Report No. DODIG-2024-080

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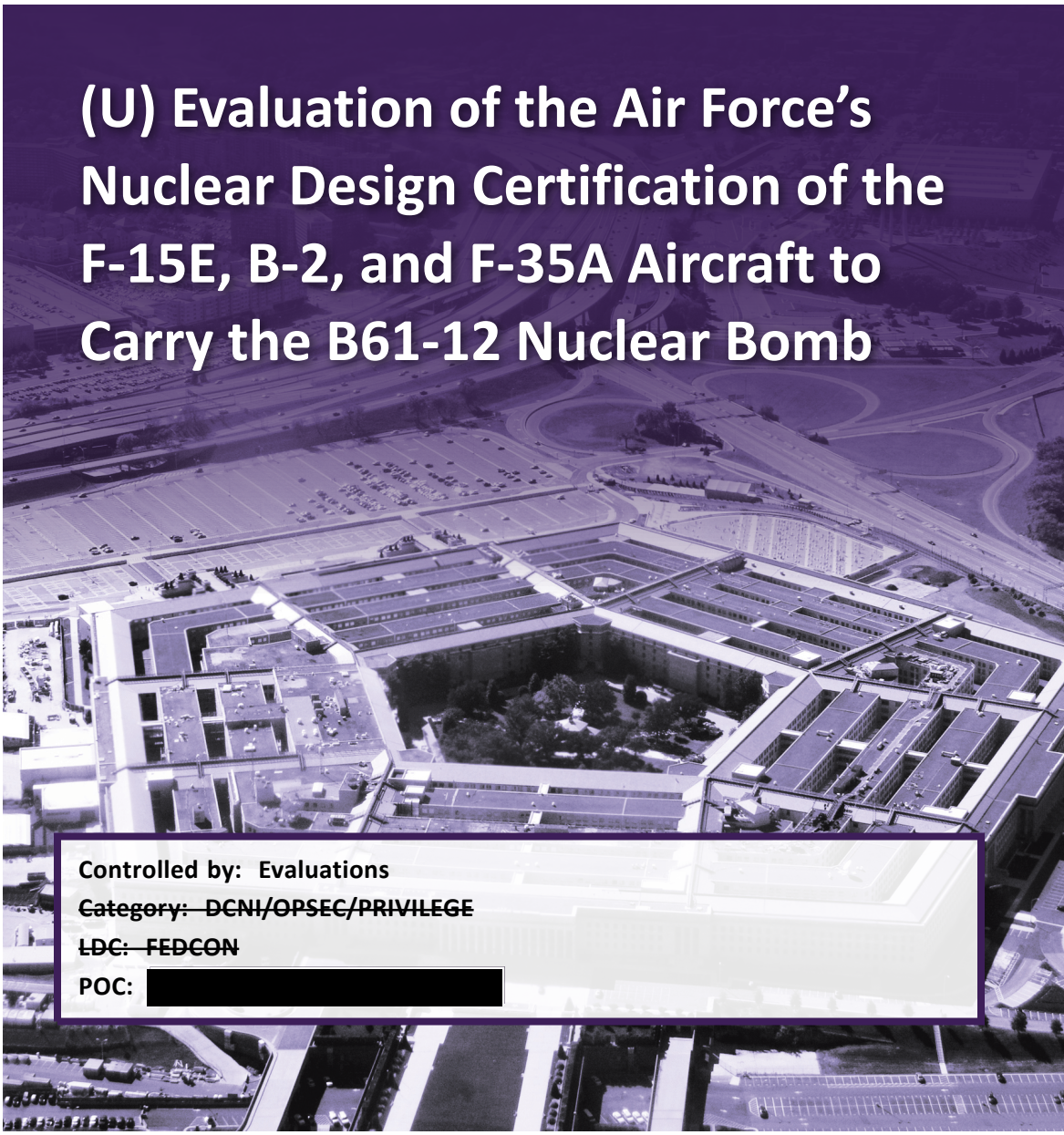
INSPECTOR GENERAL

U.S. Department of Defense

MAY 7, 2024

(U) Evaluation of the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb



Controlled by: Evaluations
~~**Category: DCNI/OPSEC/PRIVILEGE**~~
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INDEPENDENCE ★ INTEGRITY ★ EXCELLENCE ★ TRANSPARENCY

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INSPECTOR GENERAL
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DEPARTMENT OF DEFENSE

(U) Results in Brief

(U) Evaluation of the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb

May 7, 2024

(U) Objective

(U) The objective of this evaluation was to determine the extent to which the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb complied with DoD and Air Force requirements.

(U) Background

(U) The B61-12 nuclear bomb is the latest version of the nuclear bomb designed to be carried by the F-15E, B-2, and F-35A aircraft. However, before these three aircraft can carry a B61-12 nuclear bomb, each aircraft must receive nuclear certification.

(U) The Air Force Nuclear Certification Program is the process for determining whether procedures, personnel, equipment, software, facilities, and organizations meet nuclear surety standards and are capable of performing assigned nuclear weapon functions and missions. The Nuclear Certification Program is composed of two elements: Nuclear Design Certification and Nuclear Operational Certification.

(U) Air Force Instruction (AFI) 63-125, "Nuclear Certification Program," January 16, 2020, states that Nuclear Design Certification "occurs when Compatibility Certification, Nuclear Safety Design Certification, Weapon System Safety Rules Approval, and Technical Order Approval" are accomplished. In addition, Nuclear Operational Certification requires that the command seeking certification:

- (U) qualify their personnel to use the B61-12 nuclear bombs,

(U) Background (cont'd)

- (U) certify personnel in the Personnel Reliability Assurance Program,
- (U) train personnel in nuclear surety, and
- (U) successfully complete an Initial Nuclear Surety Inspection of the units designated to carry the B61-12 nuclear bombs.

(U) Once both Nuclear Design Certification and Nuclear Operational Certification are complete, the F-15E, B-2, and F-35A aircraft are authorized to carry the B61-12 nuclear bomb.

(U) As an element of Nuclear Design Certification, Nuclear Safety Design Certification criteria require aircraft software to have independent verification and validation (IV&V) to ensure that the software and firmware are designed, coded, and implemented to comply with DoD Nuclear Weapons Surety Program requirements. In addition, IV&V must be "technically, managerially, and financially independent of the prime contractor." IV&V provides independent verification that the F-15E, B-2, and F-35A aircraft can safely carry and reliably operate the B61-12 nuclear bomb.

(U) Finding

(U) We determined that the Air Force complied with the Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb in accordance with DoD and Air Force requirements. Air Force officials achieved Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft by completing all Nuclear Design Certification tasks within each aircraft's Certification Requirements Plan in accordance with DoD Directive 3150.02, "DoD Nuclear Weapons Surety Program," April 24, 2013 (Incorporating Change 5, July 15, 2022) and AFI 63-125.

(U) Although the Air Force complied with all Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb, the Air Force should provide clear guidance on conducting IV&V.

(U) Results in Brief

(U) Evaluation of the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb

(U) Finding (cont'd)

(U) Specifically, the F-35 Joint Program Office officials faced challenges interpreting the IV&V independence requirements within AFI 91-103, "Air Force Nuclear Safety Design Certification Program," March 24, 2016, and Air Force Manual (AFMAN) 91-119, "Safety Design Criteria for Nuclear Weapons Systems Software," March 11, 2020, for the independent verification organization (IVO) team, program office, and prime contractor during the F-35A IV&V. However, after correspondence between the F-35 Joint Program Office and the Air Force Safety Center (AFSEC) Weapons Safety Division Chief, the AFSEC Division Chief, accepted the F-35A IV&V and issued the F-35A aircraft's Nuclear Safety Design Certification Letter without affecting the overall Nuclear Design Certification.

(U) As a result of the unclear AFMAN 91-119 guidance regarding the IV&V process, the challenges the Air Force faced certifying the B61-12 nuclear bomb could negatively impact future Nuclear Safety Design Certifications. Without guidance that clarifies how to conduct and document IV&V, the negative impacts could include invalid or incomplete IV&V for nuclear weapons certifications or incorrect Nuclear Safety Design Certification of current or future aircraft and missiles designated to carry nuclear weapons.

(U) Recommendations

(U) We recommend that the Air Force Headquarters Chief of Safety (AF/SE), in coordination with the Air Force Nuclear Weapons Center Commander (AFNWC/CC), update the AFMAN 91-119 IV&V requirements to:

- (U) explain how to select an IVO team,
- (U) explain how to ensure an IVO team's independence, and
- (U) define technical, managerial, and financial independence.

(U) Additionally, AFMAN 91-119 should detail how the prime contractor's laboratory, equipment, and software can be used during IV&V.

(U) Management Comments and Our Response

(U) The AF/SE and AFNWC/CC responded to our recommendations and concurred with the report's finding, indicating that the requested changes would be made by April 2025. The recommendations are resolved and will be closed once the changes to AFMAN 91-119 have been incorporated.

(U) The AF/SE concurred with the recommendations in the report. In the response, the AF/SE directed the Air Force Safety Center Weapons Safety Division (AFSEC/SEW), in coordination with the AFNWC, to further update AFMAN 91-119 to provide detail and clarity of IV&V requirements.

(U) The AFNWC/CC concurred with the recommendations in the report. In the response, the AFNWC/CC directed the Nuclear Technology and Integration Directorate and Nuclear Surety and Certification Division to coordinate with AFSEC/SEW and Air Force Safety Center Weapons Safety Division–Nuclear on future improvements to AFMAN 91-119 regarding improved IV&V guidance and requirements. The AFNWC/CC also stated that dates of completion will coincide with AFSEC's next publication of AFMAN 91-119.

(U) Therefore, we request that AFSEC work in coordination with the AFNWC to ensure that future publications of AFMAN 91-119 reflect our recommendations. We will close the recommendations when we receive and validate that the updates to AFMAN 91-119 are completed.

(U) Please see the Recommendations on the next page for the status of recommendations.

(U) Recommendations Table

(U) Management	Recommendations Unresolved	Recommendations Resolved	Recommendations Closed
Chief of Safety, Air Force Headquarters	None	1.a, 1.b, 1.c, and 1.d	None
Commander, Air Force Nuclear Weapons Center	None	1.a, 1.b, 1.c, and 1.d	None **(U)**

(U) Please provide Management Comments by June 7, 2023

(U) Note: The following categories are used to describe agency management's comments to individual recommendations.

- **(U) Unresolved** – Management has not agreed to implement the recommendation or has not proposed actions that will address the recommendation.
- **(U) Resolved** – Management agreed to implement the recommendation or has proposed actions that will address the underlying finding that generated the recommendation.
- **(U) Closed** – The DoD OIG verified that the agreed upon corrective actions were implemented.


