

Standard Review Plan Instrumentation and Controls Potential Update Topics



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Barry S. Marcus
Instrumentation and Controls Branch
Division of Engineering



AGENDA

- **9:00 a.m. Introduction**
- **9:15 a.m. SRP Update Program
Priorities, Schedules, and Public Interactions**
- **9:30 a.m. Digital Basics, Design Certification and ITAAC**
- **9:55 a.m. Break**
- **10:05 a.m. Digital Details, Defense-In-Depth and Diversity, Important to
Safety, Setpoints, Communication and Isolation, Control Systems**
- **11:50 a.m. Overview of I&C Sections with Administrative Changes**
- **12:00 p.m. Lunch**
- **1:00 p.m. Continue Discussion (as needed)**



PURPOSE OF MEETING

- **Provide information to the public on Standard Review Plan (SRP) updates**
- **Provide a forum for public comments on planned changes to the instrumentation and controls (I&C) portions of the SRP**



DIGITAL BASICS

- **Appendix 7.1-D – Guidance for Evaluation of Conformance to IEEE Std 7-4.3.2**
- **New Appendix**
 - **Move Discussion of IEEE Std 7-4.3.2 and RG 1.152 from Appendix 7.1-C**
- **Potential Topics**
 - **IEEE Std 7-4.3.2 and RG 1.152**
 - **IEEE 603**
 - **Software Review Lessons Learned**
 - **Commercial Grade Dedication Lessons Learned**
 - **RG 1.180 – EMI, RFI**
 - **RG 1.204 – Lightning**
 - **Soft Controls**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL BASICS

- **BTP 7-14 – Guidance on Software reviews for Digital Computer-Based Instrumentation and Control Systems**
- **Potential Update Topics**
 - **Software Review Lessons Learned**
 - **Commercial Grade Dedication Lessons Learned**
 - **IEEE Std 7-4.3.2 and RG 1.152**
 - **RG 1.168 – Software Verification and Validation**
 - **Digital System Life Cycle Process**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL BASICS

- **Appendix 7.1-C – Guidance for Evaluation of Conformance to IEEE Std 603**
- **Move Discussion of IEEE Std 7-4.3.2 and RG 1.152 to Appendix 7.1-D**
- **Potential Update Topics**
 - IEEE Std 7-4.3.2 and RG 1.152
 - IEEE 603
 - RG 1.180 – EMI, RFI
 - RG 1.204 – Lightning
 - Update References, Latest Standards, Latest RGs, Branch Names



DESIGN CERTIFICATION AND ITAAC

- **Section 14.3.5 – Instrumentation and Controls (Tier 1) - ITAAC**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - Software Review Lessons Learned
 - Digital System Life Cycle Process
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Update References, Latest Standards, Latest RGs, Branch Names



DESIGN CERTIFICATION AND ITAAC

- **BTP 7-16 – Guidance on the Level of Detail Required for Design Certification Applications Under 10 CFR Part 52**
- **Update with DG-1145**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **Software Review Lessons Learned**
 - **Digital System Life Cycle Process**
 - **IEEE Std 7-4.3.2 and RG 1.152**
 - **IEEE Std 603**
 - **Defense – In – Depth and Diversity**
 - **Emerging Technology**
 - **PRA**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL DETAILS

- **Appendix 7.0-A – Review Process for Digital Instrumentation and Control Systems**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **Software Review Lessons Learned**
 - **Commercial Grade Dedication Lessons Learned**
 - **Digital System Life Cycle Process**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE Std 603**
 - **Human Factors Interface**
 - **Soft Control**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL DETAILS

- **BTP 7-17 – Guidance on Self-Test and Surveillance Test Provisions**
- **Potential Update Topics**
 - **Technical Specification Changes, 10 CFR Part 50**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE 603**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL DETAILS

