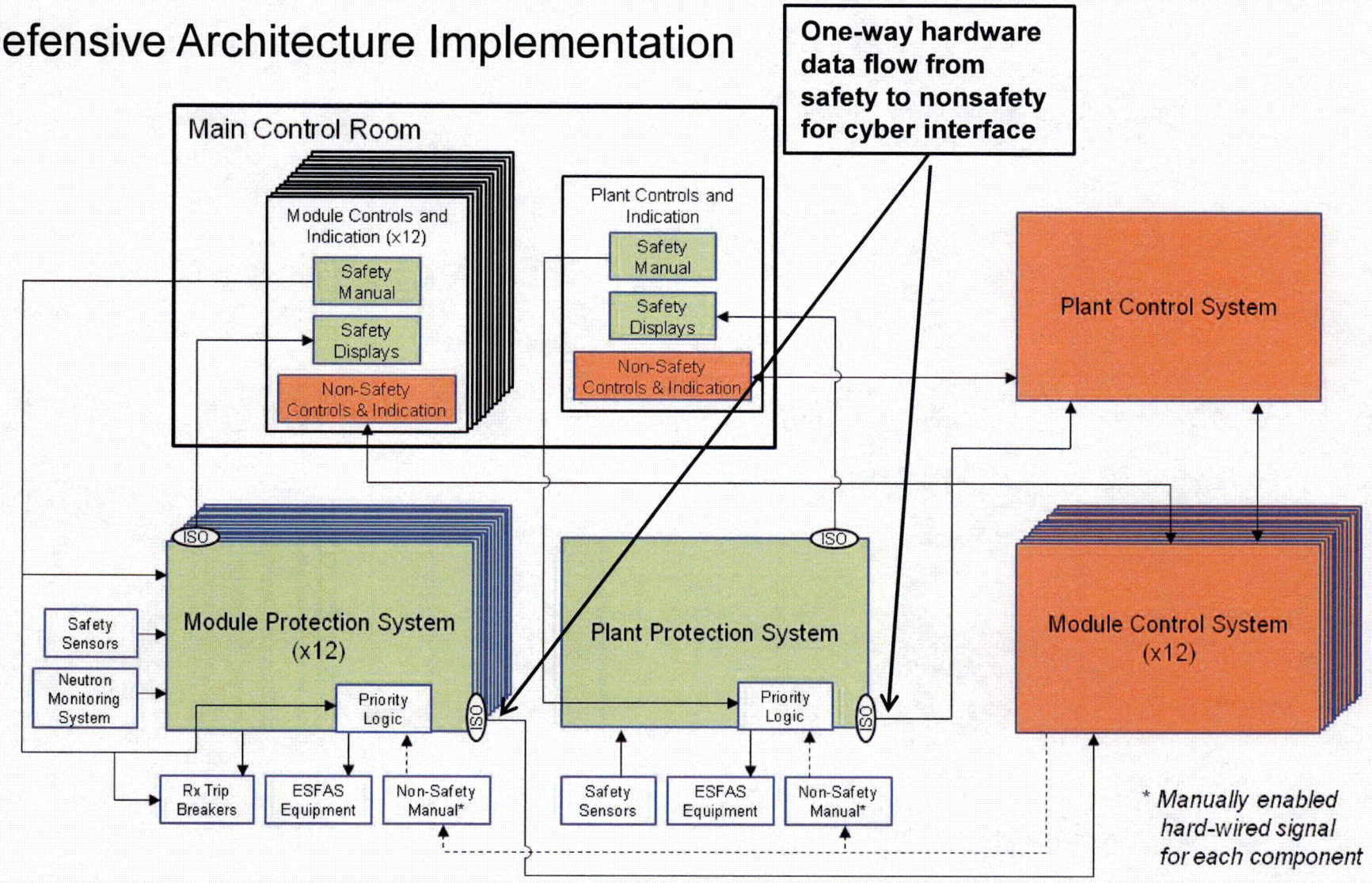
SDOE (3/4)

- Licensee SDOE scope



SDOE (4/4)

Defensive Architecture Implementation



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Use of Software-Based RGs (1/5)

- General approach to software-based RGs and associated IEEE standards:

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Use of Software-Based RGs (2/5)

- IEEE Std. 1074-2006, as endorsed by RG 1.173, Revision 1
  - NuScale software life cycle development documents developed in alignment with NuScale design control, QA plan, and project management requirements
    - PL-0302-973, Digital I&C Software Quality Assurance Plan
    - NP-PL-0002-3283, NuScale Software Program Plan
    - PL-0003-3975, NuScale Digital Safety Systems Project Plan
  - NuScale development documents meet the intent of IEEE Std. 1074-2006, as endorsed by RG 1.173

Use of Software-Based RGs (3/5)

- IEEE Std 1028-2008, as endorsed by RG 1.168, Revision 2

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- IEEE Std 830-1993, as endorsed by RG 1.172, Revision 1

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  - exceptions to specific documentation requirement details that conflict with NuScale standard documentation requirements or are inconsistent with platform neutral strategy

Use of Software-Based RGs (4/5)

- IEEE Std 1008-1987, as endorsed by RG 1.171, Revision 1

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  - expect tailoring for FPGA technology
  - expect exceptions to specific documentation requirement details that conflict with NuScale standard documentation requirements or are inconsistent with platform neutral strategy

