AIR FORCE DOCTRINE PUBLICATION 3-40

COUNTER-WEAPONS OF MASS DESTRUCTION OPERATIONS

U.S. AIR FORCE

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Air Force Doctrine Publication 3-40, *Counter-Weapons of Mass Destruction Operations*

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"The Air Force organizes, trains, and equips forces to be an air component to a joint force commander (JFC). As part of the joint force's air component, our forces must be prepared to accomplish JFC objectives. The air component commander's administrative authorities are derived from Title 10, U.S. Code, and exercised as the commander, Air Force forces (COMAFFOR). The air component commander's operational authorities are delegated from the JFC and exercised as both the COMAFFOR, over Air Force Forces, and as the functional joint force air component commander (JFACC), over joint air forces made available for tasking. Thus, the air component commander leads Air Force forces as the COMAFFOR and the JFC's joint air operations as the JFACC. This duality of authorities is expressed in the axiom: Airmen work for Airmen and the senior Airman works for the JFC."

-- Air Force Doctrine Publication (AFDP) 1, *The Air Force*

Since the COMAFFOR and JFACC are nearly always the same individual, this AFDP will use the term "air component commander" when referring to duties or functions that could be carried out by either or both, unless explicit use of the term "COMAFFOR" or "JFACC" is necessary for clarity.

FOREWORD

Doctrine embodies the fundamental principles by which military forces guide their actions in support of national objectives. It is a body of carefully developed, authoritative ideas that have been officially approved and establishes a common frame of reference for solving military problems. However, to be an effective guide, the challenge for doctrine is to be simultaneously focused on the past, applicable in the present, and facing toward the future, all in equal measure.

The US Air Force must anticipate a new reality, one in which decision advantage, freedom of maneuver, and freedom of action are increasingly challenged. To deter, compete, and win across the competition continuum, Airmen must advance solutions that enable operations in highly contested environments. Broadly, the joint force's approach to meet this challenge is encapsulated in joint all-domain operations (JADO). Together with joint all-domain command and control (JADC2), JADO provides JFCs the means to integrate, synchronize, and deconflict the convergence of effects across all domains to achieve operational advantage.

AFDP-1 supports this effort by establishing mission command as the Airman's philosophy for the command and control (C2) of airpower. To that end, decision makers at every echelon need the ability to develop understanding, make decisions, and converge effects when disconnected from higher echelons. Mission command embraces centralized command, distributed control, and decentralized execution as the foundation for the responsiveness, flexibility, and initiative necessary at the tactical edge that ensures capabilities continue to function, even when information is degraded or denied.

AFDP 3-40, *Counter-Weapons of Mass Destruction* (CWMD) *Operations*, though firmly rooted in existing best practice, also looks to the future, adapting where needed to ensure continued effectiveness in the challenges to come. Airmen should be trained to plan operations in a distributed or decentralized manner, and execute the mission when isolated from higher echelons in distributed environments and environments degraded by the effects of attacks with weapons of mass destruction (WMD). Airmen at all levels should be capable of making decisions independently, operating based on commander's intent and the principles of mission command, even in conditions degraded and contaminated by WMD attacks.

Though not fully adapted to the challenges identified above, CWMD doctrine represents what we believe to be true based on extant best practices. As we continue to press toward a more capable future force, it is critical that we continue to evolve our doctrine, ensuring a grounded foundation is set to meet the nations' security challenges.

CHAPTER 1: INTRODUCTION TO COUNTER-WEAPONS OF MASS DESTRUCTION OPERATIONS

Deterring or preventing adversaries from acquiring, proliferating, or using WMD[1] – **chemical, biological, radiological, and nuclear (CBRN) weapons capable of high order destruction or production of mass casualties** – is a primary national security objective. Such attacks are capable of second- and third-order political and psychological effects that exceed their immediate impact on military operations. Whether aiming to counter US conventional military superiority, to gain strategic advantage, or to destabilize international order in their favor, adversaries, including non-state actors, will continue to pursue WMD, advance their lethality, or proliferate their spread. AFDP 3-40, *Counter-Weapons of Mass Destruction Operations* is operational doctrine that captures lessons learned and best practices for securing the US's ability to counter and prevent the spread of CBRN threats. It should serve as a guide to effectively organize and employ through the complexities of counterterrorism, counterproliferation, and other continuing, steady-state challenges.

During the Cold War, US military planners anticipated the use of CBRN weapons in the context of a bilateral balance of power with the Soviet Union and its proxies during major combat operations abroad. However, in the contemporary operational environment (OE), in which the threat from rogue regimes and international terrorists continues, and long-term strategic competition with peer competitors has re-emerged, the CBRN threat has evolved and become more complex. Compounding this threat, the US *National Defense Strategy* details an increasingly complex security environment defined by rapid technological change, challenges from competitors in every domain, and impacts to readiness that resulted from the longest continuous armed conflict in US history. Furthermore, the proliferation of CBRN related information may enable state and non-state actors to develop advanced WMD delivery systems and agents.

The US *National Security Strategy* declares that the US Government (USG), "must prevent nuclear, chemical, radiological, and biological attacks [and] must also deter, disrupt, and defeat potential threats before they reach the US." To address the full spectrum of current and projected WMD threats, the Department of Defense (DOD) *Strategy for Countering Weapons of Mass Destruction* (*DODS CWMD*) establishes three strategic end states: **no new WMD possession, no WMD use, and minimized WMD effects**. To achieve these end states, the *DODS CWMD* supports the overarching *National Security Strategy* framework through a continuous process for countering proliferation and use consisting of three CWMD lines of effort (LOE):

- **Prevent Acquisition:** Actions to prevent those not possessing WMD from obtaining them.
- **Contain and Reduce WMD Threats:** Actions to reduce extant WMD risks.

[1] This publication uses the terms "CBRN weapons" and "WMD" interchangeably.

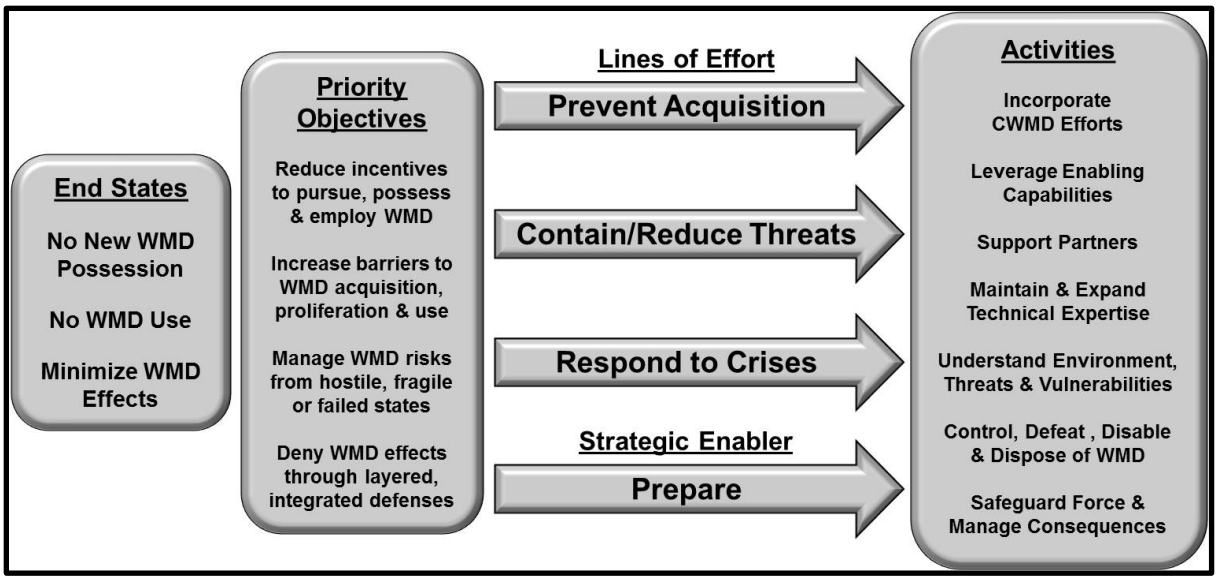
- **Respond to WMD Crises:** Operations to manage and resolve complex WMD crises.

Air Force CWMD Operations and Missions Construct

*C2ISR – Command, control, intelligence, surveillance, and reconnaissance

In addition to the three LOEs, **Prepare** activities serve as a strategic enabler that continuously ensure general and specialized joint forces are ready to execute CWMD operations, missions, and activities across each of the LOEs. The figure, "DOD Ends-Ways-Means Approach to CWMD" provides a visual summary of the *DODS CWMD* ends-ways-means strategy for CWMD.

The Air Force's strategic approach to CWMD derives from and aligns with the DOD's strategic approach. In coordination with the other Services, joint staff, combatant commands (CCMDs) and other USG agencies, the Air Force develops capabilities, provides forces, and executes operations required to detect, deter, disrupt, deny, and defeat CBRN-related threats. The Air Force also maintains the ability to respond to WMD use and to recover operational capability following CBRN attacks. CWMD spans the competition continuum and requires cross-functional participation, as shown in the illustration, "Air Force CWMD Operations and Missions Construct."



DOD Ends-Ways-Means Approach to CWMD

JOINT CWMD ACTIVITIES AND TASKS

The Air Force provides forces and capabilities the joint force requires to execute CWMD operations in support of the DODS CWMD's three LOEs: 1) prevent WMD acquisition, 2) contain and reduce WMD threats, and 3) respond to WMD crises. In turn, they enable accomplishment of the three DODS CWMD-identified end states of no new WMD possession, no WMD use, and minimization of WMD effects. DODS CWMD LOEs may be pursued individually or simultaneously depending on threat scenario and required CWMD operations and missions. Joint CWMD activities fall into three broad categories of activities: **Synchronizing, Foundational, and Specialized.**

SYNCHRONIZING ACTIVITIES

Synchronizing activities involve tasks to integrate, harmonize, and employ capabilities across the whole of-government to counter adversary proliferation and use of CBRN-related threats. These activities include **incorporating CWMD efforts** into the larger context of USG activities and **leveraging enabling capabilities** designed to respond to a range of other threats or meet other government requirements. While the DOD often contributes to these activities, there is no specific joint or Air Force doctrine concerning them. Rather, the focus of such activities is most often on non-military actions (e.g., USG sanctions, freezing of foreign assets, etc.). When *DODS CWMD* identified synchronizing capabilities are militarily focused, they are designed to respond to a range of threats other than countering WMD alone.

FOUNDATIONAL ACTIVITIES

Foundational CWMD activities include maintaining and expanding WMD-related technical expertise and the development of cooperative relationships among allies and partners. The CWMD operational framework found in Joint Planning (JP) 3-40, *Joint*

Countering Weapons of Mass Destruction, includes cooperation and support of such partners. However, joint CWMD doctrine does not include efforts to maintain and expand technical expertise in the CWMD activities construct.

Maintain and expand technical expertise. Expansion and maintenance of technical expertise essential for preparing the joint force to conduct CWMD operations. The ability to recruit, develop, and retain sufficient numbers of educated, trained, and exercised personnel is vital to ensure tasks across all CWMD activities are supported and executable.

Cooperate with and Support Partners. Cooperating with other organizations across the DOD and USG, as well as with allies and partners outside the US, is a CWMD capability multiplier. Military-to-military partnerships enhance the execution of CWMD operations, enabling more equitable burden sharing among the US and friendly nations to counter WMD threats. CWMD partnerships should incorporate operational planning, coordination, and information sharing to ensure a common operating picture. Doing so should improve situational awareness, aid force interoperability, and boost incident response preparedness.

Understand the WMD Environment, Threats, and Vulnerabilities. Understanding the OE involves collecting, processing, exploiting, and disseminating timely and actionable intelligence on adversaries and actors of concern, including possible proliferation or use of CBRN weapons and materials. Service and DOD intelligence, surveillance, and reconnaissance (ISR) feeds national intelligence needed to locate, identify, characterize, assess, attribute, predict, and forecast information relating to WMD and CBRN-related threats.

SPECIALIZED ACTIVITIES

Specialized CWMD activities are those that enable an understanding of the threat environment and related vulnerabilities. Possible considerations include: control of lost or stolen WMD; military options to defeat, disable, and dispose of adversary WMD program elements; the ability to safeguard the force from WMD attacks; the ability to manage consequences during restoration operations; and saving lives following WMD attacks and CBRN incidents.

Control WMD Threats. Control activities reduce WMD threats (including recovery of lost or stolen material) through isolation or denial of adversary access to CBRN-related materials and resources, including facilities and personnel. These activities include efforts to divert proliferated CBRN weapons, agents, and related material through direct military action or formal diplomatic channels. Such activities may also include efforts to intercept, seize, or otherwise secure CBRN-related material.

Defeat WMD Threats. Pathway and WMD defeat activities cover the spectrum of offensive activity, from conventional to cyberspace and special operations, which address an adversary or actor of concern's development and use of WMD. Pathway defeat activities focus on actions to delay, disrupt, destroy, or otherwise complicate conceptualization, development, possession, and proliferation of WMD. When an

adversary or actor of concern obtains WMD or the critical components (e.g., expertise, technology, materials, delivery systems, facilities, personnel) needed to acquire a weapons capability, WMD defeat operations target and strike critical vulnerabilities (e.g., the ability to assemble, stockpile, deliver, transfer, or employ WMD) to neutralize or destroy the threat.

Disable WMD and Related Program Infrastructure. Disabling efforts involve exploitation, degradation, or destruction of WMD, as well as critical and at-risk components of an actor of concern's WMD program.

Dispose of WMD Threats, Related CBRN Materials, and Program Infrastructure. WMD disposal activities involve systematic efforts to remove the remnants of an actor of concern's WMD program. These efforts include tasks to dismantle capabilities, redirect or re-purpose material, facilities, and personnel and continuously monitor the actor of concern's activities to ensure compliance with treaties and agreements involving CBRN weapons, agents, and related materials.

