IEEE Std 382-Draft

Status Report: April 2006

Introduction to the W.G.

Chris Abernathy	EPRI
Nissen Burstein	AREVA NP
Tim Chan	TVA
Jerry Daniels	Southern Nuclear
Jim Gleason	SAIC - Bechtel
Pat McQuillian	Flowserve- Limitorque
Ed Mohtashemi	GE Nuclear
Ted Necowitz	Exelon
Bill Sadowski	Wyle Laboratories
Chad Smith	Duke Energy
Toni Wittamore	Rotork

PAR

13. Scope of Proposed Project:

This standard describes the qualification of all types of actuators, including damper actuators, for Safety-Related Power-Operated Valve Assemblies for nuclear power plants. This standard may also be used to separately qualify actuator components.

Is the completion of this document contingent upon the completion of another document?

No

14. Purpose of Proposed Project:

The standard establishes the minimum requirements for qualification of safety-related power driven valve actuators.

15. Reason for the Proposed Project:

The reason for the project is to:
(1) Revise this standard to be consistent with IEEE Std 323-2003 (IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations) and IEEE Std 344-2004 (Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations).
(2) Reflect the current state-of-the art,
and (3) Reevaluate the need of current testing and analytical requirements.
The target users are the nuclear industry.

Stats

- Group formed, had kick-off meeting in San Diego *April 2005*
- PAR accepted *June 9, 2005*
- First working group meeting in Huntsville *June 21, 2005*
- W.G. had 5 brainstorming meetings (2 off-site, 3 teleconferences) to discuss potential changes to the standard. Adds more utility input as guests.
- W.G. presented potential changes to SC-2 for comment at meeting in Fort Lauderdale *October 2005*
- W.G. had 5 detail oriented meetings (1 off-site, 4 teleconferences) to implement the detailed wording of the proposed changes presented at the October 2005 SC-2 meeting.
- W.G. presents IEEE Std 382-Draft to Satish *March 24, 2006* for submittal to the SC-2.

Changes to IEEE Std 382

- Eliminated entirely Part II (Cases) of IEEE Std 382-1996.
  - Improves consistancy with IEEE Std 323-2003 which has eliminated dual transients.
  - Eliminates redundancy with Annex B of IEEE Std 382-1996.
  - Emphasizes that any environmental conditions (i.e. values) listed in the standard are informative and not necessarily bounding or representative of specific plant conditions.

Changes to IEEE Std 382

- The test sequence and requirements (Section 6.3.2) were revised.
  - Clarifies the intent of the test sequence is to place the actuator in its worst case end-of-life condition prior to the design basis event.
  - Intermediate inspections were explicitly added between each step in the test sequence to reflect current practices and provide data for condition monitoring.

Changes to IEEE Std 382

- Revised Tests Section of the standard (Part III of IEEE Std 382-1996)
  - Aligned the order of the tests with the order of the test sequence outlined in Section 6.3.2.
  - Revised wording of the Scope Section for each of the aging tests to emphasize the objective of placing the actuator in its end-of-life condition and removed the word “operability”.

Changes to IEEE Std 382

- Revised “Normal thermal aging test” of Part II Tests (Part III of IEEE Std 382-1996)
  - Revised Scope Section
    - Eliminated reference to operability during and after exposure to accelerated thermal aging environment.
    - Emphasized intention is to place actuator into its end-of-life condition.
  - Revised Test setup requirements Section
    - Added note that temperature rise must be considered.
  - Revised Test conduct Section
    - Eliminated predetermined aging time and temperature based on activation energy of 0.8. Emphasized reference to Annex C of the IEEE Std 382 which provides the methodology for determining the proper aging time and temperature.
    - Eliminated Deviation Section (Section 2.4 of Part III of IEEE Std 382-1996) entirely since there is no default approach to deviate from.

Changes to IEEE Std 382

- Added new Section “Mechanical Cycles” to Part II Tests (Part III of IEEE Std 382-1996)
  - Mechanical cycles were included in Part II (Cases) of IEEE Std 382-1996; however, no details were provided in the Test section of the standard.
  - Debated at some length the loading and number of mechanical cycles to perform. Settled on the concept that a “representative load” shall be applied during mechanical cycling and the number of cycles shall be “representative” for the application. Made mention of the historic 2000 cycles for on/off and 100,000 cycles for modulating valves based on a 40 yr life found in the IEEE Std 382-1996.
  - Added note about rebuilding the actuator between mechanical cycles to reflect the manufacturers service intervals.

Changes to IEEE Std 382

- Revised “Seismic simulation test” of Part II Tests (Part III of IEEE Std 382-1996)
  - Revised Test conduct Section
    - Updated reference to IEEE Std 344-2004.
    - Made the default test a triaxial multifrequency rather than biaxial to reflect current state-of-the-art practices.

Changes to IEEE Std 382

- Revised “Normal pressurization cycle test” of Part II Tests (Part III of IEEE Std 382-1996)
  - Revised Test conduct Section
    - Replaced specific values for:
      - Number of cycles. The number of cycles may be different for new plant construction, plants with life extension, etc.
      - External pressure. This value varies depending on plant type and may not be relevant for new plant construction.
      - Hold time. The main point is that the pressure is stabilized.
      - Old values left in as examples.
    - Added option to perform a first principles balance of forces analysis in lieu of testing.

Changes to IEEE Std 382

- Annex B “Normal and design basis environmental parameters”
  - Added note that the user is responsible for defining the environmental parameters.
  - Left the legacy parameters, but added note that at the time the standard was written new generation of plants were being considered for new plant construction and these are legacy values.
  - Considered removing any values and replacing with simple description of the types of information required. However, there was considerable push back from some of the working group on elimination of all values from the standard. Having the values in Annex B which is an “informative” section of the standard, and making it clear it is the users responsibility to define the values of the environmental parameters was an agreeable compromise.

Summary

- The W.G. agrees the revised standard is more concise, reflects the philosophy set-out in the recent revisions of IEEE Std 323-2003 and IEEE Std 344-2004, as well as the current state-of-the-art in equipment qualification.
- The W.G. agrees there is still room for improvement in the standard.
  - Overall, the standard is still relatively lengthy and not an easy read.
  - May want to consider issue regarding “safety related” vs. risk significant, important to safety, etc.
- Any Questions?