Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plan

May 2023

Homeland Security

This page intentionally left blank.

HANDLING INSTRUCTIONS

Questions pertaining to the distribution, transmission, or destruction of this annex should be submitted to the Federal Emergency Management Agency, Office of Response and Recovery, Planning and Exercise Division, National Planning Branch at fema-response-ped@fema.dhs.gov.

INTENDED AUDIENCE

The intended audience for this annex includes departments and agencies (D/As) of the federal government. Also included are state, local, tribal, and territorial (SLTT) stakeholders and other partners that are committed to response and recovery operations during nuclear/radiological incidents.

USE OF THIS DOCUMENT

Those with equity and interest in the U.S. government response to a nuclear/radiological incident will find the mechanisms of coordination and communication by the federal government in this annex. Matters and methods of operations should refer to the operations plans housed within the appropriate D/As responsible for response.

RESCISSION NOTICE

Publication of this annex to the *Response and Recovery Federal Interagency Operational Plan* hereby rescinds the following documents: *Federal Radiological Emergency Response Plan, 1996*;[1] *Improvised Nuclear Device Concept of Operations Plan (Version 10), 2009*; and *Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plan, 2016*.

[1] Previously rescinded upon development of the *National Response Plan* (2004) and later, the *National Response Framework* (2008) and should no longer be referenced by planners.

This page intentionally left blank.

RECORD OF CHANGES

Version	Date	Summary of Changes	Name

This page intentionally left blank.

TABLE OF CONTENTS

LIST OF FIGURES

This page intentionally left blank.

LIST OF TABLES

This page intentionally left blank.

ANNEX OVERVIEW

This version of the *Nuclear/Radiological Incident Annex* (NRIA) *to the Response and Recovery Federal Interagency Operational Plan* (FIOP) supersedes the previous NRIA (2016).[2] The Response and Recovery FIOP provides a coordination and communication framework for coordinated interagency federal government activities in response to and recovery from all hazards. The NRIA complements the FIOP by utilizing the same base concept of operations but also provides federal guidance specific to the unique considerations of nuclear/radiological incidents.

The NRIA focuses on the Response Mission area, which includes activities that protect public health and safety, property, critical infrastructure, and the environment; restore government services; and provide emergency relief to governments, businesses, and individuals affected by the consequences of an incident. For nuclear/radiological incident responses, these activities include securing the incident site, assessing the dispersal of radioactive material, enhancing first responder capabilities, and providing medical triage capabilities, including for radiological exposure-induced injuries, and establishing contamination control measures, including ensuring availability of decontamination and site remediation resources. Recovery Mission activities for nuclear/radiological incidents can include long-term housing assistance and/or permanent resettlement, long-term health monitoring programs for the affected population, and long-term environmental consequence management. The time frame for response and recovery activities described in this annex will vary according to the specific incident dependent on how long it takes to reach the desired end states for each activity. Some recovery activities may continue long-term.

The NRIA also describes Prevention Mission activities, which include site security and scene preservation, law enforcement investigation activities, and attribution for suspected or actual intentional incidents.[3] Emergency management planners should recognize that some mission area activities can happen concurrently and may have overlapping resource needs and therefore require increased coordination, though life-saving activities remain paramount. The policy of the United States is that any possible terrorist incident will be treated as an actual terrorist incident until otherwise determined by the Attorney General, acting through the Director of the Federal Bureau of Investigation (FBI).[4] This presumption requires federal response to nuclear/radiological incidents to be well coordinated across the U.S. government and integrated with federal law enforcement and/or counterterrorism activities.[5]

Although the NRIA describes how responding federal departments and agencies (D/As) will communicate and coordinate their activities, this annex does not alter or impede the ability

[2] Response and Recovery Federal Interagency Operational Plan (FIOP) (2023).
[3] The Prevention Mission area scope includes imminent threats, incidents, and stopping follow-on attacks.
[4] Planners should anticipate the execution of counterterrorism activities during a response to any potential terrorist-related nuclear/radiological incident that will involve additional roles and responsibilities of federal and SLTT D/As.
[5] For the purposes of this annex, the term "law enforcement" will encompass criminal investigative activities and counterterrorism activities.

of state, local, tribal, and territorial (SLTT) governments or federal departments and D/As[6] to execute their responsibilities under applicable laws, executive orders, and directives.

SITUATION

Most nuclear/radiological incidents are due to loss, theft, or mismanagement of relatively low-level radioactive sources. Nuclear and radiological facilities include fixed facilities that store nuclear material; those that store or use radioactive material; industries such as radiation source and radiopharmaceutical manufacturers; educational research institutions; and other facilities involved in the production, refinement, handling, storage, transportation, or use of nuclear/radioactive materials. Further, natural hazards, such as fires and earthquakes, may impact nuclear or radiological facilities, resulting in an incident.

The following are examples of accidental nuclear/radiological incidents:

- Natural hazard causing an accident at a nuclear facility[7]
- Accidentally lost, found, or orphaned radioactive material sources
- U.S. nuclear facilities accidents
- Accidental breaches of research and test reactors
- Transportation accidents involving radioactive materials
- Domestic nuclear weapons accidents
- Launch or reentry accidents involving spacecraft containing nuclear systems[8]

In addition, intentional nuclear/radiological incidents can occur, such as terrorist attempts by hostile actors or other criminal acts. Threats involving devices[9] can be categorized as either nuclear devices[10] or dispersal devices[11] containing radiological or nuclear materials.[12]

[6] For this annex, "federal agency" includes any federal executive branch department or agency including boards, commissions, government corporations, and any independent agencies of the U.S. government that have authority for, or provide support to, the response to and recovery from a nuclear/radiological incident.
[7] This includes nuclear power plants, national laboratories, research facilities, spent fuel sites, nuclear fuel cycle facilities (production and decommissioning), and naval reactors.
[8] Space nuclear systems include radioisotope power systems, such as radioisotope thermoelectric generators and radioisotope heater units, and fission reactors used for power and propulsion.
[9] All potential terrorist threats or incidents, including weapons of mass destruction threats or incidents, are presumed to be an act of terrorism unless otherwise determined by the Attorney General, acting through the FBI Director.
[10] A nuclear device is a device incorporating fissile materials that has, appears to have, or is claimed to have the capability to produce harmful effects via nuclear fission. This includes any U.S. nuclear weapon that is no longer in the control of a competent authority or custodian or is suspected to be modified from its designated firing sequence. This includes improvised nuclear devices (INDs).
[11] A dispersal device is a device containing chemical, biological, or radiological materials and the essential electrical or mechanical components to enable the material to be disseminated explosively, mechanically, or by means of pressure or exposure. The device may be of a crude, nonstandard design, intended to cause destructive, lethal, or noxious effects. This includes radiological dispersal devices (RDDs) and radiological exposure devices (REDs).
[12] National Security Presidential Memorandum (NSPM) 36 Guidelines for U.S. Government Interagency Response to Terrorist Threats and Incidents in the United States and Overseas (classified) (2021).

- A nuclear detonation can result in mass casualties, radioactive contamination,[13] and destruction of property. Even a relatively small nuclear detonation in an urban area could result in tens of thousands of fatalities and many survivors requiring medical care, behavioral health care, and dose assessments. This detonation could also result in massive infrastructure damage and hundreds of square miles of long-term contamination.
- An RDD is any device that disperses radioactive material or emits radiation by conventional explosive or other mechanical means, such as a spray, at a harmful level without a nuclear detonation occurring. While these devices can cause significant damage as a result of explosion, the radiological harm caused by a dispersal device is principally contamination and denied use of the contaminated area, perhaps for many years. High radiation exposures are unlikely, but costs associated with remediation and loss of access due to an effective dispersal device could be significant.
- An RED is a terrorist device intended to expose people to significant doses of ionizing radiation without their knowledge. Constructed from partially or fully unshielded radioactive material, an RED could be hidden from sight in a public place, exposing those who sit or pass close by.

Nuclear/radiological incidents that occur internationally, which may be accidental or intentional, can also threaten or impact the United States.

Some nuclear/radiological incidents can develop into multi-jurisdictional, interagency, catastrophic disasters with serious environmental and public health consequences. Such serious incidents require well-coordinated responses among SLTT governments; private-sector entities; non-governmental organizations (NGOs); and the federal government.

For most nuclear/radiological incidents, SLTT emergency responders initiate response activities because they are first on-scene. In addition, a Federal On-Scene Coordinator (Federal OSC) may be dispatched to the scene to coordinate with SLTT responders and to determine whether the incident can be managed with existing resources or whether additional federal resources are required. If the Federal OSC determines a need for increased federal support, the level of federal assistance will vary based on the magnitude of the incident, potential or actual impacts to public health or the environment, and other factors. A nuclear/radiological incident that triggers the need for federal assistance may have varying characteristics, including some or all of the following:

- SLTT capabilities are overwhelmed, and additional resources are requested.
- The incident covers multiple states or Federal Emergency Management Agency (FEMA) regions or is international in scope.
- A significant portion of the population in the affected area needs prolonged mass care and emergency assistance.

[13] Contamination (radioactive) is when unwanted radioactive material is deposited on the surfaces of structures, areas, objects, or people, where it may be external or internal.

- Impacts to critical infrastructure result in significant loss of critical lifeline services (such as energy, water, communication, and transportation), which poses risks to personal safety, national security, economic viability, and physical and behavioral health, including continuity of care. (See Appendix B: Community Lifelines for further discussion of lifelines.)
- The federal government has substantial authority and responsibility during nuclear and radiological incident response under laws described in Appendix V: Authorities, which are applied in coordination with SLTT governments.

Purpose

The NRIA provides incident-specific supplemental information to the Response and Recovery FIOP. Federal interagency partners respond in support to SLTT governments to save lives, to protect safety and health, property, critical infrastructure, and the environment and to meet basic human needs when a nuclear/radiological incident occurs. This annex provides the following information (which is also depicted in Figure 1):

- Describes the process and organizational constructs that federal D/As will use to support SLTT governments in responding to nuclear/radiological incidents.
- Identifies how federal interagency partners will respond, coordinate national response to nuclear/radiological incidents, and provide recovery support under federal authorities.
- Provides information specific and unique to federal nuclear/radiological incident response and recovery processes, assets, resources, and teams.
- Details the mechanisms and structures for information sharing and operational coordination with the Prevention Mission's response to suspected or actual intentional incidents.