Safeguard the Force and Manage Consequences. Safeguarding the force and managing consequences enables the joint force to survive and operate through WMD attacks and CBRN incidents through the mitigation of CBRN effects and the sustainment of mission-critical capabilities in contaminated environments. The activity also includes CBRN incident response support to US and foreign civil authorities that mitigate the hazards and the effects of CBRN weapons, to restore operations and save lives.

NUCLEAR DETERRENCE AND CWMD OPERATIONS

Joint doctrine underscores the importance of strategic deterrence to CWMD operations. It shows that "no new WMD" and "no WMD use" are CWMD end states (JP 3-40). As with CWMD activities, strategic deterrence supports the DOD CWMD LOE that enable accomplishment of objectives and strategic end states. Strategic deterrence is an effort separate from, but closely coordinated with, CWMD. In the Air Force, the linkage between strategic deterrence and CWMD reflects a more interconnected approach. Its goal is to achieve nuclear deterrence, which is a subset of strategic deterrence. Forces tasked to provide nuclear deterrence are not the only Air Force capabilities that can serve as a WMD deterrent, but they do provide visible, flexible, and credible capabilities. In turn they reinforce other Air Force deterrence capabilities, such as conventional precision strike.

Comprising two of the three legs of the strategic triad, Air Force nuclear capabilities support US strategic deterrence activities. The fundamental purpose of the US nuclear arsenal is to deter adversaries from attacking the US and its interests with nuclear weapons or other WMDs. Additionally, US nuclear forces assure allies of America's continuing commitment to their security, dissuade potential adversaries from embarking on programs, and defeat threats when deterrence fails. Air Force nuclear deterrence forces, in turn, support both national strategic deterrence as well as joint force CWMD. For additional information, refer to AFDP 3-72, *Nuclear Operations*.

CBRN WEAPON CHARACTERISTICS

The various types of CBRN attacks will not impact operations equally. Commanders should be familiar with the unique characteristics of each threat. Different CBRN-related materials and agents are characterized by varying degrees of lethality, persistence, and destructive capability. Additionally, numerous other variables can affect a weapon's scope and the severity of its impact. CBRN agents may be combined and employed together or delivered via alternative methods. These variables may influence concentration levels, areas of contamination, and levels of physical destruction. Likewise, individually or in combination, they present challenges for detection, protection, and treatment of casualties. Further, variables such as weather, terrain, and the readiness of the force to survive, operate, and recover from attacks can influence the resulting effects and severity of injuries. In all cases, use of these weapons will likely cause psychological trauma—everything from short term effects on economic resources to widespread post-traumatic stress.

CHEMICAL

JP 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*, defines a chemical agent as "a chemical substance that is intended for use in military operations to kill, seriously injure, or incapacitate mainly through its physiological effects."

Chemical weapons are categorized according to their physical effects on the human body as well as the time the agents remain effective in the OE (persistence). They consist of choking, blister, blood, and nerve agents. Large quantities may be needed to cause mass casualties. However, because of the potential for severe psychological effects, even a limited attack can have an adverse operational impact. Though chemical weapons may be manufactured in facilities designed specifically for military purposes, many can also be manufactured using technologies and facilities commonly available in non-military industries (known as "dual-use"). The ubiquity and availability of dual-use technology, coupled with the potential for small quantities of chemical agents to generate widespread effects, can make chemical weapons manufacturing difficult to detect and assess. Some countries no longer stockpile large amounts of chemical warfare agents. While many countries are assessed to have retained the ability to produce chemical weapons, they appear to have adopted a strategy of just-in-time production.

BIOLOGICAL

Biological agents can occur naturally or be manufactured and are capable of causing disease and illness in human populations, livestock, or crops. Pathogens, including bacteria, viruses, and fungi, have different incubation times and lethality and can enter the body by various means: the lungs, digestive tract, mucous membranes, and/or skin abrasions. Additionally, biological agents also include toxins – poisonous byproducts of microorganisms, plants, and animals that interfere with cell and tissue functions. Many toxins occur naturally. However some can be produced using synthetic processes. Biological pathogens normally have an incubation period before health effects manifest

as detectable symptoms. Consequently, the potential exists for an adversary to release biological agents covertly and remain undetected. In such instances, the difficulty to attribute such an attack may hamper the DOD's ability to respond.

Although biological weapons research does not always require a large facility to produce pathogens or toxins, dedicated facilities are needed to develop, test, and stockpile agents for military purposes related to major combat operations. Biological warfare agents may be produced in universities, hospitals, and industrial-sized pharmaceutical or fermentation facilities. They can also be produced in clandestine laboratories operating in a limited space. Both small-scale and large-scale production can make use of dual-use technologies. Thus, as with chemical weapons, adversary biological weapons production and proliferation present challenges for detection and identification.

RADIOLOGICAL

Radiation is energy. As such, personnel may be harmed even if not in direct physical contact with radioactive material. The term radiation is very broad. However, in this context it refers to radiation capable of penetrating matter emitted by radioactive material or resulting from nuclear reactions. The four types in this respect are alpha, beta, gamma, and neutron. Each form, listed in order of penetration ability, is capable of harm by damaging or destroying cell tissue and Deoxyribonucleic acid, or DNA, as it is commonly known. Radiological hazards can emit from any radioactive source. While nuclear weapons detonations produce large amounts of immediate radiation and radioactive fallout, attacks involving radiological materials can also leverage other radiological sources and dispersal methods. In addition to nuclear power and nuclear weapons-related facilities, sources of radiological material include medical, security, and industrial equipment and waste. The potential for an adversary to acquire these materials is greatest in states with lower levels of control, creating numerous pathways for possible proliferation.

Radiological dispersal devices (RDDs), commonly referred to as a "dirty bomb," combine radioactive substances with some type of dispersal mechanism to spread radioactive material, most often some type of conventional explosive material. RDDs may be deployed clandestinely or overtly and have the potential to contaminate wide areas. An RDD's potential for harm results from a combination of variables including the amount and type of radioactive material used and the explosive power of the device. Additionally, various environmental factors (height of the explosion, wind, etc.) can affect radiological dispersal. For explosions in open spaces, the majority of casualties will likely result from blast effects, rather than from exposure to radiological materials. However, within enclosed spaces, the risk from radiation exposure may increase significantly. Though a radiological device is unlikely to cause large numbers of casualties, known employment of these devices may lead to mass panic or economic damage. Although the direct effects on military assets may be minimal, the political and psychological effects could disrupt combat forces, adversely impact civilian populations, and stress international partnerships.

Importantly, RDDs are not the only means for malicious dispersal of radiological material. Other dispersal devices can spread material by aerosolizing it or by contaminating water and food supplies. Other devices do not spread material at all. Instead, non-dispersal weapons, or radiological exposure devices, use a highly radioactive source placed in a location designed to expose a nearby target. Depending on the type, amount, and size of the dispersal device, as well as the radiological material's nature, radiation-based injuries may result from exposure to such hazards. The likelihood and severity of health effects depend on the type and duration of exposure (inhalation, contact, exposure to gamma rays), the distance from the radioactive source, and the level of shielding between the radioactive source and the individual.

Radiation cannot be "neutralized" or "sterilized." Further, radiological material may remain hazardous for many years, if not longer. Alpha particles are generally unable to penetrate skin but can be extremely harmful if inhaled, swallowed, or otherwise introduced to the body. Some beta particles are capable of penetrating but are most hazardous when inhaled or swallowed. Respiratory protection can prevent inhalation of airborne radiological contaminants. Likewise, personal protective equipment (PPE) can provide protection against the contact and penetration effects of alpha and some beta radiation. However, adequate protection from gamma and neutron radiation can only be provided by safe distance from the emitting material or by shielding with material of appropriate type, density, and thickness to prevent penetration.

NUCLEAR

Nuclear weapons derive their explosive power from the energy released during either nuclear fission, or, in thermonuclear weapons, through both nuclear fission and fusion reactions. The technologies involved with the development, production, and physical effects of nuclear weapons are well known. However, the greatest challenge in creating a functioning weapon is acquiring enough weapon-grade fissile material: either highly enriched uranium or plutonium (neither of which occur naturally in amounts concentrated enough to produce a fission bomb or thermonuclear weapon).

Weapons effects include blast, heat, ionizing radiation, fallout, and electromagnetic pulse. These effects have the potential to cause massive destruction to physical structures and equipment in addition to lethal effects against personnel. High-altitude EMP may cause catastrophic effects to unprotected electronic systems within a wide area. The long-term effects of radioactive fallout and significant blast effects make nuclear weapons use a top concern in any military operation against actors possessing them.

DELIVERY METHODS

WMD delivery methods vary widely depending on CBRN agent type, having historically included manned aircraft, ballistic missiles, as well as artillery. Newer delivery platforms, including cruise missiles (possibly hypersonic), remotely piloted aircraft, or small unmanned aircraft (drones), pose complex challenges resulting from their speed, stealth, and persistence. Clandestine means of delivery for CBRN may include person-

to-person contact, aerosol sprayers, land vehicles, watercraft, or aircraft. Covert dispersive techniques are only limited to the imagination of the adversary and can include improvised explosive devices (IEDs), aerial or ground sprays, or simply leaking containers.

Viable chemical agent delivery systems include artillery shells, rockets, vehicle bombs, theater ballistic missiles, and other small-scale improvised explosive dispersal devices. Aerosolized chemical agents can also be sprayed from aircraft, land vehicles, and ships. Biological agents can be spread through the use of spray, fomite, vector, and person-to-person contact, and can also be used covertly to contaminate food and water supplies. Radiological materials may be spread using dispersal devices or point sources, surface vehicles, or, potentially, from person-to-person contact.

CHAPTER 2: CWMD PLANNING

Air Force planners should integrate CWMD-specific knowledge, experience, and capabilities into all planning efforts. Plans should include steady-state and contingencies. Air Force planners also need to understand the implications and requirements of CWMD related tasks assigned to the Service component by a combatant commander. Operations and missions with CWMD objectives (e.g., destroying a WMD target) require specific CWMD plans which should be integrated into the broader joint force planning effort. Consequently, CWMD planning considerations should be integrated into strategies and plans throughout the adaptive planning and execution system and the joint planning process.

DOD AND JOINT CWMD PLANNING

The *DODS CWMD* provides the overarching construct for CWMD planning. CWMD strategic planning is further guided by the *Unified Command Plan*, *Global Employment of the Force*, the *Joint Strategic Capabilities Plan*, and other strategic guidance documents. This guidance is executed through the *DOD Functional Campaign Plan for Countering WMD*, a comprehensive campaign plan focused on steady-state activities to prevent WMD crises and achieve other CWMD objectives. The plan provides a framework for CCMDs, Services, and combat support agencies to develop and execute operations through development of regional CWMD campaign plans or by integrating CWMD planning into CCMD campaign plans (CCPs) directly. Contingency plans under CCPs or regional plans may integrate CWMD activities and tasks or they can focus on a specific CWMD mission. Importantly, campaign plans should include branches and sequels to address WMD crises response, such as WMD aggression.

INTEGRATION OF CWMD INTO JOINT AND AIR FORCE PLANS

The Air Force integrates CWMD activities within overall planning efforts. Though WMD considerations may be addressed by steady-state CCPs, plans involving WMD are typically initiated at the strategic level in response to potential or actual WMD crises. Within each of the seven joint planning process for air stages, Air Force planners should consider and address relevant WMD considerations. To fully understand the JFC's concept of operations, Air Force planners should be involved as early as possible. This also ensures component commanders are informed on airpower's capabilities and limitations regarding CBRN-contaminated operating environments or in strikes against WMD targets.

During the mission analysis phase, an "air-minded" review is imperative, particularly as it applies to CWMD related military end states. Air Force planners should realistically consider limitations relative to CWMD targeting and operations involving CBRN hazards. Understanding as much as possible about the OE with regard to location, types of WMD and delivery systems, adversary concepts of employment, weather patterns, and other factors is critical. To support such an understanding, Air Force ISR assets may be called upon to support joint intelligence preparation of the OE effort to support the mission analysis. Additionally, legal guidance may be required on issues

such as rules of engagement (ROE) and the impacts of collateral effects from WMD defeat operations.

Planning that addresses or involves WMD considerations or CWMD operations should include CWMD specialists as part of course of action development, analysis, comparison, and approval processes. Due to the complexity of WMD-related operations, assessing feasibility and operational risk is particularly difficult. For example, determining mitigation strategies for possible WMD release following an airstrike requires detailed knowledge of agents, weapons, adversary capabilities, environmental conditions, legal constraints, and other factors that should be part of the decision calculus.

Finally, in both steady-state and contingency planning, planners should clearly articulate WMD objectives, the impact of CBRN-related threats on mission accomplishment, and airpower's particular WMD related vulnerabilities. Overall, the plans and orders should address WMD effects and relevant considerations across all operational phases. For more information on Air Force planning, see AFDP 3-0, *Operations and Planning*.

INCORPORATING CWMD ACTIVITIES ACROSS OPERATIONAL PHASES

CWMD military activities can be accomplished during any phase of an operation. However, the level-of-effort associated with the execution of CWMD activities varies depending on the required operations and missions in each phase. For example, operations involving the disposal of adversary WMD and related program components will most likely occur in phases devoted to stabilization and enabling civil authorities. Missions involving WMD defeat or safeguarding the force from fielded WMD threats are usually emphasized in phases involving direct combat and achievement of combat objectives. For further discussion on operational phases and phasing see JP 5-0, *Joint Planning*.

MEDICAL PLANNING

Air component medical planners should provide a medical estimate of the identified CBRN threats in the OE and develop a supporting medical operational plan to address these threats. Medical planning takes into account intelligence on adversary WMD programs and adjusts plans as the threat evolves. Air Force Medical Services lead medical planning for force health protection, support to medical facility operations, casualty management, and related CBRN medical activities. For more information on medical planning, refer to AFDP 4-02, *Health Services*.

