Jerry L. Mauck

DETAILED EXPERIENCE

Digital I&C Licensing Consultant (July 2000 to Present)

Provided licensing assistance to vendors and utilities in varied digital licensing areas with emphasis on defense-in-depth and diversity (D3), communication, digital technical specification, environmental qualification of platforms, software hazard analyses, diverse manual initiation paths, software tools, software quality, independence, verification and validation, configuration management, interpretation of HICB BTP-14 and 19 guidance, and the application of the new 50.59 Rule for digital modifications. Wrote numerous position papers illustrating how certain digital systems comply with the digital Regulatory Guides and IEEE Standards.

The D3 efforts resulted in several written assessments for plant specific applications where the imposition of a software common mode failure to the digital platform for both RTS and ESFAS is taken and an ensuing safety analysis is performed. Provided a D3 assessment for a digital diesel excitation modification at Comanche Peak. Participate in the qualification efforts and the writing of the 50.59 reports for this modification. For I&C vendors, oversaw NRC audits of software quality and hardware compliance with Appendix B criteria, verification and validation and equipment qualification. Provide written assessment for NRC open issues resulting from the review of a generic Topical Report and these audits.

Provided licensing assistance to utilities in the selection of digital platforms based on complexity, licensing thresholds and issues, safety significance and scope. Where control room changes were proposed and made due to digital modifications (resulting in hybrid control rooms), NUREG 0700 was used as review guidance to ensure meeting HFE standards and regulations. Examples are in the Reactor Protection System, Post Accident Monitoring System, Turbine Controls and Diesel Generator Controls. Represented vendors and utilities in meetings and conference calls to discuss licensing issues using digital systems. Have provided on numerous instances, liaison efforts between industry and the NRC to aid in an acceptance of position in several licensing areas.

Coauthored EPRI report, “Guideline on the Use of Pre-Qualified Digital Platforms for Safety and Non-Safety Applications”. This report gives design and licensing guidance to industry for implementing digital platforms. Also, coauthored EPRI report TR-102348, “Digital Licensing Guideline” to incorporate the new 50.59 Rule and other digital licensing concepts. Presently a representative to working group that is determining the regulatory validity for using risk informed attributes to assist with D3 assessments. Coauthored Topical Report submitted to the NRC for acceptance of a new digital platform design. This topical report addresses both hardware and software issues for licensing review. Coauthored a report for Japanese utility group to provide review critique and practical application of seismic and EMC guidance for digital I&C systems. Wrote independent assessment for equipment qualification for a programmable logic controller for a US vendor.

Member of the NEI/NRC I&C task force to resolve complex digital issues (D3, licensing, and communication) involving new and operating plants. Currently working with 50.52 Rule and Regulatory Guide 1.206 for design certifications and COLAs in the area of digital I&C for new plant application for US utility. This involves the assessment of the entire ABWR digital I&C system and the documentation of both Tier 1 and Tier 2 information to ensure NRC regulations and standards are met. The ABWR COLA was provided to the NRC on time and accepted.

U. S. NUCLEAR REGULATORY COMMISSION (September 1980 to July 2000)
Title: Chief, Instrumentation and Control Systems Section

Directed engineers in the review and evaluation of a wide range of instrumentation and control issues relating to nuclear power plant operation. Was the technical lead for all issues regarding digital retrofits for operating plants and directly responsible for current NRC positions on digital retrofit issues.

As task manager for the Year 2000 effort, led staff in the analysis of Year 2000 issues for operating reactors. Established criteria for licensees to use to resolve Year 2000 concerns. Developed the Generic Letter and Audit guidelines for use in resolving this issue. Arranged training for the inspectors, cleared press releases, responded to Congressional queries and coordinated the overall effort to ensure that the potential safety concerns are addressed. Directed the Y2K site reviews, audits, and inspections. Gave CNN interview on nuclearY2K readiness

Led the Evaluation of numerous different digital system retrofits using newly developed hardware and software review guidance. Ensured compliance with I&C guidance and regulations and, also, HFE guidance and regulations where digital modifications led to control room changes. Led the development of the revised Standard Review Plan in the instrumentation and control area with emphasis on software issues. Published written guidance on the establishment of high-level software quality. This included the development of software quality assurance techniques and guidance, defense-in-depth for common-mode software failures and the use of diversity. Was the technical lead in developing the licensing guidance (GL 95-02) to be used in establishing the USQ threshold for 10CFR 50.59. Developed the licensing basis (Eagle 21 retrofit for Zion) that was used for digital retrofits for operating plants which included the first reviews of EMI/RFI issues and then incorporated this baseline licensing guidance (paper published at Budapest IAEA conference) into the Standard Review Plan. Led the development of the operating reactor diversity and defense-in-depth guidance (BTP-19) for digital retrofits along with the process to aid in the determination of software quality (BTP-14) and relation to Appendix B criteria. Established criteria for acceptable verification and validation process during the Watts Bar and Zion Eagle 21 retrofit reviews.

Interfaced with University and vendor personnel frequently to discuss the design and licensing of advanced digital systems including, computers, networks, routers, hubs, switches, logic devices and many types of transducers.

Directed staff in the evaluation and resolution of numerous Generic Issues including Part 21s (equipment failures). Issued Information Notices (17), Bulletins (6) and Generic Letters (3) on a varied range of nuclear reactor topics (relays, transmitters, bistables, PLCs, sensors).

Led reviews of approximately 20 Topical Report issues including digital system designs, response time elimination, on-line surveillance monitoring, analog instrumentation designs and power supplies. Directed staff in evaluating instrumentation and control designs for advanced reactor designs that led to their design certification.

Represented USNRC on the International Atomic Energy Agency nuclear power plant I&C working group on plant modernization and on the Instrument Society of America working group on technical specification issues and digital retrofits. Published and presented papers both nationally and internationally on advanced digital design reviews and the Year 2000 concern.

Through these actions, I have led the development of several IAEA digital instrumentation and control technical documents.

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER (1967 to 1980)

Developed, operated and analyzed instrumentation packages for use during sea trials of nuclear submarines and surface ships. These systems gathered control surface information, nuclear reactor propulsion parameters, and environmental data including sea surface information and ship or submarine position data.

EDUCATION

- BSEE - Virginia Tech University;
- MSEA - George Washington University
- Numerous NRC Reactor Technology, Instrumentation and Control, Software Quality Assurance, Digital System Design, and Management courses