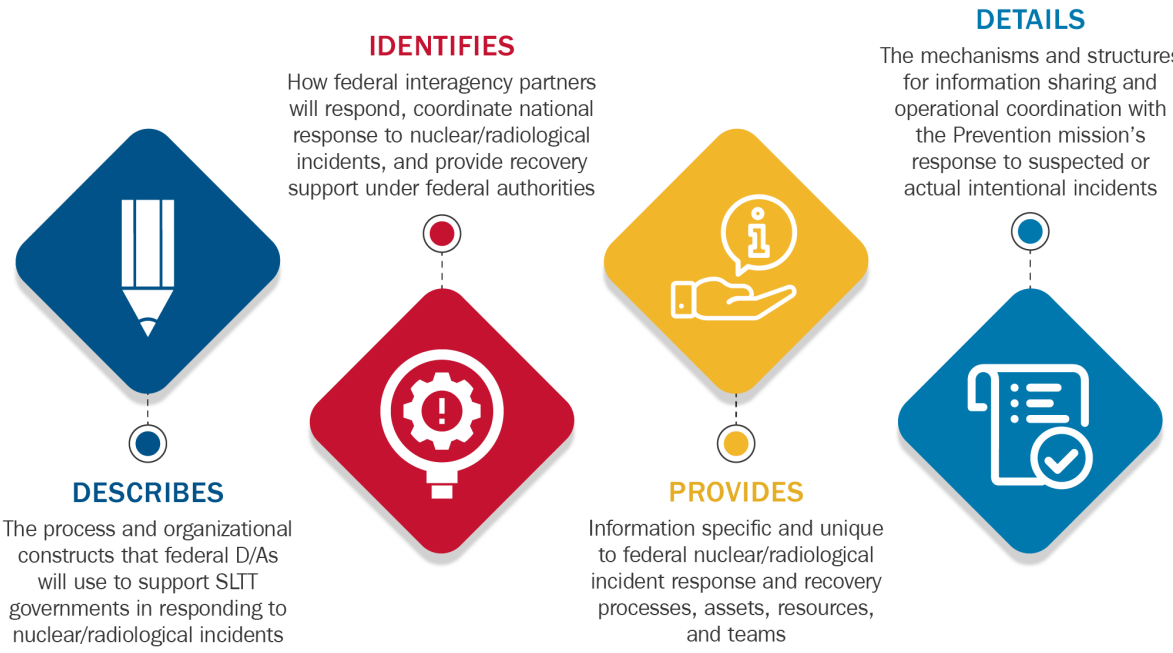

Figure 1: Purpose of the NRIA

Scope

This annex applies to federal responses to nuclear/radiological incidents, regardless of size, complexity, or cause. It also applies to federal support for recovery from such incidents. This annex does not address acts of nuclear war. The NRIA does not alter or impede the ability of any SLTT government or federal agency to execute authorities or meet responsibilities under applicable laws and executive orders, including Presidential policy directives and memoranda. Federal D/As may take independent emergency actions pursuant to their own statutory authorities and actions described in national policy.

This annex applies to federal D/As responding to or supporting recovery from nuclear/radiological incidents under a wide range of legal authorities, including those listed in Appendix V: Authorities. This annex is intended to be consistent with U.S. laws, policies, and other related requirements.

Facts, Planning Assumptions, and Critical Considerations

The following information represents facts, planning assumptions, and critical considerations used to develop the planning environment for the Nuclear/Radiological Incident Annex.

Facts

Facts are known data concerning the situation that can be substantiated.

- A nuclear/radiological incident presents unique challenges and complications for traditional emergency management and all-hazards response functions.

- A nuclear or radiological incident can occur at any time with little or no warning, can involve single or multiple geographic areas, and can result in mass casualties, property damages, and environmental impacts.
- A significant nuclear/radiological incident exceeds the response capabilities of SLTT governments and the private sector, requiring federal assistance.
- Clear, consistent, unified, timely, and actionable public messaging and information is critical to limiting radiation exposure and saving lives due to the public's limited experience with nuclear/radiological incidents.
- The following three primary methods limit exposure to radiation, and officials will need to weigh which method to prioritize to achieve the best radiation dose reduction:
    - Time: Minimize time spent near a radioactive source. The less time exposed to the source of radiation, the lower the dose received.
    - Distance: Maximize the distance from a radioactive source. The farther one is from the source of radiation, the lower the dose received.
    - Shielding: Shielding means having something that will absorb radiation (such as concrete, steel, etc.) between an individual and the source of the radiation. Keep as much protection between oneself and the source as possible.
- SLTTT governments have primary responsibility for decision making and implementation of protective actions. Protective actions for nuclear/radiological incidents include evacuation, sheltering in place, self-decontamination, administration of radioprotectants,[14] food and water restrictions, and potential long-term relocation and remediation.[15]
- Personnel are required to follow federally mandated protective protocols, limit time near radioactive material, and monitor changing conditions. Federal D/As are responsible for ensuring the safety and health of their own response and recovery workers (including contract workers).[16] D/As must comply with applicable requirements for protecting worker safety and health, including applicable dose limits for workers.[17] Occupational radiation workers responding to an emergency should

[14] A radioprotectant is any drug or biologic that protects or aids in protecting against cell damage caused by radiation.
[15] Protective Action Guides (PAGs) are radiation dose guidelines that would trigger public safety measures, such as evacuation or staying inside, to safeguard public health during a radiation emergency. See the current PAGs in the EPA's *Protective Action Guidance Manual*, EPA-400/R-17-001 (2017).
[16] The federal law enforcement agencies within the Prevention Mission area are responsible for the health and safety of their personnel entering these areas. However, law enforcement personnel must refrain from undertaking missions in areas where radioactivity may be present until radiation levels can be accurately determined and readily monitored. While law enforcement response should be unimpeded, as their activities may prevent follow-on attacks and save additional lives, all responders, including law enforcement personnel, must be fully informed of the risks of exposure they may experience and must be trained and equipped, to the extent possible, on actions to be taken.
[17] See National Council on Radiation Protection and Measurements (NCRP) Guidance for Emergency Response Dosimetry, Report No. 179 (2017), its accompanying Commentary 28, and NCRP Management of Exposure to Ionizing Radiation: Radiation Protection Guidance for the United States, Report No. 180 (2018) for additional information.

follow the emergency guidelines established at their site for the incident, not those of their usual occupational setting.

Planning Assumptions

In the absence of known facts, planning assumptions represent information presumed to be true, as necessary to facilitate planning. During response and recovery operations, assumptions may be validated as or replaced by facts.

- During a federal, interagency response to a nuclear/radiological incident, multiple authorities will be used concurrently as each agency fulfills its mission area responsibilities.
- As a nuclear/radiological incident increases in complexity and scale, the multi-layered response will require an organization structure to coordinate response activities across federal interagency partners.
- For a complex nuclear/radiological incident response, specialized equipment, technical expertise, and other required resources will be limited. Specifically, for intentional incidents, competition for scarce resources will increase due to concerns about subsequent attacks.
- Public fear of radiation will result in many concerned citizens seeking unnecessary medical assistance, which could further exacerbate strains to medical resources and reduce the capacity to assist the more critically affected patients.[18] In addition to straining medical resources, public fear of radiation will also result in unnecessary self-evacuation from uncontaminated areas adjacent to the incident, which could cause transit congestion and constrain federal D/As from responding efficiently.
- Behavioral health impacts will be significant in survivors and responders. Significant behavioral health impacts (e.g., depression, anxiety, anger, post-traumatic stress disorder) will overwhelm existing behavioral health counseling professionals and facilities.
- Preparedness, public education, awareness of nuclear/radiological risks, and understanding of protective actions are limited.
- Employers, including federal D/As must still comply with applicable requirements for protecting worker safety and health, including Occupational Safety and Health Administration (OSHA) and Nuclear Regulatory Commission (NRC) dose limits for workers
- Fatality management resources will be strained by nuclear/radiological incidents that cause mass fatalities. Systems for managing human remains will be overwhelmed because of unusually great numbers of fatalities and specific decontamination requirements.

[18] See the NRC's Nonradiological Health Consequences from Evacuation and Relocation, NUREG/CR-7285 (2021) for additional information

Critical Considerations

Critical considerations are elements of information that must be taken into account when developing a plan. The following critical considerations are supplemental to those outlined in the Response and Recovery FIOP:

- In a nuclear/radiological incident that requires federal interagency support to SLTT jurisdictions, the President will likely declare a Major Disaster or Emergency under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act).
- For nuclear/radiological incidents that occur on federal lands not owned or operated by the Department of Defense or the Department of Energy, federal D/As designated as federal land or facilities managers will be the first responder on-scene and will conduct initial response and notification of a nuclear or radiological incident.
- Following a nuclear/radiological incident, communication with the public is critical for life-saving activities. Due to the ongoing nature of the incident, the government must continually provide accurate and reliable information to the public to facilitate appropriate protective actions and mitigate physical and behavioral health effects.
    - While social media can be beneficial when used as a public information outreach tool, information control on these platforms is difficult. Rumors and misinformation on these platforms following an incident can create confusion.
    - Despite consistent and accurate messaging to inform the public about specific protective actions, part of the population may choose to disregard this information for a variety of reasons, taking unnecessary health and safety risks.
- A nuclear/radiological incident will likely overwhelm the local medical community and result in a high demand for medical care. Local medical facilities can be unavailable if affected by the incident. Provision of emergency care, patient transport to definitive care, contamination control, availability of trained medical personnel, and medical logistics are expected to be negatively impacted.
    - Early access to medical care will increase the likelihood of survival and quality of life, but this can be difficult due to excessive debris and/or if survivors are located within dangerous radiation zones.
    - People exposed to high levels of radiation during nuclear/radiological incidents will require long-term medical monitoring and care.
- After a nuclear/radiological incident, disruptions to the water supply can occur, making firefighting and decontamination difficult.
- A radiological incident may not be recognized until responders detect radioactive material, a breach or theft is reported, or the health effects of radiation exposure are manifested in the population and identified by the public health community.
- Residual radioactivity in the environment (e.g., waterways, livestock, forests, agricultural land, and wildlife) may affect the food supply and drinking water.

- Meteorological conditions and weather forecasts throughout the incident will likely play a significant role in decision making, including evacuation routes, locations for staging areas and shelters, and establishing incident response zones. Weather will affect contamination, with precipitation and wind potentially creating "hot spots" some distance away from the initial impact areas.
- The radioactive plume[19] from airborne releases can reach areas distant from the point of release and can rapidly change in intensity and area coverage (based on weather conditions and radioactive decay). Response to a large incident will depend on the extent of radiological dispersion and can require that certain operations are conducted in contaminated areas over multi-jurisdictional and multi-state regions.
- By policy, any possible terrorist incident, including those relating to a nuclear/radiological incident, will be treated as an actual terrorist incident until otherwise determined by the Attorney General, acting through the FBI Director. In these instances, the Attorney General acting through the FBI Director has lead responsibility for the federal operational law enforcement response to and criminal investigations of terrorist threats and/or incidents in the United States and its territories.
- If a nuclear/radiological incident is caused by or suspected of having been caused by terrorism or other criminal activity, coordination with the law enforcement and/or counterterrorism communities must also be included.
- The location of a suspected or actual intentional incident will be treated as a federal crime scene. The preservation and collection of evidence is critical to determine the identity of culpable parties or information regarding potential additional planned attacks.
- Some critical response personnel will be personally affected by the incident and unable to execute their job responsibilities.
- Contamination control measures will place additional constraints on responder and mass care resources. Clear public messaging will be critical for survivors to perform self-decontamination activities effectively. Mass decontamination activities will require specialized resources and equipment. Resources and technical expertise will be limited and competition among various governmental entities and the private sector should be anticipated.[20]
- A nuclear/radiological incident can result in long-term displacement of affected individuals from their normal residences and/or places of business.

[19] A plume is the material spreading from a particular source and traveling through environmental media such as air or ground water. A plume could describe the dispersal of particles, gases, vapors, and aerosols in the atmosphere or the movement of contamination through an aquifer (for example, dilution, mixing, or absorption onto soil).
[20] See the CDC's Population Monitoring in Radiation Emergencies: A Guide for State and Local Public Health Planners (2014) for more information about decontamination activities.