UNDERSTANDING THE ENVIRONMENT, THREATS, AND VULNERABILITIES

When tasked, the air component commander directs the execution of tasks to locate, identify, characterize, assess, attribute, and predict CBRN-related proliferation and use in the AO. As the table, "Air Force Contributions…" details, the Air Force contributes to many joint CWMD activities, including some that are vital for force protection and mission continuation, to include medical planning and logistics (AFDP 4-02).

	CWMD Activity: Understand the Environment, Threats, and Vulnerabilities	Supported DoD Lines of Effort
Air Force CWMD-Related Operations, Missions, and Capabilities	Global Integrated Intelligence, Surveillance, and Reconnaissance (GIISR) • Plan and direct, collect, process and exploit, analyze and produce, disseminate intelligence • Battlespace characterization for indications and warnings of WMD proliferation and use • Collection operations to find, fix, track and characterize WMD and CBRN-related targets	• Prevent Acquisition • Contain and Reduce Threats • Respond to Crises
	CBRN hazard modeling and simulation to support predictive analysis (includes meteorological assessments)	• Respond to Crises • Contain and Reduce Threats
	Detect and monitor chemical, biological, and radiological contamination on/around airfields and air bases	• Prevent Acquisition • Respond to Crises
	Biological surveillance and epidemiological investigative capabilities to address biological threats	• Contain and Reduce Threats • Respond to Crises
	Medical planning and logistics predicated on adversary or actor of concern WMD program	• Prevent Acquisition • Contain and Reduce Threats
	Arms control treaty compliance monitoring, verification, and confidence building measures (e.g., overflight)	• Prevent Acquisition • Contain and Reduce Threats

Air Force Contributions to the Understanding the Environment, Threats, and Vulnerabilities Joint Counter-WMD (CWMD) Activity

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

Air Force globally integrated ISR capabilities are essential to air component commander-directed efforts to identify and locate adversary CBRN weapons and materials, program components, and proliferation pathways (e.g., materials, technologies, facilities, processes, products, and events). When combined with other Service, department, or agency intelligence efforts, Air Force ISR assets contribute to the provision of intelligence needed to find, fix, track, and target adversary CBRN-related capabilities for the joint force.

The air component commander leverages Air Force ISR, along with other intelligence sources, to characterize the OE "to provide indications and warning, identify potential vulnerabilities to our forces and identify opportunities to achieve our combat objectives."[2] In turn, such characterization, enables the air component commander to implement defenses to safeguard the force from the effects of potential CBRN attacks and to direct operations to control, defeat, disable, and dispose (CD3) of identified CBRN-related threats. Characterization of CBRN threats may also occur during and

[2] AFDP 2-0, *Global Integrated ISR Operations*.

after a conflict, when the joint force has the ability to examine WMD facilities, stockpiles, weapons, and personnel.

Air Force characterization of CBRN threats contributes to air component commander assessments, attribution activities, and analysis. For example, Air Force collection on CBRN targets may also support air component commander, DOD, and national intelligence assessments used to understand US, allied, and partner "vulnerabilities in relation to a specific actor's WMD capability."[3] Air Force ISR capabilities also support special operations and nuclear operations. (Refer to AFDP 2-0, in section, "ISR Special Relationships.") Though the air component commander may be expected to conduct a wide range of characterization efforts, targeted characterization of seized or secured WMD elements conducted in uncertain or permissive environments is normally a responsibility of the joint force land component commander (JFLCC) and is performed by specifically trained and designated forces.

CBRN HAZARD MODELING AND SIMULATION

Though the Air Force may possess the ability to conduct precision strikes against WMD and related targets, certain targets may be removed from strike lists due to potential collateral damage that could undermine operational and strategic objectives. The air component commander relies on informed, accurate, and effective CBRN hazard modeling and simulation to assess threats and vulnerabilities, predict consequences of CBRN use, enable effective use of resources, and to minimize the collateral effects from strikes on CBRN weapons, materials, or related program components (e.g., production facilities). Though the Air Force possesses some hazard modeling and simulation capabilities, it has also partnered with other organizations (e.g., the Defense Threat Reduction Agency [DTRA]) to develop further capabilities needed to generate accurate models.

Hazard modeling and simulation software generates estimates that characterize the threats associated with striking CBRN targets by incorporating input sources such as environmental data, intelligence on the CBRN target locations, specific CBRN agent characteristics, and weapons effects data. Meteorological and oceanographic assessments also provide essential data. By incorporating relevant data, the software can predict the dispersal and persistence of CBRN agents in the OE following a strike and estimate the potential for casualties.

CBRN hazard modeling also informs the development, implementation, and refinement of CBRN concepts of operation (CONOPS) to enable sustainment of operations in CBRN-contaminated environments. Similarly, chemical agent hazard modeling has proven instrumental in informing Air Force policy regarding operations in a CBRN environment.[4] Hazard modeling, employed in conjunction with operational analysis, provides a cross-functional, force-wide approach for minimizing and managing contamination. It allows reduction of protective posture levels as soon as it is safe to do

[3] JP 3-40.
[4] See Air Force Manual 10-2503, *Operations in a Chemical, Biological, Radiological, and Nuclear (CBRN) Environment*, for further guidance.

so—the timing of which is a balance between force survivability and mission accomplishment. For more information on WMD hazard modeling and simulation, refer to AFDP 3-60, *Targeting*, Appendix B: "Targeting Automation," subsection on "Capability Analysis Tools."

CBRN CONTAMINATION DETECTION AND MONITORING OPERATIONS

When confronting CBRN-armed adversaries, detection of CBRN threats on and around airfields is of critical importance to Air Force operations. Installation-level monitoring capabilities support joint force hazard identification assessments and are essential to surviving and operating in CBRN-contaminated environments. CBRN detection, sampling, and identification include CBRN point and stand-off detection systems; medical, food, and water surveillance; attack preparation; pre- and post-attack reconnaissance (PAR); and installation PAR teams. Samples collected for real-time identification provide evidence of a CBRN attack and may trigger response or protection operations. Point detection systems continue to improve and incorporate rapid identification capabilities. Epidemiological investigative capabilities conducted by public health and medical personnel can also contribute to detection of biological weapons exposure, low-level chemical agent exposure (below current instrument detection levels), or radiation exposure. Individual Airmen also serve as a key component of the detection architecture as a CBRN "sensor," reporting and identifying unusual events or symptoms.

BIOSURVEILLANCE AND EPIDEMIOLOGICAL INVESTIGATIVE CAPABILITIES

Medical personnel within Air Force bioenvironmental flights, in coordination with laboratory flights, employ biosurveillance capabilities to detect biological warfare agent exposure and identify biological agents and naturally occurring infectious diseases present within a surveilled area. This surveillance supports both Service and joint battlespace characterization and assessment. Biosurveillance involves active data gathering with appropriate analysis and interpretation of data that might relate to disease activity and threats to human or animal health to achieve early warning of health threats, early detection of health events, and overall situational awareness of disease activity."[5]

Such threats can be infectious, toxic, or metabolic, and may be present due to malicious or natural origin. Air Force public health and medical personnel conduct epidemiological investigations to determine if a biological event is a natural occurrence or the result of deliberate action. Epidemiological investigations involve examination of a wide range of variables. These can include:

- ✪ Number of casualties.

[5] Homeland Security Presidential Direction 21, *Health and Medical Preparedness*, and *National Strategy for Biosurveillance*.

- Morbidity and mortality rates.[6]
- The likelihood of naturally occurring infection in specific geographic regions.
- Antibiotic resistance.
- Incubation times.
- Number, variance, and frequency of outbreaks in the AO.
- Unusual disease manifestation.[7]

For more information on public health and medical personnel CWMD roles and responsibilities, see the "Support Operations, Health Services" section in this AFDP.

[6] Morbidity rate is the measure of occurrence within a population. Mortality rate is a measure of the number of deaths that result from infection.
[7] JP 3-40.

CHAPTER 3: COOPERATING WITH AND SUPPORTING PARTNERS

The air component commander directs the execution of tasks to partner and coordinate with state and local authorities, USG interagency organizations, multinational partners, and nongovernmental organizations to promote common threat awareness, build CWMD self-sufficiency, improve military interoperability, enhance military and civilian preparedness, enhance deterrence, and, in some cases, facilitate security of dual-use and CBRN materials.[8] The Air Force provides capabilities and executes operations in support of these tasks, which comprise elements of the joint CWMD activity to cooperate with and support partners. Support of partners in CWMD entails security cooperation (SC), which includes building partnership capacity (BPC), homeland operations, and communication synchronization, as shown in the table below.

	CWMD Activity: Cooperate With and Support Partners	Supported DoD Lines of Effort
Air Force CWMD-Related Operations, Missions, and Capabilities	Security cooperation and building partner capacity • CBRN defense relationships (e.g., Air Force medical stability operations, global health engagement, and medical C-CBRN operations) • Foreign consequence management • Cooperative threat reduction • Allied, coalition, and partner exercises • WMD interdiction operations • Nonproliferation agreement and arms control treaty implementation (e.g., Air Force treaty compliance monitoring) • Foreign internal defense • Combined targeting for pathway and WMD defeat	• Prevent Acquisition • Contain and Reduce Threats • Respond to Crises
	Homeland operations in response to WMD attacks and CBRN incidents • Homeland defense • Defense support of civil authorities	• Contain and Reduce Threats • Respond to Crises
	Communication synchronization • Information operations to influence target audiences • Public affairs in support of DoD, national, allied, partner, and coalition strategic communications	• Prevent Acquisition • Contain and Reduce Threats • Respond to Crises

Air Force Contributions to Cooperating with and Supporting Joint and Partner CWMD Activities

SECURITY COOPERATION

The Air Force engages in a broad range of SC and BPC operations and missions in support of joint CWMD activities in accordance with approaches established in the *US Air Force Global Partnership Strategy*.

[8] JP 3-40.

> The security of the US is increasingly bound to the security of the broader international community. As a result, the [Air Force Global Partnership Strategy] is focused on developing and building the capability and capacity of our partner nations to withstand internal threats and external aggressions while also improving their capacity to proactively meet national and regional challenges such as those posed by WMD, natural disasters, regional instability, rogue states, and violent nonstate actors.
>
> -- ***US Air Force Global Partnership Strategy***

MEDICAL CBRN DEFENSE

Air Force CWMD SC activities are conducted with international partners, often in coordination with USG interagency organizations, and are intended to improve defense relationships and increase regional capability for collective WMD defense. For example, Air Force medical forces are engaged in SC and BPC efforts that support CWMD defense through medical stability operations (MSO) and global health engagement (GHE). Air Force medical forces engaged in MSO enhance partner nation health capacity by providing appropriate health services and training, conducting humanitarian assistance and disaster relief, and improving the health surveillance, force health protection, and partner nation military aeromedical evacuation (AE) abilities.

Medical forces also deliver CWMD defense capability through GHE SC activities. GHE is part of an approved SC program to partner with other nations to achieve SC objectives through:

- Medical-related stability activities.
- Military-to-military and military-to-civilian consultation and training in public health and preventive medicine.
- Disaster or outbreak response.
- Exercises.
- Disease surveillance.
- Medical and dental civic action programs.
- Force health protection.[9]
- While improving ties with partner nations and enhancing host nation medical response capabilities, GHE also provides a biosurveillance capability needed to understand and track regional and global biological threats.

[9] AFDP 4-02.

Air Force medical forces may also support partners through the provision of disaster response capabilities, including medical counter-CBRN (C-CBRN) threat response capabilities. Expeditionary medical support, including preventive medicine, biological testing, bioenvironmental engineering, radiological assessment, infectious disease identification, medical patient decontamination, and mental health services, provides critical response capabilities to mitigate the effects of CBRN attacks and incidents. Medical C-CBRN response capabilities include the following team capabilities: patient decontamination team, pharmacy team, bioenvironmental engineering team, laboratory biological detection team, field response team, triage team, clinical team, mental health, nursing services, preventive aerospace medicine team, and manpower / security team. These medical team capabilities are available to support installation commanders responding to CBRN incidents at foreign operating locations. For more information on medical CBRN defense, disaster response, and medical C-CBRN threat response, see AFDP 4-02.

INTERNATIONAL CBRN RESPONSE

International CBRN Response (ICBRN-R) is assistance provided by the USG to an impacted nation to respond to the effects of a deliberate or inadvertent CBRN incident in a foreign territory. ICBRN-R encompasses coordinated USG efforts to assist a partner nation responding to CBRN incidents. [10] Interagency organizations and partner nations may request Air Force capabilities in ICBRN-R operations in coordination with and under the direction of the US Department of State (DOS) and host nation civilian authorities.

THREAT REDUCTION COOPERATION

In addition to CBRN defense and ICBRN-R, the Air Force engages in SC efforts with partners to prevent WMD and CBRN agent proliferation. For example, the Air Force has provided strategic airlift in support of Cooperative Threat Reduction (CTR) Program activities to dismantle and dispose of partner nation WMD stockpiles that may be vulnerable to theft or illicit proliferation. Air Force contributions to CTR efforts, in coordination with interagency and international partners; such as DTRA, DOS, and the Department of Energy (DOE); have involved the transport of CBRN materials from unsecure locations in partner states to secure facilities within territories of the US and its allies. Air Force personnel coordinate, plan, and execute missions to transport materials of concern by air. The vignette below provides an example of this type of operation.

CWMD RELATED EXERCISES WITH PARTNER NATIONS

Air Force SC and BPC efforts in the CWMD arena include participation in exercises to improve combined capabilities, military interoperability, and CWMD self-sufficiency. Exercises with partner nations also increase common WMD threat awareness. For example, Air Force intelligence and legal experts may participate in Proliferation Security Initiative exercises. These exercises are designed to demonstrate a collective commitment to act against proliferation related shipments, send a strong message of

[10] JP 3-41, *Chemical, Biological, Radiological, and Nuclear Response*.

deterrence to would-be proliferators, enhance interdiction capabilities of Proliferation Security Initiative endorsing states, and extend outreach to non-endorsing nations observing the exercises. Similarly, the Air Force contributes to interagency planning efforts for transport security exercises conducted in support of nuclear security summits.

