

## CHAPTER 4

### NUCLEAR WEAPON SYSTEM SAFETY CERTIFICATION

#### A. GENERAL

1. Nuclear weapon system safety certification is the process that ensures that nuclear weapons and weapon systems are designed, built, and used in a safe manner. By “safe,” it is meant that the equipment does not impose abnormal environments, inadvertently provide unintended signals, or aid in providing unauthorized signals to the weapon.

2. All procedures, personnel, equipment, facilities, and organizations shall be safety certified before conducting any operations that involve a nuclear weapon. Any significant modification to procedures, equipment, or facilities will require recertification before being used in the operational weapon system. That requirement extends to NATO nuclear weapon systems and operations with U.S. nuclear weapons as well.

3. This Chapter also establishes the requirement for NNAP to preclude the possibility of a nuclear warhead being used in a nonnuclear test.

#### B. CERTIFICATION GUIDELINES

1. Personnel Certification. Personnel certification shall be accomplished through training and an evaluation of individual technical proficiency by the Services.

2. Certification of Organizations and Facilities That Will Handle Nuclear Weapons. Certification of nuclear weapon facilities and organizations for use shall include successful completion of an NWTI. (See Chapter 12.)

3. Nuclear Weapon Safety Certification. The DoE is responsible for the safety design, test, and analysis of nuclear weapons. A review to ensure that a weapon meets its design requirements (including safety) is accomplished by a joint Design Review and Acceptance Group (DRAAG). After successful completion of the DRAAG, the DoE documents safety certification in the Final Design Development Report. The Department of Defense accepts the weapon as certified. However, safety is further addressed through Service NWSSG and POG activities.

4. Nuclear Weapon System Safety Certification. The Services oversee the safety certification process for nuclear weapon systems. They develop the policy and establish nuclear weapon system safety design criteria. The weapon system program manager is responsible for the safety design, development, analysis, and testing of nuclear weapon systems. The weapon system program manager evaluates nuclear surety to identify hardware, software and procedures to be used with a nuclear weapon or nuclear weapon system. The Services will ensure that independent analyses are conducted of the weapon system’s data and the operating command’s procedures. Those analyses are performed against the system safety design criteria, and recommendations on nuclear safety design certification will be provided. The completion of the above certification process, with the completion of the appropriate nuclear weapon system safety study or review and the Secretary of Defense approval of safety rules, qualifies the system for use. The Service reviews the data from the weapon system program manager and the independent evaluation and provides safety certification. That certification is documented in Service publications.

5. Safety Certification of DoE-Developed Support Equipment. The DoE is responsible for

the nuclear safety design, test, and analysis of nuclear support equipment and software developed by the DoE for a specific nuclear weapon. The Services evaluate use of DoE-developed nuclear weapons support equipment. Approval of a nuclear retrofit order and its incorporation into the JNWPS manual constitutes nuclear safety certification for the Department of Defense. However, the equipment may be reviewed by the Service NWSSGs, which may restrict use of DoE safety certified weapons or equipment if they feel the equipment is not safe in a Service operational context.

**6. Safety Certification of DoD Developed Support Equipment.** Safety certification is required of DoD-developed equipment that is used to handle nuclear weapons, all specialized equipment (components designed specifically for use with nuclear weapons), and all nonspecialized equipment (components used with nuclear weapons but not specifically designed for that purpose). The weapon system program managers are responsible to the Service for the safety design, analysis, and testing of equipment or software to meet Service safety criteria. The weapon system program managers submit the data documenting compliance with nuclear safety criteria for a Service-designated independent technical review. That independent analysis provides a safety certification recommendation to the Services. The Service then certifies the equipment or software, documenting the certification in a Service publication, or rejects certification and sends the package back to the weapon system program managers for additional action.

### **C. The NONNUCLEAR ASSURANCE PROGRAM**

1. The NNAP is a verification system that ensures that test assemblies are nonnuclear. That safety positive measure is implemented with the goal of preventing inadvertent nuclear detonation. The Military Departments perform some unique test programs, independent from the DoE, that require denuclearized test assemblies and should exercise the intent of the NNAP also.

2. Those test units are designed to simulate the nuclear weapon in its operational configuration as much as possible. Actual arming, fuzing, and firing system components, weapon case structures, and detonators can be used. Those test assemblies and the test units housing them will look like actual warheads. Additionally, during flight tests, those units are expected to operate as if they were an actual nuclear weapon, except for the lack of a nuclear detonation. The test conditions simulate actual operational scenarios to the maximum extent possible. Those conditions create the possibility, however unlikely, that an actual warhead could be inadvertently assembled into a test unit and subsequently tested as a part of the operational test program.

3. There are three parts to the NNAP process for verifying that a test assembly is not a nuclear weapon. Those three methods are to be used in combination with each other. They are, as follows:

a. **Inspection of TamPer-Evident Seals.** Tamper evident seals will be inspected (on those weapons equipped with such seals) to verify serial numbers and for alterations or damage to ensure that the test assembly configuration has not been altered or substituted.

b. **Inspection of Engineered Signatures.** The physical or electrical characteristics that differentiate between a nuclear weapon and a test assembly will be inspected. Those include external differences, such as engraved markings, electrical connections and antennas, as well as internal differences that may be verified with instrumentation.

c. **Radiation Detection Instrument Measurements.** Nuclear emissions from each test assembly will be measured as close as practical to the timing of the test to ensure that the test assembly does not contain plutonium, or other special nuclear materials (other than depleted

uranium).

4. For joint tests, the DoE is responsible for providing joint test assemblies, tamper-evident seals, signature information, and radiation detection equipment. As additional verification that joint test assemblies are nonnuclear, the DoE permanently marks them as test assemblies.