- If a nuclear/radiological incident affects both the environment and population, close coordination between the emergency management and environmental protection communities will be required throughout the incident.
- A nuclear/radiological incident can require concurrent implementation of the *National Contingency Plan, the Biological Incident Annex to the Response and Recovery FIOP* and *Oil and Chemical Incident Annex to the Response and Recovery FIOP* to address oil, chemical, or biological as well as radiological releases into the environment.
- The disposition of human remains is complicated by both internal and external radiological contamination. Special considerations for personnel handling and processing remains, waste, and final disposition is required.[21] Law enforcement investigations also necessitate that human remains be recovered and preserved as evidence.
- The incident type will affect radioactive and hazardous waste processing and disposal. Management of large quantities of radioactive and hazardous waste is challenging and will further drain limited critical resources.
- Depending on the scale of the nuclear/radiological effects, communities can remain uninhabitable for years. Displaced residents could require alternative long-term housing and permanent relocation plans.
- Following a major incident, short- and long-term domestic and international contamination migration issues can occur due to unmonitored and uncontrolled movement of people, household pets and service animals, and transportation conveyances outward from the affected area, which can cause cascading challenges across multiple jurisdictions.
- Radiation contamination can require long-term or permanent closure of buildings or public spaces. Environmental decontamination and remediation can take an extended period, closing affected areas to individuals and businesses, which could cause long-term economic and supply chain impacts.
- Following a nuclear/radiological incident, commercial communications and public safety communications infrastructure in the impacted area can be affected for long periods of time or permanently. Infrastructure that survives the initial event but remains exposed to the effects of ionizing radiation can degrade, impacting the performance and survivability of electronic devices in radiation environments. Responders dependent on commercial communications may experience deteriorating capabilities. Equipment brought into areas with increased radiation may be required to be left in those areas due to contamination and can also degrade with continued exposure. Communications plans should incorporate the risk of electronic component failures, as well as a means of incorporating surge and/or mobile

[21] See the CDC's Guidelines for Handling Decedents Contaminated with Radioactive Materials (2021) for additional information.

communications recovery capabilities that will likely be rendered unusable through repeated use.

- Due to OSHA standards, response teams should not enter affected areas until radiation levels in these areas can be accurately determined and readily monitored, and personnel must receive pre-entry briefings (in addition to any other required radiation safety training) before entering such areas, when feasible.[22] This requirement can delay response activities and require additional staffing. The principle "as low as reasonably achievable" applies to all federal and SLTT responders, requiring every reasonable effort to maintain exposures to ionizing radiation as far below the dose limits as practical.[23] However, the Protective Action Guide (PAG) developed by the Environmental Protection Agency (EPA) provides higher dose level guidance for responders to allow for life saving activities and protection of critical infrastructure under certain circumstances.[24]
- Embargos or stop movement orders can be placed on interstate or exported products and/or goods from the affected areas due to contamination concerns.
    - Neighboring states and countries can close transit hubs and crossings, restricting the flow of resources, waste, response/recovery personnel, and evacuees.
- A nuclear/radiological incident can warrant federal continuity of operations actions.

MISSION

The mission of the federal government following a nuclear/radiological incident is to save lives, protect health and safety, reduce human suffering, protect property and the environment, restore critical infrastructure capacity,[25] re-establish an economic and social base, and support community activities to successfully overcome the physical, psychological, and environmental impacts of a nuclear/radiological incident. To achieve this mission, the federal interagency operations seek to stop, contain, and remediate the harmful effects produced by the incident and implement consequence management by assisting survivors. For intentional incidents, the mission of the federal government includes the operational law enforcement response, which includes conducting investigations, attributing the incident to perpetrators, and using all available tools to hold them accountable.[26]

[22] See OSHA's *Hazardous Waste Operations and Emergency Response Standard*, 29 CFR 1910.120 for additional information.
[23] See the U.S. National Response Team (NRT) Guidance, Technical Assistance, and Planning Resources website at https://www.nrt.org/Main/Resources.aspx?ResourceType=Health%20and%20Safety&ResourceSection=2.
[24] For more information about higher dose level guidance for responders, the EPA's Protective Action Guide Manual: Protective Action Guides and Planning Guidance for Radiological Incidents (2017).
[25] *Presidential Policy Directive 21 (PPD-21): Critical Infrastructure Security and Resilience* (2013) advances a national policy to strengthen and maintain secure, functioning, and resilient critical infrastructure.
[26] For additional information on responding to suspected and actual intentional incidents, see Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents.

Desired End State

The desired end state of federal response and recovery operations after a nuclear/radiological incident is achieved when the following conditions are fulfilled:

- All necessary lifesaving and life-sustaining assistance is provided.
- SLTT governments can provide individuals and families with the means to recover from their losses in a manner that sustains their physical, emotional, social, and economic well-being.
- All affected land has been assessed for environmental safety, need for decontamination, and appropriateness for re-occupancy and resumption of use. Results of the assessments have been made public. Remediation activities for the contaminated areas have been established.
- Critical infrastructure capability and capacity are restored.
- Public safety and health protection are reestablished.
- Affected populations are fully identified and have received appropriate medical care or other interventions to protect or restore health.
- Commercial activity meets the demand of the population. Economic disruptions are minimized locally, nationally, and internationally.
- Contaminated waste is effectively managed, transported, contained, and/or disposed of. Systems are in place to prevent entry of contaminated food and agricultural products into the market.
- Displaced populations have returned or relocated to permanent housing.
- Long-term public health monitoring and behavioral health programs are in place.
- Processes are in place to support potential multi-year fatality management activities.
- For intentional nuclear/radiological incidents, law enforcement investigations have concluded, and perpetrators have been identified and held accountable.

Authorities

The following key authorities are applicable to this annex. More information on the authorities listed below can be found in Appendix V: Authorities.

- Presidential Policy Directive (PPD) 8: National Preparedness
- PPD-35: United States Nuclear Weapons Command, Control, Safety and Security
- PPD-44: Enhancing Domestic Incident Response
- Homeland Security Presidential Directive (HSPD) 5: Management of Domestic Incidents
- National Security Memorandum (NSM) 16: Strengthening the Security and Resilience of United States Food and Agriculture (classified)
- NSM-19: Counter Weapons of Mass Destruction (WMD) Terrorism and Advance Nuclear and Radioactive Material Security Worldwide (classified)

- National Security Presidential Directive (NSPD) 42 / HSPD-14: Domestic Nuclear Detection
- National Security Presidential Memorandum (NSPM) 36: Guidelines for U.S. Government Interagency Response to Terrorist Threats and Incidents in the United States and Overseas Homeland Security Act of 2002
- Post-Katrina Emergency Management Reform Act of 2006 (PKEMRA)
- Pets Evacuation and Transportation Standards Act of 2006
- Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act)
- Sandy Recovery Improvement Act of 2013
- Atomic Energy Act of 1954

Certain federal D/As are authorized to respond directly to specific nuclear/radiological incidents. Federal D/As may take appropriate independent emergency actions within the limits of their own statutory authority to protect their workers (including contractors) and the public, mitigate immediate hazards, and gather information concerning the emergency to avoid delay. Nothing in this annex alters or impedes the ability of federal D/As to carry out their respective authorities and associated responsibilities under law. This annex does not create new authorities nor change existing ones.

In addition to the authorities referenced above, which include classified policy directives and memoranda, the following key legal authorities are also applicable to this annex:

- The Energy Reorganization Act of 1974
- Price-Anderson Nuclear Industries Indemnity Act
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
- National Oil and Hazardous Substances Pollution Contingency Plan (NCP)
- The Defense Against Weapons of Mass Destruction Act
- Resource Conservation and Recovery Act
- Clean Water Act
- Safe Drinking Water Act
- Clean Air Act
- Project BioShield Act
- Pandemic and All-Hazards Preparedness Act
- Pandemic and All-Hazards Preparedness Reauthorization Act
- Pandemic and All-Hazards Preparedness and Advancing Innovation Act
- Public Readiness and Emergency Preparedness Act
- Public Health Service Act
- Social Security Act, Section 1135
- Federal Food, Drug, and Cosmetic Act
- The Office of Federal Procurement Policy Act
- Foreign Assistance Act of 1961

- Defense Production Act
- Hazardous Materials Transportation Act
- The Occupational Safety and Health Act of 1970
- 10 CFR § 20 – Standards for Protection Against Radiation
- 10 CFR § 61.55 – Waste Classification
- Reorganization Plan No. 3 of 1970
- 44 CFR § 350 – Review and Approval of State and Local Radiological Emergency Plans and Preparedness
- 44 CFR § 351 – Radiological Emergency Planning and Preparedness
- 28 CFR § 0.85 – Federal Bureau of Investigation General Functions
- Title 50 USC – War and National Defense
  - §§ 2406, 2511 (codifying Executive Order 12344): Naval Nuclear Propulsion
- Title 18 USC – Crimes and Criminal Procedure
  - § 831: Prohibited Transactions Involving Nuclear Materials
  - § 2332a: Use of Weapons of Mass Destruction
  - § 2332b(f): The Attorney General of the United States has primary investigative responsibility for all federal crimes of terrorism and certain other designated offenses
  - § 2332f: Bombings of places of public use, government facilities, public transportation systems and infrastructure facilities
  - § 2332h: Radiological Dispersal Devices
  - § 2332i: Acts of Nuclear Terrorism
- Title 28 USC – Judiciary and Judicial Procedure
- Convention on Supplementary Compensation for Nuclear Damage
- Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
- Executive Order 12656 of November 18, 1988, as amended

EXECUTION

Concept of Operations

When possible, the consequences of nuclear/radiological incidents are managed by local and state governments, but for incidents that require federal response and recovery support, the NRIA concept of operations (CONOPS) employs four constructs. As incidents change in size, scope, and complexity, the federal response and recovery support constructs are designed to be scalable, layered, and adaptable to meet operational requirements.

Tiered Response

This annex is founded on the principle of tiered response or the understanding that most incidents are handled at the lowest possible jurisdictional level. As resources and capabilities are exceeded, additional SLTT and federal assets are applied. A key component of tiered response is mutual aid and assistance. Local communities and states have mutual aid compacts in place to share critical resources across jurisdictional boundaries in a timely manner.

The owner/operator of a nuclear/radiological facility or materials is primarily responsible for consequence management within the bounds of the facility, notifying and providing protective action recommendations to SLTT governments and minimizing the radiological hazard. For incidents involving nuclear/radiological fixed facilities, the owner/operator may be responsible or liable for response and recovery activities outside the facility boundary under applicable legal obligations.[27] For areas surrounding a nuclear/radiological incident site, SLTT governments have primary responsibility for protecting life, property, and the environment. Federal and SLTT governments and owners/operators of nuclear/radiological facilities should request assistance through established protocols.

When a federal crime has been or is suspected to have been committed, the FBI will establish an FBI Command Post or Joint Operations Center (JOC) at the local level for the purpose of managing the investigation, as well as leading and coordinating the law enforcement response. If necessary, on the national level, the FBI will activate the Weapons of Mass Destruction Strategic Group (WMDSG) to enhance information sharing and the deconfliction of law enforcement and consequence management operations. The FBI may also establish other command posts, such as the Critical Incident Response Group National Asset Command Post, which provides all technical information represented by and collected from any weapons of mass destruction (WMD) devices. The FBI will establish operational coordination with the response community within these local, regional, and national level operations centers. For incidents involving terrorist use of orphan material, the Department of Homeland Security (DHS) and FEMA lead the response and recovery actions for the federal government. For additional information, see Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents.