Project Sapphire

In 1994, more than a thousand containers of nuclear material sat in metal racks on the floor in a cold, dilapidated warehouse at the end of a railroad spur in Kazakhstan. The canisters were protected only by wooden doors with padlocks and barred windows that looked out at barren trees and a chain-link fence surrounding the area.

The all-but-forgotten materials were from Soviet Union nuclear submarine fuel abandoned after the nation's collapse. Through an accord, the US acquired the materials from Kazakhstan to keep them out of the hands of terrorists. DOE's Y-12 National Security Complex (a manufacturing facility that is dedicated, in part, to reducing the global threat from WMD) got the call to secure the vulnerable materials, which included weapons-grade highly enriched uranium. After receiving confirmation of the types of materials present in Kazakhstan and details about their storage, a Y-12–led team of experts in uranium operations, health physics, criticality safety, industrial hygiene, security and nuclear packaging, began planning a material recovery mission. The secret mission (code name: Project Sapphire) was the first of its kind.

To complicate the situation, the airport was small and had no radar system. After many trips had been aborted because of bad weather, the C-5 planes finally arrived to retrieve the team and the materials. The weather, however, continued to be a problem. "The runway and the planes were iced over," the team leader said, "We were afraid we'd get stuck there all winter." After working since the beginning of October, the team finally made it home the day before Thanksgiving. Mission accomplished.

-- Excerpted from unclassified DOE article

FOREIGN INTERNAL DEFENSE

National and CCMD-level activities to counter WMD proliferation threats are frequently conducted as part of foreign internal defense (FID) operations to assist US partners that possess WMD, particularly those characterized by instability (a result of terrorism, lawlessness, subversion, or insurgency), and internal WMD threats. Such a wide range of proliferation risks, including potential WMD loss to rogue elements, could generate instability within the nation, regionally, or globally. Most Air Force FID actions entail working with and through foreign aviation forces to achieve US strategic and operational

objectives.[11] The Air Force is well positioned to deliver indirect FID support to partners for CWMD SC through security assistance programs, multinational exercises, military-to-military exchange programs, and by providing trainers and advisors. For example, nuclear operations subject matter experts may be able to assist nuclear-capable partners to improve nuclear surety by enhancing security measures. For more information, see AFDP 3-22.

COMMUNICATION SYNCHRONIZATION

The Air Force should synchronize communications with domestic and international partners to shape perceptions at the global, regional, and national levels regarding CWMD activities. Synchronized communication reassures allies and partners and underscores the costs and risk associated with CBRN acquisition and use to potential adversaries.

Operations in the Information Environment. The purpose of operations in the information environment (OIE) is to influence adversary and enemy decision-making with the intent to affect their behavior in ways favorable to the US and its partners. Air Force OIE uses information capabilities to create desired effects among three audiences: partner nations, neutral populations, and adversaries. With regard to Air Force CWMD efforts, OIE supports efforts to deter adversary proliferation and use of WMD and to assure allies and partners of US resolve. For additional information to include a list of applicable information capabilities, see AFDP 3-13, *Information in Air Force Operations*.

Public Affairs. Air Force Public Affairs (PA) operations support various Air Force CWMD operations and missions with allies and partners. PA can be leveraged to heighten domestic and friendly nation public awareness about WMD threats, promote national and coalition CWMD policies, and serve to counter adversary propaganda. Likewise, PA information releases can assure at-risk allies and partners and support strategic messaging to deter adversary WMD. PA also provides essential capabilities needed to maintain public confidence in civilian and military response operations during defense support of civil authorities (DSCA) and homeland defense operations.

Operationally, Air Force CWMD related communications should also align with JFC efforts to synchronize communication by reinforcing themes, messages, images, and actions to support the JFC's objectives. Successful communication on CWMD activities requires a highly coordinated, multi-agency PA effort that is fully integrated into operational planning. For additional information, see AFDP 3-61, *Public Affairs*, and AFDP 3-13.

ARMS CONTROL TREATY AND AGREEMENT MEASURES

The US is party to a number of international treaties and agreements relating to the reduction or elimination of WMD force structure, as well as the prohibition of use and proliferation of CBRN weapons and related materials, as listed in the table, “Air Force

[11] AFDP 3-22, *Foreign Internal Defense*.

Implementation of WMD-Related Treaties and agreements." Certain treaties and agreements allow for inspection and verification of state capabilities, thereby aiding joint force and national efforts to locate, identify, characterize, and assess WMD and related materials. As an example, New Strategic Arms Reduction Treaty implementation may involve Air Force participation in onsite inspections of nuclear weapons bases, storage and maintenance facilities, and conversion and test locations. Similarly, some treaties allow reciprocal inspection of US forces and capabilities as part of certain treaty compliance requirements. To comply, the Air Force ensures activities and systems continue to adhere to treaty provisions once a treaty is in force.[12]

WMD-Related Treaties and Agreements:

- New Strategic Arms Reduction Treaty (START) Treaty
- Treaty on the Non-Proliferation of Nuclear Weapons (NPT)
- Convention on the Physical Protection of Nuclear Material (CPPNM)
- Chemical Weapons Convention (CWC)
- Biological Weapons Convention (BWC)

Note: The above list of treaties, agreements, and commitments is provided for information purposes only and is not intended to be comprehensive. All questions regarding treaty applicability and/or obligations should be directed to the servicing legal office or AF/A10.

HOMELAND OPERATIONS

The Air Force engages with domestic partners to defend against WMD attacks and respond to CBRN incidents in the US. CWMD threats are addressed in the context of homeland defense operations and DSCA. "A key distinction between homeland defense and DSCA is that in homeland defense, the DOD is the lead federal agency (LFA), while in DSCA, another federal organization is the LFA, with DOD acting in support."[13]

DEFENSE SUPPORT FOR CIVIL AUTHORITIES

At times, the DOD may provide support to civil authorities for domestic emergencies and for designated law enforcement and other activities. Generally, support may be provided to save lives, prevent human suffering, or mitigate property damage resulting from any civil emergency or attack.[14] For domestic CBRN incidents, the Department of Homeland Security (DHS) is tasked with coordinating overall USG federal response activities in accordance with Homeland Security Presidential Directive 5: *Management of Domestic Incidents* and the *National Response Framework*. Joint forces train and

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[12] Air Force Instruction (AFI) 16-601, *Implementation of, and Compliance with, International Arms Control and Nonproliferation Agreements*.
[13] JP 3-28, *Defense Support to Civil Authorities*.
[14] AFDP 3-27.

prepare to respond and mitigate damage or effects of damage from domestic CBRN incidents in support of civil authorities. Air Force contributions to DSCA involving domestic responses to WMD attacks or incidents will normally be in support of DHS. For such operations, either US Northern Command or US Indo-Pacific Command will have operational control of Air Force forces. Emergencies involving significant or overwhelming CBRN attacks or incidents may require JFC-directed domestic consequence management operations.[15] For more information on DSCA in support of homeland security and homeland defense, refer to JP 3-28. Beyond support to DHS, the Air Force may also support local and federal law enforcement in response to terror attacks involving CBRN weapons. In these missions, various federal, state, or local civilian agencies are in charge of incident management.[16]

HOMELAND DEFENSE

Homeland defense is "the protection of US sovereignty, territory, domestic population, and critical infrastructure against external threats, aggression, or other threats, as directed by the President of the US."[17] The DOD is the lead federal agency for conducting homeland defense operations and is supported by interagency partners as required. Air Force contributions to US Northern Command or US Indo-Pacific Command-led homeland defense encompass a wide range of operations and missions from pre-emptive strikes on targets holding the homeland at risk to special operations forces (SOF) operating to locate, characterize, and secure WMD prior to adversary use against the homeland. For more information, refer to AFDP 3-27, *Homeland Operations*.

CBRN RESPONSE ENTERPRISE

The DOD established the CBRN Response Enterprise (CRE) to organize and present forces effectively and efficiently for domestic CBRN response operations. These include DSCA, domestic consequence management, and homeland defense operations. The CRE is an integrated Active and Reserve Component approach to CBRN response. Its constituent forces may be in direct support of various entities and operating under either U.S. Code Title 10 or Title 32 status at any given time.[18] CRE response teams are organized to enable responses at the state and federal level.

CRE state response teams include:

- ✪ WMD-civil support teams.
- ✪ CBRN explosives enhanced response force package.
- ✪ Homeland Response Force.

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[15] Chairman of the Joint Chiefs of Staff Instruction 3125.01D, *Defense Response to CBRN Incidents in the Homeland*.

[16] AFDP 3-27.
[17] JP 3-27, *Homeland Defense*.
[18] JP-3-41.

CRE federal response teams include:

- Defense CBRN Response Force.
- Command and Control CBRN Response Element.

State response teams are principally Title 32 responders in support of civil authorities, whereas federal response teams are Title 10 forces under US Northern Command. CRE forces deployed under state control may be ordered to federal Title 10 active duty. Other National Guard assets, such as division headquarters may also support a domestic CBRN response. For more information regarding the CRE, refer to JP 3-41, Appendix C.

CHAPTER 4: CONTROLLING, DEFEATING, DISABLING, AND DISPOSING WMD

The air component commander directs the execution of tasks associated with the CD3 of CBRN materials and related program components and infrastructure. When conducting control activities, the joint force must be able to isolate, divert, intercept, secure, and seize WMD and related program components.

Defeat activities fall into two categories:

- **Pathway Defeat –** WMD pathways are networks or links among individuals, groups, organizations, governmental entities, etc. that encompass the critical components required for WMD acquisition (ideas, materials, technologies, facilities, processes, products, and events). Pathway defeat operations seek to prevent or delay acquisition, development, possession, or proliferation of WMD by employing measures designed to create layers of complex barriers that impose recurring, collectively reinforcing, and enduring costs and setbacks.
- **WMD defeat –** After acquisition, WMD defeat efforts target the ability to assemble, stockpile, deliver, transfer, or employ WMD, including deliberate actions to neutralize or destroy a WMD device or agent. WMD defeat includes disablement and disposal activities designed to reduce WMD threats and roll back associated programs. Such efforts may also entail monitoring and dismantling WMD infrastructure. Disabling and disposal activities are frequently conducted in coordination with or in support of USG interagency and international partners and typically occur in later phases of an operation.

Air Force support to joint force CD3 activities and tasks (as shown in the table below) may vary according to the nature of the task. Disable and dispose tasks are normally the responsibility of the JFLCC, in cooperation with USG interagency and international partners. For such operations, Air Force contributions are generally limited to operations support or low density, specialized capabilities (e.g., the Air Force Radiological Assessment Team [AFRAT]). However, the Air Force may be a primary provider for joint force control and defeat activities. In either case, the Air Force may be called to leverage both CWMD specific capabilities, as well as those developed and fielded for other missions. Air Force CD3 operations and missions typically fall into three broad categories:

- Controlling WMD threats.
- Defeating WMD threats.
- WMD disablement and disposal.

	CWMD Activities: Control, Defeat, Disable, Dispose of WMD	Supported Lines of Effort
Air Force CWMD-Related Operations, Missions, and Capabilities	Control of WMD • Global Integrated Intelligence, Surveillance, and Reconnaissance • Support of land and maritime component WMD interdiction operations	• Prevent Acquisition • Contain and Reduce Threats • Respond to Crises
	Offensive operations (counterair, counterland, countersea, special operations, strategic attack) to achieve pathway and WMD defeat • Global Integrated Intelligence, Surveillance, and Reconnaissance • Targeting • Weaponeering • Hazard modelling and simulation	• Prevent Acquisition • Contain and Reduce Threats • Respond to Crises
	Support to Joint, national, international partner WMD program disablement and disposal activities • Global Integrated Intelligence, Surveillance, and Reconnaissance • Specialized site exploitation capabilities • Airlift of WMD and CBRN materials	• Contain and Reduce Threats • Respond to Crises

Air Force Contributions to Joint CWMD CD3 Activities

CONTROLLING WMD THREATS

Controlling WMD threats involves JFC-directed operations and missions to **divert**, **intercept**, and **seize** WMD, related technology, materials, and means of delivery. Diversion and interception of WMD supports joint force interdiction operations and missions as well as interdiction[19] agreements with international partners (e.g., the Proliferation Security Initiative).

- **Divert** – efforts and resources to change the intended course or destination of shipments of WMD, related technologies, materials, expertise, and/or means of delivery, either willingly or by force.
- **Intercept** – efforts to stop movement or proliferation of CBRN materials, WMD components, means of delivery, functional weapons, or WMD-related personnel.

[19] Within this context, interdiction refers to operations that support civil (domestic and partner) agency enforcement of laws and treaties. Used in this manner, the terms intercept and interdict have similar meanings. Not to be confused with air interdiction.

Such operations may require boarding, search, and detection capabilities to secure and seize shipments.

- **Seize** – offensive action to obtain control and possession of WMD capabilities (e.g., designated area, building, transport, materials, or personnel) that deny a relevant actor's access to WMD capabilities.[20] Normally, operations and missions to seize WMD capabilities will be the responsibility of either the land or maritime component commander.

Air Force ISR and air counterproliferation interdiction capabilities contribute to joint force efforts to divert and intercept proliferated WMD and related materials. Air Force collection capabilities feed DOD and national intelligence collection on WMD and related targets. In turn, the national intelligence community's production of timely and actionable intelligence enables joint force and coalition military actions to divert and intercept illicit transfers of WMD and related materials. For additional Air Force ISR information, see AFDP 2-0, *Global Integrated ISR Operations*.

Additionally, the air component commander may provide a range of air support to aid land and maritime component operations aimed at seizing adversary WMD and related program components (e.g. air mobility, counterland, countersea counterair, etc.). Particularly, during combat operations in uncertain or non-permissive environments, counterland capabilities may be required to support land component seizure operations (e.g., WMD facilities) to defend friendly forces. For additional information on Air Force counterland operations, see AFDP 3-03, *Counterland Operations*.