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OFFICE OF INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
4800 MARK CENTER DRIVE
ALEXANDRIA, VIRGINIA 22350-1500

May 7, 2024

(U) MEMORANDUM FOR COMMANDER, AIR FORCE SAFETY CENTER
COMMANDER, AIR FORCE NUCLEAR WEAPONS CENTER

SUBJECT: (U) Evaluation of the Air Force's Nuclear Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb (Report No. DODIG-2024-080)

(U) This final report provides the results of the DoD Office of Inspector General's evaluation. We previously provided copies of the draft report and requested written comments on the recommendations. We considered management's comments on the draft report when preparing the final report. These comments are included in the report.

(U) The Air Force Headquarters Chief of Safety and the Air Force Nuclear Weapons Center Commander agreed to address all of the recommendations presented in the report; therefore, we consider the recommendations resolved and open. We will close the recommendations when we receive documentation showing that all agreed-upon actions to implement the recommendations are completed. Therefore, we request that the Air Force Headquarters Chief of Safety and the Air Force Nuclear Weapons Center Commander provide comments within 30 days in response to the final report to address the updates to AFMAN 91-119 by April 2025. Send your unclassified response to [redacted]

(U) If you have any questions, please contact [redacted]

FOR THE INSPECTOR GENERAL:

Randolph R. Stone
Assistant Inspector General for Evaluations
Space, Intelligence, Engineering, and Oversight

cc:

UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND SUSTAINMENT
COMMANDER, AIR COMBAT COMMAND
COMMANDER, AIR FORCE GLOBAL STRIKE COMMAND
COMMANDER, AIR FORCE MATERIEL COMMAND
CHIEF OF SAFETY, AIR FORCE HEADQUARTERS
INSPECTOR GENERAL, DEPARTMENT OF THE AIR FORCE
AUDITOR GENERAL, DEPARTMENT OF THE AIR FORCE

(U) Contents

(U) Contents (cont'd)

(U) Introduction

(U) Objective

(U) The objective of this evaluation was to determine the extent to which the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb complied with DoD and Air Force requirements.[1]

(U) Background

(U) The initial B61 nuclear bomb entered the U.S. inventory in 1968, and development of the latest version of the nuclear bomb, the B61-12, began in 2012. This air-dropped weapon relies on gravity to fall toward an intended target, using its nuclear reaction to generate an explosive force. The B61-12 has a lower yield and is accuracy than previous versions.[2] The B61-12 is designated to be carried by the F-15E, B-2, and F-35A aircraft and is approximately 12 feet long and weighs 825 pounds.

(U) Figure 1. B61-12 Nuclear Bomb
(U) Source: U.S. Air Force.

(U) As of September 29, 2022, the Air Force Nuclear Weapons Center Commander (AFNWC/CC) approved the Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft. However, at the completion of this evaluation, only the F-15E aircraft completed both Nuclear Design Certification and Nuclear Operational

[1] (U) This report contains information that has been redacted because it was identified by the Department of Defense as Controlled Unclassified Information (CUI) that is not releasable to the public. CUI is Government-created or owned unclassified information that allows for, or requires, safeguarding and dissemination controls in accordance with laws, regulations, or Government-wide policies.

[2] (U) According to the "Nuclear Matters Handbook 2020 (Revised)," no date a yield is defined as the total effective energy released in a nuclear (or atomic) explosion. It is usually expressed in terms of the equivalent tonnage of TNT required to produce the same energy release in an explosion.

(U) Certification, thereby becoming fully nuclear certified.[3] For this evaluation, we focused on the Nuclear Design Certification of the F-15E, B-2, and F-35A aircraft as it relates to the B61-12 nuclear bomb.

(U) Nuclear Certification Criteria

(U) Nuclear certification criteria are established by DoD directives and manuals. The Air Force implemented these criteria through Service instructions and manuals. Air Force Safety Center (AFSEC) officials develop policies and establish Nuclear Safety Design Certification criteria for the Air Force. Compliance with the Air Force's current Nuclear Safety Design Certification criteria is mandatory for all organizations that design, develop, modify, evaluate, operate, or acquire a nuclear weapon system. Any deviation from the Air Force's current nuclear safety design criteria must be approved by the Office of Primary Responsibility.[4] Appendix B provides a detailed explanation of the DoD and Air Force criteria that govern the Nuclear Certification Program.

(U) Description of the Nuclear Certification Program

(U) According to Air Force Instruction (AFI) 63-125, the Air Force Nuclear Certification Program is a "process for determining that procedures, personnel, equipment, software, facilities, and organizations meet nuclear surety standards and are capable of performing assigned nuclear weapon functions and missions."[5] In addition, AFI 63-125 requirements state that "Nuclear certification is necessary prior to a system acquiring operational status." The Air Force Nuclear Weapons Center (AFNWC) manages the Air Force Nuclear Certification Program, and is responsible for the Compatibility Certification process, providing technical independent reviews and analysis support to AFSEC throughout the Nuclear Safety Design Certification. The AFNWC issues a Nuclear Certification Summary Letter (or Design Certification Summary) when all tasks identified in the Certification Requirements Plans (CRPs) are completed.

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[3] (U) According to a memorandum from the AFNWC/CC to the Air Force Life Cycle Management Center Program Executive Officer for Fighters and Advanced Aircraft, "Design Certification Summary (DCS) Letter – F-15E Operational Flight Program (OFP) 8.0.1N System 2 with B61-12," April 22, 2022, the F-15E aircraft was Nuclear Design Certified on April 22, 2022. In addition, according to a memorandum from the AFNWC/CC to the Air Force Life Cycle Management Center Program Executive Officer for Bombers, "Design Certification Summary (DCS) Letter – B-2A Integrated Functional Capability (IFC) P6.2.1 System 2," July 8, 2022, the B-2 aircraft was Nuclear Design Certified on July 8, 2022. Additionally, according to a memorandum from the AFNWC/CC to the F-35 Lightning II Joint Program Office, "Design Certification Summary (DCS) Letter – F-35A/B61-12 Nuclear Weapon System," September 29, 2022, the F-35A aircraft was Nuclear Design Certified on September 29, 2022. Furthermore, according to a memorandum from U.S. Air Force Europe-Air Force Africa Weapons Safety Division-Nuclear to all U.S. Air Force Europe-Air Force Africa units, "Operational Certification Letter for F-15E 8.0.1N System 2," August 2, 2022, the F-15E aircraft was operationally certified on August 3, 2022.

[4] (U) The Office of Primary Responsibility for Air Force Manual 91-119, "Safety Design Criteria for Nuclear Weapons Systems Software," March 11, 2020, is the Air Force Safety Center Weapons Safety Division.

[5] (U) AFI 63-125, "Nuclear Certification Program," January 16, 2020. In addition, according to AFI 91-101, "Air Force Nuclear Weapons Surety Program," March 2020 (Incorporating Change 1, April 6, 2022), the Air Force nuclear mission consists of the people, organizations, processes, procedures, and systems conducting, executing, and supporting nuclear operations and developing and implementing nuclear policy and guidance.

(U) AFSEC supports the Nuclear Safety Design Certification as the independent agency for the Nuclear Design Certification. Additionally, AFSEC provides support and guidance for specific tasks required to achieve Nuclear Safety Design Certification and Weapon System Safety Rules (WSSR) development and approval for the CRP.

(U) According to DoD Manual (DoDM) 3150.02, once the Department of Energy (DOE) completes production and the DoD is ready to accept the B61-12 nuclear bombs, "the Military Departments conduct further safety certification of the weapon systems."[6] The manual establishes the Air Force's responsibility to develop a nuclear certification "policy and to establish the nuclear weapon system safety design criteria." For example, DoDM 3150.02 requires procedures, personnel, equipment, hardware, software, facilities, and organizations to be certified before conducting operations with nuclear weapons or nuclear weapon systems. In addition, Air Force Manual (AFMAN) 91-119 implements requirements by directing the commands conducting Nuclear Design Certifications to validate the safety and security system for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb.

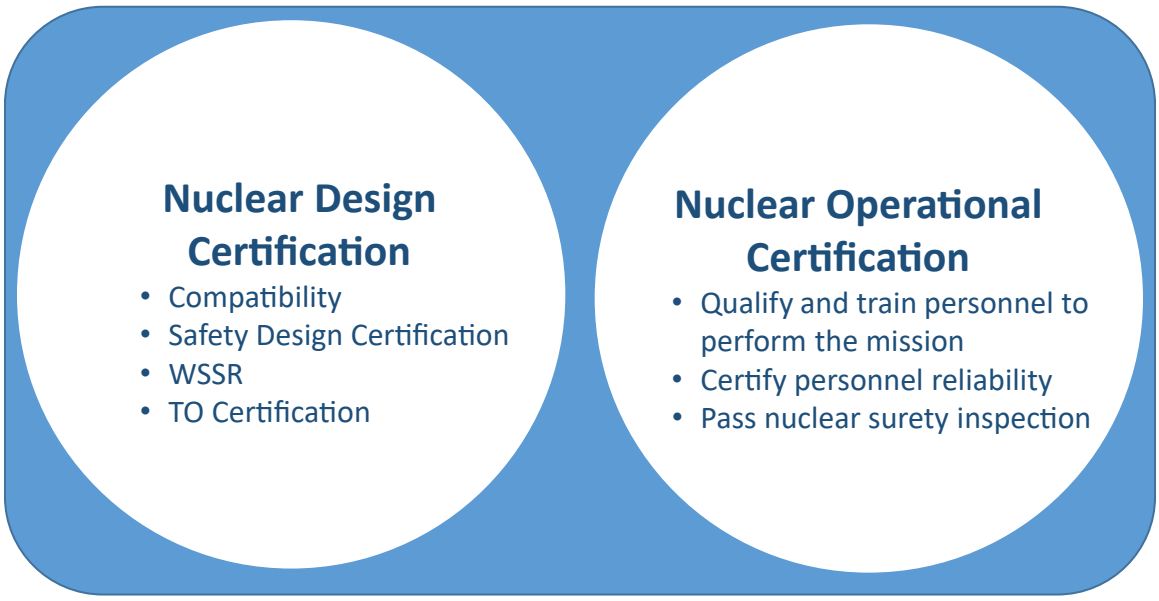
(U) The overall intent of the Air Force Nuclear Certification Program is to have organizations such as AFSEC and the AFNWC ensure that all procedures and equipment, such as aircraft, certification software applications, facilities, and personnel, are certified before conducting nuclear operations with nuclear weapons or nuclear weapon systems. In addition, AFI 63-125 states that "Nuclear certification is required before a nuclear weapon system, or item equipment, can be used to support unit nuclear mission operations."[7]

(U) The Air Force Nuclear Certification Program has two major elements: Nuclear Design Certification and Nuclear Operational Certification. AFI 63-125 also states that Nuclear Design Certification "occurs when each of four components is accomplished for the weapon system: Compatibility Certification, Nuclear Safety Design Certification, Weapon System Safety Rules Approval, and Technical Orders Approval." See Figure 2 for the Nuclear Design Certification elements and associated components.