Response/Recovery Coordination Constructs

The federal response to nuclear/radiological incidents is consistent with the authority of the federal government as described in the *National Response Framework* (NRF),[28] *National Disaster Recovery Framework* (NDRF),[29] and other national policy guidance and directives.

---

[27] *The Comprehensive Environmental Response, Compensation, and Liability Act,* otherwise known as CERCLA or Superfund, provides a federal "Superfund" to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup.
[28] The NRF (2019) is a guide to how the nation responds to all types of disasters and emergencies. It is built on scalable, flexible, and adaptable concepts identified in the National Incident Management System (NIMS) to align key roles and responsibilities.
[29] The NDRF (2016) enables effective recovery support to disaster impacted SLTT jurisdictions. It provides a flexible structure that enables disaster recovery managers to operate in a unified and collaborative manner. The NDRF focuses on how best to restore, redevelop, and revitalize the health, social, economic, natural, and environmental fabric of the community and build a more resilient nation.

In addition, the federal response must be well coordinated and may involve owner/operators, SLTT governments, NGOs, and private-sector partners.

Emergency Support Functions (ESFs) are the primary coordinating structure for building, sustaining, and delivering the response core capabilities during a federal interagency response. However, while ESFs are designed for both Stafford Act and non-Stafford Act incidents, ESFs may not always be the most appropriate response coordination structure for non-Stafford Act incidents. For incidents in which there has been no declaration under the Stafford Act, the lead agency should respond in a standard National Incident Management System (NIMS) structure. In addition to their NIMS structures, D/As responding under their own legal authorities may request that FEMA activate relevant ESFs. This annex describes the coordination structures, in addition to the ESFs, that may be used to deliver core capabilities and respond to complex nuclear/radiological incidents.

Consistent with the NDRF, the federal government uses Recovery Support Functions (RSFs) to coordinate key functional areas of recovery support. Each RSF has a designated coordinating agency along with primary agencies and supporting organizations with programs relevant to the functional area. The RSF Coordinating Agency, with the assistance of FEMA, provides leadership, coordination, and oversight for each RSF. The RSF Coordinating Agency also ensures ongoing communication and coordination among federal D/As, SLTT governments, and non-profit and private sector organizations. The NDRF will provide the overarching interagency coordination structure for the recovery phase for Stafford Act incidents, and elements of the framework may be used for significant non-Stafford Act incidents.

Nuclear/radiological incidents vary significantly in scope, consequences, and required resources. Most are managed at the local level, while others require the deployment of a Federal OSC to assist owners/operators and SLTT responders in determining the need for and level of federal support. Most Federal OSCs for nuclear/radiological incidents will be provided by the EPA and U.S. Coast Guard (USCG) depending on geographical jurisdiction. However, the Department of Energy (DOE) and the Department of Defense (DOD) also have the authority and responsibility to provide the Federal OSC for emergency hazardous substance releases specifically from DOE and DOD facilities and materials, which includes nuclear/radiological incidents.

The four federal coordination constructs identified in Figure 2 assist the Federal OSC and other federal authorities in determining the level of federal support required, if any. These constructs are adaptable to escalating incidents that may require moving from lesser to greater federal response. Typically, as severity and complexity increase, a higher-level construct is implemented to manage the incident. Factors determining which federal construct applies to a given nuclear/radiological incident include the following:

- The ability of SLTT governments to manage the incident without federal assistance
- The ability of owners/operators to execute response activities
- The applicability of specific federal response authorities to a given incident
- The type and extent of incident impacts, which can include the following:
    - Lifesaving and life-sustaining needs (including need for mass care)
    - Public health impacts, including number of fatalities and injuries

- Severity of impacts to critical infrastructure and key resources
- Property damage
- General economic impacts
- Environmental contamination
- Damage to natural resources, including recreational and cultural sites

Figure 2 illustrates the four constructs and displays how the level of federal support required scales based upon the size and complexity of the nuclear/radiological incident. A summary of each construct is provided below, but more detailed information can be found in Appendix A: Federal Response Coordination Constructs.

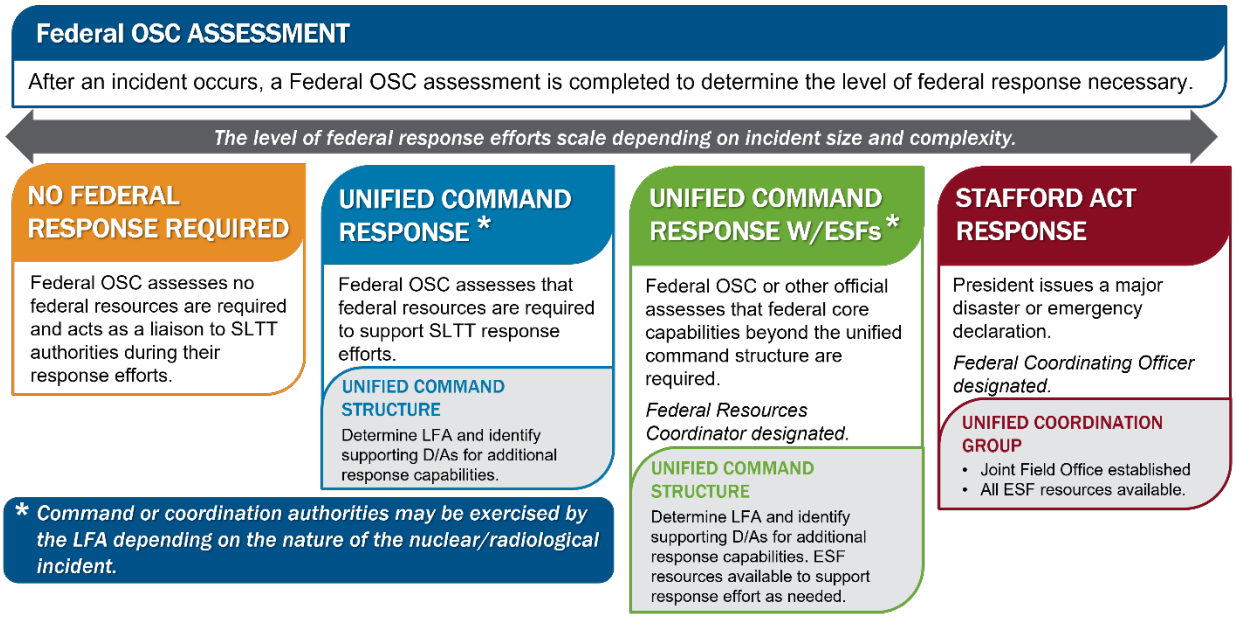

Figure 2: Federal Coordination Constructs for Nuclear/Radiological Incident Response

No Federal Response Required

The Federal OSC assesses the situation in collaboration with SLTT authorities and owner/operators and determines that the nuclear/radiological incident can be managed by SLTT authorities, owner/operators, NGOs, and private-sector resources and that **no federal response/recovery coordination is required**.

Unified Command Response

The Federal OSC assesses the situation in collaboration with SLTT authorities, federal land management agencies, and/or owner/operators, as appropriate, to determine if the nuclear/radiological incident **requires federal response/recovery coordination** to deliver appropriate resources to support response/recovery operations. Lead Federal Agencies (LFAs) may exercise command or coordination authorities granted by national policy depending on the nature and complexity of the nuclear/radiological incident.

Unified Command Response with Emergency Support Functions

The Federal OSC or other federal official determines that the nuclear/radiological incident **requires federal resources beyond those that can be delivered solely through the Unified Command response construct.** One or more ESFs are required to support the federal

response/recovery. In addition, a Federal Resource Coordinator (FRC) is designated to ensure federal D/As are working collaboratively to support response/recovery operations in conjunction with the Federal OSC and SLTT governments.

Command

The act of directing or ordering by virtue of explicit statutory, regulatory, or delegated authority.

Coordinate

To advance an analysis and exchange of information systematically among principals to carry out specific incident management responsibilities.

Stafford Act Response

The President issues a **major disaster or emergency declaration under the Stafford Act** due to the magnitude of the nuclear/radiological incident. A Federal Coordinating Officer (FCO) is designated, and a Joint Field Office (JFO) is established. The relevant ESFs coordinate with the appropriate federal D/As and officials in support of the SLTT response/recovery.

Lead Federal Agencies with Primary Authority

The agency that is responsible for leading and coordinating all aspects of the federal response is referred to as the Lead Federal Agency (LFA)[30] and is determined by the context and characteristics of a specific incident. When a federal D/A owns, authorizes, regulates, or is deemed responsible for the facility or activity causing the nuclear/radiological incident and has authority to manage federal actions onsite, that federal D/A will be designated the LFA.

Determination of Lead Federal Agency

Table 1[31] details which federal D/A is designated as the LFA based upon the context and characteristics of the nuclear/radiological incident. The LFA is determined by incident type, facilities, and/or materials involved. The LFAs listed in Table 1 have authorities, technical expertise, and/or assets for responding to the unique characteristics of nuclear/radiological incidents that are not otherwise described in the Response and Recovery FIOP. Specific roles and responsibilities are determined by the scope of their authorities over relevant aspects of the incident. As Table 1 illustrates, the LFA has specific responsibilities, and as a result, depending on the nature of the nuclear/radiological incident and the response required, there may be more than one LFA for the same incident. In such circumstances, coordination should occur through national coordination structures. For further information, see Response and Recovery FIOP, Figure 2: Example Unified Coordination Organization, and accompanying text.

[30] In the 2016 version of the NRIA, the term "primary authority" designated the lead agency for federal response. The term "Lead Federal Agency" (LFA) is used to designated agencies with primary authority in this version to align with its usage in other national-level documents and plans. For certain emergency response actions, under CERCLA, LFA is defined in Title 40 CFR Part 300.5.

[31] For incidents involving nuclear facilities licensed by the NRC or an NRC Agreement State, FEMA may assume coordination of federal response if the incident includes offsite consequence. NRC remains the primary federal authority for onsite response.

Table 1: Lead Federal Agency with Primary Authority for Federal Response

INCIDENT TYPE, FACILITIES, OR MATERIALS INVOLVED	LEAD FEDERAL AGENCY WITH PRIMARY AUTHORITY
NUCLEAR FACILITIES	
Owned or operated by the DOD	**DOD**
Owned or operated by the DOE	**DOE**
Licensed by the NRC or an NRC Agreement State	**NRC**
Not licensed, owned, or operated by a federal agency, an NRC Agreement State or currently or formerly licensed facilities for which the owner/operator is not financially viable or is otherwise unable to respond	**EPA**
Nuclear Weapons and Components	
In the custody of the DOD	**DOD**
In the custody of the DOE	**DOE**
Radioactive Materials Owned, Licensed, or Being Transported	
By or for the DOD	**DOD**
By or for the DOE	**DOE**
Containing NRC or NRC Agreement State licensed materials	**NRC**
Within the coastal zone for materials that are not licensed or owned by a federal agency or an NRC Agreement State	**USCG**
All others	**EPA**
Radioactive Materials in Space Vehicles Impacting the United States	
Managed by the National Aeronautics and Space Administration (NASA)	**NASA**
Managed by the DOD	**DOD**
Not managed by the NASA or the DOD, not licensed by the Federal Aviation Administration (FAA) for launch or reentry, and impacting the coastal zone	**USCG**
All others not licensed, permitted, regulated, or managed by a federal D/A	**EPA**
Disused and Unwanted Sealed Sources with no Disposition Pathway	
Off-Site Source Recovery	**DOE**
Unknown or Unlicensed Materials, and Domestic Response to Foreign Materials and International Incidents	
Inadvertently imported radioactive materials that are interdicted at or between U.S. Ports of Entry	**CBP**
Imported contaminated consumer products that are distributed before detection	**EPA**
Within the coastal zone for materials that were not imported	**USCG**
All others	**EPA**
Inadvertent Incidents Involving Lost/Found/Orphaned Radioactive Material	**DOE, NNSA**
U.S. Assistance to Foreign Governments for Incidents with International Impacts	**DOS**
All Intentional Incidents Involving Nuclear/Radiological Facilities or Materials (e.g., RDDs, INDs)	**DHS, FEMA**

NOTE: DHS/FEMA may be called upon to lead or provide supplemental operational consequence management and response coordination support for the Lead Federal Agency during complex incidents.