DEFEATING WMD THREATS

GENERAL FRAMEWORK FOR PATHWAY AND WMD DEFEAT OPERATIONS

Joint force pathway and WMD defeat operations provide the JFC with options to defeat the full suite of adversary CBRN capabilities before they can be used against US interests. In addition to WMD and CBRN-related targets, pathway and WMD defeat operations focus their effects on adversary WMD and CBRN-related capabilities, including research and development (R&D) infrastructure; production and storage facilities; delivery, transfer, and employment vehicles and systems; as well as fielded forces and related C2.

The Air Force maintains both kinetic and non-kinetic capabilities employed across a variety of missions to deliver effects required to delay, disrupt, destroy, and neutralize adversary WMD targets. Among others, such missions may include strategic attack, counterair, counterland, countersea, special operations, and IO. In any of the above, the catastrophic potential of WMD use or CBRN release warrants significant scrutiny of potential targets and planning considerations. Given the unique hazards associated with CBRN weapons and materials, pathway and WMD defeat operations present unique planning considerations with regard to operational risk calculations, ISR collection requirements, targeting and weaponeering challenges, and legal issues associated with

[20] JP 3-40.

ROE and the Law of War. Effective coordination among related ISR, targeting, weaponeering, and hazard modeling activities is crucial to defeating WMD threats.

Strategic Attack in Pathway and WMD Defeat. Operations against the full spectrum of CBRN-related targets may be considered strategic attack. In both Operation DESERT STORM and Operation IRAQI FREEDOM (OIF), suspected Iraqi CBRN capabilities were a designated center of gravity and became the focus of extensive coalition WMD defeat operations. Most notably, in Operation DESERT STORM, coalition forces expended considerable effort to neutralize ballistic missiles operating in the western Iraqi desert. Recognizing that the US-led coalition depended on the support and participation of many middle-eastern partners, the goal of Iraq's strategy was that such attacks would draw Israel into the conflict, thereby undermining critical relations. Further, fearing that these attacks would be used to deliver WMD, efforts to defeat them were vital in convincing Israel not to enter the war, thus denying Iraqi strategy. For additional information, see AFDP 3-70, *Strategic Attack*.

Counterair in Pathway and WMD Defeat. Offensive counterair operations, including surface attack mission, consist of offensive operations aimed at destroying, disrupting, or degrading enemy air and missile threats and their supporting infrastructure. Consistent with the objectives of pathway and WMD defeat operations, the main goal of the offensive counterair surface attack mission is to prevent the employment of adversary air and missile capabilities, which may be used to deliver WMD. For additional information, see AFDP 3-01, *Counterair Operations*.

Counterland in Pathway and WMD Defeat. For pathway and WMD defeat, the most relevant mission within counterland operations is air interdiction – efforts to divert, disrupt, delay, or destroy the enemy's military potential before it can be used effectively against friendly forces. In this context, air strikes against a convoy transporting WMD or strikes against WMD-equipped indirect fire (e.g. artillery) units may constitute counterland WMD defeat operations. For additional information, refer to AFDP 3-03.

Countersea Operations in Pathway and WMD Defeat. Countersea operations are conducted to attain and maintain a desired degree of maritime superiority by the destruction, disruption, delay, diversion, or other neutralization of threats in the maritime environment. While normally conducted at the direction of the joint force maritime component commander, the air component commander may act in support of maritime operations with air or cyberspace capabilities to perform countersea operations. Countersea operations against WMD-armed surface ships or submarines, including those still in port, contribute to achieving WMD defeat objectives. For additional information, refer to AFDP 3-04, *Countersea Operations*.

Pathway and WMD Defeat Targeting. Pathway and WMD defeat targets are those that enable the adversary to develop, produce, store, proliferate or employ CBRN agents. Together with adversary CBRN-related intelligence assessments, guidance and objectives received from national leadership and the JFC help operational planners select WMD and related program targets. WMD targets may be identified ahead of conflict and should be updated throughout an operation when new intelligence allows. Pathway and WMD defeat operational objectives may become more difficult to achieve

against adversaries that have mature development programs or who have progressed to WMD employment. Identifying and striking these targets in the early stages of development and acquisition reduces an adversary's potential attack capability, provides commanders and partners with more options, and may result in fewer collateral effects. Potential target sets include:

- **WMD Research and Development Facilities.** Pathway and WMD defeat operations against R&D facilities rely heavily on accurate intelligence to detect and characterize CBRN materials and agents. Hazards may be concealed within medical and industrial complexes otherwise used for legitimate purposes (i.e, dual-use facilities). Attacks against WMD R&D facilities may temporarily delay or disrupt development or could achieve a more permanent effect by completely destroying the facility.

Nuclear Reactor Attack in Syria

Though not an endorsement of the attack, the 2007 Israeli airstrike against a nuclear facility in Al-kibar, Syria represents a more recent example of pathway defeat targeting operations. According to a DOD press release following the strike, Syria, with help from North Korea, constructed a nuclear facility assessed to have had the ability to produce weapons grade plutonium, "not intended for peaceful purposes." The reactor was struck before it became operational, thus defeating Syria's WMD "pathway." According to the release, the reactor was "carefully hidden from view," in the eastern Syrian desert and not configured for peaceful uses. In addition, it was being built in defiance of international obligations, without notification to the International Atomic Energy Agency.

"Syria's [construction] of a secret nuclear facility with North Korean help reinforces the need to prevent the spread of weapons of mass destruction...It should serve as a reminder to us all of the very real dangers of proliferation and need to rededicate ourselves to prevent the spread of weapons of mass destruction, particularly into the hands of a state or a group with terrorist connections."

-- Navy Adm. Mike Mullen, Chairman, Joint Chiefs of Staff

Source: DOD News—Mullen: Nuclear Project Reaffirms… Dangers

- **Production Facilities.** Pathway or WMD defeat operations against production facilities provide another option for delaying, disrupting, destroying, or neutralizing an adversary's WMD capability. Depending on the maturity and sophistication of the adversary's development program, effects may only be temporary. However, strikes against production facilities represent a relatively low-risk option for reducing threats associated with the use of CBRN weapons and agents. Strikes against WMD and related production facilities may be more effective in reducing threats if the adversary has not yet achieved an operational WMD capability. Finally, planners should remember that some production facilities may be deeply buried or hardened.

WMD and Pathway Defeat: Cyberspace Operations

Though no one has yet claimed responsibility for the attack, the STUXNET virus's effect on Iranian nuclear enrichment capabilities is well known. Thought to have been in development since 2005, the malicious code was uncovered in 2010 after it was suspected to be responsible for significant damage to nuclear centrifuges at Iran's Natanz nuclear development facility.

Classified as a malicious worm, STUXNET spread across computers and networks primarily through USB thumb-drives. Its presence in most machines was benign, enabling it to remain undetected until it found its intended host – Iranian centrifuge controllers. Once found, its malicious logic went to work. It changed centrifuge speed up and down in increments small enough to avoid detection, but by a sufficient margin to cause irreparable damage over time.

Though its designers likely hoped it would cause even greater damage, experts suspect that Iranian nuclear enrichment fell by thirty percent. Nonetheless, it represents the most notable and significant cyberspace operation for WMD and pathway defeat operations to date. Its employment highlights many important aspects:

- Officially, it remains unattributed.
- It likely took years to develop and required highly detailed target data.
- Once "fired," it could not be used again.
- Once "fired," it likely took years to achieve effects, the length of which could not have been predicted accurately during planning.
- Though non-kinetic, it produced physical effects.
- It produced second and third order effects that exceeded the impact and scope of its immediate effects.

*Compiled through open source, publicly available information. Takeaways are inferred and do not indicate specific or direct knowledge of the event.

- **CBRN Agent Storage Facilities.** As with CBRN-related R&D and production facilities, operations against CBRN agent storage facilities present effective options to defeat an adversary's ability to employ WMD-related capabilities. If detected, fixed storage facilities may be particularly vulnerable to Air Force WMD defeat operations. However, passive defense measures, such as hardened or deeply buried facilities, may complicate the destruction or neutralization of WMD. Use of mobile storage facilities can further complicate the destruction of CBRN weapons. Attacking storage facilities may also create the potential for collateral effects by releasing or dispersing CBRN materials, such as chemical agents or radioactive substances. This should be carefully considered during planning. Effects-based solutions focused on neutralization of a capability, rather than CBRN agent destruction, may deny the adversary access to capabilities and thus achieve objectives.

- **Fielded Weapon Systems and Supporting Infrastructure.** WMD defeat strikes (kinetic or non-kinetic) against fielded CBRN weapons and supporting infrastructure seek to delay, disrupt, destroy or neutralize an adversary's ability to promptly employ WMD, either prior to adversary use or to limit damage from potential follow-on attacks. These targets are among the highest priorities and are potentially the greatest threats to the security of the US, its allies, and its partners. Once fielded, weapon systems such as mobile theater ballistic missile launchers present a significant challenge to current ISR capabilities. Often proving difficult to detect before launch, such systems are able to react rapidly and launch with little or no warning. As they were in DESERT STORM and OIF, the suppression or destruction of CBRN-tipped theater ballistic missile will likely be a high-priority objective, if not the highest.

Pathway and WMD Defeat Planning Considerations. While not distinct from a doctrinal perspective, the inherent potential for mass destruction or mass effects of WMD, and the timing and circumstances of pathway and WMD defeat operations present the military planner with unique requirements. Planning considerations include:

- **Operational Risk.** Pathway and WMD defeat operations contain varying degrees of operational risk that fall into two major categories. The first is direct risk to military members participating in the operation. The use of stealth aircraft, standoff and specialized weapons, remotely-piloted aircraft, or non-kinetic capabilities such as cyberspace operations may greatly reduce risk to the warfighter.

- The second category of operational risk involves those risks associated with the threat of the target itself. Given their greater readiness to strike at friendly forces or territory, adversaries with fielded WMD capabilities present more urgent and direct threats. Operational risks may result from a partially successful or unsuccessful pathway or WMD defeat operation. Likewise, as mentioned previously, second and third order effects have potential for additional risks that must be accounted for. Conventional explosives may disperse chemical and biological agents rather than neutralize them, resulting in residual hazards for local civilian populations or advancing friendly forces. Specialized agent defeat weapons that neutralize the CBRN materials and minimize dispersal, unlike a high explosive, may help to mitigate these risks. Indirect attacks may be useful, such as denying power or

transportation to and from facilities, or interdicting access by sealing mountain entrances.

- **ISR Requirements.** ISR feeds the hazard modeling and assessment activities that contribute to understanding the environment, threats, and adversary vulnerabilities needed to assess and predict the operational effectiveness of potential pathway and WMD defeat strikes. Accurate and timely ISR is critical to conducting successful pathway and WMD defeat strikes against an adversary. Adversary CBRN capabilities should be found, fixed, and tracked before initiating defeat operations. For additional information on WMD hazard modeling and simulation, see AFDP 3-60, "Targeting Automation."

- **Targeting and Weaponeering.** Hardened or deeply buried adversary WMD facilities and associated WMD program infrastructure may present challenges to pathway and defeat operations. While destruction of the facility's contents may be impractical, an effects-based approach to targeting may delay or disrupt adversary access to CBRN-related capabilities. For more information on targeting, see AFDP 3-60.

- **Legal.** Depending on the threat scenario, preemptive pathway and WMD defeat operations may be authorized. Preemption is subject to complex interpretations of international law. Given the complicated nature of preemptive strikes, orders to conduct pathway and WMD defeat operations likely will originate at the highest levels of the USG. The resulting ROE may be restrictive due to the inherently high operational risk and potential for collateral effects resulting from these operations.

  The complexity of pathway and WMD defeat operations and associated laws, policies, treaties, and agreements require continuous involvement of the staff judge advocate or other appropriate legal advisors. The staff judge advocate should be involved throughout the planning process, including the mission analysis and course-of action development stages.

- **Multi-national and coalition considerations.** Striking WMD-related targets may generate coalition member concerns in a multinational operation. At times, coalition partners may operate under ROE that may differ from US rules. Such differences should be accounted for when planning such strikes. In some cases, they could restrict or limit strike options for WMD and other sensitive CBRN-related targets. Planners and targeteers should coordinate with coalition partners to facilitate an understanding of possible concerns. For more information on legal considerations and targeting, refer to AFDP 3-60.

DISABLING AND DISPOSING WMD

The Air Force provides operations support to disablement and disposal of WMD and related program components. While disable and dispose activities and tasks may be undertaken at specific sites, in isolation from other operations and missions, they are frequently conducted as part of broader USG or international efforts. Typically, such operations aim to roll back a state's WMD capability by eliminating its capacity for production, storage, and use of CBRN materials. Air Force ISR, air mobility, and

specialized WMD site exploitation capabilities may be used to support joint force efforts under USG or JFC-directed disable and dispose operations.

Just as they do for control and defeat activities, Air Force ISR collection capabilities feed DOD and national collection on WMD and related targets. Air Force intelligence may be called to support exploitation operations designed to maximize intelligence gained from personnel, data, information, and materials seized during CWMD disable and dispose operations.[21] Air Force collection capabilities may also be used to support monitoring actions to ensure an adversary has not reconstituted a previously dismantled CBRN-related capability. For additional Air Force ISR information, reference AFDP 2-0.

The Air Force may also be tasked to provide specialized assets in support of certain disable and dispose tasks. For example, Air Force explosive ordnance disposal (EOD) personnel may have the skills needed to assist with dismantling a WMD stockpile. Likewise, AFRATs[22] may be tasked to assist reduction and dismantling of radiological material stockpiles, delivering capabilities designed to provide on-scene health effects expertise, radiological monitoring, sampling, and dosimetry[23].