- **BTP 7-18 – Guidance on the Use of Programmable Logic Logic Controllers in Digital Computer-Based Instrumentation and Control Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Commercial Grade Dedication Lessons Learned
 - Software Review Lessons Learned
 - Digital System Life Cycle Process
 - Isolation Designs
 - RG 1.180 – EMI, RFI
 - RG 1.204 - Lightning
 - Update References, Latest Standards, Latest RGs, Branch Names



DIGITAL DETAILS

- **BTP 7-21 – Guidance on Digital Computer Real-Time Performance**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE Std 603**
 - **Commercial Grade Dedication Lessons Learned**
 - **Software Review Lessons Learned**
 - **Digital System Life Cycle Process**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



DIGITAL DETAILS

- **BTP 7-22 – Guidance on Digital Sampling**
- **New BTP to cover Sampling of Analog Signals for use in Computer-Based I&C Systems**
- **Potential Topics**
 - **Sample Rate**
 - **Word Length**
 - **Aliasing**
 - **Finite Word Length Error**
 - **NUREG-1709**



DIGITAL DETAILS

- **BTP 7-23 – Guidance on Digital Operating System Testing**
- **New BTP to cover Operating System Self Testing**
- **Potential Topics**
 - **Controlling and Allocation of Memory**
 - **Prioritization of the Processing of Instructions**
 - **Controlling Input and Output Devices**
 - **Management of Computer Resources**



DEFENSE-IN-DEPTH AND DIVERSITY

- **Section 7.8 – Diverse Instrumentation and Control Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Defense – In – Depth and Diversity
 - Power Uprate
 - Isolation Designs
 - Human Factors Interface
 - Soft Control
 - PRA
 - Update References, Latest Standards, Latest RGs, Branch Names



DEFENSE-IN-DEPTH AND DIVERSITY

- **BTP 7-19 – Guidance for Evaluation of Defense - In - Depth and Diversity in Digital Computer-Based Instrumentation and Control Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Defense – In – Depth and Diversity
 - Commercial Grade Dedication Lessons Learned
 - Software Review Lessons Learned
 - Digital System Life Cycle Process
 - Emerging Technology
 - Human Factors Interface
 - Soft Control
 - Update References, Latest Standards, Latest RGs, Branch Names



IMPORTANT TO SAFETY

- **BTP 7-10 – Guidance on Application of Regulatory Guide 1.97**
- **Potential Update Topics**
 - **RG 1.97 – Accident Monitoring Instrumentation**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



IMPORTANT TO SAFETY

- **Section 7.5 – Information Systems Important to Safety**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - RG 1.105 - Setpoints
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Human Factors Interface
 - Soft Control
 - RG 1.97 – Accident Monitoring Instrumentation
 - RG 1.177 – Risk Informed Regulation
 - Isolation Designs
 - Update References, Latest Standards, Latest RGs, Branch Names



IMPORTANT TO SAFETY

- **Appendix 7.1-A – Acceptance Criteria and Guidelines for Instrumentation and Control Systems Important to Safety**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Technical Specification Changes - 10 CFR 50.36
 - RG 1.180 - EMI, RFI
 - RG 1.204 - Lightning
 - RG 1.105 - Setpoints
 - RG 1.97 – Accident Monitoring Instrumentation
 - Digital Sampling (new BTP)
 - Digital Operating System Testing (new BTP)
 - Update References, Latest Standards, Latest RGs, Branch Names



SETPOINTS

- **BTP 7-12 – Guidance on Establishing and Maintaining Instrument Setpoints**
- **Potential Update Topics**
 - **RG 1.105 – Setpoints**
 - **Graded Approach to Setpoints**
 - **IEEE Std 603**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



SETPOINTS

- **Section 7.2 – Reactor Trip System**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **RG 1.105 - Setpoints**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE Std 603**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



SETPOINTS

- **Section 7.3 – Engineered Safety Features Systems**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **RG 1.105 - Setpoints**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE Std 603**
 - **Power Uprate**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