[6] (U) DoDM 3150.02, "DoD Nuclear Weapon System Safety Program Manual," January 31, 2014 (Incorporating Change 4, May 7, 2021). The Revised 2020 Nuclear Matters Handbook defines weapon system as the combination of one or more weapons with all related equipment, materials, services, personnel, and means of delivery and deployment (if applicable) required for self-sufficiency.

[7] (U) In addition, Joint Publication 3-72, "Joint Nuclear Operations," April 17, 2020, defines nuclear operations as those activities within the range of military operations, including deterrence, crisis response, strike, assessment, and return to stability. To deter an attack on the United States, its allies, and partners, joint forces conduct nuclear deterrence operations as part of the U.S. strategic security posture.

(U) Figure 2. Nuclear Certification Major Elements and Components



(U) Source: The DoD OIG.

(U) In addition, AFI 63-125 states that Nuclear "Operational Certification occurs when the lead/using command qualifies its personnel to perform the mission, certifies them in the Personnel Reliability Assurance Program, trains them in nuclear surety, and assigns a 'Ready' rating on an Initial Nuclear Surety Inspection." Once both Nuclear Design Certification and Nuclear Operational Certification are complete, the F-15E, B-2, and F-35A aircraft are authorized to carry the B61-12 nuclear bomb. According to AFI 63-125, the Nuclear Design Certification must be completed before Nuclear Operational Certification can be completed. Furthermore, AFI 63-125 also requires that both Nuclear Design Certification and Nuclear Operational Certification be completed before an aircraft can be nuclear certified.

(U) According to AFI 63-125, Nuclear Design Certification is further divided into four components. Nuclear Design Certification occurs when each of the applicable four components (Compatibility Certification, Nuclear Safety Design Certification, WSSR Approval, and Technical Order [TO] Certification Approval) are completed. The Nuclear Design Certification is obtained and maintained by the acquisition program manager (PM). See Figure 3 depicting the four components of the Nuclear Design Certification.

(U) Figure 3. Nuclear Design Certification Components

(U) Source: The DoD OIG.

- (U) **Compatibility Certification.** According to AFI 63-125, the intent of the Compatibility Certification is to ensure that the aircraft types that will carry the B61-12 nuclear bomb "meet design and evaluation requirements for physical, functional, and environmental interface between the aircraft and the nuclear weapon." For the B61-12 nuclear bomb, this consists of testing and evaluating systems involved with loading and carrying the B61-12 nuclear bomb on the F-15E, B-2, and F-35A aircraft. As process owner, the Air Force Nuclear Weapons Center Nuclear Technical Surety and Certification Division (AFNWC/NTS) evaluates evidence demonstrating compatibility and provides a certification decision.
- (U) **Nuclear Safety Design Certification.** The purpose of the Nuclear Safety Design Certification is "to validate that the system, item of equipment, or nuclear maintenance, handling, and storage facility can be used safely in support of nuclear mission operations."[8] Additionally, AFI 91-103 and AFMAN 91-119 establish the criteria for system PMs to "evaluate facilities, hardware, and software associated with nuclear weapon systems for compliance with Nuclear Safety Design Certification" for final Air Force Safety Center Weapons Safety Division (AFSEC/SEW) approval for certification. The Nuclear Safety Design Certification begins with receipt of a Nuclear Certification Impact Statement originated by the program office PM and a basic Certification Requirements Plan (bCRP)

[8] (U) AFI 91-103, "Air Force Nuclear Safety Design Certification Program," March 24, 2016.

(U) from the AFNWC/NTS certification management team.[9] The Nuclear Safety Design Certification includes an approved bCRP that identifies the need to certify the nuclear safety design of a system or item that is used with nuclear weapons.[10] In addition, as part of the Nuclear Safety Design Certification, AFI 91-103 requires aircraft software to have independent verification and validation (IV&V) to ensure that the "software/firmware, as designed, coded, and implemented, complies with the DoD Directive (DoDD) 3150.02."[11] IV&V provides an independent verification that the F-15E, B-2, and F-35A aircraft can carry the B61-12 nuclear bomb safely and operate it reliably. IV&V also tests that the F-15E, B-2, and F-35A aircraft and supported systems meet the safety design and evaluation criteria in AFI 91-107.[12] AFI 91-103 requires an independent verification organization (IVO) that is "technically, managerially, and financially independent of the prime contractor" to conduct IV&V.

- (U) **Weapon System Safety Rules Development.** DoDD 3150.02 defines WSSR as "operational restriction requirements designed to ensure nuclear weapon systems are compliant with the four DoD nuclear surety standards."[13] The Nuclear Weapons System Surety Group (NWSSG) develops and revises WSSR, which are composed of general and specific provisions applicable to a nuclear weapon system for conducting approved operations while ensuring maximum safety consistent with operational or logistic requirements. The NWSSG conducts all nuclear weapon system safety studies and operational safety reviews to evaluate Air Force nuclear weapon systems and ensure that the DoD nuclear weapon surety standards are met in weapon system design and operations.[14] According to AFI 63-125, the Under Secretary of Defense for Acquisition, Technology, and Logistics approves WSSR and AFSEC/SEW publishes WSSR in the form of an AFI.

[9] (U) According to AFI 63-125, a Nuclear Certification Impact Statement provides a functional description of the proposed new system and includes the system PM's evaluation of its potential for nuclear certification impact. In addition, according to the F-15E, B-2, and F-35A CRPs, a bCRP describes requirements for accomplishing nuclear certification.

[10] (U) According to AFI 63-125, the AFNWC develops, coordinates, and distributes the bCRP to appropriate process owners involved with the Nuclear Safety Design Certification. The bCRP task is a programmatic nuclear certification task used as a template for the CRP for the Nuclear Safety Design Certification.

[11] (U) DoDD 3150.02, "DoD Nuclear Weapons Surety Program," April 24, 2013 (Incorporating Change 5, July 15, 2022).

[12] (U) AFI 91-107, "Design Evaluation Troubleshooting and Maintenance Criteria for Nuclear Weapon Systems," December 11, 2012 (Incorporating change 1 April 7, 2014, and July 20, 2017).

[13] (U) According to DoDD 3150.02, four DoD nuclear weapon surety standards provide positive measures to: 1) prevent nuclear weapons involved in accidents and incidents, or jettisoned weapons, from producing a nuclear yield; 2) prevent a deliberate pre-arming, arming, launching, or releasing of nuclear weapons, except on execution of emergency war orders or when directed by competent authority; 3) prevent inadvertent pre-arming, arming, launching, or releasing of nuclear weapons in all normal and credible abnormal environments; and 4) ensure adequate security for nuclear weapons.

[14] (U) According to AFI 63-125, the NWSSG is composed of representatives from Air Force Headquarters Strategic Deterrence, Nuclear Integration (AF/A10) and Logistics, and Engineering and Force Protection (AF/A4) Divisions; applicable Air Force major commands (such Air Force Global Strike Command, Air Force Material Command, and Air Force Air Combat Command); combatant commands (such as U.S. Strategic Command and U.S. European Command); the DOE; and the Defense Threat Reduction Agency and is chaired by an appointee from AFSEC/SEW.

- (U) **Technical Order Certification.** According to AFI 63-125, TOs are Air Force publications that give specific technical directions and information regarding inspection, storage, operation, modification, and maintenance of Air Force equipment.

(U) According to AFI 63-125, when the four Nuclear Design Certification components are completed, AFNWC/NTS officials issue the Design Certification Summary Letter signed by the AFNWC/CC to the program offices.[15]

(U) Nuclear Certification Roles and Responsibilities

(U) DoD and Air Force criteria establish the roles and responsibilities for a nuclear certification. Specifically, the DoD and Air Force nuclear certification criteria identify several Air Force organizations with assigned roles and responsibilities to ensure the F-15E, B-2, and F-35A aircraft are Nuclear Design Certified to carry the B61-12 nuclear bomb. For example, AFI 91-103 and AFMAN 91-119 define specific roles and responsibilities during nuclear certification for AFSEC, the AFNWC, and the F-15E, B-2, and F-35A aircraft program offices.

(U) Department of Energy's Role in Nuclear Certification

(U) Nuclear certification is a joint effort between the DOE's National Nuclear Security Agency (NNSA) and the Air Force, specifically the AFNWC. The NNSA is responsible for certifying the B61-12 nuclear bomb, while the Air Force is responsible for certifying the F-15E, B-2, and F-35A aircraft carrying the B61-12 nuclear bomb. A 2012 DOE–DoD memorandum of understanding between the AFNWC and the DOE's NNSA states that the NNSA and AFNWC will share the responsibility for certifications specifically related to compatibility.[16] In addition, the purpose of the memorandum of understanding is to identify the responsibilities between the NNSA and AFNWC with respect to the development, production, and integration of the B61-12 nuclear bomb and the aircraft.

(U) Manager for the Air Force Nuclear Certification Program

(U) According to AFI 63-125, the AFNWC manages the Air Force Nuclear Certification Program and is responsible for Compatibility Certification. The AFNWC provides technical, independent, evaluation support to AFSEC/SEW as part of Nuclear Safety Design Certification and develops technical nuclear surety analysis to support nuclear weapon system safety studies conducted by the NWSSG.[17] The AFWNC/CC signs

[15] (U) According to the F-15E, B-2, and F-35A CRPs, the Design Certification Summary Letter is issued when all Nuclear Design Certification actions identified in the CRPs are completed.

[16] (U) "Memorandum of Understanding Between the Air Force Nuclear Weapons Center and Department of Energy/National Nuclear Security Administration for the Division of Responsibilities for Development, Integration and Production of the B61 Modification 12," June 2012.

[17] (U) The Air Force NWSSG develops the Technical Nuclear Surety Analysis to support nuclear weapon system safety studies.

(U) the Design Certification Summary Letter once all applicable Nuclear Design Certification requirements identified in a CRP are complete and the Nuclear Design Certification is granted.[18]

(U) Developer of Air Force Nuclear Certification Surety Standards

(U) According to AFI 63-125, the Air Force Headquarters Chief of Safety (AF/SE) is responsible for coordinating with the Office of the Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration (AF/A10) to develop and establish Air Force nuclear surety safety, security, and reliability standards in addition to guidance, training, planning, safety programs, and Nuclear Safety Design Certification of nuclear weapon systems and components. AFSEC supports the AF/SE in fulfilling the responsibility to develop these standards through AFSEC/SEW.

(U) Program Office Nuclear Certification Responsibilities

(U) Officials from the F-15E, B-2, and F-35A aircraft program offices identify the need to obtain nuclear certification. Each program office's PM has the responsibility and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The PM documents those needs in the Nuclear Certification Impact Statement, as required by AFI 63-125. The PM also prepares the CRP. PMs develop specific CRP requirements for accomplishing F-15E, B-2, and F-35A aircraft nuclear certification with the B61-12 nuclear bomb and provide overall guidance for the conduct of nuclear certification activities.

