



NuStart Energysm

March 2, 2007

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

ATTN: Stephanie Coffin

SUBJECT: NuStart Bellefonte COL Project – NRC Project No. 740
Standard Technical Report Submittal
AP-TR-NS03, *Equipment Qualification Program*

In support of Combined License application pre-application activities, NuStart Energy, LLC (NuStart) is submitting Revision 0 of AP1000 Standard Combined License Technical Report Number AP-TR-NS03, *Equipment Qualification Program*. This report completes and documents, on a generic basis, activities required for COL Information Item 3.11-1 in the AP1000 Design Control Document (DCD); it provides a description of the Equipment Qualification (EQ) Program for AP1000 Combined Construction and Operating License (COL) applicants. This report also identifies and justifies standard changes to Section 3.11.5 of the AP1000 DCD related to the EQ Program. The changes identified in Technical Report AP-TR-NS03 are intended to be incorporated into FSARs referencing the AP1000 Design Certification, and may be incorporated into the design certification if 10 CFR Part 52 is revised to permit revision of the design certification.

This report is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in this report is generic and is expected to apply to all COL applicants referencing the AP1000 Design Certification.

The purpose for the submittal of this report is to close AP1000 COL Item 3.11-1. This COL item requires the applicant to address the maintenance of the equipment qualification file during the equipment selection and procurement phase. It is expected that upon completion of the NRC review of Technical Report AP-TR-NS03, the changes to the DCD identified in this topical report will be considered approved generically through a Safety Evaluation Report (SER) for COL applicants referencing the AP1000 Design Certification. (Although not specifically requested in prior letters submitting AP-TR-NS01 and -NS02, NuStart expects that review of those TRs will result in SERs as well.)

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If you have questions related to the content of Technical Report AP-TR-NS03, please contact Peter Hastings at (980) 373-7820.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 2, 2007.

Sincerely,

A handwritten signature in black ink, appearing to read "Marilyn C. Kray". The signature is written in a cursive style with a long, sweeping tail on the final letter.

Marilyn C. Kray
President

Enclosure: AP-TR-NS03, Revision 0, *Equipment Qualification Program*

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Report AP-TR-NS03
Revision 0

Date February 2007

NuStart
AP1000 Standard Combined License
Technical Report

EQUIPMENT QUALIFICATION
PROGRAM



Revision Page

Revision	Date	Description
0	February 2007	Initial issue



1.0 INTRODUCTION

The purpose of this Technical Report (TR) is to provide a description of the Equipment Qualification (EQ) Program for those AP1000 Combined License (COL) applicants that choose to implement the methodology described herein, and to close COL Information Item 3.11-1.

COL Information Item 3.11-1 in Revision 15 of the AP1000 Design Control Document (DCD, Reference 1) is found in Section 3.11.5:

“3.11.5 Combined License Information Item for Equipment Qualification File

The Combined License applicant is responsible for the maintenance of the equipment qualification file during the equipment selection and procurement phase.”

As described in the DCD, the mechanical and electrical portions of the AP1000 engineered safety features, reactor protection systems, and selected portions of the post-accident monitoring system are designed to endure the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents in accordance with General Design Criteria 1, 2, 4, and 23. Documentation and inspection programs must be in place to address the maintenance of the equipment qualification files.

2.0 TECHNICAL BACKGROUND

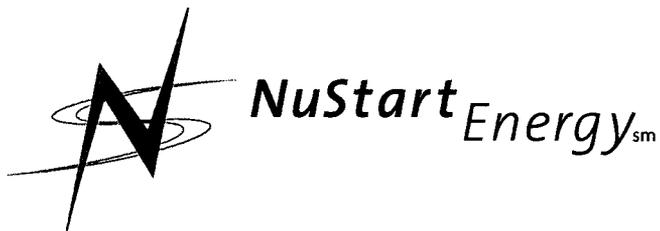
Regulatory Bases

The following documents were used as the bases for this program description, in addition to the documents referenced in Section 3.11 and Appendix 3D of the AP 1000 Design Control Document (Reference 1):

10 CFR 50.49, Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants, requires the applicant to establish a program for qualifying certain electrical equipment located in a harsh environment. Meeting the requirements of 10 CFR 50.49 provides reasonable assurance that such equipment is environmentally qualified and is capable of performing its intended safety function.

10 CFR 50, Appendix A, General Design Criterion 1, Quality Standards and Records, requires that components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed. Meeting the requirements of GDC 1 provides reasonable assurance that equipment important to safety is environmentally qualified and is capable of performing its intended safety function.