Notification of Incident

The owner/operator of a nuclear/radiological facility or owner/transporter of nuclear/radiological material is generally the first to become aware of an incident and may be obligated to notify SLTT governments, as well as relevant federal D/As. For example, NRC licensees are legally required to notify SLTT governments and the NRC.

Federal and SLTT governments that become aware of a nuclear/radiological incident shall notify the appropriate federal D/A, per Table 1. The LFA provides notification of a nuclear/radiological incident to the DHS National Operations Center (NOC) and other appropriate federal D/As, in compliance with other statutory requirements for notification.

In nuclear/radiological incidents involving suspected criminal acts, LFAs should immediately inform the FBI field office nearest to the incident site. Federal D/As performing response missions will cooperate with the FBI throughout the course of the investigation, giving priority to lifesaving activities. Further, SLTT law enforcement agencies should continue to coordinate with their local FBI field office regarding potential ongoing terrorist activities, incidents, or investigations.

If an SLTT government requests assistance directly from a specific federal D/A that does not have primary authority, that federal D/A must notify the correct LFA for the nuclear/radiological incident.

Activation of Federal Interagency Response

Once notified, the LFA initiates the coordinated federal interagency response in accordance with its authorities.

Responding federal D/As provide representatives to the coordination elements described in the NRF and NDRF (e.g., JFO, NOC). For Stafford Act incidents, FEMA may issue mission assignments to federal D/As to support response and recovery activities.

The LFA may request that FEMA activate NRF and/or NDRF elements to support response and/or recovery activities. The LFA may also request assistance from other federal D/As.

The LFA will be represented in appropriate positions within the Command Staff in the Incident Command/Unified Command (IC/UC) structure, will coordinate federal radiological response and recovery activities at appropriate field facilities, and will provide personnel to other sections of the IC/UC as needed (i.e., the Nuclear Radiological Incident Task Force Leader).

For any nuclear/radiological incident, responding federal D/As may establish a field facility, assist SLTT response and recovery organizations, monitor and support owner/operator activities, provide technical support to the owner/operator if requested, and serve as a federal source of information about incident conditions.

State, Local, Tribal, and Territorial Coordination

The federal response and recovery support following a nuclear/radiological incident must be coordinated closely with the SLTT governments in the area near the incident. Response to and recovery from nuclear/radiological incidents affecting land owned by the U.S. government are coordinated with the agency responsible for managing that land to ensure that incident management activities are consistent with federal statutes governing use and occupancy. In the case of tribal lands, tribal governments have a special relationship with

the U.S. government. Federal and SLTT governments may have limited or no authority on tribal lands. The NRF's Tribal Relations Support Annex[32] provides further guidance.

Recovery activities often begin while sustained response operations are still ongoing. Early and effective recovery coordination enables the appropriate SLTT stakeholders to better understand the federal programs and other assistance available. For successful recovery, federal D/As should discern the SLTT governments' priorities for rebuilding their community after the incident. Federal D/As should work closely with SLTT governments to support and execute their vision of recovery.[33]

Operational Phases

The Response and Recovery FIOP provides a more detailed description of FEMA's phased approach to federal operations. Other federal D/As may use different methods for operational phasing, but for the purposes of this document, FEMA emergency management phasing applies. Figure 3 illustrates these phases. The timing and duration of each phase may vary depending on the incident.

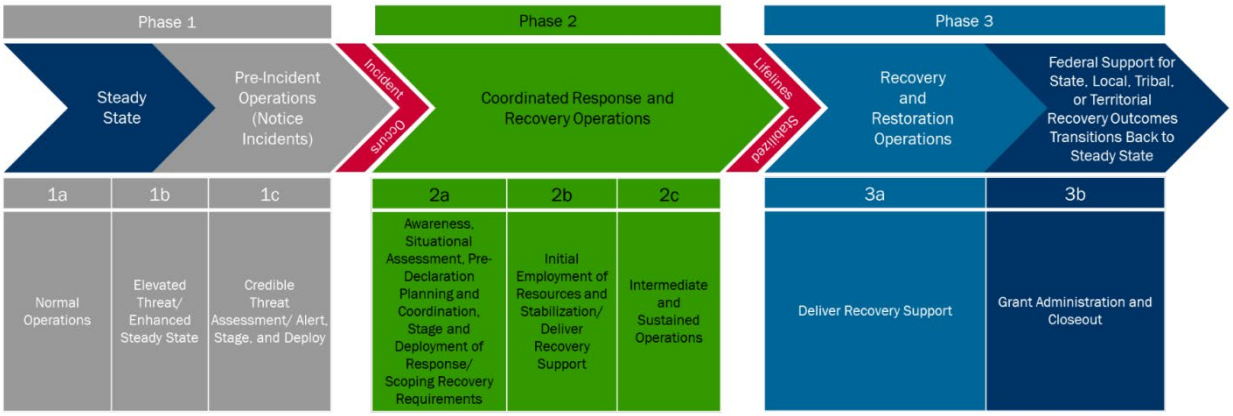

Figure 3: FEMA Operational Phases[34]

Phase 1: Pre-Incident Operations

Appropriate federal D/As coordinate with each other and with SLTT governments, NGOs, and private-sector stakeholders to plan for nuclear/radiological incidents and maintain situational awareness. See the Response and Recovery FIOP for a more detailed description of all-hazards preparedness actions for the federal government.[35]

Sub-phase transitions differ for no-notice and notice incidents. Sub-Phases 1b and 1c pertain to notice incidents. Examples of notice incidents include an impending hurricane and a criminal or terrorist threat identified by law enforcement. Most nuclear/radiological

[32] See the Tribal Relations Support Annex (2013) to the NRF.
[33] See FEMA's Effective Coordination of Recovery Resources for State, Tribal, Territorial and Local Incidents (2015) document for more information on SLTT coordination.
[34] Although not depicted in Figure 3, during intentional nuclear and/or radiological incidents, such as terrorism, Prevention mission operations may be occurring at the same time during Phase 2 Response and Recovery Operations and Phase 3 Recovery and Restoration Operations depending on the nature of the intentional incident.
[35] There could be requests to prepare or preposition assets in connection with the U.S. government's response to an imminent terrorist threat prior to actual incident. This, however, is not addressed within this annex.

incidents are accidental and therefore are no-notice incidents. In these incidents, Sub-Phases 1b and 1c are bypassed and the response moves directly to Sub-Phase 2a.

For nuclear/radiological incidents with notice, federal D/As will take the preliminary actions in preparation for a Sub-Phase 2a response. The following include some of the key federal government activities that occur during Sub-Phase 1b and 1c:

- Analyzing and modeling the potential impacts from a nuclear/radiological incident, analyzing the market impacts to the economy, and determining the effect on other critical infrastructure (CI)
- Conducting coordination calls among appropriate federal D/As and obtaining situational awareness with nuclear/radiological industry representatives and SLTT governments
- Determining if the potential incident is related to crime or terrorism through the FBI and sharing that information with SLTT law enforcement, if necessary

Phase 2: Coordinated Response and Recovery and Operations

Sub-Phases 2a and 2b typically include actions beginning within 72 hours of a nuclear/radiological incident. When feasible, these actions can begin as early as 24 to 48 hours following a nuclear/radiological incident. Actions focus on saving lives, meeting basic human needs, protecting the environment, including limiting the spread of contamination, and supporting the transition to recovery. For nuclear/radiological incidents, communication during this phase is critical to minimize potential impacts to the public and the environment. During these sub-phases, the federal government takes actions, including deployment of specialized teams and assets, conducting damage assessments, and sharing information.

Sub-Phase 2c normally covers a period of approximately 3 to 30 days following the incident, though the unique nature of nuclear/radiological incidents may extend this timeline. The following include some of the key federal government activities during this sub-phase:

- Coordinating with SLTT governments, owner/operators, and other affected entities to identify potential cascading impacts
- Continuing to communicate critical information to the public
- Ensuring that public protective actions continue to conform to environmental modeling and established protective action guidelines

Phase 3: Recovery and Restoration Operations

Initial recovery actions begin during the response phases (Sub-Phases 2a through 2c) and include preparing to support longer-term health and safety needs, assessing damages, and beginning to restore infrastructure. Recovery activities may last for an extended period, which includes Sub-Phases 3a and 3b. Each SLTT government defines its own goals for successful recovery based on its circumstances, challenges, vision, and priorities. In general, the goals of federal operations to recover from a nuclear/radiological incident include ensuring the relocation or return of displaced survivors, reestablishment of essential services, and the remediation of the environment. The following actions occur during this phase:

- Supporting and advising SLTT governments on recovery options

- Identifying and facilitating federal programs to expedite CI restoration
- Developing a Recovery Support Strategy, including a projected timeline detailing the levels, types, and durations of federal support, which may be long-term for nuclear/radiological incidents
- Advising how to incorporate mitigation, sustainability, and resilience-building into recovery operations

Protective Action Phases

Federal response and recovery actions are carried out with appropriate health and safety guidelines and concurrent with SLTT decision making. For example, if the area is contaminated by radioactive material and appropriate personal protective equipment (PPE) and capabilities are not available, response actions may be delayed until the radiological hazard dissipates to a safe level for emergency response personnel or until appropriate PPE and capabilities arrive. The federal government established Protective Action Guides (PAGs)[36] for nuclear/radiological incidents. Protective action decision making can be divided into three action phases that are common to all nuclear/radiological incidents: the early phase, the intermediate phase, and the late phase. The phases, which may overlap, represent non-precise time periods in which response officials would be making public health protection decisions. Figure 4 outlines how these protective action phases align to operational phases. Figure 5 lists potential exposure pathways, their corresponding protective actions, and approximate operational phase.

Figure 4: Protective Action Phases Aligned to Operational Phases

Early Phase

The early phase is the period at the beginning of the incident when immediate decisions for effective protective actions are required. There may be little or no information available on actual releases or field measurement data. Protective actions in the early phase are aimed at avoiding inhalation of gases or particulates in a plume, minimizing external exposure, and limiting the spread of contamination.

[36] See the EPA's Protective Action Guide Manual: Protective Action Guides and Planning Guidance for Radiological Incidents (2017).