(U) Aircraft Designated for Nuclear Safety Certification

(U) The Air Force identified the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb. The F-15E Strike Eagle is an aircraft designed to perform air-to-air and air-to-ground missions. The B-2 Spirit is a multi-role bomber capable of delivering nuclear weapons. The F-35A Lightning II is an agile, versatile, high-performance aircraft that combines stealth, enhanced situational awareness, and reduced vulnerability for the United States and allied nations.

[18] (U) A Design Certification Summary Letter is issued when all Nuclear Design Certification actions identified in the CRP are completed.

(U) Finding

(U) The Air Force Complied with the Nuclear Design Certification Requirements for the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb; However, the Air Force Could Improve the IV&V Process

(U) We determined that the Air Force complied with the Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb in accordance with DoD and Air Force requirements. Air Force officials achieved Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft by completing all aircraft-specific Nuclear Design Certification tasks in each aircraft's CRP in accordance with DoDD 3150.02 and AFI 63-125. Specifically, in 2022, the Air Force completed the following CRP tasks.

- ~~(CUI)~~ [redacted]
- ~~(CUI)~~ [redacted]
- ~~(CUI)~~ [redacted]

(U) As a result of achieving Nuclear Design Certification for the three aircraft in 2022, the Air Force began Nuclear Operational Certification of each aircraft to carry the B61-12 nuclear bomb.

(U) Although the Air Force complied with all Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb, the Air Force's IV&V processes could be improved with detailed guidance to ensure independence when conducting IV&V. Specifically, the F-35 Joint Program Office (JPO) officials faced challenges interpreting the AFI 91-103 and AFMAN 91-119 IV&V requirements for ensuring the independence of their IVO team, program office, and prime contractor during the F-35A IV&V. For example, AFSEC's Weapons Safety Division Chief identified in an October 2021 memorandum that the F-35 JPO did not initially meet AFI 91-103 and AFMAN 91-119 requirements for conducting an independent IV&V. AFSEC questioned the IV&V team's formation and the prime contractor's access involvement during the IV&V process. However, after correspondence between the F-35 JPO and the AFSEC Weapons Safety Division Chief, AFSEC accepted the F-35A IV&V as completed and issued the F-35A aircraft's Nuclear Safety Design Certification Letter without affecting the overall Nuclear Design Certification.

(U) AFSEC Weapons Safety Division Chief's concerns occurred because the requirements are unclear and do not provide a detailed process for IV&V.[19] Specifically, the Air Force could improve the IV&V process by providing more detailed requirements for future IVOs to:

- (U) select an IVO team;
- (U) coordinate with AFSEC and conduct IV&V;
- (U) document the IVO team's independence with AFSEC;
- (U) understand the definitions of technical, managerial, and financial independence; and
- (U) ensure compliance with Nuclear Design Certification requirements during IV&V.

(U) Furthermore, AFMAN 91-119 requirements should provide clear guidance for IV&V teams on using the prime contractor's laboratory, equipment, and software for IV&V when the Government does not have the facilities to conduct IV&V. AFMAN 91-119 requirements should also have clear guidance on how to document and conduct IV&V modifications and deviations to software with AFSEC during IV&V.

~~(CUI)~~ As a result of unclear AFMAN 91-119 guidance for the IV&V process, [redacted] Specifically, if IV&V processes are not updated with clear guidance, AFMAN 91-119 IV&V [redacted] and future Nuclear Safety Design Certification for aircraft and missiles designated to carry nuclear weapons.

(U) The Air Force Complied with Nuclear Design Certification Requirements for the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb

(U) The Air Force complied with the Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb in accordance with DoD and Air Force requirements. Air Force officials achieved Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb in accordance with DoDD 3150.02 and AFI 63-125.

[19] (U) At the time of this report, AFI 91-103 was superseded, and the information was incorporated into AFMAN 91-119.

(U) Air Force Officials Completed All Aircraft-Specific Nuclear Design Certification Tasks for the F-15E, B-2, and F-35A CRPs

(U) Air Force officials achieved Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft by completing all aircraft-specific Nuclear Design Certification tasks within each aircraft's CRP in accordance with DoDD 3150.02 and AFI 63-125. The Nuclear Design Certification tasks for each aircraft included the following components: Compatibility Certification, Nuclear Safety Design Certification, WSSR Development, and TO Certification.

(U) CRPs are unique to each certification effort and tailored to meet the specific needs of each aircraft in accordance with AFI 63-125. Therefore, the total number of CRP tasks for Nuclear Design Certification differed for each aircraft. Table 1 lists the number of Nuclear Design Certification tasks for the F-15E, B-2, and F-35A CRPs.

~~(CUI)~~ [redacted]

(U) Source: The DoD OIG.

(U) We reviewed each of the Nuclear Design Certification tasks in the three aircraft CRPs. Specifically, we obtained certification documentation from AFSEC, the AFNWC, and each aircraft program office. Our purpose was to verify the completion of all Nuclear Design Certification tasks required by each aircraft CRP and to assess compliance with AFI 63-125 and DoDM 3150.02 Nuclear Design Certification requirements. Specifically, we examined reports and memorandums to verify evidence of completion for all Nuclear Design Certification tasks required by each aircraft's CRP for Compatibility Certification, Nuclear Safety Design Certification, WSSR Development, and TO Certification.[20]

[20] (U) For this evaluation, we determined proper evidence of completion by verifying documentation for each aircraft's CRP tasks for proper approval signatures and dates.

(U) For example, for each aircraft's CRP, we reviewed Nuclear Compatibility Certification Statements, Nuclear Safety Design Certification Letters, WSSR Approval Letters, and TO Approval Notification Letters for completion. We used these documents in our analysis to determine that each CRP task was addressed for the F-15E, B-2, and F-35A CRPs. Additionally, we verified that the appropriate Air Force agency officials approved the documentation with signatures. In addition, we interviewed officials from AFSEC, the AFNWC, and each program office to discuss in detail how each office completed its assigned tasks.

(U) The AFNWC/CC Approved the Nuclear Design Certification for the F-15E, B-2, and F-35A Aircraft Following the Completion of Each Aircraft's CRP

(U) The AFNWC/CC approved Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft in 2022 following the completion of each aircraft's CRP. As a result of achieving Nuclear Design Certification for the three aircraft in 2022, the Air Force began Nuclear Operational Certification, which is the final step to authorize the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb.

(U) We confirmed that the AFNWC/CC issued Nuclear Design Certification Summary Letters to the program offices for the F-15 aircraft in April 2022, the B-2 in July 2022, and the F-35A in September 2022. These letters supported that each aircraft met all applicable Nuclear Design Certification requirements identified in AFI 63-125 and were granted Nuclear Design Certification. Therefore, based on our analysis, we determined that Air Force officials completed all aircraft-specific Nuclear Design Certification tasks as required by DoDD 3150.02 and AFI 63-125 for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb. Following completion of the aircraft-specific Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft, the Air Force began the Nuclear Operational Certification of each aircraft to complete the final step for the B-61 nuclear bomb to be fully certified.

(U) The Air Force's IV&V Requirements Could Be Improved

(U) Although the Air Force complied with all Nuclear Design Certification requirements for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb, the Air Force's IV&V requirements could be improved. Specifically, F-35 JPO officials faced challenges interpreting AFI 91-103 and AFMAN 91-119 IV&V requirements for ensuring the independence of the IVO team, program office, and prime contractor during the F-35A IV&V.

(U) F-35 Joint Program Office Officials Faced Challenges Interpreting IV&V Requirements

~~(CUI)~~ The F-35 JPO officials faced challenges interpreting the IV&V requirements within AFI 91-103 and AFMAN 91-119 related to the independence of their IVO team, program office, and prime contractor personnel during the F-35A IV&V. For example, AFSEC's Weapons Safety Division Chief identified in an October 2021 memorandum that the F-35 JPO did not initially meet certain independence requirements for the F-35A IV&V as required by AFI 91-103 and AFMAN 91-119. In the memorandum, AFSEC questioned how the IV&V team was formed and the involvement of [redacted] However, after correspondence between the F-35 JPO and the AFSEC Weapons Safety Division Chief, the AFSEC Weapons Safety Division Chief accepted the F-35A IV&V as completed and issued the F-35A aircraft's Nuclear Design Certification Letter.[21]

(U) AFSEC's Weapons Safety Division Chief Identified Concerns Regarding the F-35A IV&V

~~(CUI)~~ While the F-35A's IV&V was accepted as complete in July 2022, the AFSEC's Weapons Safety Division Chief initially [redacted][22]

- ~~(CUI)~~ [redacted]
- ~~(CUI)~~ [redacted]"[23]
- ~~(CUI)~~ The prime contractor changed the F-35A [redacted][24]

[21] (U) Memorandum from Headquarters AFSEC/SEW to the AFNWC/NTS, "Nuclear Safety Design Certification of the F-35 Lightning II Dual Capable Aircraft," July 20, 2022.

[22] (U) Memorandum from Headquarters AFSEC/SEW to the Office of the Under Secretary of Defense for Acquisition and Sustainment, "Violation of Independence on F-35 Lot 14 Block 30p06.041 Independent Verification and Validation (IV&V), AF Instruction 91-103," October 15, 2021.

[23] (U) F-35A software refers to software being developed for the F-35A aircraft subject to nuclear certification requirements in AFI 91-103. Specifically, according to the F-35A IV&V report, "the initial capability will be delivered with the Block 30P06.041-US Operational Flight Program (OFP) software."

[24] (U) "F-35 Dual Capable Aircraft (DCA) Independent Verification and Validation (IV&V), Block 30P06.041-US Final Report," June 21, 2021, defines a "finding" as any potential failure, discrepancy, or shortfall identified through IV&V.

~~(CUI)~~ The AFSEC Weapons Safety Division Chief concluded in the October 2021 memorandum that the IVO team's F-35A IV&V [redacted] In December 2021, the F-35 Mission Systems PM at the F-35 JPO issued a memorandum documenting the F-35 JPO's and AFSEC's agreed-upon way forward to address the October 2021 memorandum regarding the F-35A IV&V violations.[25] The AFSEC Weapons Safety Division Chief later accepted the F-35A IV&V as complete by issuing the F-35A's Nuclear Safety Design Certification Letter in July 2022.

(U) We Analyzed the AFI 91-103 and AFMAN 91-119 IV&V Guidance to Determine Independence Requirements

(U) We analyzed the IV&V guidance in AFI 91-103 and AFMAN 91-119 to determine the requirements for the independence of IVO teams, program offices, and prime contractors during IV&V.[26] During the evaluation, we compared AFSEC's concerns to the current AFMAN 91-119 to determine if the manual provided clear guidance.