Air Force Airlift is often critical for moving forces and equipment into theater quickly to enable rapid site exploitation as part of activities to disable adversary WMD programs. In addition, airlift has proven essential in historical efforts to reduce and dismantle WMD and CBRN facilities and stockpiles. An example of this type of effort is highlighted in the previous chapter by the vignette “Project Sapphire” – a post-Cold War, national threat reduction effort that sought to reduce and dismantle nuclear materials in former Soviet Union states. For additional information, see AFDP 3-36, Air Mobility Operations.

[21] JP 3-40.
[22] Air Force Radiological Assessment Teams are the primary worldwide response team for the DOD for radiological incidents and accidents.
[23] Dosimetry is the science by which radiation dose is determined through measurement, calculation, or a combination thereof.

CHAPTER 5: SAFEGUARDING THE FORCE

Every Airman is responsible to understand the nature of CBRN threats and how to conduct assigned missions and tasks through them. Despite efforts to prevent, contain, and reduce CBRN-related threats, some strikes may reach their targets, generating significant mission impacts and reducing operational capacity. Focused primarily on installations, facilities, interests, points of embarkation and debarkation, and critical infrastructure, the goal for safeguarding activities is to reduce force vulnerability and to minimize the effects of CBRN agents employed against US and partner nations.

Achieving this goal requires implementation of cross-functional measures that maximize survivability and sustainment of operations in a CBRN-contaminated environment. To determine appropriate measures, commanders should assess threats within mission contexts, while ensuring proper planning, training, risk assessment, and vulnerability and hazard mitigation. In conjunction with advanced warning of impending strikes, a well-rehearsed and thoroughly tested plan for operations in a CBRN-contaminated environment will facilitate a more rapid return to full operational capability.

JOINT, COALITION, AND HOST NATION CONSIDERATIONS

The Air Force plans to conduct CWMD operations as part of a joint or combined force, to include host nation forces. Each of these may provide additional valuable resources, but may also add new vulnerabilities. To maximize effective use of existing CBRN defense assets, commanders should fully understand joint force and partner capabilities, requirements, and potential limitations. Except in circumstances where organic forces are sufficient to sustain operations, commanders should plan and train to support and sustain joint and partner mission critical functions.

Likewise, contractor and host nation personnel often provide valuable functions and services, including support to CBRN defense operations. Contractor or host nation roles should be defined within host nation support agreements, memoranda of understanding, or statements of work. Further, installation commanders are responsible to protect non-military personnel in the event of a WMD attack and should account for this protection in response plans (e.g., installation emergency management [EM] plans, disease containment plans, medical contingency response plans) and training. Where contractors and host nation personnel provide mission critical functions, commanders may plan and train for provision of CBRN defense measures that sustain these functions independent of these non-military personnel.

CBRN DEFENSE MEASURES

For numerous reasons (diverse WMD employment tactics, geography, weather, number and readiness of personnel, etc.), a “one size fits all” approach to CBRN defense is not possible. The variable nature and associated effects of specific CBRN weapons and agents necessitates specific protection measures. Measures intended to protect against one type of threat are not likely to provide protection from others. For instance, medical countermeasures and restriction of movement strategies designed to contain disease outbreaks are unlikely to be useful against chemical, radiological, or nuclear effects.

Likewise, the protection provided by existing mission-oriented protective posture (MOPP) gear is not uniform across the CBRN spectrum. Rather, commanders rely on detailed planning and intelligence preparation to implement CBRN defense measures appropriately matched to the threat, force location, surrounding environment, and resource availability.

In general, CBRN detection systems, computer-based warning systems, reporting tools, and various levels of personnel and equipment decontamination capabilities reduce the effects of an attack. These CBRN defense activities and measures should be applied in a layered and tailored approach to facilitate a comprehensive response. While these measures and capabilities are normally implemented at the installation level, the air component commander should be aware of and ensure appropriate theater-wide CBRN defense capabilities are emplaced.

Possible CBRN defense measures may include any or all of the following:

- Facility hardening.
- Evacuation.
- Individual and collective protection.
- Warning and reporting systems for detection, identification, sampling, and quantification.
- Contamination avoidance.
- Contamination control.
- Decontamination.
- Health risk assessments.
- Medical surveillance.
- Medical countermeasures.

ACTIONS TO SAFEGUARD THE FORCE

GENERAL FRAMEWORK FOR SAFEGUARDING THE FORCE

The Air Force provides a wide range of CBRN defense capabilities. These capabilities are organized around a framework of CBRN defense activities to **sense**, **shape**, **shield**, and **sustain**. As the table below indicates, Air Force CBRN defense capabilities are spread across combat support, force protection, force health protection, homeland operations, medical, and SC communities. This framework demonstrates how various functional communities synchronize and integrate at the installation level to provide Air Force commanders with the capabilities needed to mitigate CBRN effects and sustain mission essential combat readiness.

	CWMD Activity: Safeguard the Force and Manage Consequences	Supported DoD Lines of Effort
Air Force CWMD-Related Operations, Missions, and Capabilities	Combat support • Field forces able to survive and operate in CBRN-contaminated environments • Base forces in WMD threat environments • Protect forces from CBRN weapons • Generate the mission in WMD threat environments • Support and sustain the mission, forces, and infrastructure in WMD threat environments	• Contain and Reduce Threats • Respond to Crises
	Force protection • Emergency management • Wing inspection • Crisis action team/command post • Emergency operations center • Emergency communications center • Specialized support/recovery teams • First and emergency responders	• Contain and Reduce Threats • Respond to Crises
	Force health protection • Medical treatment and care as part of all hazards approach • Aeromedical evacuation from CBRN-contaminated operating environments • Medical stability operations (includes medical C-CBRN threat response)	• Contain and Reduce Threats • Respond to Crises
	Homeland operations in response to CBRN attacks and incidents • Defense support to civil authorities • Homeland defense	• Contain and Reduce Threats • Respond to Crises
	Security Cooperation • CBRN defense relationships • Foreign consequence management	• Contain and Reduce Threats • Respond to Crises

Air Force Contributions to Safeguarding the Force and Managing Consequences Activity

SENSE

Air Force sense capabilities provide commanders with up-to-date information on CBRN threats by detecting, identifying, qualifying, and quantifying hazards. Obtaining this information requires accurate intelligence assessments in a number of areas, to include CBRN agent sampling, detection, and identification. Each Airman is a key component of the sensing architecture and should recognize their roles as CBRN “sensors.” They should be trained to sense indications of impending or actual attacks involving the use of CBRN agents, report those indications, and take the immediate and prudent actions necessary to protect themselves and mission resources.

Point detection systems continue to improve and incorporate the use of rapid identification capabilities. Detection, sampling, and identification are multifaceted and multifunctional operations that involve:

- CBRN point and stand-off detection systems.
- Medical, food, and water surveillance.
- Pre- and post-attack recovery reconnaissance for explosive ordnance detection by unit and installation attack recovery reconnaissance teams.

Collected samples provide evidence of an attack involving CBRN agents and may trigger an installation EM response. Samples collected for real-time identification are typically detected and collected by civil engineering and bioenvironmental engineering personnel. Epidemiological surveillance conducted by public health and medical personnel also contribute to detecting biological warfare agent exposure, low-level chemical agent exposure (below current instrument detection levels), and radiation exposure.

SHAPE

Shaping activities focus on characterizing CBRN hazards to provide commanders with an accurate assessment of the current and future operational picture. Maintaining situational awareness of CBRN-related threats is critical to predicting potential operations degradation, allowing commanders to optimize offensive and defensive operations. Integrating information obtained from different functional communities shapes the commander's view of the operational battle space.

Shaping operations and capabilities include CBRN effects predictions and meteorological condition assessments, aimed at increasing situational awareness and anticipating future events. Intelligence, civil engineering, and weather experts provide predictions on the nature of the threat based on available data. For meteorological condition assessments, weather experts supply information on weather conditions and other meteorological data. Likewise, civil engineer readiness and EM CBRN experts provide predictions about the type of agent, release point, and the plume (i.e., footprint of the contaminated area). In combination with detection, identification, and quantification, these predictive efforts provide commanders with a clear delineation between clean and contaminated areas and enable commanders to establish protected beddown locations, mitigate CBRN effects, and identify health risks to ensure a fit and healthy fighting force.

Predictive modeling under differing meteorological conditions helps commanders prepare responses to a wide range of possible threat scenarios. Conditions like temperature, cloud cover, rainfall, and wind speed may impact the effectiveness of attacks involving CBRN agents, as well as the persistence of the resulting contamination. Analyzing the potential meteorological effects on unit operations is essential to implementing an effective response. The Air Force should be able to produce real-time data on current weather conditions pre-, trans-, and post- attack to determine what conditions might affect CBRN agent plume patterns and persistence in

the OE. Accurate and timely meteorological assessments also contribute to effective sampling, detection, and identification of CBRN agents.

Likewise, location planning is necessary for the beddown of forces and mission parameters. Site development concerns are also critical for optimizing efforts to safeguard the force. The physical features of a region should be factored into CBRN defense planning, as different geographical features will affect the potential for sensing CBRN agents and alter the spread of the CBRN contamination.

Commanders obtain health risk assessments for each potential CBRN agent via medical staff, to include the public health emergency officer (typically a flight surgeon or public health officer) and the medical nuclear, biological, and chemical officer (typically a bioenvironmental engineer), supplemented by information from EM, reach back support, and other theater support assets. By coupling the operational and health risks, the commander can make informed risk management decisions.

SHIELD

Shielding activities protect forces from the harmful effects of CBRN agents. Commander-directed shield actions include:

- ✪ Disease and casualty prevention.
- ✪ Contamination avoidance.
- ✪ Contamination control.
- ✪ Protective countermeasures.

Disease and casualty prevention. These activities include steps taken to prevent casualties before attack and minimize casualties after a CBRN attack. Proper health and hygiene, vaccines, and prophylaxis[24] increase force survivability. Commanders should optimize the appropriate level and type of protection based on current intelligence, the specific CBRN threat(s), the quantity of the agent dispersed, weather conditions, and the location of the actual or potential attack.

Contamination avoidance. This category includes actions taken to minimize the impact of attacks involving CBRN agents by limiting or preventing exposure. Beyond the nature of the contamination itself (type, dispersal, concentration, etc.), successful contamination avoidance results from a combination of actions. These include force or asset dispersal, prediction, sampling and identification, marking, rerouting of equipment and materials, and protective countermeasures, such as sheltering people and providing hardening for facilities and critical equipment.

Before an attack occurs, dispersing mission critical assets will enhance the probability that some facilities and equipment will avoid contamination. Dispersal includes

[24] A medication or a treatment designed and used to prevent a disease from occurring.

transporting mission-essential personnel and equipment from high-risk to low-risk areas for survival, recovery, and reconstitution.

Relocation or rerouting of equipment and material may be necessary to survive and recover from an attack involving CBRN agents if contamination has a significant adverse impact on operations. For air forces, this may require relocating operations to a different base and transporting uncontaminated assets to an alternate location. Diverting aircraft to an uncontaminated airfield prevents the spread of contaminants to valuable airlift assets and cargo.

Permanent and expedient hardening measures are used to strengthen buildings and utility systems, or to provide barriers to mitigate the destructive effects of weapons on aircraft and equipment. Successful hardening measures will also protect personnel, materiel, and weapons systems from explosive effects. Expedient hardening, such as the rapid erection of sandbag walls or building soil berms, is often the primary hardening method for expeditionary forces. Permanent hardening may be incorporated into structures during initial construction or added later as a modification or retrofit.

Contamination control. When operating in a CBRN-contaminated environment, these procedures prevent secondary transfer of disease; chemical, biological or radiological material; or re-aerosolization of hazard agents. Contamination control includes avoiding, reducing, removing, or rendering harmless the hazards from CBRN contamination. As part of the contamination control process, decontamination operations are intended to sustain operations by preventing or minimizing performance degradation, casualties, or loss of materiel.

If CBRN contamination is found on equipment, facilities, or vehicles, these should be marked to identify the hazard. Additionally, commanders and response personnel should implement contamination avoidance procedures, enforce contamination mitigation actions[25], and consider decontamination feasibility. Contaminated areas should be identified and personnel should avoid the use of contaminated objects and areas to the extent possible, within mission considerations.

Decontamination requirements and methods will vary according to the nature of the contamination. For instance, following a chemical attack, decontamination activities and procedures will be based on the physical form of the agent (liquid, solid, or vapor) and the type of surface (concrete, carpet, painted, metal, etc.). Depending upon the extent and type of contamination, Air Force commanders may need to seek assistance from other organizations, local agencies, civilian contractors, or specialized units such as the AFRAT.

Protective countermeasures. When contamination is unavoidable, protective countermeasures allow Air Force forces to survive and operate in CBRN-contaminated environments. Developing and implementing protective countermeasures ahead of a CBRN attack is critical to mission sustainment. The commander should optimize the appropriate level of protection based on specific threat characteristics (type, quantity,

[25] Mitigation actions may include measures such as the chemically contaminated object rule.

hazard, and means of delivery), anticipated warning time, duration of exposure, and the actual or projected attack location. Protective countermeasures include restriction of movement[26], use of shelters (to include shelter-in-place), immunizations and chemoprophylaxis, masks, and PPE or MOPP gear.

An Emerging Technology: Single Skin Shelter Material

The 25-bed Expeditionary Medical Support (EMEDS) Field Hospital pictured here uses Single Skin Collective Protection (ColPro) shelter material. Although it looks and feels similar to industry standard shelter material, the Single Skin technology has a ColPro barrier material imbedded into the external fabric. The Single Skin technology eliminates the need for an additional ColPro liner kit. This greatly reduces the required EMEDS Field Hospital set-up and conversion time from non- to full-ColPro mode.

