P2425

Submitter Email: channas@westinghouse.com
Type of Project: New IEEE Standard
PAR Request Date: 07-Mar-2016
PAR Approval Date: 12-May-2016
PAR Expiration Date: 31-Dec-2020
Status: PAR for a New IEEE Standard

1.1 Project Number: P2425
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Title: Standard for Electromagnetic Compatibility Testing of Electrical and Instrumentation and Control Equipment at Nuclear Power Generating Stations and Other Nuclear Facilities

3.1 Working Group: Working Group for Electromagnetic Compatibility for Nuclear Power Plant Equipment (PE/NPE/WG_2.16)
Contact Information for Working Group Chair
Name: Suresh Channarasappa
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None

3.2 Sponsoring Society and Committee: IEEE Power and Energy Society/Nuclear Power Engineering (PE/NPE)
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3.3 Joint Sponsor: IEEE Electromagnetic Compatibility Society/Standards Development Committee (EMC/SDCom)
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: 03/2020
4.3 Projected Completion Date for Submittal to RevCom
Note: Usual minimum time between initial sponsor ballot and submission to Revcom is 6 months.: 10/2020

5.1 Approximate number of people expected to be actively involved in the development of this project: 10
5.2 Scope: This standard provides qualification methods and criteria to establish the electromagnetic compatibility (EMC) of equipment in nuclear power plants and other nuclear facilities. The methods and criteria incorporated in this standard apply to electrical and instrumentation and control (I&C) equipment. EMC qualification involves two elements: 1) testing to assess susceptibility of equipment to interference levels that bound the expected electromagnetic environment at the installation site and 2) testing to assess emissions of equipment to ensure that the contribution to the electromagnetic environment does not invalidate bounding interference levels applied for susceptibility testing.

5.3 Is the completion of this standard dependent upon the completion of another standard: No
5.4 Purpose: The purpose of the standard is to provide qualification methods and criteria for establishing EMC of electrical and I&C

equipment used in nuclear power plants and other nuclear facilities. EMC involves susceptibility testing and emissions testing. Susceptibility testing allows assessment of equipment immunity to electromagnetic and radio frequency interference (EMI/RFI) and confirmation of its surge withstand capability (SWC). Emissions testing provides assurance that equipment is compatible with the expected electromagnetic environment. The standard specifies test methods and test levels appropriate for nuclear power plants and other nuclear facilities.

5.5 Need for the Project: Electromagnetic and radio frequency interference can be imposed on equipment from external sources through the connecting cabling by capacitive or inductive coupling from the source or through a difference of potential between the respective earth references of local equipment and remotely connected equipment. Interference may also be introduced by electrostatic discharges from the operators to panels, enclosures or cabinets and by radiated electromagnetic fields that may be generated by two-way radios, mobile phones, transmission equipment, as well as by emissions from other equipment. Power supplies and electronic equipment may be susceptible to power surge generated by lightning and various switching transients.
While there are existing standards that address type testing of equipment to various military and industrial EMC conditions, there is not a single consensus standard that comprehensively defines specific EMC qualification requirements for nuclear power plant equipment. This standard selects appropriate test methods from among existing general standards and establishes EMC criteria that are specific to qualifying equipment against the EMI/RFI and surge hazards present in nuclear power plants and other nuclear facilities. These methods and criteria include: applicable test methods from military and commercial standards for type testing of equipment, conducted and radiated emissions limits, conducted and radiated susceptibility limits, surge withstand capability limits, and qualification documentation (test plan, procedure, report, equipment calibration, etc.).

5.6 Stakeholders for the Standard: Manufacturers, Suppliers, Architect and Engineers, Nuclear power plants and other Nuclear facilities.

Intellectual Property
6.1.a. Is the Sponsor aware of any copyright permissions needed for this project?: No
6.1.b. Is the Sponsor aware of possible registration activity related to this project?: No

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7.1 Are there other standards or projects with a similar scope?: Yes
If Yes please explain: IEEE Standard 1688-2015, "IEEE Standard for Requirements for the Control of Electromagnetic Interference Characteristics of Replaceable Electronic Modules" - This standard is based on MIL-STD-461 system/equipment-level EMC controls. The requirements for conducted and radiated test methods and limits were adapted to provide risk reduction of EMI/RFI for replaceable electronic modules (REM) before their integration in a system/equipment. This standard does not address EMC requirements for nuclear power plants or other nuclear facilities.

There are two other standards that have related scope and information related to these standards are listed in 8.1.

and answer the following
Sponsor Organization: IEEE-Electomagnectic Compatibility (EMC) Society
Project/Standard Number: IEEE Standard 1688-2015
Project/Standard Date: 11-Jun-2015
Project/Standard Title: "IEEE Standard for Requirements for the Control of Electromagnetic Interference Characteristics of Replaceable Electronic Modules"
7.2 Joint Development
Is it the intent to develop this document jointly with another organization?: No

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8.1 Additional Explanatory Notes: Item 7.1: Following standards are similar in scope but do not comprehensively address the full scope relevant to EMC qualification of electrical and I&C equipment for nuclear power plant or other nuclear facilities:
MIL-STD-461F, "Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment" - This standard defines EMC emissions and susceptibility tests but establishes test limits based on military platforms (aircraft, ships, submarines, ground facilities, etc.). In addition, it does not address applicability of test methods from commercial standards.
IEC 62003, "Nuclear power plants - Instrumentation, control and electrical systems important to safety - Requirements for electromagnetic compatibility testing provides guidance for immunity tests" - Although the standard addresses susceptibility testing for nuclear power plants based on IEC test methods, it does not address emissions testing nor does it address applicability of test methods from the military standard on EMC testing.