(U) AFI 91-103 and AFMAN 91-119 Do Not Provide Detailed Requirements on Independent Verification Organization Team Independence

(U) We determined that AFMAN 91-119 does not provide detailed requirements on IVO team independence. For example, when choosing an IVO team, AFMAN 91-119 simply requires the program office PM to "designate an independent verification organization, as required by AFSEC/SEWN [Air Force Safety Center's Weapons Safety Division–Nuclear]." However, AFMAN 91-119 does not provide requirements for the steps PMs should follow to select an IVO team or how to coordinate this selection process with AFSEC. In addition, AFMAN 91-119 states that the PMs "shall obtain concurrence from AFSEC/SEWN on the independence of the" IVO team. However, AFMAN 91-119 does not provide detailed requirements for how PMs should obtain concurrence from AFSEC/SEWN on the independence of the IVO team or how to document this concurrence with AFSEC/SEWN.

(U) In addition, we determined that AFI 91-103 and AFMAN 91-119 do not provide requirements for how IVO teams should maintain independence from the prime contractor during IV&V. Although AFI 91-103 and AFMAN 91-119 both require that "IV&V be performed by an organization that is technically, managerially, and financially independent of the" prime contractor, these terms are not explained or defined in either criteria. In addition, AFMAN 91-119 states that the IVO team shall "maintain

[25] (U) F-35 Lightning II JPO's "Memorandum for Air Force Safety Center, Weapons Safety (AFSEC/SEW): Response to AFSEC's F-35 Independent Verification and Validation (IV&V) Concerns," December 9, 2021.

[26] (U) We reviewed AFMAN 91-119 dated March 2020 since this was the AFMAN 91-119 version used to conduct the F-35A IV&V. In addition, we reviewed AFI 63-125 and determined that the instruction does not discuss IV&V requirements.

(U) independence from the" prime contractor. However, AFMAN 91-119 does not provide detailed requirements for how this independence should be maintained, documented, and coordinated with AFSEC.

(U) AFI 91-103 and AFMAN 91-119 Do Not Provide Detailed Requirements on How the IV&V Team Maintains Independence from the Prime Contractor

(U) We determined that AFI 91-103 and AFMAN 91-119 do not provide detailed requirements for how the IV&V team maintains independence from the prime contractor. Specifically, AFI 91-103 and AFMAN 91-119 do not provide detail for how a prime contractor's modifications to or deviations from software should be coordinated and documented with AFSEC during IV&V. Although AFI 91-103 states that "modifications or deviations from the original manufacturer's specifications must be approved by AFSEC/SEW," the criteria do not specify whether these modifications or deviations are related to IV&V or how to document or coordinate these modifications or deviations with AFSEC. In addition, we determined that AFMAN 91-119 does not discuss modifications or deviations during IV&V.

(U) Furthermore, the October 2021 memorandum identified a concern regarding the prime contractor's participation during the F-35A IV&V testing procedures. For more detail on the prime contractor's participation, we reviewed the F-35A IV&V report. The F-35A IV&V report stated that the IVO team relied on the use of the prime contractor's laboratory, personnel, and software to assist the IVO team in conducting the F-35A IV&V. The F-35 JPO officials stated that the Air Force does not have its own F-35A aircraft-specific testing laboratory, equipment, or software to conduct F-35A IV&V because these items are proprietary property of the prime contractor. We reviewed AFI 91-103 and AFMAN 91-119 and determined that neither criterion addresses whether IVO teams may use the prime contractor's laboratory, personnel, or software during IV&V. Additionally, we obtained and reviewed a December 2021 memorandum from the F-35 JPO that documents that the F-35 JPO and AFSEC have agreed on a way forward to address AFSEC's concerns to ensure IV&V independence.[27]

[27] (U) F-35 JPO Memorandum, "Response to AFSEC's F-35 Independent Verification and Validation (IV&V) concerns," December 6, 2021, documented the agreement between the F-35 JPO and AFSEC to ensure the documentation and IV&V were completed correctly before AFSEC granted the Nuclear Safety Design Certification.

(U) The F-15E, B-2, and F-35A IV&V Were Completed in Accordance with AFI 91-103 and AFMAN 91-119

(U) As part of our analysis, we reviewed the F-35A IV&V report to determine if the prime contractors' involvement negatively impacted independence. In addition, we interviewed the IVO team that performed the F-35A IV&V and the F-35 JPO officials to understand whether the IVO team and the prime contractor maintained independence during the F-35A IV&V, as required by AFI 91-103 and AFMAN 91-119.

(U) Based on our analysis, we determined that the F-15E, B-2, and F-35A IV&V were completed in accordance with AFI 91-103 and AFMAN 91-119. Specifically, after reviewing AFI 91-103, AFMAN 91-119, and the F-35A IV&V report and interviewing the IVO team for the F-35 Nuclear Safety Design Certification and the F-35 JPO officials, we determined that the IVO team maintained independence from the F-35 JPO officials and the prime contractor during the F-35 IV&V. In addition, we verified that the IVO team signed the F-35A IV&V report, which documented that the IVO team completed the F-35A IV&V and attested that they maintained independence from the F-35 JPO and prime contractor during the F-35A IV&V process.

(U) Furthermore, we obtained and reviewed the Nuclear Safety Design Certification Letters signed by the AFSEC Weapons Safety Division Chief for the F-15E, B-2, and F-35A aircraft, which documented the completion and acceptance of each aircraft's IV&V.[28] Therefore, we determined that each aircraft's IV&V was completed in accordance with nuclear safety design criteria as required by AFI 91-103 and AFMAN 91-119.

(U) Air Force IV&V Independence Requirements in AFI 91-103 and AFMAN 91-119 Are Unclear

(U) The F-35 JPO officials faced challenges interpreting the IV&V requirements because AFI 91-103 and AFMAN 91-119 IV&V requirements are unclear. Specifically, AFMAN 91-119 should be updated to provide more detailed requirements on how to select IVO teams, conduct IV&V, and document an IVO team's independence with AFSEC. In addition, the requirements should provide detailed definitions of technical, managerial, and financial independence and how to comply with these elements of independence during IV&V. Furthermore, the requirements should provide more detail on how the prime contractor should document and coordinate with AFSEC modifications to and deviations from software as a result of IV&V.

[28] (U) "Design Certification Summary (DCS) Letter – F-15E Operational Flight Program (OFP) 8.0.1n System 2 with B61-12;" "Design Certification Summary (DCS) Letter – B-2A Integrated Functional Capability (IFC) p6.2.1 System 2;" "Nuclear Design Certification Letter of the F-35 Lightning II Dual Capable Aircraft," July 20, 2022.

(U) Therefore, the AF/SE, in coordination with the AFNWC, should update AFMAN 91-119 to include more detail and clarity on IV&V requirements. Specifically, AFMAN 91-119 should be updated to:

- (U) include instructions for how to select an IVO team;
- (U) provide clear instructions to ensure that any deviations and modifications during IV&V are: 1) well documented and 2) include supporting detail. The documentation and supporting detail should explain how to maintain and document the IVO team's independence with AFSEC;
- (U) define with detail technical, managerial, and financial independence and how to comply with these levels of independence during IV&V;
- (U) include guidance for how the prime contractor's laboratory, equipment, and software can be used during IV&V when the IVO team does not have access to Government laboratory, equipment, and software; and
- (U) include instructions on how the IV&V teams maintain independence from the prime contractor and how to document and coordinate modifications and deviations to software with AFSEC.

(U) The Air Force Needs to Update IV&V Guidance

(U) As a result of unclear AFMAN 91-119 guidance for the IV&V process, the challenges the Air Force faced certifying the B61-12 nuclear bomb could negatively impact Nuclear Safety Design Certifications for future aircraft and nuclear weapons. Specifically, if AFSEC does not update AFMAN 91-119 to provide clearer guidance to IVOs for conducting IV&V, future Nuclear Safety Design Certifications of the F-15E, B-2, and F-35A aircraft could be delayed or improperly certified.

(U) Recommendations, Management Comments, and Our Response

(U) Recommendation 1

(U) We recommend that the Air Force Chief of Safety, in coordination with the Air Force Nuclear Weapons Center Commander, update Air Force Manual 91-119 to include detail and clarity of independent verification and validation requirements. Specifically, Air Force Manual 91-119 should be updated to include procedures to:

a. (U) Select an independent verification organization team.

b. (U) Document the independent verification organization team's independence with the Air Force Safety Center; define technical, managerial, and financial independence; and comply with these levels of independence during an independent verification and validation.

c. **(U) Define how the prime contractor's laboratory, equipment, and software can be used during independence verification and validation when the independent verification organization team does not have access to Government laboratory, equipment, and software.**

d. **(U) Define the responsibilities of the independence verification and validation with the Air Force Safety Center and documenting and coordinating the modifications to and deviations from software with the prime contractor.**

(U) AFSEC Comments

(U) The AF/SE agreed with the recommendations. The AF/SE stated that that AFSEC, in coordination with the AFNWC, will update AFMAN 91-119 to include detail and clarity of IV&V requirements.

(U) The AF/SE also stated that AFSEC published an interim change to AFMAN 91-119 on August 9, 2022, as well as an updated guidance memorandum on June 8, 2023, which clarify multiple sets of policy and requirements, including IV&V. In addition, the AF/SE added that AFSEC regularly updates its guidance to stay in pace with emerging technology, risk management trend analysis, and updated DoD requirements.

(U) The AF/SE explained that, to ensure proper risk management and risk acceptance at the proper authority levels, programs should adopt and comply with updated guidance within their CRPs immediately, or coordinate for proper deviations where applicable, in accordance with nuclear surety guidance and policy.

(U) The AF/SE stated that they are directing AFSEC/SEW to continue updating AFMAN 91-119 to improve and provide clear IV&V guidance. In addition, the AF/SE stated that updating AFMAN 91-119 will ensure oversight of stated requirements and compliance with DoD nuclear surety standards. This AFSEC update will be coordinated with the AFNWC, as well as other nuclear surety stakeholders. The AF/SE also provided a Plan of Action and Milestones on the updated AFMAN 91-119 rewrite already underway, which had a completion date of April 2025.

(U) Our Response

(U) Comments from the AF/SE addressed the specifics of the recommendation; therefore, the recommendation is resolved. Specifically, the AF/SE directed AFSEC/SEW, in coordination with the AFNWC, to further update AFMAN 91-119 to provide detail and clarity of IV&V requirements. Therefore, we request that the AFNWC work in coordination with AFSEC to ensure that future publications of AFMAN 91-119 reflect our recommendations by April 2025. We will close the recommendation when we receive and validate that the updates to AFMAN 91-119 are completed.

(U) AFNWC/CC Comments

(U) Comments from the AFNWC/CC addressed the specifics of the recommendation; therefore, the recommendation is resolved. Specifically, the AFNWC/CC directed the Nuclear Technology and Integration Directorate and Nuclear Surety and Certification Division to coordinate with AFSEC/SEW and AFSEC/SEWN on future improvements to AFMAN 91-119 regarding improved IV&V guidance and requirements. The AFNWC/CC also stated that dates of completion will coincide with AFSEC's next publication of AFMAN 91-119. In addition, the AFNWC/CC stated that they did not see a specific monetary benefit upon completion of the recommendations. However, the AFNWC/CC stated that providing better nuclear certification requirements helps all future Air Force acquisition programs requiring certification. Additionally, the AFNWC/CC included a comment resolution matrix with their memorandum that provided minor requested changes to the report.

