Errata:
Correct “Supart” to Subpart

SUBPART 3.2-2.7
Implementing Guidance for Part II, Requirement 2.7: Quality Assurance Requirements for Computer Software for Nuclear Facility Applications

INTRODUCTION
This Subpart structure is based on the main sections of Subpart 2.7 (e.g., 100, General, 200, General Requirements). Not all sections in Subpart 2.7 (i.e., 600, Standards, Conventions, and Other Work Practices and 800, References) are covered in this Subpart. A review of these sections did not precipitate the need for any discussion of these sections. In most cases, the subsections (e.g., 201, Documentation) contained in Subpart 2.7 are not provided as a one-to-one correspondence in this Subpart.

100 GENERAL
This Subpart has been developed to provide organizations invoking NQA-1 with a discussion of the requirements and how those requirements may apply in various situations where software is used. Guidance pertaining to the linkage between Parts I and II, Subpart 2.7 is provided. Subpart 2.7 is applicable to software when a failure or error in the software could adversely affect the quality of structures, systems, or components of nuclear facilities. Possible exceptions will be detailed in this Subpart. Applicability of Subpart 2.7 is not dependent upon the type of computer equipment (e.g., mainframe, PC, networking workstations) that is installed.

The requirements of both Parts I and II, Subpart 2.7 should be applied in a manner to meet the requirements of ANSI/IEEE Std. 743.2-1993, IEEE Standard Criteria for Digital Computers and Safety Systems of Nuclear Power Generating Stations. This Subpart provides guidance to support meeting the requirements of that standard.

101 Software Engineering
A variety of software engineering methods may exist within an organization to meet Quality Assurance requirements contained within NQA-1. The extent of application of the software engineering activities should be commensurate with the risk associated with the failure of the software. Factors affecting this risk include the potential impact on safety and/or operation, complexity of computer program design, degree of standardization, the state of the art, and similarity to previously proven computer programs. Subpart 2.7 users should consider establishing a software categorization method that includes
(a) software engineering methods applicable to given categories of software
(b) assurance that the results of the categorization are documented

The software categorization method should consider safety significance and the relative importance of the software.

Paragraphs 101.1 through 101.7 provide additional considerations in developing a categorization method and determining software applicability.

101.1 Simple and easily understood computer programs (e.g., computer programs whose results can be easily confirmed through hand calculations) that are used in the design of plant systems, structures, and components, may be excluded from the controls of Subpart 2.7 if designs using these computer programs are individually verified. Design verification documentation should include design inputs, the computer program-generated results, and computer-generated evidence of the programmed algorithms or equations (e.g., computer program listings, spreadsheet cell contents). However, frequent use of the software may justify the application of Subpart 2.7 in order to simplify future use of the software.

101.2 Complex computer programs used in the design of structures, systems, and components should be developed and approved for use in accordance with Subpart 2.7 unless software design verification and testing of the computer program (or parts thereof) independent of a specific application is not practical. In these cases each application of the computer program must be design verified and documented in accordance with the requirements of Part I, Requirement 3, section 400.

101.3 Separate software design verification and tests may not be required for computer programs that are design reviewed and tested in conjunction with hardware as a unit, in accordance with other Parts or Subparts (e.g., Measurement and Test Equipment) of this Standard.