Use of Software-Based RGs (5/5)

- IEEE Std 829-2008, as endorsed by RG 1.170, Revision 1

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  - expect exceptions to specific documentation requirement details that conflict with NuScale standard documentation requirements or are inconsistent with platform neutral strategy

Open Discussion - Level of Detail

- Alignment on what is to be done for each topic for design certification
- Discussion on how each topic might be described in the DCD (i.e., how much detail in terms of specific sub-topics that need elaboration and general sense of expected page count)

Open Discussion – DSRS Comments

- Discuss suggested changes to DSRS to address FPGA technology adaptation and implement graded software QA based on risk significance
- Discuss plans and schedule to comment formally on NuScale DSRS Chapter 7

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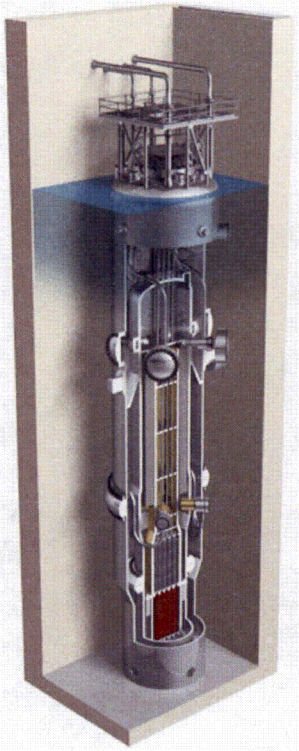

Enclosure 4:

Affidavit, AF-0815-16476

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NuScale Power, LLC

AFFIDAVIT of José N. Reyes, Jr.

I, José N. Reyes, Jr., state as follows:

(1) I am the Chief Technology Officer of NuScale Power, LLC (NuScale), and as such I am authorized to apply for withholding of information transmitted with this letter from public disclosure and to execute this affidavit on behalf of NuScale.

(2) I am knowledgeable of the criteria and procedures used by NuScale in designating confidential commercial information as proprietary and have been specifically delegated the function of reviewing the information described in this affidavit that NuScale seeks to have withheld from public inspection.

(3) The harm that would result if the information sought to be withheld is disclosed to the public is as follows:

(a) The presentation discloses information about the processes and methods by which NuScale develops safety-related software. NuScale has performed significant research and evaluation to develop a basis for these processes and methods and has invested significant human and financial resources in such development.

(b) NuScale's unique process and method provide NuScale with a competitive economic advantage over other companies. Public disclosure of the information would cause substantial harm to NuScale's competitive position and reduce or foreclose opportunities for NuScale to generate a return on its investment in research and development. Although the exact financial value of the information is difficult to quantify, it is a key element of the design basis for a NuScale plant and, therefore, has substantial value to NuScale.

(c) If the information were disclosed to the public, NuScale's competitors would have access to the information without having been required to undertake a similar expenditure of resources. Such disclosure would constitute a misappropriation of NuScale's intellectual property, would unfairly provide NuScale's competitors with a windfall, and would deprive NuScale of the opportunity to seek an adequate return on its investment.

(4) The information sought to be withheld is contained in the enclosed presentation scheduled for August 26, 2015 entitled "Software Quality Assurance". The enclosure contains the designation "NuScale Confidential - Proprietary Class 2" at the top of each page containing proprietary information. The information considered by NuScale to be proprietary is identified within double braces, "{{ }}" in the document.

(5) The basis for proposing that the information be withheld is that NuScale treats the information as trade secrets and commercial or financial information that are privileged and confidential. NuScale relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC § 552(b)(4), as well as exemptions applicable to the NRC under 10 CFR §§ 2.390(a)(4) and 9.17(a)(4).

(6) With respect to the considerations set forth in 10 CFR § 2.390(b)(4):

(a) The information sought to be withheld has been held in confidence by NuScale.

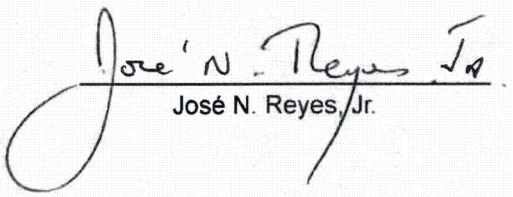
(b) The information is of a sort customarily held in confidence by NuScale and, to the best of my knowledge and belief, consistently has been held in confidence by NuScale. The procedure for approval of external release of such information typically requires review by the staff manager, project manager, chief technology officer or other equivalent authority, or the manager of the cognizant marketing function (or his delegate), for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside NuScale are limited to regulatory bodies, customers and potential customers and their agents, suppliers, licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or contractual agreements to maintain confidentiality.

(c) The information is being transmitted to and received by the NRC in confidence.

(d) No public disclosure of the information has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or contractual agreements that provide for maintenance of the information in confidence.

(e) Public disclosure of the information is likely to cause substantial harm to the competitive position of NuScale, taking into account the value of the information to NuScale, the amount of effort and money expended by NuScale in developing the information, and the difficulty others would have in acquiring or duplicating the information. The information sought to be withheld is part of NuScale's technology that provides NuScale with a competitive advantage over other firms in the industry. NuScale has invested significant human and financial capital in developing this technology and NuScale believes it would difficult for others to duplicate the technology without access to the information sought to be withheld.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 08/12/15



José N. Reyes, Jr.