(U) Our Response

(U) Comments from the AFNWC/CC addressed the specifics of the recommendations; therefore, the recommendations are resolved. Specifically, the AFNWC/CC agreed to update IV&V requirements within AFMAN 91-119. In addition, the AFNWC/CC stated that the dates of completion for the updated AFMAN 91-119 will coincide with AFSEC's next publication of AFMAN 91-119. Therefore, we request that the AFNWC work in coordination with AFSEC to ensure that future publications of AFMAN 91-119 reflect our recommendations by April 2025. We will close the recommendation when we receive and validate that the updates to AFMAN 91-119 are completed.

(U) Additional Management Comments Regarding F-35 IV&V Issues and Lessons Learned

(U) AFSEC Comments

(U) The AF/SE included an attachment memorandum by AFSEC/SEW in their management comments that provided additional inputs denoting concerns and lessons learned throughout the F-35 IV&V process. In this memorandum, AFSEC/SEW stated that, while the F-35 was eventually Nuclear Safety Design Certified in accordance with all appropriate AFIs and AFMANs, the F-35 IVO team did not maintain independence from the F-35 JPO officials and the prime contractor throughout the F-35 IV&V process. In addition, the memorandum states that the DoD OIG report references AFMAN 91-119 as the sole requirement for Nuclear Safety Design Certification. However, stating that overall nuclear certification requirements are adopted and contained within the CRP in accordance with AFI 63-125 is more accurate. The memorandum also states that the F-35 IV&V process was not completed in accordance with the CRP.

(U) Our Response

(U) Although AFSEC/SEW stated in the memorandum attachment that the F-35 IVO team did not maintain independence, AFSEC did not provide documentation to support that AFI 63-125, AFI 91-103, or AFMAN 91-119 was violated, which reinforces our recommendation for AFSEC to update AFMAN 91-119. In addition, the CRP is not a regulation, and we do not have evidence to support that the F-35 IV&V process was not completed in accordance with the CRP. Furthermore, the scope of this evaluation did not include the specifics of the aircraft IV&V.

(U) Appendix A

(U) Scope and Methodology

(U) We conducted this evaluation from July 2022 through October 2023 in accordance with the "Quality Standards for Inspection and Evaluation," published in December 2020 by the Council of Inspectors General on Integrity and Efficiency. These standards require that we adequately plan the evaluation to ensure that we meet objectives and perform the evaluation to obtain sufficient, competent, and relevant evidence to support the findings, conclusions, and recommendations. We believe that the evidence obtained was sufficient, competent, and relevant to lead a reasonable person to sustain the findings, conclusions, and recommendations.

(U) The scope of this evaluation focused on the Nuclear Design Certification of the F-15E, B-2, and F-35A aircraft as it relates to the B61-12 nuclear bomb. As of September 29, 2022, the AFNWC/CC approved the Nuclear Design Certification for the F-15E, B-2, and F-35A aircraft; however, only the F-15E aircraft was certified nuclear operational. We focused our evaluation on the Air Force's compliance with DoD and Air Force requirements when conducting the Nuclear Design Certification of the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb. Therefore, we did not evaluate the technical accuracy for the F-15E, B-2, and F-35A aircraft to carry the carry the B61-12 nuclear bomb.

(U) To determine the DoD and Air Force nuclear certification requirements, the evaluation team examined DoD and Air Force policy, including the following.

- (U) DoDD 3150.02, "DoD Nuclear Weapons Surety Program," April 24, 2013 (Incorporating Change 5, July 15, 2022)
- (U) DoDM 3150.02, "DoD Nuclear Weapon System Safety Program Manual," January 31, 2014 (Incorporating Change 4, May 7, 2021)
- (U) AFI 63-125, "Nuclear Certification Program," January 16, 2020
- (U) AFI 91-103, "Air Force Nuclear Safety Design Certification Program," March 24, 2016
- (U) AFI 91-107, "Design, Evaluation, Troubleshooting, and Maintenance Criteria for Nuclear Weapons Systems," December 11, 2012 (Incorporating Change 1, April 11, 2014)
- (U) AFMAN 91-118, "Safety Design and Evaluation Criteria for Nuclear Weapon System," March 13, 2020

- (U) AFMAN 91-119, "Safety Design Criteria for Nuclear Weapons Systems Software," March 11, 2020[29]

(U) Additionally, the evaluation team conducted visits to and interviewed officials from the following organizations.

- (U) Office of the Under Secretary of Defense for Acquisition and Sustainment
- (U) U.S. Air Force Office of the Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration (AF/A10)
- (U) AFNWC
- (U) AFSEC
- (U) Air Force Global Strike Command
- (U) Air Combat Command
- (U) F-15E System Program Office (SPO), B-2 SPO, and F-35 JPO
- (U) DOE's NNSA

(U) To determine if Air Force officials completed Nuclear Design Certification tasks for the F-15E, B-2, and F-35A aircraft to carry the B61-12 nuclear bomb, we obtained and reviewed each aircraft's CRP and identified the specific certification tasks for the aircraft. To determine whether CRP tasks were completed, we reviewed each aircraft's CRP to identify documents that demonstrated completion of each task and requested supporting documentation for each Nuclear Design Certification task. Specifically, we examined Nuclear Design Certification documentation provided by the AFNWC, AFSEC, and F-15E, B-2, and F-35A aircraft program offices and compared the documentation to certification tasks listed in each aircraft's CRPs.

(U) We examined supporting documentation Air Force officials provided to ensure that the documents complied with the related CRP task requirements and that appropriate Air Force officials validated the documents. We corroborated findings and conclusions from CRP task reports with relevant stakeholders specific to each task, including the AFNWC, AFSEC, and program office personnel for the F-15E, B-2, and F-35A aircraft.

(U) In addition, for instances where we identified an area of concern, we requested additional documentation to support how the concern was resolved and the steps that Air Force officials took to ensure compliance with DoD and Air Force criteria. Specifically, as a result of the concerns with the F-35A IV&V

[29] (U) We used different versions of these policies during our evaluation depending on which criteria were applicable to each of the F-15E, B-2, and F-35A CRPs.

(U) process identified in the October 2021 AFSEC Weapons Safety Division Chief memorandum, we evaluated the F-35A IV&V certification process to ensure that the nuclear safety design requirements in AFI 91-103 and AFMAN 91-119 were accomplished. For example, we cross-checked the F-35A IV&V findings with other Nuclear Design Certification-related reports, including the nuclear safety analysis report and technical nuclear safety analysis, and interviewed AFSEC and F-35 JPO officials. We also met with the F-35A IVO team that conducted the validation and verification tests to validate the F-35 JPO's supporting documentation and email correspondences.

(U) Use of Computer-Processed Data

(U) We did not use computer-processed data to perform this evaluation.

(U) Use of Technical Assistance

(U) We did not require any technical assistance.

(U) Prior Coverage

(U) During the last 5 years, the Government Accountability Office (GAO) and the DoD OIG issued five reports discussing the B61-12 nuclear bomb and the nuclear certification process. Unrestricted GAO reports can be accessed at http://www.gao.gov. Unrestricted DoD OIG reports can be accessed at http://www.dodig.mil/reports.html/.

(U) GAO

(U) GAO Report No. GAO-22-104061, "Nuclear Enterprise: Department of Defense (DoD) and National Nuclear Security Administration (NNSA) Could Further Enhance How They Manage Risk and Prioritize Efforts," January 2022

> (U) The DoD and DOE's NNSA began implementing processes to improve risk management within their respective nuclear portfolios. However, they have not established joint processes to identify, analyze, and respond to risks that affect the joint U.S. nuclear enterprise and report information about these risks to stakeholders. The DoD and NNSA have interdependencies among their nuclear programs, including among the weapon and delivery platform systems of the strategic nuclear triad. Furthermore, the DoD and NNSA have not prioritized efforts within their respective nuclear portfolios. Therefore, GAO issued four recommendations for the DoD and NNSA to establish joint risk management processes and for the DoD to establish prioritization criteria and then prioritize within the DoD's nuclear enterprise.

(U) GAO Report No. GAO-20-443T, "Nuclear Weapons: NNSA's Modernization Efforts Would Benefit from a Portfolio Management Approach," March 3, 2020

(U) The NNSA is conducting four programs to modernize nuclear weapons, and the DoD's 2018 Nuclear Posture Review calls for the NNSA to consider additional programs to refurbish or build new weapons over the next two decades. The NNSA is also managing numerous, multi-billion–dollar construction projects to modernize the infrastructure it uses to produce components and materials needed for its weapon programs. The GAO reported on challenges the NNSA faces in managing these efforts. For example, the W87-1 warhead program found that the NNSA's past challenges in managing plutonium activities cast doubt on the NNSA's ability to produce the required number of plutonium weapon cores on schedule. The GAO also found in June 2019 that future weapon programs would require newly produced explosives, including some that the NNSA has not produced at scale since 1993. Furthermore, the NNSA improved its management of weapon programs and related projects in some respects. For example, the NNSA established requirements for independent cost estimates in weapon programs and made progress in revising plans for the uranium processing facility project. However, the GAO identified additional actions that could further improve the NNSA's management of weapon programs and projects.

(U) GAO Report No. GAO-18-456, "B61-12 Nuclear Bomb: Cost Estimate for Life Extension Incorporated Best Practices, and Steps Being Taken to Manage Remaining Program Risks," May 2018

(U) The GAO reported that weapons in the U.S. nuclear stockpile are aging. To refurbish or replace nuclear weapons' aging components, the NNSA and DoD undertake Life Extension Programs (LEPs). The B61-12 LEP is the most complex and expensive LEP to date. In October 2016, the NNSA formalized a program cost estimate of about $7.6 billion, which is lower than an independent cost estimate of about $10 billion. Senate Report 113-44 included a provision for the GAO to periodically assess the status of the B61-12 LEP. This report assessed: 1) the extent to which the NNSA followed best practices for cost estimation in producing the program cost estimate for the B61-12 LEP, 2) the reasons for differences between the program cost estimate and the independent cost estimate and how the differences were reconciled, and 3) the extent to which the NNSA and DoD have identified and managed program risks. The GAO assessed the program cost estimate against best practices; reviewed NNSA and DoD documents; conducted site visits to four NNSA and Air Force sites responsible for design, production, and management activities; and interviewed NNSA and DoD officials. The GAO found that the NNSA

(U) incorporated most cost-estimating best practices to develop the program cost estimate for the B61-12 LEP. The program substantially met best practices for ensuring the estimate was comprehensive, well documented, accurate, and credible. Furthermore, the GAO found that the NNSA and DoD have identified and are managing risks that could complicate efforts to meet the LEP's FY 2025 completion date. The program is managing these and other risks with a formal risk management process.