10 CFR 50, Appendix A, General Design Criterion 2, Design Bases for Protection Against Natural Phenomena, requires that components important to safety be designed to withstand the effects of natural phenomena without loss of capability to perform their safety function. The design bases



for these components must include considering the effects of normal and accident conditions (i.e., environmental qualification) along with the importance of the safety function to be performed and the effects of natural phenomena. Meeting the requirements of GDC 2 provides reasonable assurance that equipment important to safety is environmentally qualified and is capable of performing its intended safety function.

10 CFR 50, Appendix A, General Design Criterion 4, Environmental and Dynamic Effects Design Bases, requires that components important to safety be designed to accommodate the effects of, and be compatible with, the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including LOCAs. Components must be protected against dynamic effects, including those of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. Meeting the requirements of GDC 4 provides reasonable assurance that equipment important to safety is environmentally qualified and is capable of performing its intended safety function.

10 CFR 50, Appendix A, General Design Criterion 23, Protection System Failure Modes, requires that the protection system be designed to fail in a safe state, or in a state demonstrated to be acceptable on some other defined basis, if conditions such as postulated adverse environments (e.g., extreme heat or cold, pressure, steam, water, or radiation) are experienced. Meeting the requirements of GDC 23 provides reasonable assurance that the protection system is environmentally qualified and is capable of performing its intended safety function.

10 CFR 50, Appendix B, Quality Assurance Criterion III discusses establishing design control measures to correctly translate applicable regulatory requirements and the design basis for those structures, systems, and components into specifications, drawings, procedures, and instructions.

10 CFR 50, Appendix B, Quality Assurance Criterion XI sets forth the requirements for a test program to demonstrate that structures, systems, and components will perform satisfactorily in service in accordance with written test procedures.

10 CFR 50, Appendix B, Quality Assurance Criterion XVII addresses the maintenance of sufficient records to furnish evidence of activities affecting quality.

Regulatory Guide 1.89 references 10 CFR 50.49 and provides additional guidance related to the environmental qualification of electrical equipment that could be subjected to a harsh environment as a result of the conditions addressed in GDC 4.

NUREG-0588 supplements the requirements of IEEE 323-1974. NUREG-0588 presents guidance on establishing service conditions and methods for qualifying equipment located inside or outside of containment.

The NRC Staff has concluded that the operational programs discussed in SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria" (Reference 3), can be fully



described in a COL application. (The COL application would not call for ITAAC for an operational program if the program and its implementation are fully described¹ in a COL application.) The staff is proposing that each COL contain license conditions associated with the timing of implementation for these programs.

AP1000 Design Certification Bases

The AP1000 DCD indicated in Section 3.11.2.1 that the methodology for environmental qualification of Class 1E equipment was developed based on the guidelines of IEEE 323-1974 and IEEE 344-1987.

Appendix 3D of the AP1000 DCD outlines the AP1000 methodology for qualifying electrical and mechanical equipment included in the scope of the Equipment Qualification Program. The requirements, recommended methods, and qualification procedures described in this appendix are based on IEEE 323-1974. Specific consideration is given to seismic qualification. The AP1000 DCD references IEEE 344-1987 for technical guidance, recommendations, and requirements for seismic qualification. The AP1000 DCD equipment qualification methodology also includes the guidance of IEEE 627-1980, which addresses the qualification of in-scope electrical and mechanical equipment.

Program Implementation

The EQ Program must be implemented upon turnover from construction, pursuant to commitments made in FSAR Table 13.4-1 Item 3. The applicable milestones associated with this operational program implementation milestone will be described in Table 13.4-1 of Section 13.4 of the COL applications referencing this TR.

3.0 REGULATORY IMPACT

The obligation to describe the EQ Program is contained in SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria" (Reference 3). This TR does not affect the DCD or FSER, except in providing the additional information needed to fully describe the EQ Program.

This TR may be used as input to a revision to the DCD, or may be referenced by discrete COL applicants as a basis for the EQ Program.

¹ The Commission defined "fully described" in a May 14, 2004, SRM for SECY-04-0032, "Programmatic Information Needed for Approval of a Combined License Application Without Inspections, Tests, Analyses, and Acceptance Criteria." In this context, "fully described" should be understood to mean that the program is clearly and sufficiently described in terms of the scope and level of detail to allow a reasonable assurance finding of acceptability. Required programs should always be described at a functional level and at an increased level of detail where implementation choices could materially and negatively affect the program effectiveness and acceptability.



There are no proposed departures from Tier 2 that would affect resolution of a severe accident issue identified in the DCD, and there are no changes that have an impact on the Severe Accident Criteria.

Information summarized in this TR will not alter barriers or alarms that control access to the protected areas of the plant. The closure of related COL Information Items will not alter requirements for security personnel. Therefore, this TR does not have an adverse impact on the security assessment of the AP1000.

