Nuclear and NBC Contamination
Survivability of Army Equipment

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Overview. The United States Army Nuclear and Chemical Agency (USANCA) has a very important role in the Army's nuclear survivability (NS) and NBC contamination survivability (NBCCS) programs. Notably, USANCA is in the review process for most requirements documents to ensure that mission critical systems adequately address NS and NBCCS in their characteristics paragraphs of both the mission needs statement (MNS) and the operational requirements document (ORD). Comments and recommended changes are provided to HQDA, ODCSOPS (DAMO-FD), HQ TRADOC and the TRADOC proponent school responsible for the system being developed. USANCA reviews over 200 MNSs and ORDs each year. The NS and NBCCS requirements review process is amplified below.

The United States Army NS and NBCCS programs are addressed in Army Regulation (AR) 70-75 and the mandatory procedures contained in the Department of Defense (DoD) Regulation 5000.2-R. AR 70-75, Survivability of Army Personnel and Materiel, dated 10 Jan 95, states that the ORD must specify if the need is mission critical and that, as a minimum, mission essential or critical items will be high-altitude electromagnetic pulse (HEMP) survivable. Correspondingly, the AR states that "if an item is designated as mission essential or is a critical component of one or more mission essential end items, it will be nuclear, biological, and chemical (NBC) contamination survivable." AR 70-75 further defines responsibilities for all organizations involved in the materiel acquisition process. USANCA's primary responsibility as stated in AR 70-75 is to "...establish nuclear effects and NBC contamination survivability criteria for requirements contained in MNSs and ORDs that specify nuclear and NBC contamination survivability." DoD 5000.2-R, Mandatory Procedures for Major Defense Acquisition Programs and Major Automated Information System Acquisition Programs, dated 15 Mar 96, requires "mission-critical systems be survivable to the threat levels anticipated in their operating environment."

USANCA is also responsible for issuing NS and NBCCS criteria to both materiel and combat developers for systems with NS and NBCCS requirements. The NS criteria are based on Army approved criteria/standards such as QSTAG-244, QSTAG-1031, AEP-4, and MIL-STD 2169B, while the NBCCS criteria are based on QSTAG 747 and AEP-7. The criteria are issued for each system upon receipt of an approved ORD. Most Army systems have requirements to survive the effects of HEMP and NBC contamination. For NS, many systems are hardened to survive all initial nuclear weapons effects. USANCA issues balanced criteria for systems with a requirement to survive all effects of a nuclear detonation. The concept of bal-
Advanced hardening is defined in QSTAG-244 and requires the system to survive at levels where the crew will remain combat effective to fight the next battle. By utilizing a balanced hardening approach to survivability, the materiel developer can minimize development and acquisition costs. Historical acquisition data for Army systems have shown that, when addressed at the start of the program development, the costs for designing nuclear hardening into a system are 1% to 3% of the total system cost. For NBCCS, USANCA issues a single set of criteria/standards. These criteria are applicable to all mission critical/essential systems and are used in developing an NBC survivable system. It is based on three essential characteristics of the system: hardness, decontaminability and compatibility.

Materiel developers must validate systems with NS and NBCCS requirements through tests, evaluations, and/or assessments. The Army and other DoD services maintain testing centers such as White Sands Missile Range and Dugway Proving Ground to conduct tests to validate a system’s NS and NBCCS. AR 70-75 requires all materiel developers of Army systems to utilize existing Army and other government testing facilities when feasible. Using these facilities will minimize testing costs and allow materiel developers to make use of existing test data and institutional NS and NBCCS knowledge. NS and NBCCS test results are presented to the independent evaluator by the materiel developer. The independent evaluator makes the determination whether or not the system meets NS and NBCCS requirements. If the system does not meet criteria requirements for NS and NBCCS, the materiel developer must either improve the system design or request a waiver of the unmet test portion of the criteria from the Army DCSOPS before the system can be fielded.

The Waiver Process

The waiver process for Army systems with NS and NBCCS shortfalls is addressed in AR 15-41, Nuclear and Chemical Survivability Committee, dated 20 Feb 92. It is the procedure that the materiel developer must follow before the system can be fielded. The materiel developer submits a request for waiver of NS and/or NBCCS criteria to Director, Nuclear and Chemical Survivability Committee (NCSC) Secretariat, USANCA. The waiver request must include results of all survivability tests, any possible engineering or materiel solutions that would solve the shortcomings, and cost and operational effectiveness analysis (COEA) which will assess the cost effectiveness of any possible solutions. The NCSC Secretariat reviews the waiver request for completeness and technical content and makes a recommendation to the NCSC whether to grant or deny the waiver request. The NCSC, composed of six general officers, reviews the NCSC Secretariat’s recommendation. The NCSC either concurs or nonconcurs with the Secretariat position based upon the information provided and the needs of the Army. The NCSC recommendation is then forwarded to the Army Deputy Chief of Staff for Operations and Plans (DCSOPS) for his personal review and approval. The DCSOPS is the only person authorized to approve waivers for NS and NBCCS criteria. The DCSOPS has three options on the waiver: deny the request, approve, or approve the request with stipulations that shortcomings be corrected. The NS and NBCCS waiver process is also depicted in Figure 1.

Conclusion

Army systems that are mission critical are required to be nuclear and NBC contamination survivable. It is the responsibility of the materiel developer to ensure that NS and NBCCS are addressed at the start of program development and are verified through tests, evaluation and/or assessment. USANCA stands ready to assist the materiel developer in the execution of his program to field an NBC survivable system.

Figure 1. The Waiver Process.