(U) GAO Report No. GAO-18-129, "Nuclear Weapons: NNSA Should Adopt Additional Best Practices to Better Manage Risk for Life Extension Programs," January 2018

(U) The GAO reported that weapons in the U.S. nuclear stockpile are aging. The NNSA and DoD undertake LEPs to refurbish or replace nuclear weapons' aging components. Prior LEPs experienced cost overruns, schedule delays, and scope reductions, and prior GAO reports identified the need for the NNSA to use earned value management and conduct technology readiness assessments to address program risks. In 2013, the NNSA developed a management approach for LEPs that it regards as an improvement and currently manages three LEPs using its revised approach. The NNSA and its contractors conduct the work associated with these LEPs at seven sites across the country. The GAO was asked to review the NNSA's management of its LEPs using its revised approach. GAO-18-129 assessed the extent to which the NNSA implemented the use of earned value management and technology readiness assessments consistent with best practices in its management of LEPs. The GAO reviewed NNSA directives and compared them to relevant best practices, reviewed LEP documents and reports, and interviewed NNSA program officials. The GAO found that the NNSA began implementing requirements for independently conducting technology readiness assessment of LEP critical technologies, but it had not adopted a key best practice that could help the agency better manage risk for LEPs.

(U) DoD OIG

(U) DoD OIG Report No. DoDIG-2021-046, "Aircraft Monitor and Control System's Nuclear Certification," January 22, 2021

~~(CUI)~~ [redacted]

~~(CUI)~~ [redacted]

(U) Appendix B

(U) Nuclear Certification Criteria

(U) Nuclear certification criteria are established by DoD directives and manuals that the Air Force implemented through Service instructions and manuals. According to DoDM 3150.02, once "DOE officials provide approval" of the B61-12 nuclear bomb, Air Force certification officials oversee the performance of an additional safety certification process.[30] Specifically, AFSEC officials develop policies and establish nuclear safety design criteria for the Air Force. Compliance with the Air Force's current Nuclear Safety Design Certification criteria is mandatory for all organizations that design, develop, modify, evaluate, operate, or acquire a nuclear weapon system. Any deviation from the Air Force's current nuclear safety design criteria must be approved by the Office of Primary Responsibility.

(U) DoD Nuclear Certification Criteria

(U) DoD nuclear certification criteria establish the baseline for which the Air Force develops their Nuclear Design Certification requirements. Specifically, DoDM 3150.02 and DoDD 3150.02 "establish nuclear certification policy and assign responsibilities for DoD nuclear weapons surety for the oversight of safety, security, and control of nuclear weapons and establish mandatory procedures for the nuclear weapon systems."[31] In addition, DoDD 3150.02 and DoDM 3150.02 outline how the Services will conduct the nuclear certification and identify the roles and responsibilities that the DoD, DOE, and NWSSG have in certifying nuclear weapons for deployment on the F-15E, B-2, and F-35A aircraft.

(U) Air Force Nuclear Certification Criteria

(U) Air Force nuclear certification criteria are derived from DoDD 3150.02 and DoDM 3150.02 and implemented within AFIs and AFMANs. The Air Force nuclear certification criteria, provided in AFI 63-125, implements instructions for the DoDD 3150.02 and DoDM 3150.02 nuclear certification requirements. According to AFI 63-125, an official from the AFNWC/NTS notifies the PM at the program office

[30] (U) According to DoDM 3150.02, the DOE is responsible for the safety design, test, and analysis of nuclear weapons. A joint Design Review and Acceptance Group review process ensures that a weapon meets its design requirements, including safety. After successful completion of the Design Review and Acceptance Group review process, the DOE documents the safety certification in the final design development report, and the DoD accepts the weapon as certified. However, safety is further addressed through Military Department NWSSG and Project Officers Group activities.

[31] (U) According to DoDM 3150.02, the Nuclear Weapons Surety Program implements policies, procedures, controls, and actions that encompass safety, security, and control measures, which ensures no nuclear weapon accidents, incidents, unauthorized detonation, or degradation of weapon effectiveness occurs during its stockpile-to-target sequence.

(U) of required nuclear certification activities, and the PM develops the CRP.[32] CRPs are unique to each certification effort and tailored to the weapon system. When nuclear certification is needed, the AFNWC/NTS certification management team prepares a bCRP. The bCRP also describes the documentation necessary to support nuclear certification. Using bCRP requirements, the PM develops the CRP, which details how and when the process owners will meet the certification requirements identified in the bCRP.[33] According to AFI 63-125, "the CRP is forwarded to the AFNWC/NTS certification management team for coordination and signature from all appropriate process owners. When the CRP coordination is complete, the AFNWC/NTS certification management team approves the CRP and returns it to the PM for implementation."

(U) AFSEC developed the nuclear safety design criteria, which include the IV&V criteria.[34] The IV&V requirements are located within AFI 91-103, AFMAN 91-118, and AFMAN 91-119.[35]

(U) AFI 91-103 states that each program office requesting Nuclear Design Certification is required to conduct IV&V of aircraft software.

(U) AFMAN 91-118 requires "Air Force activities to apply DoD and Air Force safety criteria to design, develop, evaluate, troubleshoot, certify, and maintain nuclear weapon systems."

(U) AFMAN 91-119 requires the PM at the program offices to designate an IVO as required by AFSEC/SEWN and to obtain concurrence from AFSEC/SEWN regarding the independence of the IVO. In addition, AFMAN 91-119 states that the IVO must ensure its independence from the prime contractor.[36]

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[32] (U) AFI 63-125 was updated during the course of the F-15E, B-2, and F-35A CRP process. During the analysis of this evaluation, we referenced the AFI 63-125 versions that were used at the time of the CRP processes, as well as the updated January 2020 version because, according to the Air Force Headquarters Office of the Deputy Chief of Staff Strategic Deterrence and Nuclear Integration (AF/A10) personnel, only changes that substantively affect the surety approach for the system in question (being nuclear certified) would trigger changes to the system's CRP. In addition, according to the F-15E, B-2, F-35A CRPs, a CRP is defined as a document that describes "how" and "when" the tasks that are listed are accomplished. This document will be stamped as the CRP when appropriate agencies and organizations involved agree to its content and sign the document.

[33] (U) According to the F-15E, B-2, and F-35A CRPs, the process owners are the F-15E, B-2, and F-35A aircraft program offices, the AFNWC, and AFSEC.

[34] (U) According to AFI 91-103, IV&V is a software evaluation process that includes both analysis and testing and extends throughout program development. "Verification" analyzes software requirements, design, and code to detect program deficiencies before they can propagate into later development phases. "Validation" analyzes and tests the final program to determine its compliance with requirements. In addition, Federal Acquisition Regulation 44.101, "Definitions," June 2, 2023, defines "prime contractor" as the total contractor organization or a separate entity of it, such as an affiliate, division, or plant, which performs its own purchasing.

[35] (U) AFMAN 91-118, "Safety Design and Evaluation Criteria for Nuclear Weapon Systems," March 13, 2020.

[36] (U) According to AFMAN 91-119, an IVO is a group of people independent of the development organization that is responsible for verifying software for the Nuclear Safety Design Certification. For the purposes of this report, the "independent verification organization" and the "verification organization" are referred to as the "IVO team," and the development organization is referred to as the "prime contractor."

(U) Appendix C

(U) F-15E Aircraft CRP Nuclear Design Certification Tasks

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(U) LEGEND

ACC	Air Combat Command
AFGSC	Air Force Global Strike Command
AFNWC/NDN	Air Force Nuclear Weapons Center/Nuclear Materiel Management Division
NDN	Nuclear Materiel Management Division
SNL	Sandia National Laboratories
USAFE	U.S. Air Force Europe

(U) Source: "F-15E B61-12 Weapon System/Suite 8.0.1N OFP CRP," AFNWC, Control Number: NWC201706003, July 13, 2018.

(U) B-2 Aircraft CRP Nuclear Design Certification Tasks

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(U) LEGEND

ACC	Air Combat Command
AFGSC	Air Force Global Strike Command
AFNWC/NDN	Air Force Nuclear Weapons Center/Nuclear Materiel Management Division
NDN	Nuclear Materiel Management Division
SNL	Sandia National Laboratories
USAFE	U.S. Air Force Europe

(U) Source: "B-2/B61-12 System 2 Certification Requirements Plan," Control Number: NWC201508008, December 6, 2019.

(U) F-35A CRP Nuclear Design Certification Tasks

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(U) LEGEND

ACC	Air Combat Command
AFGSC	Air Force Global Strike Command
AFNWC/NDN	Air Force Nuclear Weapons Center/Nuclear Materiel Management Division
NDN	Nuclear Materiel Management Division
SNL	Sandia National Laboratories
USAFE	U.S. Air Force Europe

(U) Source: "F-35A/B61-12 Certification Requirements Plan," Control Number: NWC200708001, 12 March 2018.

(U) Management Comments

(U) Air Force Headquarters Chief of Safety

DEPARTMENT OF THE AIR FORCE
OFFICE OF THE CHIEF OF SAFETY
WASHINGTON, DC 20330

20 March 2024

MEMORANDUM FOR INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
ATTENTION: [redacted]

FROM: AF/SE

SUBJECT: Response to DoD OIG Release of the Draft Report on the Evaluation of the Air Force's Nuclear Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb (Project No. D2022-DEV0SN-0154.000)

1. I **concur with comment** on the recommendations listed in the subject report.

   a. I concur with the recommendation that AF/SE, through the Air Force Safety Center update Air Force Manual (AFMAN) 91-119 to include detail and clarity of Independent Verification and Validation (IV&V) requirements.

   b. Air Force Safety has already published an Interim Change to AFMAN 91-119 on 9 August 2022, as well as an updated Guidance Memorandum on 8 June 2023, clarifying multiple sets of policy and requirements including Independent Verification and Validation, which may not have been fully captured during the course of DOD OIG's Evaluation.

2. It should be noted that Air Force Safety regularly updates its guidance in order to stay in pace with emerging technology, risk management trend analysis, and updated DoD requirements. In order to ensure proper risk management and risk acceptance at the proper authority levels, programs should adopt and comply with updated guidance within their certification requirements plans immediately, or coordinate for proper deviations where applicable in accordance with Nuclear Surety guidance and policy.

3. See attachment with Air Force Safety Center Weapons Safety Division (AFSEC/SEW) inputs denoting issues and lessons learned throughout the F-35 IV&V process.

4. I am directing AFSEC/SEW to continue work on further updating AFMAN 91-119 in order to further improve and provide clear IV&V guidance, as well as ensuring oversight of stated requirements to ensure compliance with DoD Nuclear Surety Standards. This update is being coordinated with the Air Force Nuclear Weapons Center as well as other nuclear surety stakeholders.

5. See attachment for Plan of Action and Milestones (POAM) on and updated AFMAN 91-119 rewrite already underway.

(U) Air Force Headquarters Chief of Safety (cont'd)

6. I do not see any information in the draft report that would require special handling at the Controlled Unclassified Information (CUI) level.