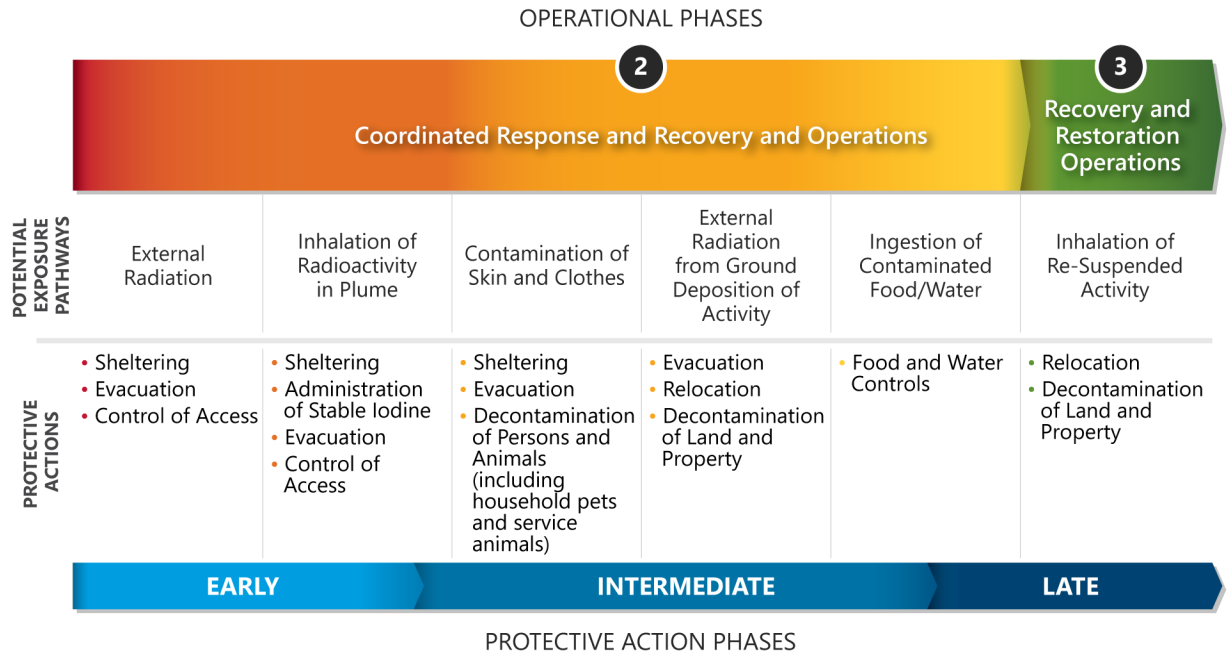

Figure 5: Potential Exposure Pathways and Effective Protective Actions by Operational Phase

Intermediate Phase

The intermediate phase may overlap with and/or follow the early phase response within as little as a few hours and can last for weeks or months. This phase is assumed to begin after the incident source and releases have been brought under control and protective action decisions can be made based on measurements of exposure and radioactive materials that have been deposited. Protective actions in the intermediate phase are intended to reduce or avoid exposure of the public to radioactivity, control worker exposures and the spread of contamination, and prepare for late-phase cleanup.

Late Phase

The late phase is the period when actions designed to reduce radiation levels in the environment to acceptable levels are conducted. The late phase entails final clean-up decisions and implementation of remediation strategies. The late phase will overlap with the intermediate phase response, making Sub-Phase 2c part of both the intermediate and late phases.

The clean-up process described in this document does not rely on and does not affect authority under CERCLA, 42 USC 9601 et seq. and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR § 300.

Roles, Responsibilities, and Capabilities

U.S. Department of Defense (DOD)

Consistent with applicable Presidential policies and memoranda, U.S. Department of Defense (DOD) is responsible for coordinating federal actions related to nuclear/radiological

incidents involving nuclear weapons in DOD custody, DOD facilities (including U.S. nuclear-powered ships), or material otherwise under DOD jurisdiction.

Under the CERCLA, Executive Order 12580, and the NCP, DOD is responsible for hazardous substance responses to releases on or from DOD facilities or vessels under the jurisdiction, custody, or control of DOD, including transportation-related incidents. For responses under these circumstances, DOD provides a Federal OSC or Remedial Project Manager (RPM) who is responsible for all CERCLA response actions, both onsite and offsite.

For incidents occurring on, or where the sole source of the nuclear/radiological release is from, any facility or vessel under DOD jurisdiction, custody, or control, DOD is responsible for the following actions:

- Mitigate the consequences of the incident.
- Provide notification and appropriate protective action recommendations to SLTT government officials.
- Minimize the radiological hazard to the public.

If the incidents for which DOD is responsible require integration of federal consequence management capabilities, then DOD will coordinate with other federal entities under the NRF, the NIMS, and the NCP. For radiological incidents involving a nuclear weapon, special nuclear material, and/or classified components that are in DOD custody, DOD may establish a National Defense Area (NDA), consistent with applicable law and Presidential policies and directives. An NDA is an area established on non-federal lands located within the United States or its possessions or territories for the purpose of safeguarding classified defense information or protecting DOD equipment and/or materiel. Establishment of an NDA temporarily places such non-federal lands under the effective control of DOD and results only from an emergency incident. The senior DOD representative at the scene will define the boundary, mark it with a physical barrier, and post warning signs. The landowner's consent and cooperation will be obtained whenever possible; however, military necessity will dictate the final decision regarding location, shape, and size of the NDA. DOD will manage the response within the boundaries of the DOD facility or NDA and will coordinate with SLTT officials to ensure appropriate public health and safety actions are taken outside the NDA. DOD will lead the overall response to safeguard national security information and/or restricted data, equipment, or materiel.

DOD coordinates the federal response for incidents involving the release of nuclear/radioactive materials from DOD space vehicles or joint space vehicles with significant DOD involvement. A joint venture is an activity in which the U.S. government has provided extensive design/financial input; has provided and maintains ownership of instruments, spacecraft, or the launch vehicle; or is intimately involved in mission operations. A joint venture with a foreign nation is not created by simply selling or supplying material to a foreign country for use in its spacecraft.

U.S. Department of Energy (DOE)

The U.S. Department of Energy (DOE) and the National Nuclear Security Administration (NNSA) maintain a diverse array of authorities, responsibilities, and capabilities for responding to nuclear and radiological incidents. DOE provides technical and operational support to all types of nuclear/radiological incidents via the Nuclear Emergency Support

Team (NEST) and is responsible for coordinating the federal response to a nuclear/radiological incident at a DOE facility or involving DOE materials.

NEST is the umbrella designation that encompasses all DOE/NNSA nuclear/radiological emergency and incident response functions, including resources that can be deployed both nationally and internationally. NEST coordinates across all levels of the NRF operational coordination structure and NIMS command and coordination elements to provide tailorable, flexible and scalable response capabilities backed by DOE technical expertise.

NEST performs four principal missions:

1. Countering WMD threats
2. Responding to accidents involving U.S. nuclear stockpile weapons
3. Protecting public health and safety during potential and actual releases of radioactive materials
4. Performing nuclear forensic activities to attribute the origin of nuclear material interdicted outside regulatory control or used in a nuclear device

NEST protects public health and safety by delivering timely, technically sound, and actionable decision support to federal and SLTT authorities in response to nuclear or radiological incidents. NEST capabilities specific to nuclear/radiological response and recovery includes the following:

- Contingency planning
- Radiological incident assessment
- Atmospheric modeling
- Specialized radiation detection systems
- Monitoring and sampling
- Data management and assessment
- Laboratory analysis
- Radiological health and safety
- Resources to establish and manage the FRMAC for the initial response
- Technical and scientific expertise in nuclear/radiological incidents
- Remote technical support within the National Laboratory complex
- NEST Senior Response Official (SRO) cadre

For radiological/nuclear incidents involving its own facilities or materials, DOE maintains initial response capabilities at its facilities and sites, as well as mutual aid agreements with SLTT and federal partners. Under CERCLA and the NCP, DOE is responsible for hazardous substance responses to releases on or from DOE facilities or vessels under the jurisdiction, custody, or control of DOE, including transportation-related incidents. In these incidents, DOE provides a Federal OSC or Remedial Project Manager responsible for taking all CERCLA response actions.

DOE also has responsibility for the disposition, handling, and disposal of radioactive waste materials that derive from operational activities at DOE sites. This includes the disposal of high-level waste, Transuranic waste, low level waste, and waste from DOE radioactive waste sites under the EPA's CERCLA Program.

Through NEST, DOE/NNSA maintains capabilities to respond to incidents involving U.S. nuclear weapons in DOD and DOE custody, including a lost or stolen weapon. In accordance with the Atomic Energy Act, DOE is responsible for protection of certain nuclear materials, facilities, information, and nuclear weapons under DOE control, including U.S. nuclear materials and weapons at DOE facilities and while in transit under DOE custody. NEST provides weapon recovery and safety expertise, consequence management and health physics support, and incident management capabilities. NEST scientists, technical specialists, and incident managers work closely with the NNSA Office of Defense Programs and DOD in execution of this mission.

For nuclear/radiological incidents involving nuclear weapons, special nuclear material, and/or classified components that are in DOE custody, DOE may, in accordance with the Atomic Energy Act, establish a national security area (NSA). DOE will lead the overall response to safeguard national security information and/or restricted data, or equipment and materiel. DOE will manage the response within the boundaries of the DOE facility or NSA and will coordinate with SLTT officials to ensure appropriate public health and safety actions are taken outside the NSA. DOE is assigned authority under CERCLA and the NCP for DOE custody weapons accidents with release of nuclear/radiological material, or the threat of release of nuclear/radiological material.

DOE will manage recovery and remediation efforts for incidents in which DOE is designated LFA, and for other incidents may provide resources as requested by federal or SLTT partners, or as directed by DHS/FEMA through mission assignments or other authorities. As an incident transitions from response to recovery, DOE will closely coordinate with the EPA and transfer leadership of specific mission functions, particularly radiological monitoring and assessment activities under FRMAC, to EPA. Upon stabilization of an incident, priority will be given to demobilizing NEST resources to ensure readiness for mission essential functions and requirements. During a large-scale incident, NEST will prioritize operations most effective in protecting public health and safety. Following an initial response period of days to one week at high operational requirements, absent substantial support from interagency response resources of a similar type and capability to those provided by NEST, DOE/NNSA expects substantial impacts to NEST's ability to sustain operations.

DOE and NNSA nuclear and radiological resources, including NEST, are a finite pool of specialized resources that are leveraged across multiple mission spaces. During complex and sustained responses, DOE and NNSA will work with FEMA and interagency partners to identify additional resources and effectively allocate DOE, NNSA, and interagency responses to sustain a whole of government response.

U.S. Department of Homeland Security (DHS)

The Secretary of Homeland Security is the principal federal official for domestic incident management. Pursuant to the Homeland Security Act of 2002, the Secretary is responsible for coordinating federal preparedness activities and operations within the United States for response to and recovery from terrorist attacks, major disasters, and other emergencies.

HSPD-5 provides that the Secretary shall coordinate the federal government's resources utilized in response to or recovery from terrorist attacks, major disasters, or other emergencies if and when any one of the following four conditions applies: (1) A federal department or agency acting under its own authority has requested the assistance of the Secretary; (2) SLTT capabilities are overwhelmed and federal assistance has been requested by the appropriate SLTT authorities; (3) more than one federal department or agency has become substantially involved in responding to the incident; or (4) the Secretary has been directed to assume responsibility for managing the domestic incident by the President. The Secretary coordinates with federal D/As to provide federal unity of effort for domestic incident management.