COMMUNICATION AND ISOLATION

- **Section 7.9 – Data Communications Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - RG 1.105 - Setpoints
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - RG 1.180 – EMI, RFI
 - RG 1.204 – Lightning
 - Human Factors Interface
 - Soft Control
 - Isolation Designs
 - Security Issues
 - Update References, Latest Standards, Latest RGs, Branch Names



COMMUNICATION AND ISOLATION

- **Section 9.5.2 – Communications Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - RG 1.180 – EMI, RFI
 - RG 1.204 – Lightning
 - Human Factors Interface
 - Digital System Life Cycle Process
 - Security Issues
 - Wireless Communications
 - Update References, Latest Standards, Latest RGs, Branch Names



COMMUNICATION AND ISOLATION

- **BTP 7-11 – Guidance on Application and Qualification of Isolation Devices**
- **Potential Update Topics**
 - Isolation Designs
 - IEEE 603
 - RG 1.180 – EMI, RFI
 - RG 1.204, Lightning
 - Update References, Latest Standards, Latest RGs, Branch Names



CONTROL SYSTEMS

- **Section 7.0 – Instrumentation and Controls – Overview of Review Process**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - RG 1.177 – Risk Informed Regulation
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Commercial Grade Dedication Lessons Learned
 - Reliability
 - Technical Specification Changes – 10 CFR 50.36
 - Power Uprate
 - Update References, Latest Standards, Latest RGs, Branch Names



CONTROL SYSTEMS

- **Section 7.4 – Safe Shutdown Systems**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Update References, Latest Standards, Latest RGs, Branch Names



CONTROL SYSTEMS

- **Section 7.6 – Interlock Systems Important to Safety**
- **Potential Update Topics**
 - ITAAC Implementation under 10 CFR Part 52
 - IEEE Std 7-4.3.2, RG 1.152
 - IEEE Std 603
 - Power Uprate
 - Soft Control
 - Update References, Latest Standards, Latest RGs, Branch Names



CONTROL SYSTEMS

- **Section 7.7 – Control Systems**
- **Potential Update Topics**
 - **ITAAC Implementation under 10 CFR Part 52**
 - **IEEE Std 7-4.3.2, RG 1.152**
 - **IEEE Std 603**
 - **Power Uprate**
 - **Human Factors Interface**
 - **Soft Control**
 - **Update References, Latest Standards, Latest RGs, Branch Names**



ADMINISTRATIVE CHANGES

- **Section 7.1 – Instrumentation and Controls – Introduction**
- **Table 7.1-T – Acceptance Criteria and Guidelines for Instrumentation and Controls Important to Safety**
- **Appendix 7.1-B – Guidance for Evaluation of Conformance to ANSI/IEEE Std 279**
- **Appendix 7-A – Branch Technical Positions**



ADMINISTRATIVE CHANGES

- **Appendix 7-B – General Agenda, Station Site Visits**
- **Appendix 7-C – Acronyms, Abbreviations, Glossary, and Index**
- **BTP 7-1 – Guidance on Isolation of Low-Pressure Systems from the High-Pressure Reactor Coolant System**
- **BTP 7-2 – Guidance on Requirements of Motor- Operated Valves in the Emergency Core Cooling System Accumulator Lines**



ADMINISTRATIVE CHANGES

- **BTP 7-3 – Guidance on Protection System Trip Point Changes for Operation with Reactor Coolant Pumps out of Service**
- **BTP 7-4 – Guidance on Design Criteria for Auxiliary Feedwater Systems**
- **BTP 7-5 – Guidance on Spurious Withdrawals of Single Control Rods in Pressurized Water Reactors**



ADMINISTRATIVE CHANGES

- **BTP 7-6 – Guidance on Design of Instrumentation and Controls Provided to Accomplish Changeover from Injection to Recirculation Mode**
- **BTP 7-8 – Guidance for Application of Regulatory Guide 1.22**
- **BTP 7-9 – Guidance on Requirements for Reactor Protection System Anticipatory Trips**
- **BTP 7-13 – Guidance on Cross-Calibration of Protection System Resistance Temperature Detectors**