

7/16/07
72FR38845

2

JAN-07



IEEE POWER ENGINEERING SOCIETY
NUCLEAR POWER ENGINEERING COMMITTEE

CHAIR
J. Scott Malcolm
AECL
2251 Speakman Drive
Mississauga, Ontario
L5K 1B2 Canada
VOX: 905 823-8040 / FAX 905 403-7301
MalcolmS@AECL.CA

VICE-CHAIR
John D. MacDonald
IST-Conax Nuclear, Inc.
402 Sonwil Drive
Buffalo, NY 14225 USA
VOX: 716 881-1073 / FAX: 716 681-1130
j.d.macdonald@ieee.org

SECRETARY
Satish K. Aggarwal
U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852 USA
VOX: 301 415-0005 / FAX: 301 415-5074
SKA@NRC.gov

PAST CHAIR
John J. Disoway
Dominion-North Anna Power Station
P O Box 402
Mineral, VA 23117-USA
VOX: 540 804-2588/Fax: 540 894-2178
john_disoway@dom.com

Sub-Committee Chairs
SC-1 Qualification
Nisesh Burstein
AREVA NP, Inc.
3315 Old Forest Road
Lynchburg, VA 24506 USA
VOX: 434 832-2501 / FAX: 434 832-2683
nbur@ieee.org

SC-3 Operations, Surveillance and Testing
George Ballasi
General Dynamics
Electric Boat Corporation
75 Pierson Point Road
Groton, CT 06340 USA
VOX: 860 433-3389 / FAX: 860 433-1190
gballasi@gb.com

SC-4 Auxiliary Power
Harvey Lesko
Arizona Public Service - Palo Verde NPS
PO Box 52034, MS 7588
Phoenix, AZ 85072-2034 USA
VOX: 623 393-6986 / FAX: 623 393-6249
h.lesko@azps.com

SC-5 Human Factors, Control Facilities and Reliability
Stephen Floger
Science Application International Corp.
1710 BAIC Drive, MS T-1-12-3
McLean, VA 20170 USA
VOX: 202 493-3378 / FAX 202 493-3390
sfloger@SAIC.com

SC-6 Safety Related Systems
Michael Miller
Duke Energy - Oconee Nuclear Station
7800 Rochester Highway
Senoeca, SC 29672 USA
VOX: 864 885-4411 / FAX: 864 885-4173
mmiller@duke-energy.com

Standards Coordinator
Paul L. Yanosy, Sr.
Westinghouse Electric, Co.
4350 Northern Pike
Moorestown, PA 15146 USA
VOX: 412 374-6402 / FAX: 412 374-6458
paul.l.yanosy@wes.westinghouse.com

Awards Chair
Daniel F. Bruman
PG&E Dinblo Canyon PP
P.O. Box 56
Avila Beach, CA 93424 USA
VOX: 805 545-6646 / FAX: 805 545-6515
dbr@ieee.com

September 14, 2007

Rulemaking, Directives and Editing Branch
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Comments on Draft Regulatory Guide DG-1132
"Qualification of Safety-Related Cables and Field Splices
for Nuclear Power Plants"

Dear Sir or Madam:

The attached comments of draft regulatory guide DG-1132 are submitted by the IEEE Nuclear Power Engineering Committee (NPEC). These comments were provided by the membership of NPEC Sub-committee 2 (SC-2) that has responsibility for IEEE Standards relating to Equipment Qualification for Nuclear Power Generating Stations. The comments have been reviewed and approved by AdCom, the governing body of NPEC, and as such represent a consensus position of NPEC.

As noted, these comments are the consensus position of the Nuclear Power Engineering Committee. For follow-up or questions, please contact Mr. Nissen Burstein, Chair of SC-2, at 434-832-2501, or by e-mail to nissen.burstein@areva.com

Very truly yours,

Scott Malcolm

J. Scott Malcolm
Chair, Nuclear Power Engineering Committee

cc: J. D. MacDonald, NPEC Vice-Chair
S. K. Aggarwal, NPEC Secretary
N. Burstein, Sub-Committee 2 Chair
J. White, SC 2.4 Chair

RECEIVED

2007 SEP 14 PM 1:21

RULES AND DIRECTIVES
BRANCH
UNIT



THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, Inc.

FRIDS = ADM-03

SUNSI Review Complete

Template = ADM-013

Adm = S. Aggarwal
(SKA)

14-Sep-07

IEEE Power Engineering Society
Nuclear Power Engineering Committee
Comments to NRC Draft Guide DG-1132

B. Discussion

"In addition, power and instrumentation and control cables for which failures could disable risk - significant equipment should have condition monitoring programs to determine that the cables can perform their function when needed."

IEEE Comment: IEEE 383-2003 asserts that type testing is adequate to ensure that cable and field splices will perform their intended functions during and after a design basis event. The requirement to impose condition monitoring on a subset of Class 1E electrical cables implies that qualification by type testing is no longer adequate. This is inconsistent with the qualification philosophy contained within IEEE 323-2003 and its daughter standards.

The requirement for CM is also being imposed without any condition monitoring techniques being endorsed by IEEE 383-2003. The introduction of cable CM establishes a requirement for testing with no defined test methodology or acceptance criteria.