Consistent with applicable presidential guidance including NSPM-36, HSPD-5, and PPD-44, an LFA may be assigned by the President to coordinate the federal interagency response in accordance with PPD-8 and the relevant incident-specific plan.

Federal Emergency Management Agency (FEMA)

The Stafford Act provides that a presidential declaration of a major disaster or an emergency triggers financial and physical assistance through FEMA. The Stafford Act gives FEMA the responsibility for coordinating government-wide relief activities. The Stafford Act constitutes the statutory authority for most federal disaster response activities especially as they pertain to FEMA and FEMA programs.

PKEMRA designated the FEMA Administrator as the principal advisor to the President, the Secretary of Homeland Security, and the National Security Council regarding emergency management. FEMA responsibilities include operation of the National Response Coordination Center (NRCC); the effective coordination of all ESFs and RSFs; and the preparation for, protection against, response to, and recovery from all-hazards incidents.

FEMA may be called upon to provide lead or supplemental operational coordination for consequence management support for the primary D/A for complex and/or large-scale incidents.

PKEMRA established the key principle that after a major disaster or emergency declaration, accelerated federal assistance could be sent by FEMA, in the absence of a specific request by a state, to save lives and prevent suffering. PKEMRA established the following important provisions:

- Requires the development of pre-scripted mission assignments as part of the planning activities for ESF response.
- Transfers to FEMA various preparedness functions formerly assigned to other parts of DHS.
- Establishes NIMS and the NRF, as the framework for emergency response and domestic incident management.
- Requires the development of comprehensive plans to respond to catastrophic incidents to include clear standardization, guidance, and assistance to ensure common terminology, approach, and framework for all strategic and operational planning.

- Directs the development of a National Disaster Recovery Strategy and National Disaster Housing Strategy.
- Amends the Stafford Act to direct FEMA to appoint a Disability Coordinator to ensure that the needs of individuals with disabilities are addressed in emergency preparedness and disaster relief.
- Requires an annual report to Congress on all federal planning and preparedness activities.
- Adds protection for household pets and service animals.

U.S. Customs and Border Protection (CBP)

U.S. Customs and Border Protection (CBP) coordinates the federal response for incidents involving the inadvertent or illegal import of radioactive materials that are interdicted at or between U.S. Ports of Entry.

CBP maintains radiation detection equipment and nonintrusive inspection technology at ports of entry and Border Patrol checkpoints to detect the presence of radiological substances transported by persons, cargo, mail, or conveyance arriving from foreign countries.

Through its National Targeting Center, CBP provides extensive analytical and targeting capabilities to identify and interdict suspect nuclear/radiological materials.

The CBP Laboratories and Scientific Services Teleforensic Center provides 24/7 WMD reachback support to federal law enforcement personnel in the identification of interdicted suspect nuclear/radiological material, as well as providing a link for coordination with and triage to other federal D/As as appropriate for the incident.

U.S. Coast Guard (USCG)

The National Contingency Plan[37] (see Appendix V: Authorities) designates the U.S. Coast Guard (USCG) as the Federal OSC for directing the removal and mitigation of oil spills and releases of hazardous substances, pollutants, or contaminants into or threatening the waters and adjoining shorelines of the coastal zone.[38]

The NCP establishes the USCG National Strike Force (NSF) and the USCG Public Information Assist Team as special teams. The NSF provides highly trained, experienced personnel and specialized equipment to USCG and other federal D/As to facilitate preparedness for and response to oil and hazardous substance incidents to protect public health and the environment. The NSF's area of responsibility covers all USCG districts and federal response regions. The Public Information Assist Team is an element of the USCG that is available to assist Federal OSCs to meet the demands for public information during a response or exercise.

While not part of the NCP, the USCG Maritime Security Response Team (MSRT) possess specialized equipment with an advanced organic detection, identification, and technical

[37] See the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300.
[38] Precise zone boundaries are determined by EPA/USCG agreements and identified in federal regional contingency plans. Refer to 40 CFR 300.5 for definition of coastal and inland zones.

capabilities similar to that possessed by DOE's Nuclear Radiological Advisory Teams. MSRT members also have federal law enforcement authorities.

The National Response Center, staffed by the USCG, is a 24-hour sole federal point of contact for reporting all hazardous substances releases and oil spills. The National Response Center receives all reports of releases involving hazardous substances and oil that trigger federal notification requirements under several laws.

U.S. Department of Justice (DOJ)

The Attorney General has lead responsibility for investigating and prosecuting violations of federal criminal law, including terrorist acts by individuals or groups inside the United States or directed at U.S. citizens or institutions abroad, where such acts are within the federal criminal jurisdiction of the United States. The U.S. Department of Justice (DOJ) leads and coordinates law enforcement activities to detect, prevent, preempt, and disrupt federal crimes, including crimes involving acts of terrorism by acting through the FBI. The FBI acts primarily through its Joint Terrorism Task Forces (JTTFs) to investigate terrorism-related activities. The Attorney General, acting through the FBI Director, also has primary responsibility for searching for, finding, and neutralizing WMDs within the United States and its territories and for conducting, directing, and overseeing the forensic examination of evidence collected in connection with domestic investigations.

The FBI has a WMD Coordinator and Special Agent Bomb Technicians (SABTs) assigned to each of its field offices. WMD Coordinators are responsible for managing the field offices' WMD programs and serve as the points of contact for emergency responders and public health officials at the SLTT level in the event of an incident potentially involving a WMD. Further, all commercial nuclear power plants have an assigned FBI liaison agent. In the event of a WMD-related terrorism incident, the WMD Coordinator serves as a conduit for obtaining federal assistance and support. Consistent with relevant Presidential directives, FBI SABTs are responsible for responding to and conducting defeat and mitigation actions for WMD devices and materials. FBI SABTs also serve as points of contact for public safety bomb squad coordination at the SLTT level in threat scenarios or incidents potentially involving a WMD. The FBI's Critical Incident Response Group (CIRG) is responsible for training and certifying all public safety bomb technicians at the FBI's Hazardous Devices School. The CIRG ensures that all public safety bomb squads are trained to understand the protocols for responding to all WMD incidents.

The FBI On-Scene Commander (FBI OSC) is the designated senior FBI representative responsible for leading and coordinating the federal operational law enforcement response and investigative activities necessary to resolve terrorist incidents and preserving evidence for subsequent criminal prosecution. The FBI OSC retains the authority to take appropriate law enforcement actions at all times during a law enforcement response to a terrorist incident. Additionally, the FBI OSC has primary responsibility to conduct, direct, and oversee crime scenes, including those involving WMD, its security, and evidence management through all phases of the response.

The FBI OSC also leads the JOC, a multijurisdictional interagency investigative and intelligence operations center, supported by a multiagency command group. The JOC is the place from which the FBI leads and coordinates law enforcement investigations, intelligence activities, and counterterrorism in response to terrorist incidents. The FBI OSC establishes

the JOC within a regional area of responsibility. Additionally, the FBI JOC may be staffed by federal D/As, SLTT law enforcement agencies, private industry, and other entities as may be appropriate, including representatives from the DEST (if deployed). The FBI JOC is established to ensure incident coordination and to organize multiple agencies and jurisdictions within an overall command and coordination structure.

In addition, DOJ, acting through the ESF #13 National Coordinator, is also responsible for coordinating the federal interagency law enforcement response to provide force/asset protection for other federal responders and assistance to SLTT officials charged with maintaining public safety and security in the affected areas. During a nuclear/radiological incident, ESF #13 may be called on to perform duties such as perimeter and/or crime scene security, quarantines, and other public safety missions related to the incident.

U.S. Department of State (DOS)

U.S. Department of State (DOS) has the lead responsibility for protection of U.S. government personnel on official duty abroad and their accompanying dependents. DOS is the lead coordinating agency for U.S. government response to U.S. Chief of Mission and/or host nation requests for support to international nuclear/radiological incidents. DOS will manage the provision of humanitarian assistance to refugee populations affected by an incident, in coordination with the U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA). For nuclear/radiological incidents that may be terrorist-related and are directed at U.S. citizens or governmental institutions abroad and within the federal criminal jurisdiction of the United States, DOS coordinates with the Attorney General and the Director of the FBI. DOS has the responsibility for handling issues related to the safety and security of U.S. private citizens abroad, which includes compliance with the DOS "no double standard" policy of providing members of the official and non-official U.S. community with relevant security information. DOS also coordinates U.S. government assistance to U.S. private citizens and works to provide information regarding other assistance that may be available to them from host country officials or non-governmental entities, as appropriate. DOS, in coordination with the U.S. Department of Health and Human Services (HHS), has a repatriation and evacuation mission related to U.S. citizens abroad.[39]

DOS serves as the U.S. government lead in notification of foreign governments and the International Atomic Energy Agency (IAEA) in accordance with the Convention on Early Notification of a Nuclear Accident. DOS will immediately notify Canada and Mexico to negotiate cooperative and collaborative cross-border activities. DOS serves as the U.S. government lead in requesting or accepting assistance in accordance with the IAEA Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency.

U.S. Environmental Protection Agency (EPA)

The U.S. Environmental Protection Agency (EPA) is responsible for coordinating the federal environmental response to incidents that occur at facilities not licensed, owned, or operated by a federal agency or an NRC Agreement State.[40] The EPA is also responsible for incidents

[39] See HHS's *National Emergency Repatriation Incident Framework* (2021) for information about the repatriation mission.
[40] The Atomic Energy Act authorizes the NRC to enter into agreements that allow states to assume regulatory authority over specified types of radioactive materials. The NRC has relinquished to 39 states portions of its regulatory authority to license and regulate byproduct materials (radioisotopes), source materials (uranium and thorium), and quantities of special nuclear materials under critical mass. The mechanism for the transfer of the NRC's regulatory authority to a state is an agreement signed by the governor of the state and the Chairman of the Commission.

involving currently or formerly licensed facilities for which the owner/operator is not financially viable or is otherwise unable to respond in certain areas of the inland zone.

The EPA also coordinates the federal environmental response to incidents involving the release of nuclear/radioactive materials that occur in the inland zone. Precise zone boundaries are determined by EPA/USCG agreements and are identified in federal regional contingency plans. The following are incidents that fall under EPA authority:

- Transportation incidents involving the release of nuclear/radioactive materials that are not licensed or owned by a federal agency or NRC Agreement State
- Incidents involving space vehicles that are not managed, licensed, permitted, or regulated by DOD, National Aeronautics and Space Administration (NASA), or any other federal D/A
- Incidents involving foreign, unknown, or unlicensed radiological sources in the United States or its territories, possessions, or territorial waters, and that are not addressed by CBP

For incidents where contaminated consumer goods are distributed before detection, the response is primarily carried out at the SLTT level. However, the EPA will provide federal coordination and technical assistance to the states as needed.

For a DHS-led federal response, the EPA will generally provide response coordination support to DHS through this annex and ESF #10 Oil and Hazardous Materials Response. For an EPA-led federal response, the EPA will generally respond under the NCP, which is an operational supplement to the NRF.[41] For some incidents, the EPA may also rely upon its Public Health Service Act and Atomic Energy Act authorities.

National Aeronautics and Space Administration (NASA)

National Aeronautics and Space Administration (NASA) is responsible for coordinating the federal response to incidents involving the release of nuclear/radioactive materials from NASA space vehicles or joint space vehicles with significant NASA involvement. For radiological incidents involving nuclear material in NASA custody, NASA may establish a security area per 14 CFR Part 1203a. NASA will manage the response within the boundaries of the security area and coordinate with SLTT officials to ensure appropriate public health and safety actions are taken outside the security area.