SUSTAIN

In various scenarios, operating effectively in a contaminated environment may be critical to mission success. Proper planning in the sense, shape, and shield areas prior to CBRN attack may ensure operations to sustain the force are successfully accomplished. Sustain activities, such as recovery and reconstitution operations, are designed to regenerate unit combat readiness as soon as possible. Other sustain activities include notification of personnel, decontamination, and casualty management, attack recovery reconnaissance. *Note: Depending on purpose and context, certain sense, shape, shield, and sustain activities may overlap.*

Effective shield actions, including contamination control, improve a unit or installation's initial footing for sustain operations. If assets could not be covered or protected from CBRN contamination, priority should be given to identifying and using uncontaminated assets to the extent possible. Command staffs, subject matter experts, and installation personnel should be aware of site decontamination capabilities, to include knowing when attempting decontamination is worthwhile. Bioenvironmental engineers are responsible for clearance certification of platforms and materials post-decontamination.

Similarly, health risk assessments are important first steps toward a return to pre-attack operational capability. These assessments, accomplished by bioenvironmental engineering staff, provide critical guidance to commanders, informing and enabling effective risk management decisions. Immediate medical actions are important to personnel survivability and operability in the post-CBRN attack phase. Casualty management involves triaging, treating, stabilizing, and transporting the victims of

[26] Movement restriction may reduce exposure by limiting interactions between personnel, restricting large gatherings, closing facilities, quarantining, and isolating exposed personnel, etc.

CBRN attacks. Safeguarding the force through hazard mitigation and force sustainment operations will also include medical activities such as self-aid and buddy care and tactical combat casualty care.

Long-term health risks due to exposure to low levels of residual contamination should also be considered in sustainment of combat operations. Even after decontamination, formerly contaminated assets may pose a long-term health risk to personnel.[27] Applicable instructions and tactical guides[28] inform and direct actions to track formerly contaminated assets and document potential exposures of personnel.

Commanders, through medical and services personnel, should also be prepared to care for contaminated casualties and human remains. Along with other theater-wide challenges, overflight or landing restrictions in other states may complicate medical evacuation and return of contaminated or deceased personnel.

RESPONDING TO CBRN INCIDENTS

A CBRN attack or incident can occur via wartime action, terrorist attack, or as the result of a military or industrial accident. When CBRN events occur, the JFC may task the air component commander to provide response and recovery capabilities to assist US local, state, or national civilian authorities or host nation governments.

Incorporating and employing various CBRN defense sense, shape, shield, and sustain capabilities, CBRN response encompass three phases: **casualty management**, **restoration of essential services**, and **remediation of the affected area**. Within the US, local state and federal agencies will be involved in CBRN response, but normally the DHS will be the lead federal agency in charge of coordinating response and recovery efforts. Agreements and plans must be established and exercised fully to ensure integrated and efficient operations. Overseas, air component commander support to host nations will be provided under the leadership of the DOS. However, in a foreign country where the DOS does not have an established diplomatic presence, or on a DOD installation, DOD forces may be directed to lead CBRN response and recovery operations.

CASUALTY MANAGEMENT

Casualty management involves self-aid and buddy care, patient identification, stabilization, medical treatment, rehabilitation, and, if necessary, victim transportation to a higher level of care. In addition to physiological ailments, victims may suffer from psychological disorders, including acute stress, panic, and post-traumatic stress disorder, the effects of which may not be apparent for weeks, months, or even years after a WMD attack or incident. The symptoms of psychological disorders may include

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[27] See AFTTP 3-2.46 for a more detailed discussion of the levels of decontamination. (CAC required)
[28] These include DOD Instruction 6055.05, *Occupational and Environmental Health*, and Air Force Tactics, Techniques, and Procedures (AFTTP) 3-2.46 *Multiservice Tactics, Techniques, and Procedures for Chemical, Biological, Radiological, and Nuclear Passive Defense* .(CAC required)

anxiety over exposure concerns or chronic stress that deteriorates physical and mental health.

Chaplains and religious affairs Airmen, serving on religious support teams, perform a significant role in casualty management. These individuals bolster force morale by providing spiritual care and ensuring free exercise of religion. Religious support team members also advise commanders concerning morale, ethical, and moral issues. The trauma of CBRN events will likely intensify the need for spiritual counseling and religious support. Military chaplains are uniquely trained to operate in hostile, dangerous, and degraded military environments.

RESTORATION OF ESSENTIAL SERVICES

As part of efforts to manage the consequences of CBRN contamination, the Air Force is responsible for the restoration of essential services on its installations. Essential services include security, medical, housing, potable water, electrical power, telecommunications, and other utilities, and a sustainable food supply.

REMEDIATION

Following attacks involving CBRN agents, commanders may undertake long-term remediation activities to return Air Force equipment and facilities to pre-attack preparation levels, if possible. On-scene remediation efforts are designed to remove unexploded explosive ordnance and reduce, remove, or neutralize contamination within affected areas. Though a primary operational objective is to enable personnel to operate within these areas without protective equipment, some residual CBRN agent hazards may remain. Therefore, personnel should be observant. They may be required to wear protective equipment when near contaminated surfaces and equipment to avoid exposure to toxic materials.

Remediation begins with sense activities: attack recovery reconnaissance and reporting, detection, and sampling to determine the extent of any CBRN hazard and the effects to human health and the environment. Shape capabilities may also enable commanders to model and simulate activities to determine if there is a downwind CBRN hazard due to an attack. Commanders employ shield and sustain capabilities to decontaminate personnel, equipment, aircraft, terrain, and facilities. Another part of long-term remediation is the management and disposal of hazardous waste. Commanders will need to mark, track, and report on the process for disposing of hazardous waste, which will vary for CBRN agents and related materials.

APPENDIX A: PREPARING THE FORCE

ORGANIZE

Air Force preparation efforts involve responsibilities to organize, train, and equip forces. Organize, train, and equip preparations enable the Air Force to conduct operations and missions to accomplish joint activities for CWMD.

While cross-functional integration is needed to execute certain CWMD operations, some CWMD specific knowledge, skills, and abilities (KSA) should be well-understood and instituted across the Air Force. To ensure the continuation of mission critical operations against WMD-armed adversaries and actors of concern, all Airmen should have a basic understanding of the threat, operational risks, and specialized procedures to mitigate those risks. In particular, all Airmen should possess the KSAs required to defend against, survive, and operate through initial nuclear effects and chemical, biological, and radiological contamination.

CWMD efforts involve all Airmen, assets, functional communities and platforms across the total force, working in an integrated and synchronized manner. The development and implementation of applicable doctrine; tactics, techniques, and procedures (TTPs); CONOPS; and concepts of employment provides the foundation for how the Air Force integrates and synchronizes CWMD operations and missions across the Total Force.

Although some Air Force CWMD operations and missions require specialized KSAs, many CWMD operations rely on the integration and organization of multiple non-CWMD specific functional communities. For example, intelligence experts, aircrews, weaponeers, targeteers, weather experts, and hazard modelers, may all be required to support Air Force WMD defeat operations. Each community provides mission critical KSAs needed to find, fix, track, target, engage, and assess adversary WMD or related targets.

TRAIN

CWMD capabilities are instilled through a life-cycle approach that aims to improve KSAs from accession-to-separation using targeted force development principles. The figure, “Air Force Integrated Approach…” depicts the Air Force’s integrated CWMD approach to prepare Airmen for operations and missions against WMD-armed adversaries, including the ability to survive and operate in CBRN-contaminated environments. Air Force CWMD education and training exercises target multiple audiences to include individual Airmen, functional communities, and leadership.

INDIVIDUAL AIRMEN

Individual capabilities are developed through proper education and training. This ensures Airmen can survive and operate in a CBRN environment. Examples of specific CBRN training for all Airmen include how to don individual protective equipment (IPE), respond to MOPP declarations, administer nerve agent antidotes, or shelter in place. All

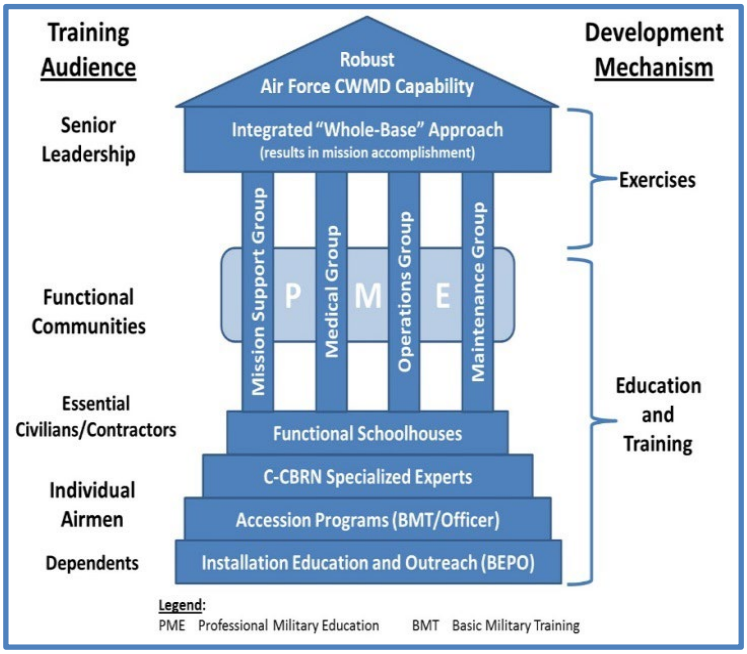
Airmen should be able to take the protective measures needed to execute the mission in CBRN-contaminated environments.

FUNCTIONAL AND SPECIALIZED COMMUNITIES

The objective for educating and training functional communities in CWMD operations is to ensure they have the knowledge, competencies, training, equipment and funding required to execute their responsibilities in a CBRN threat environment. For instance, aerial port personnel are trained on contamination avoidance for cargo transload operations. In addition to community or specialty specific training, Airmen may require education and training to conduct specialized CWMD roles and responsibilities. For example, Air Force civil engineer EM personnel require significant training in detection, decontamination, shelter procedures, post-attack reconnaissance, and other CBRN defense operations.

CWMD EXERCISES

In addition to educating and training personnel, total force preparedness is achieved through the execution of realistic exercises. Peacetime activities with partners—particularly interagency and multinational training and planning exercises focused on building CWMD capabilities—enable the accomplishment of complex multinational CWMD operations. Air Force personnel regularly participate in exercises involving operations to counter CWMD threats. For example, Air Force personnel contribute to and participate in several National Exercise Program events including ARDENT SENTRY—an annual joint exercise led by North American Aerospace Defense Command and US Northern Command, and EAGLE HORIZON—a federal continuity-of-government exercise focused on coordination between federal agencies.



Air Force Integrated Approach to CWMD Education, Training, and Exercises

EQUIP

The Air Force EM program equips Airmen to conduct operations and missions across the full range of CWMD military activities. Depending on the type operation or mission, the Air Force may use CBRN-specific systems, such as the employment of CBRN defense equipment to protect aircrews in CBRN-contaminated environments. However, equipment designed for other missions may also be leveraged in CWMD operations, such as the use of airlift to transport CBRN materials of concern as part of WMD disposal activities.

Aircrew Flight Equipment: Focus on Counter-CBRN Operations

One of the primary missions of Air Force Aircrew Flight Equipment (AFE) Program is to provide aircrew protection from the effects of CBRN weapons by managing aircrew CBRN equipment, preparing aircrew to operate in CBRN environments, and processing contaminated aircrew through the Aircrew Contamination Control Area (ACCA). ACCA operations, capabilities, and manpower support can be bolstered while deployed with a deployable AFE team (Unit Type Code: 9ALCW).

EQUIPPING FOR CBRN DEFENSE

The categories for CBRN defense equipment align with the four activities within the CBRN defense activities framework detailed in Chapter 5:

- **Sense**: systems designed to detect CBRN hazards.
- **Shape**: systems that characterize the OE and provide CBRN hazards warning by collecting and assimilating real-time data to inform operational decision making.
- **Shield**: systems that protect personnel/assets from the effects of CBRN hazards.
- **Sustain**: systems that enable decontamination, including medical actions needed to return facilities and equipment to pre-threat conditions.

Equipping to Control, Defeat, Disable, and Dispose of WMD Threats. Air Force CD3 capabilities include the ability to defeat WMD and related targets, conduct close air support and air interdiction to support land component WMD seizure operations, and deliver airlift in support of joint, national, or coalition efforts to dismantle WMD programs. While the Air Force has developed and sustained some CWMD-specific systems, most weapon systems used in CD3 operations and missions are designed to execute operations and missions other than, or in addition to, those involving CWMD.

CBRN Survivability of Mission Critical Systems. CBRN survivability is the characterization of a system's ability to avoid, withstand, or operate during and after exposure to CBRN contamination or initial nuclear effects. A system's nuclear survivability describes its ability to withstand exposure to initial nuclear effects, including air blast, electromagnetic pulse, and thermal radiation. A system's CBRN contamination

survivability is determined by three relative design factors: hardness, ability and degree to which it can be decontaminated, and compatibility.

- Hardness refers to the degree to which a system is hardened against CBRN agents and decontaminants the Air Force uses to remove hazards.
- Design should also allow decontamination attempts to reduce the hazard to personnel operating, maintaining, or resupplying them.
- Compatibility ensures procured systems can be operated, maintained, and resupplied by Airmen wearing IPE in all climates and for the period of time needed to conduct required operations.

CBRN survivability can also be accomplished by incorporating system hardening, ensuring timely resupply, maintaining redundancy, implementing appropriate TTPs, or using a combination of these methods.

APPENDIX B: PLANNING CONSIDERATIONS FOR CBRN RESPONSE

In dealing with a CBRN event, including the intentional or accidental release of toxic industrial chemicals or materials, there are two primary situations facing the air component commander. The first situation involves the effects of the event on an installation, and the second situation involves the effects of the event on the military forces and civilian populations off the installation. Off-installation forces and civilians can be those in the US or in a foreign nation.

When responding to an off-installation event in the US, installation commanders should attempt to contact higher headquarters for guidance on proper application of Air Force resources on DSCA. However, if after a request for assistance from local authorities, time or circumstances do not permit contact with headquarters, the installation commander may conduct an immediate response to save lives, prevent human suffering, or mitigate great property damage. For further information, see AFDP 3-27.