The recommended use of such cable CM programs is also inconsistent with prior NRC conclusions regarding cable condition monitoring. The technical assessment of Generic Safety Issue 168, determined that "typical I&C cable qualification test programs include numerous conservative practices that collectively provide a high level of confidence that the installed I&C cables will perform their intended functions during and following design-basis events, as required by Title 10, Section 50.49, (10 CFR 50.49), of the Code of Federal Regulations "Environmental Qualification of Electrical Equipment Important to Safety for Nuclear Power Plants".

IEEE Recommendation: The requirement for condition monitoring of Class 1E cables should be omitted from the "Discussion", Regulatory Positions 2(c) and 10.

Regulatory Position 1

Clause 3.3, "Representative Cable," of IEEE Std 383-2003 should be supplemented with a description of conductor type (material, strand, and strand type) and also differentiate between conductor shield, insulation shield, and overall static shield.

IEEE Comment: The IEEE is not aware of any research, qualification test, or experience information suggesting that conductor material, strand, and strand type can affect qualification results of the cable's performance during DBE testing. Since this change is being recommended to the definition of

14-Sep-07

IEEE Power Engineering Society
Nuclear Power Engineering Committee
Comments to NRC Draft Guide DG-1132

"representative cable" this could lead to the interpretation that any change in the conductor material, strand, and strand type would have to be qualified. The requirement to include additional test samples for a change that does not impact qualification is not warranted and will add an unnecessary complexity to the qualification process.

IEEE Recommendation: Delete regulatory position 1.

Regulatory Position 2

Clause 4, "Principal Qualification Criteria," should be supplemented as follows:

- (a) the documentation should include the cable or field splice's specification and qualification plan.
- (b) the documentation should include manufacturer's inspection and maintenance requirements to maintain and demonstrate continued qualification throughout its qualified life.
- (c) a condition monitoring program should also be implemented.

IEEE Comment: The information required with items (a) and (b) is currently required. Clause 4 currently requires that the documentation used to demonstrate qualification includes:

- The cable or field splice's specification or qualification plan
- Inspection and maintenance requirements
- Summaries and conclusions

See previous comments on cable condition monitoring.

IEEE recommendation: Delete Regulatory Position 2.

Regulatory Position 3

Clause 6.1.2, "Coaxial, triaxial, and twinaxial," should also include specimens of identical materials and construction, and configuration should include connections.

IEEE comments: Clause 6.1.2 currently requires that test specimens use identical materials and unique construction features, including braid angle and shield filler materials. The test specimens must also meet the requirements of a "Representative Cable". To add identical constructions could be implied to mean that every coaxial cable (RG 6, 58, etc.) is tested. This will require test specimens for each and every cable variation offered by a manufacturer. Such a

14-Sep-07

IEEE Power Engineering Society
Nuclear Power Engineering Committee
Comments to NRC Draft Guide DG-1132

requirement is an unnecessary burden, inhibits the use of minor cable design changes, and is inconsistent with the qualification of other cable types. IEEE 383-2003 and current practice rely on testing of representative cables with identical materials and specific characteristics but do not require identical constructions.

IEEE also disagrees that the coaxial, triaxial, and twinaxial test specimens include connections. IEEE 383-2003 specifically removed connections from its scope. Connectors are now addressed in IEEE Std. 572. The requirement to test cable and connectors could also be interpreted as qualifying a "matched set". This could further lead to the interpretation that every variation of cable and connector must be type tested. It should also be noted that IEEE 383-2003 now requires that coaxial, triaxial, and twinaxial cable be tested with their jacket to ensure that jacket integrity is maintained. This is intended to ensure that jacket integrity is maintained for qualified connectors and splices that rely on said performance.

IEEE recommendation: Delete Regulatory Position 3.

Regulatory Position 7

Cause 6.3, "Age-conditioning" should be supplemented to include aged cable specimen and new splice kits; and a new splice kit combining an aged cable with a new cable.

IEEE comment: It is believed that the requirement to combine in a new cable splice with an aged cable is intended to demonstrate that the aged cable will not adversely affect the splice. This test configuration is not considered relevant to future qualification tests performed in accordance with IEEE 383-2003. IEEE 383-2003 requires that a 20 X diameter mandrel bend test be performed after normal environment thermal and radiation aging. This test demonstrates the cable jacketing material will retain some flexibility at the end of its qualified life. This effectively precludes installing splices onto embrittled cables within their specified qualified life. IEEE 383-1974 did not require this test if a similar 40 X diameter mandrel bend test was performed after the accident exposure. The requirement for the mandrel bend test after thermal and radiation aging is an enhancement to the qualification type test defined in IEEE 383-2003.

IEEE Recommendation: Delete Regulatory Position 7.

Regulatory Position 8

Clause 6.4.5, "Retained Flexibility," should be supplemented to include the following:

14-Sep-07

**IEEE Power Engineering Society
Nuclear Power Engineering Committee
Comments to NRC Draft Guide DG-1132**

"The acceptance criteria for instrument cables should specify the minimum acceptable insulation resistance and signal attenuation limits".

IEEE Comment: The mandrel bend tests are intended to test the integrity of the cable not establish a suitable level of electrical performance for specific instruments. The acceptable performance of an instrument cable during a DBE is an installation specific evaluation which is dependent on device type and cannot be determined by the cable manufacturer or the test lab.

IEEE Recommendation: Delete Regulatory Position 8.