SEAN M. CHOQUETTE
Major General, USAF
Chief of Safety

Attachments:
1. AFSEC Response to DoD OIG Draft Report
2. AFSEC Plan of Action and Milestone (POAM) for DAFMAN 91-119 Rewrite CAO 23 Jan 24

(U) Air Force Headquarters Chief of Safety (cont'd)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SAFETY CENTER
KIRTLAND AIR FORCE BASE NEW MEXICO

14 March 2024

MEMORANDUM FOR DODIG

FROM: AFSEC/SEW

SUBJECT: Factual accuracy and findings, and recommendations response to DoD IG Evaluation of the Air Force's Nuclear Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb

References: (a) DoD Draft Report Evaluation of the Air Force's Nuclear Design Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb Project No. D2022-DEV0SN-0154.000

(b) (CUI) F-35 Dual Capable Aircraft (DCA) Independent Verification and Validation (IV&V) Block 30P06.041-US Final Report, dated 21 June 2021

(c) Memorandum for F-35 Joint Program Office, Materials Lead, from AFSEC/SEW, dated 13 October 2021

1. After review of the DoDIG Draft Report on Air Force Nuclear Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb, we find concern with the factual accuracy of the following statement in the findings section on page 17:

> "Based on our analysis, we determined that the F-15E, B-2, and F-35A IV&Vs were completed in accordance with AFI 91-103 and AFMAN 91-119. Specifically, after reviewing AFI 91-103, AFMAN 91-119, the F-35A IV&V report, and the F-35A CRP, along with conducting interviews with the IVO team for the F-35 Nuclear Safety Design Certification and the F-35 JPO officials; we determined that the IVO team maintained independence of the IVO team from the F-35 JPO officials and the prime contractor during the F-35 IV&V. In addition we verified that the IVO team signed the F-35A IV&V report which documented that the IVO team completed the F-35A IV&V and attested that they maintained independence from the F-35 JPO and prime contractor during the F-35A IV&V process."

Based on documents provided to the DoDIG, including references (b) and (c), it is documented that the F-35 IVO team did not maintain independence from the F-35 JPO officials and the prime contractor throughout the F-35 IV&V process.

(U) Air Force Headquarters Chief of Safety (cont'd)

From the F-35 IV&V Final Report:

> "As noted in this report, the IV&V team relied on assistance from LM during certain phases of this effort. LM provided guidance on locating the applicable DCA software implementations. The IV&V team used the MSIL for testing which is owned and operated by LM. LM was reluctant to provide full access to the source code and laboratories. Instead, DCA source code was provided and representatives from each software domain were made available. LM also provided test engineers to configure and operate the MSIL. The IV&V team continually strived for independence throughout this effort, but had to rely on LM at certain times."

From the AFSEC/SEW Memorandum to F-35 JPO:

> "Independence (technically, financially, managerially) as required by AFI 91-103 on contract was not maintained during the IV&V process."

2. While the system was eventually certified, including Nuclear Safety Design, in accordance with all appropriate Air Force Instructions and Air Force Manuals, and it is factually accurate to state "The Air Force Complied with the Nuclear Design Certification Requirements for the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb," it is not factually accurate to state the IVO team maintained independence of the IVO team from the F-35 JPO officials and the prime contractor throughout the F-35 IV&V process.

3. It should also be noted that throughout the report where it references AFMAN 91-119 as the sole requirement document for nuclear safety design certification, it is more accurate to state that overall nuclear certification requirements are adopted and contained within the Certification Requirements Plan (CRP) in accordance with AFI 63-125. The F-35 IV&V process was also not completed in accordance with the CRP.

4. Recommended verbiage to update the statement on IVO independence:

> "The F-35 IV&V was not initially completed in accordance with AFI 91-103 and AFMAN 91-119 or the CRP, which required AFSEC intervention to ensure compliance with DoD Nuclear Surety Standards."

5. Please address any further questions to me at [redacted].

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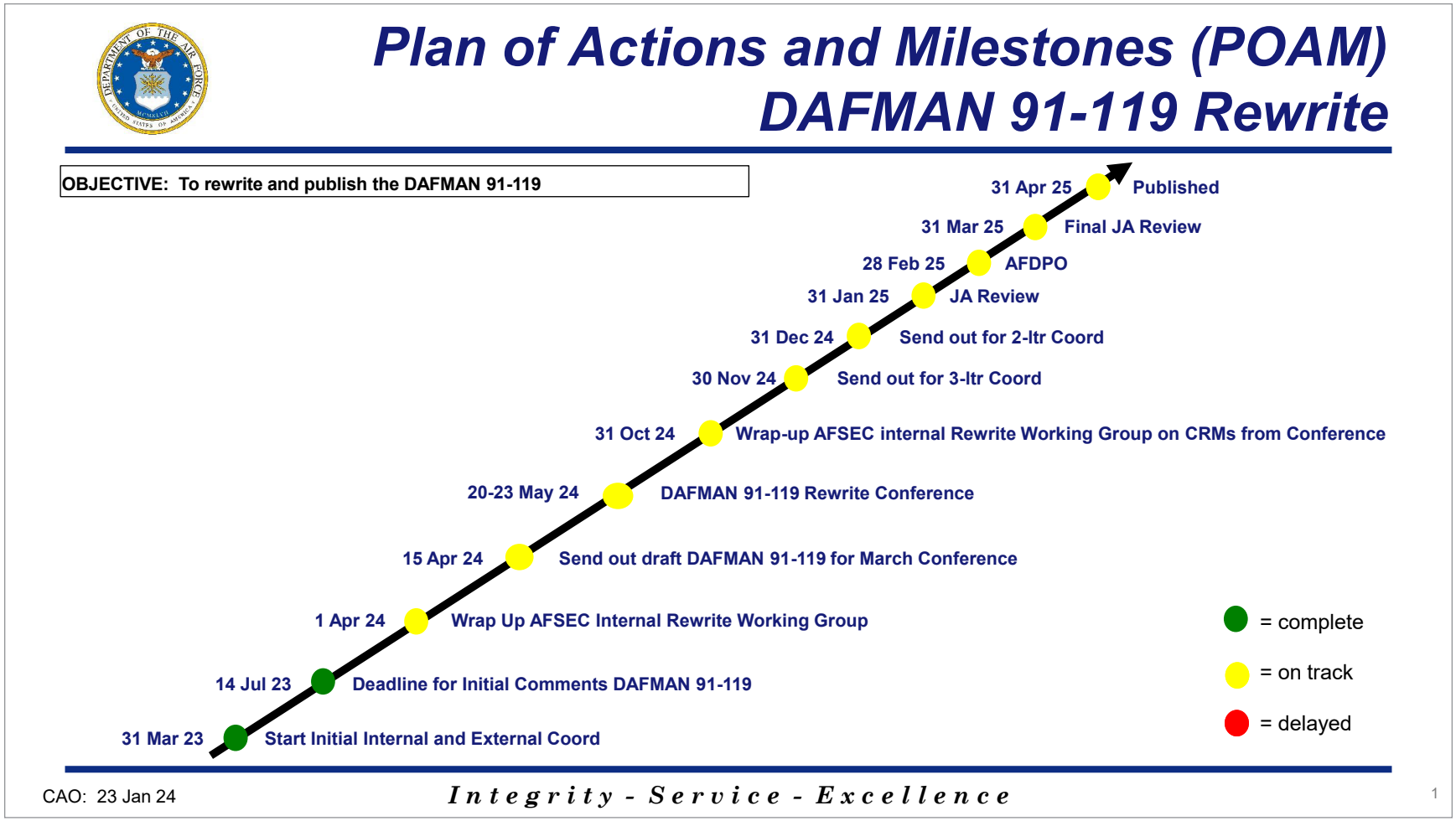
ANDREW T. LAZAR, Colonel, USAF
Chief, Air Force Weapons Safety

(U) Air Force Headquarters Chief of Safety (cont'd)



(U) Air Force Nuclear Weapons Center Commander

DEPARTMENT OF THE AIR FORCE
AIR FORCE NUCLEAR WEAPONS CENTER
KIRTLAND AIR FORCE BASE NEW MEXICO

04 Mar 2024

MEMORANDUM FOR INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
ATTENTION: [redacted]

FROM: AFNWC/CC

SUBJECT: Response to the Evaluation of the Air Force's Nuclear Certification of the F-15E, B-2, and F-35A Aircraft to Carry the B61-12 Nuclear Bomb (Project No. D2022-DEV0SN-0154.000)

1. I concur with the recommendations listed in the subject report.

2. See attachment with recommended changes for factual content.

3. I am directing the Nuclear Technology and Integration Directorate (AFNWC/NT) and Nuclear Surety and Certification Division (AFNWC/NTS) to coordinate with the Air Force Headquarters Chief of Safety (AFSEC/SEW) and the Air Force Safety Center's Weapons Safety Division – Nuclear (AFSEC/SEWN) on future improvements to the AFMAN 91-119 regarding improved Independent Verification and Validation (IV&V) guidance and requirements and report status to me, as necessary.

4. The dates of completion will coincide with the next publication of the Air Force Safety Center's AFMAN 91-119.

5. I do not see a specific monetary benefit upon completion of the recommendations, however, providing better nuclear certification requirements helps all future Air Force acquisition programs requiring certification and will ensure we continue to meet the challenging timelines of the warfighters and national leaders.

6. I do not see any information in the draft report that would require special handling at the Controlled Unclassified Information (CUI) level.

JOHN P. NEWBERRY, Major General, USAF
Commander

1 Attachment:
1. (CUI) Draft DoD IG AFNWC CRM

NEVER DOUBTED, ALWAYS FEARED

(U) Acronyms and Abbreviations

AFI	Air Force Instruction
AFMAN	Air Force Manual
AFNWC	Air Force Nuclear Weapon Center
AFNWC/CC	Air Force Nuclear Weapon Center Commander
AFNWC/NTS	Air Force Nuclear Weapons Center Nuclear Technical Surety and Certification Division
AFSEC	Air Force Safety Center
AF/SE	Air Force Headquarters Chief of Safety
AFSEC/SEW	Air Force Safety Center Weapons Safety Division
AFSEC/SEWN	Air Force Safety Center Weapons Safety Division–Nuclear
AMAC	Aircraft Monitor and Control
bCRP	Basic Certification Requirements Plan
CRP	Certification Requirements Plan
DoDD	DoD Directive
DoDM	DoD Manual
DOE	Department of Energy
IV&V	Independent Verification and Validation
IVO	Independent Verification Organization
JPO	Joint Program Office
LEP	Life Extension Programs
NNSA	National Nuclear Security Administration
NWSSG	Nuclear Weapons System Surety Group
PM	Program Manager
SPO	System Program Office
TO	Technical Order
WSSR	Weapon System Safety Rules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DEPARTMENT OF DEFENSE

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U.S. Department of Defense

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For more information about DoD OIG reports or activities, please contact us:

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