4.0 REFERENCES

1. APP-GW-GL-700, Revision 15, AP1000 Design Control Document.
2. NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," Revision 1, July 1981.
3. SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," October 28, 2005.
4. IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," 1974.
5. IEEE 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," 1987.
6. IEEE 627-1980, "IEEE standard for Design Qualification of Safety Systems Equipment Used in Nuclear Power Generating Stations," 1980.
7. Regulatory Guide 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants," Revision 1, June 1984.
8. 10 CFR 50.49, "Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plants."

5.0 DCD MARKUP

The EQ Program description in Appendix A to this TR will be used as input to the COL application Final Safety Analysis Report unless the information in this TR is used as input to a future revision to the DCD.

In the event this TR is used as input to a future revision to the AP1000 DCD, the DCD markups provided in Appendix A identify how the AP1000 DCD will be modified.



**NuStart AP-TR-NS03
REV 0**

APPENDIX A



Appendix A

AP1000 Equipment Qualification Program

Introduction

The purpose of this appendix is to provide the information needed to close COL Information Item 3.11.5, thereby fully describing the Equipment Qualification (EQ) Program. The information below is presented in the context of the additional information needed in FSAR Section 3.11 for a COL application referencing the certified AP1000 design (and associated Westinghouse Technical Reports).

The following DCD markup identifies how COL application Final Safety Analysis Reports should be prepared to incorporate the subject change.

Revise Subsection 3.11.5 as follows:

3.11.5 Combined License Information Item for Equipment Qualification File

The Combined License applicant is responsible for the maintenance of the equipment qualification file during the equipment selection and procurement phase.

Westinghouse Electric Company, LLC (the Reactor Vendor) acts as the contractor for the Combined License Holder during the equipment design phase, equipment selection and procurement phase, equipment qualification phase, plant construction phase, and ITAAC closure phase.

The Combined License holder defines the process and procedures for which the equipment qualification files are accepted from Westinghouse at system turnover from construction and how the files are retained and maintained in an auditable format for the entire period that the equipment is installed and/or stored for future use in the nuclear power plant.

The Combined License holder is responsible for the maintenance of the equipment qualification file upon receipt from the Reactor Vendor. The documentation necessary to support the continued qualification of the equipment installed in the plant that is within the EQ Program scope is available in accordance with 10 CFR 50 Appendix A, General Design Criterion 1.

EQ files developed by the Reactor Vendor are maintained as applicable for equipment and certain post-accident monitoring devices that are subject to a harsh environment. The contents of the qualification files are discussed in Section 3D.7. The files are maintained for the operational life of the plant.



For equipment not located in a harsh environment, design specifications received from the Reactor Vendor are retained. Any plant modifications that impact the equipment use the original specifications for modification or procurement. This process is governed by applicable plant design control or configuration control procedures.

Central to the EQ Program is the EQ Master Equipment List (EQMEL). This EQMEL identifies the electrical and mechanical equipment or components that must be environmentally qualified for use in a harsh environment. The EQMEL consists of equipment that is essential to emergency reactor shutdown, containment isolation, reactor core cooling, or containment and reactor heat removal, or that is otherwise essential in preventing significant release of radioactive material to the environment. This list is developed from the equipment list provided in AP1000 DCD Table 3.11-1. The EQMEL and a summary of equipment qualification results are maintained as part of the equipment qualification file for the operational life of the plant.

Administrative programs are in place to control revision to the EQ files and the EQMEL. When adding or modifying components in the EQ Program, EQ files are generated or revised to support qualification. The EQMEL is revised to reflect these new components. To delete a component from the EQ Program, a deletion justification is prepared that demonstrates why the component can be deleted. This justification consists of an analysis of the component, an associated circuit review if appropriate, and a safety evaluation, and is released and/or referenced on an appropriate change document. For changes to the EQMEL, supporting documentation is completed and approved prior to issuing the changes. This documentation includes safety reviews and new or revised EQ files. Plant modifications and design basis changes are subject to change process reviews, e.g. reviews in accordance with 10 CFR 50.59 or Section VIII of Appendix D to 10 CFR 52, in accordance with appropriate plant procedures. These reviews address EQ issues associated with the activity. Any changes to the EQMEL that are not the result of a modification or design basis change are subject to a separate review that is accomplished and documented in accordance with plant procedures.

Engineering change documents or maintenance documents generated to document work performed on an EQ component, which may not have an impact on the EQ file, are reviewed against the current revision of the EQ files for potential impact. Changes to EQ documentation may be due to, but not limited to, plant modifications, calculations, corrective maintenance, or other EQ concerns.