When responding to an off-installation event in a foreign country, the same guidance applies for an immediate response. However, in ICBRN-R, the installation commander should be sensitive to the political environment within the civilian community and the laws and policies governing response. With the exception of the immediate response authority, the DOS is the LFA for ICBRN-R. As the LFA, the DOS coordinates USG ICBRN-R activities in response to a request by a host nation.

If a CBRN event occurs on an installation where Air Force forces are present, one of the air component commander's top priorities will be ensuring the safety and survival of personnel on the installation. The air component commander may need to divert forces from other installations in the area of operations or request additional forces to deal with the effects of the event. These forces may include medical assistance personnel, health risk assessment experts, decontamination capabilities, and clean-up crews.

If Air Force forces are engaged in military operations, then sustainment of operations will be another priority. Factors to consider are:

- Can the operations at the affected installation be sustained? Can they be sustained with augmentation?
- Do the mission or forces of the installation need to be diverted to another installation?
- How soon can the affected installation return to mission capable status?
- How much effort must be diverted to do initial recovery of personnel and clean-up?
- How much effort must be expended to return the installation to pre-event capability?

The nature of the event should also be considered. In many cases, the US considers a terrorist attack (with or without CBRN) a crime to be investigated by appropriate civilian law enforcement authorities (e.g., the Department of Justice). The air component commander's first priority should be the immediate response to save lives. However, a

criminal investigation may also begin immediately and the two may be conducted in parallel.

The air component commander should advise senior leaders on the short-term and long-term future of the installation and the impact on mission accomplishment. The installation may be damaged to such an extent that restoration to attack preparation capability is cost prohibitive. In this case, the air component commander may move forces or shift tasks and responsibilities to other installations.

APPENDIX C: SPECIALIZED CONSIDERATIONS

AIR MOBILITY

Air mobility forces play a crucial role in supporting Air Force CWMD efforts. In spite of adversary use of WMD weapons or other CBRN materials, air mobility must continue to provide the Air Force with the global reach necessary to achieve its objectives.

Airlift in a CBRN Contaminated Environment. To allow sustained and effective use of airlift resources, theater planners may identify alternate aerial ports of embarkation and debarkation to protect and continue the time-phased force and deployment data (TPFDD) airflow and other resupply efforts.

While air mobility forces are trained and equipped to operate in a CBRN-contaminated environment, the limitations imposed on air mobility assets in those environments may significantly degrade the rate of force deployment. Until large-frame aircraft decontamination is technically feasible, contaminated aircraft should be segregated from the airlift flow. If operations into a contaminated airfield are deemed mission-critical and are specifically authorized, the air component commander should establish a geographically-separated transload site that can be used to transfer personnel and cargo between clean and contaminated aircraft. This transload process will likely delay TPFDD deliveries and may only be feasible for emergency or isolated cases.

Retrograde of cargo from contaminated areas may be severely restricted. Until internationally recognized standards and legal requirements for acceptable decontamination levels are established, nations may deny transit and overflight rights to contaminated aircraft or cargo.

Aeromedical Evacuation. The Air Force's AE capability to move contaminated patients should only be used in extreme circumstances. Potential aircraft contamination, threats to aircrew safety, and limited availability of protective resources significantly restrict the ability to move large number of patients, contaminated or otherwise. Rather, treatment-in-place using contagious casualty management (CCM) capabilities is preferred. This is normally accomplished via deployed expeditionary medical support CCM specialty set or can be done expeditiously using existing theater assets redeployed by the air component commander to assist with the management of contagious casualties.

After the patients have been stabilized, Air Mobility Command (AMC) can move a limited number of biologically-contaminated patients to the continental US via litter-based isolation units. This will facilitate "hands-on" disease analysis by DOD and other US infectious disease experts to determine optimum management of biological casualties. Patients exposed to non-contagious biological agents can also be decontaminated and transported on aircraft. Basic infection control guidelines should apply when biological warfare casualties are evacuated. Casualties who have been contaminated with chemical or radiological agents are decontaminated before entering the AE system unless the theater and US Transportation Command (USTRANSCOM) commanders direct otherwise. When directed, the AMC commander is the formal policy waiver authority for movement of contaminated casualties. Once the theater combatant

commander and USTRANSCOM identify the requirements for AE of contaminated patients, AMC will authorize their transportation.

Evacuating potentially contaminated patients, human remains, and non-contaminated patients requires the approval of the destination country, overflight privileges, and approval of any country where the aircraft will land for servicing. Close coordination between supporting and supported commanders, DOD, and DOS will be required for such movements.

Commercial Aviation. Commercial aviation plays an important role in the deployment, sustainment, and redeployment of Air Force forces. When fully activated, the Civil Reserve Air Fleet (CRAF) provides almost all of AMC's passenger-lift capability and a significant portion of its cargo airlift.

Civilian aircraft operating under DOD contracts or activated as part of the CRAF are not planned or intended to operate in areas where the threat level is greater than "low." Although commercial aircrews are issued ground crew chemical defense equipment for personal protection and trained to use it, they are neither trained nor equipped for flight operations in a contaminated environment. Upon warning of impending CBRN attack, every effort should be made to divert arriving commercial aircraft and launch those currently on the ground. Contaminated CRAF assets and civil aircraft under DOD contract should not be used, even if decontaminated to negligible levels. Currently, no decontamination standards exist for international flights. En route transload of cargo and passengers from civilian carriers to military aircraft or other transportation modes (sealift, rail, trucks, etc.) may be required, involving decontamination procedures. Generally, civil aircraft will not be used to transport equipment or human remains with residual CBRN contamination due to safety and legal concerns.

Contractor Supported Aviation. Civilian contractor personnel provide essential maintenance support for Air Force operational support airlift (OSA) aircraft (C-21, C-37, etc.). If contractor-supported OSA aircraft are deployed to medium and high threat areas, the Air Force installation commander will provide contractor personnel with IPE and "just in time" training on IPE wear and CBRN response TTPs. Commanders at the deployed location will integrate the civilian contractor personnel into the base defense plan and ensure that they are properly trained, equipped, and exercised. For more information, refer to AFDP 3-36.

AIR FORCE SPECIAL OPERATIONS FORCES

Conventional and SOF regularly conduct operations and activities that contribute to CWMD efforts, either directly or indirectly. SOF are uniquely qualified to conduct SOF core activities such as special reconnaissance, direct action, and counterterrorism operations that support small-scale CWMD efforts. Mission objectives may include operations into and out of contaminated battlespaces where avoidance is not an option.

The JFC may use SOF independently or integrated with conventional forces, to perform tasks to CD3 actors of concern with WMD capabilities. The joint special operations air component commander, as the air component commander to special operations,

conducts operations which support these SOF core activities. To accomplish these missions, Air Force Special Operations Command has identified the following core mission areas: specialized air mobility, precision strike, special tactics, ISR, aviation FID, C2, IO, and agile combat support.

CIVIL ENGINEERING

Air Force civil engineering provides critical pre-planning activities to coordinate and organize efforts to manage, prepare for, respond to, and recover from the consequences of WMD attacks using CBRN (as well as conventional weapon attacks, major accidents, and natural disasters). Besides standard engineering skills, civil engineers fulfil three functions that provide significant support to the CWMD enterprise. These functions are fire emergency services (FES), EOD, and EM. For homeland defense and DSCA, National Fire Protection Association Publication 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents*, identifies the minimum levels of competence required by responders to emergencies involving hazardous materials/WMD and is used by civil engineer emergency responders as the standard. For operations to support geographic combatant commanders in CWMD operations, standard military procedures are used.

FES provides the capability to minimize loss to lives, property, and the environment occurring throughout all phases of military operations in peacetime, wartime, and in support of homeland operations. Included are both man-made and natural incidents; fire suppression or hazard mitigation; rescue; mitigation or containment of hazardous material releases, terrorism, or WMD; and the appropriate corresponding emergency medical response.

EOD provides the capability to mitigate and defeat hazards presented by the enemy or friendly employment of explosive ordnance. This encompasses IEDs, conventional explosives such as explosive remnants of war, unexploded explosive ordnance, CBRN, WMD, homemade explosives, and incendiary materials.

EM supports WMD hazard analysis and assessments, establishment and operation of the CBRN threat detection grid, active CBRN response, and development of CBRN contamination avoidance measures. Another main component of the EM program is to support homeland security operations and to support civil and host-nation authorities through the appropriate Air Force major command or combatant command (for more information, reference to AFDP 3-34, Engineer Operations).

HEALTH SERVICES

The Air Force Medical Service (AFMS) provides critical support in CWMD operations. In addition to attack recovery casualty treatment via fixed military treatment facilities (MTFs) and expeditionary medical support facilities, AFMS provides essential expertise in medical intelligence, medical surveillance, detecting and identifying CBRN threats, performing health risk assessments, food and water quality and vulnerability assessments, and decontamination.

These unique capabilities are provided by Home Station Medical Response Teams located at each of our main operating bases, as well as by various deployable teams. One such example is the Medical Nuclear, Biological, and Chemical Defense Team. This team provides human health protection, support to medical facility operations, and prevention of acute and chronic health hazards resulting from a CBRN threat environment. The Biological Assessment Team performs rapid, specific pathogen/ infectious disease identification and risk analysis. The AFRAT provides manpower and equipment for rapid, global response to radiological/nuclear accidents and incidents. The AFRAT provides subject matter experts to support planning, surveillance, analysis, and assessment to mitigate radiation health and operational risks resulting from radiological/nuclear events. Finally, the Expeditionary Medical Patient Decontamination Team removes, neutralizes, or lowers the level of contamination from casualties prior to admission to MTFs.

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

ISR is a key enabler for CWMD operations. The ISR process provides the ability to detect, identify, characterize, and track the development and deployment of adversary WMD. The unique phenomena and signatures of WMD materials, devices, and effects requires specialized detection and analysis capabilities to complement traditional ISR platforms, such as unmanned aircraft systems and satellites. Vigilant surveillance using a wide range of sensor and analytic capabilities is required to reveal production, testing, and weaponization of large-scale CBRN programs. ISR enables decision making at the national and warfighter level across the competition continuum to include nonproliferation, strategic deterrence, pathway and WMD defeat, attribution, and consequence management efforts.

ISR is a critical component of CWMD operations and plays a vital role in detecting, characterizing, tracking, and warning of CBRN attacks by providing information on the location, type, timing, method, and effects supporting a commander's ability to prevent adversary proliferation and use, contain and reduce threats, and respond to crises. As with C2 assets, ISR assets remain operational in adverse environments and will be targeted by adversaries. For more information, see AFDP 2-0.

LEGAL SUPPORT

CWMD operations involve a complex mix of laws, policies, treaties, and agreements. The staff judge advocate or other appropriate legal advisor should be continuously involved with the planning, oversight, and assessment of these operations. For further guidance, refer to JP 3-40 and JP 3-84, Legal Support.

LOGISTICS

Logistical considerations, such as the flow of war materiel, are essential supporting elements of Air Force CWMD operations. Adversary operations using CBRN weapons present challenges to logistics support by introducing the threat of contamination to aircraft, personnel, materiel, and the supply chain. Timely delivery of required CBRN protection and detection assets is critical to force survivability and the ability to sustain

mission operations. The air component commander should ensure critical consumables reach the area of operations in a timely manner and provide needed weapons, supplies, and facilities in such a way as to reduce the “footprint” of deployed forces. In garrison, Air Force MAJCOM commanders sustain appropriate stock, storage, and maintenance of the required IPE per base.

PERSONNEL SUPPORT FOR CONTINGENCY OPERATIONS

The primary mission of Personnel Support for Contingency Operations (PERSCO) is force accountability and casualty reporting. Accurate force accounting will inform commanders about the availability of resources. PERSCO teams are normally an integral component of the location’s reception processing center. Base subject matter experts at the employment location work with PERSCO teams to ensure arriving personnel are briefed on EM actions, protective measures, threat conditions (including the CBRN-related actions and measures), and local area health conditions.

PUBLIC AFFAIRS

Air Force PA operations support CWMD operations and missions by releasing information through public communication channels. This information serves to execute prevention and deterrence strategies, reinforces the effects of IO on adversary decision-making, mitigates unintended information effects of pathway and WMD defeat operations, and maintains public confidence in local, state, federal and military authorities during DSCA and foreign consequence management operations. Successful communication on CWMD activities requires a highly coordinated, multi-agency PA effort that is fully integrated into operational planning. For more information, reference AFDP 3-61.

SERVICES

Continued operations when countering WMD threats demand specific planning considerations for service support activities in a CBRN environment. Services personnel providing meals to forces should take all necessary steps to safeguard and protect food and bottled water assets during the attack preparation period. To protect kitchen facilities from possible contamination, commanders may choose to forego hot meal preparation during periods of intense conflict in CBRN threat areas. All efforts should be made to disperse and protect food assets from contamination, particularly meals ready-to-eat.

Services personnel should consider the hazards of a CBRN environment when developing shelters, reassignment of living quarters, and evacuation plans, and procuring food service support in the local area. These plans include measures to protect personnel, equipment, materials, and food from contamination.

In extreme situations, it may be necessary to temporarily inter contaminated human remains. Prior to interment, mortuary personnel should be prepared to conduct standard processing procedures for contaminated remains. Temporary burial and decontamination of remains should follow appropriate guidelines as found in JP 4-02 and Air Force medical TTPs. Geographic combatant commanders are responsible for

ensuring the development of policies for the overall supervision of mortuary affairs matters. Upon return of contaminated remains to CONUS, the need to protect the health of service members and the public typically takes priority over rapid repatriation.

As the lead service for mortuary affairs, the US Army manages development of joint mortuary affairs doctrine, procedures, and training materials for use by all Services.

WEATHER OPERATIONS

Weather Operations are key elements (characterization and exploitation) of CWMD operations. Weather information is critical during planning, execution, assessment, and sustainment during all phases of CWMD operations. These operations provide weather information to support CBRN hazard modeling activities to include current and forecast weather projections. Additionally, weather operations support SOF execution of site exploitation and security.