

July 14, 2015

Mr. Patrick Troy, Program Licensing Manager  
Nuclear Systems & Solutions  
Lockheed Martin Missiles and Fire Control  
459 Kennedy Drive  
Archibald, PA 18403

SUBJECT: AUDIT REPORT – LOCKHEED MARTIN NUCLEAR SYSTEM AND SOLUTIONS,  
REQUEST FOR REVIEW OF THE NUPAC\_ED610000-47-P, “GENERIC  
QUALIFICATION OF THE NUPAC PLATFORM FOR SAFETY-RELATED  
APPLICATIONS” TOPICAL REPORT (TAC NO. ME7900)

Dear Mr. Troy:

By letter dated June 28, 2011 (Agencywide Documents Access and Management System Accession Number ML11201A323), Lockheed Martin (LM) Nuclear Systems and Solutions submitted a topical report (TR) NuPAC\_ED610000-47-P, Revision -, which proposes to use a generic digital safety instrumentation and control platform (i.e., the Nuclear Protection and Control (NuPAC) platform) to implement Class 1E safety-related applications in United States nuclear power plants. The TR is for a generic platform, not a plant-specific implementation.

From April 7 through 10, 2015, the U.S. Nuclear Regulatory Commission (NRC) staff performed a regulatory audit of the Dunmore, Pennsylvania facilities of LM. The audit was conducted to support the NRC staff evaluation of the NuPAC TR.

The purpose of this letter is to provide LM with the results of the regulatory audit. Documented in the report are the observations the NRC staff identified during the audit.

If you any questions or require any additional information, please feel free to contact me at 301-415-7297.

Sincerely,

**/RA/**

Joseph J. Holonich, Sr. Project Manager  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Project No. 780

Enclosure:  
Audit Report

Mr. Patrick Troy, Program Licensing Manager  
Nuclear Systems & Solutions  
Lockheed Martin Missiles and Fire Control  
459 Kennedy Drive  
Archibald, PA 18403

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REQUEST FOR REVIEW OF THE NUPAC\_ED610000-47-P, “GENERIC  
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DATE	07/01/2015	06/26/2015	07/06/2015	07/14/2015	07/14/2015

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**AUDIT REPORT**  
**LOCKHEED MARTIN NUCLEAR SYSTEM AND SOLUTIONS,**  
**NUPAC ED610000-47-P, "GENERIC QUALIFICATION OF THE NUPAC PLATFORM FOR**  
**SAFETY-RELATED APPLICATIONS" TOPICAL REPORT**  
**(TAC NO. ME7900)**

**Background:** By letter dated June 28, 2011 (Agencywide Documents Access and Management System Accession Number ML11201A323), Lockheed Martin Nuclear Systems and Solutions (LM) submitted a topical report (TR) NuPAC\_ED610000-47-P, Revision -, which proposes to use a generic digital safety instrumentation and control platform (i.e., the Nuclear Protection and Control (NuPAC) platform) to implement Class 1E safety-related applications in United States nuclear power plants. The TR is for a generic platform, not a plant-specific implementation.

The U.S. Nuclear Regulatory Commission (NRC) staff has conducted an audit, as described in this enclosure.

**Material Used:**

- Electronic Access (for viewing) to Project Documents
- 2 Copies of Current Version of Docketed Material (Printed)

**Team Assignments:** Norbert Carte: Team Lead

Tung Truong: Digital Communication Reviewer

Wed. (pm) and Thurs.

Royce Beacom: Peer Reviewer

**Logistics:** The audit started at 8:00 am on Tuesday 4/7/15 (Kickoff and Introductions).  
The audit was completed at noon on Friday 4/10/14.

**Material Covered:**

**QA Program Assessments and Corrective Actions:** Over the life of the NuPAC project LM has been audited and assessed by various entities. During the audit, the NRC asked about these external and other internal evaluations. As explained (in detail) during the audit, LM is in the process of addressing items identified in the last (January 2015) self-assessment. Some enhancements in the documentation of process and procedures were deemed necessary; the changes will be incorporated in any documentation that will be docketed in the future. A subsequent audit of the "trinity road" facility (anticipated to be in the fall of 2015) will address the assessments and corrective actions of that facility.

**Equipment Qualification:** During the audit LM summarized the status of the equipment qualification testing. Some testing has been completed, and some test anomalies were identified which were being evaluated. A detailed audit of the qualification testing will be conducted after all of the qualification test reports have been prepared.

ENCLOSURE

**Digital Communications:** The hardware and software resources associated with digital communications were discussed in detail. The mechanisms to identify errors in digital communication were described. Some mechanisms are addressed at the platform level (e.g., byte level checks), but most are addressed during application development (i.e., by the application). The interdivisional communications compliance matrix in Appendix D of the TR, Revision C, and the staff positions in Digital Instrumentation and Controls Interim Staff Guidance (DI&C ISG) – 04, Section 1 (Interdivisional Communications) were discussed. The applicant chose to address some staff positions at the platform level (in this TR), and address some staff positions during application development. The applicant will update the compliance matrix to specify whether the criteria are addressed at the platform or application levels, along with the rationale. The applicant stated that the scope of TR does not include Priority Logic Modules so DI&C ISG-04, Section 2 (Command Prioritization) was not discussed. Likewise, the scope of the topical report does not include the type of communications described in DI&C ISG-04, Section 3 (Multidivisional Control and Display Stations) so this aspect is therefore not discussed. Based on the interdivisional communications discussions, the applicant is re-evaluating compliance to staff positions, and will be updating the TR and issuing a supporting data communications white paper.

**Watchdog Timers:** The NuPAC system is a Field Programmable Gate Array based system, and as such is inherently highly parallel; therefore, traditional watchdog timers do not provide the same protection as they do in microprocessor based systems. LM intends to address the need for aliveness checking functionality in associated plant specific applications.