Nuclear Regulatory Commission (NRC)

The Nuclear Regulatory Commission (NRC) is responsible for coordinating response to incidents at or caused by a facility or an activity that is licensed by the NRC or an NRC Agreement State. These facilities include, but are not limited to, commercial nuclear power plants, fuel cycle facilities, DOE-owned gaseous diffusion facilities operating under NRC regulatory oversight, independent spent fuel storage installations, radiopharmaceutical manufacturers, and research reactors within facility boundaries. For incidents with offsite consequences, FEMA may assume the role of coordinating offsite federal response. The NRC would remain the primary federal authority for onsite activities.

[41] Subject to certain limitations. See 42 U.S.C. § 9604(a)(3).

The NRC licensee and agreement state licensee primarily are responsible for taking action to mitigate the consequences of an incident and providing appropriate protective action recommendations to SLTT government officials.

The NRC is responsible for the following activities, as appropriate:

- Perform an independent assessment of the incident and potential offsite consequences and provides recommendations concerning any protective measures.
- Perform oversight of the licensee, to include monitoring, evaluation of protective action recommendations, advice, assistance, and direction.
- Dispatch NRC technical experts to the licensee's facility.

Under certain extraordinary situations involving public health and safety or national defense and security, the NRC may order the transfer of special nuclear materials and/or specific operator actions at certain facilities regulated by the NRC.

The NRC closely coordinates its actions with SLTT government officials during an incident by providing advice, guidance, and support as needed.

Federal Aviation Administration (FAA)

The Federal Aviation Administration (FAA) Office of Commercial Space Transportation licenses commercial launch and reentry activities and the operation of launch and reentry sites as carried out by U.S. citizens or within the United States. The FAA issues a license if an applicant demonstrates compliance with all applicable requirements of 14 CFR 400, and the FAA determines that the proposed launch or reentry will not jeopardize public health and safety, safety of property, or national security or foreign policy interests of the United States.

FAA requires launch and reentry applicants to submit a written plan (as according to 14 CFR § 450.173) to report, respond to, and investigate mishaps. The requirements address public safety, including the implementation of agreements with government authorities and emergency response services. Applicants must address toxic hazards mitigation for ground operations. Under § 450.189(e), an "operator must have general emergency procedures that apply to any emergencies not covered by the mishap plan of § 450.173 that may create a hazard to the public."

In addition, FAA reviews a payload proposed for launch or reentry (§ 450.43) to determine whether it would jeopardize public health and safety, safety of property, U.S. national security or foreign policy interests, or international obligations of the United States. FAA consults with other D/As for Payload Reviews, including DOD, DOS, NASA, Department of Commerce (DOC), DHS, Federal Communications Commission (FCC), and the Office of the Director of National Intelligence. Other D/As can be added if needed. FAA does not make a payload review determination for those aspects of payloads that are subject to regulation by FCC or DOC, or payloads owned or operated by the U.S. government.

Any radionuclides in a launch or reentry are evaluated by the FAA on a case-by-case basis (§ 450.45). An environmental review is also required in FAA launch and reentry licensing (and for non-federal launch sites), including meeting the National Environmental Policy Act. FAA's authority focuses on hazardous activities associated with launch and reentry. The FAA can enforce representations in an application. The FAA does not certify launch or reentry vehicles.

Additional Federal Capabilities

The following additional federal agency capabilities may be used to support the LFA during nuclear/radiological incident response.

U.S. Department of Agriculture (USDA)

The U.S. Department of Agriculture (USDA) provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Assists in the planning and collection of agricultural samples within the Ingestion Exposure Pathway Emergency Planning Zone (See Appendix E: Incidents Involving Commercial Nuclear Facilities).
- Assesses damage to crops, soil, livestock, poultry, animal feeds, and processing facilities and incorporates the findings in a damage assessment report.
- Assists in the evaluation and assessment of data to determine the impact of the incident on agriculture.
- Provides support and advice on screening and decontamination of pets and farm animals that may have been exposed to radiation or contaminated with radioactive materials.
- Assists in the planning and operations for disposal of animal carcasses.
- Inspects and assists in the collection of samples of crops, meat and meat products, poultry and poultry products, egg products, and milk and dairy products to ensure that they are safe for human consumption.
- Collects samples of agricultural products to monitor and assess the extent of contamination as a basis for recommending or implementing protective actions (as coordinated with FRMAC).
- Assists, in conjunction with HHS, in monitoring the production, processing, storage, and distribution of food through the wholesale level to eliminate contaminated product and to ensure that the levels of contamination in the product are safe and below the designated intervention levels.
- Acts as a federal land manager, and through the National Forest Service, is responsible for conducting initial response and notification after the discovery of nuclear/radiological incidents on National Forest Service-managed lands.

National Oceanic and Atmospheric Administration (NOAA)

National Oceanic and Atmospheric Administration (NOAA) provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides near or on-scene weather observations upon request.
- Prepares forecasts tailored to support emergency incident management activities.
- When the Interagency Modeling and Atmospheric Assessment Center (IMAAC) is activated, provides atmospheric transport and dispersion (plume) modeling and forecasts, surface weather observations, and weather forecasts.

- When the IMAAC is not activated, provides atmospheric transport and dispersion (plume) modeling and forecasts to the LFA, in accordance with established procedures.
- Maintains and further develops the Hybrid Single Particle Lagrangian Integrated Trajectory Transport and Dispersion Model.
- Archives the meteorological data from national observing and numerical weather analysis and prediction systems applicable to the monitoring and assessment of the response.
- Provides assistance and reference material for calibrating radiological instruments.
- Provides support in the testing and evaluation of radiation shielding materials.
- In the event of materials potentially crossing international boundaries, provides atmospheric transport and dispersion products to international hydrometeorological services and associated agencies through the mechanisms afforded by the World Meteorological Organization.
- Provides radioanalytical measurement support and instrumentation.
- Provides assistance for collection and monitoring for marine and estuary contamination assessment.
- Advises and provides assistance on building operations for contamination control and decontamination processes.
- Provides laboratory support for analysis of materials and environmental samples.

U.S. Army Corps of Engineers (USACE)

As a support agency to the EPA, the U.S. Army Corps of Engineers (USACE) provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides response and cleanup support.
- Provides technical expertise and support to response and recovery operations regarding contamination and remediation activities through USACE Natural Resource Management Environmental Compliance Coordinators (ECCs), if needed.
- Integrates and coordinates with other D/As, as requested, to perform any or all of the following:
    - Radiological survey functions
    - Gross decontamination
    - Site characterization
    - Contaminated water and debris management
    - Site remediation
    - Disposal options

U.S. Department of Health and Human Services (HHS)

The Secretary of HHS has the authority to declare a Public Health Emergency (PHE) should conditions warrant. The Secretary also may declare an emergency and justify an emergency

use authorization (EUA), where the Commissioner of the Food and Drug Administration (FDA) may authorize the use of an unapproved medical product or an unapproved use of an approved medical product to diagnose, treat, or prevent serious or life-threatening disease or conditions where no adequate or appropriate alternatives are available. HHS provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides guidance and conducts epidemiological surveillance to detect symptoms consistent with exposure to radioactive materials, collect exposure histories, or identify public health needs.
- Provides advice for preventing or reducing exposure of the general population and response workers to radiation or radioactive materials.
- Provides advice on triage, assessment, medical management, behavioral health, and treatment of casualties for trauma and exposure to or contamination by radioactive materials, including among response workers.
- Provides available medical countermeasures (MCMs) through deployment of the Strategic National Stockpile assets.
- Facilitates the development, approval/authorization, availability, and security of MCMs.
- Provides assessment and treatment teams for those exposed to radiation or contaminated by radioactive materials.
- Provides advice, guidance, and resources in assessing the impact of the effects of radiological incidents on the health, including behavioral health, of persons in the affected area.
- Provides guidance on food safety, animal feeds, medicines, and other regulated commodities.
- Manages long-term public monitoring and supports follow-on personal data collection, collecting and processing of blood samples and bodily fluids/matter samples, and advice concerning medical assessment and triage of survivors, which tracks patient treatment and long-term health effects.
- Maintains the Epidemiologic Contact Assessment Symptom Exposure (Epi CASE) toolkit (formerly Rapid Response Registry toolkit), through the Agency for Toxic Substances and Disease Registry (ATSDR), which helps SLTT public health and incident response agencies rapidly establish registries of persons who are exposed or potentially exposed to chemicals or other harmful agents, including radiation, during catastrophic incidents.
- Provides, through ATSDR, public health assessments of waste sites, health consultations concerning specific hazardous substances, health surveillance, and applied research to support public health assessments.
- Coordinates all aspects of the national medical and public health response to include the National Disaster Medical System and the Radiation Injury Treatment Network, as well as radiation specific clinical guidance and training materials.

- Coordinates patient movement.
- Coordinates all aspects of national fatality management activities.
- Coordinates the behavioral health response and recovery activities.

U.S. Department of Interior (DOI)

U.S. Department of Interior (DOI) provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides resources, including personnel, equipment, and laboratory support, to advise and assist in evaluating processes affecting radioisotopes in soils.
- Provides resources, including personnel and equipment, to advise and assist in the development of geographic information systems databases to be used in the analysis and assessment of contaminated areas.
- Provides liaison between federally recognized tribal governments and federal, state, and local D/As for coordination of response activities.
- Advises and assists DHS on economic, social, and political matters should a nuclear/radiological incident occur in an U.S. insular area.
- Acts as a federal land manager responsible for conducting initial response and notification after the discovery of nuclear/radiological incidents on DOI-managed lands.
- Supports the identification and tracking of contaminated transient wildlife, which can transport radioisotopes outside of the known radiation zones of the incident.

Occupational Safety and Health Administration (OSHA)

OSHA provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides advice and technical assistance to the LFA and SLTT governments concerning the health and safety of response and recovery workers.
- Provides assistance with developing site health and safety plans.
- Provides technical assistance with emergency worker decontamination.

During the initial emergency response, OSHA will likely operate in a technical assistance and support mode, pursuant to the NRF, rather than issuing citations for workplace violations. However, OSHA retains its enforcement authority under the Occupation Safety and Health Act of 1970, particularly during cleanup, remediation, and other recovery activities.

U.S. Department of Transportation (DOT)

DOT provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Provides technical advice and assistance on the transportation of radiological materials and the impact of the incident on the transportation infrastructure.
- Regulates the transportation of hazardous materials such as radiological materials.

In emergencies, the Pipelines and Hazardous Material Safety Administration (PHMSA) can provide technical advice including recommendations for special permit situations.

Defense Threat Reduction Agency (DTRA)

DTRA provides the following capabilities in support of response to and recovery from a nuclear/radiological incident:

- Maintains a 24-hour, year-round Technical Reachback program to provide critical operational support and modeling of chemical, biological, radiological, nuclear, and explosive (CBRNE) events in support of DOD and other interagency customers.
- Provides technical expertise through SMEs in biology, medicine, nuclear/radiology, chemistry, explosives, structural engineering, meteorology, and targeting support.
- Serves as the technical operations hub for FEMA's IMAAC.
- In the event of an emergency, activates the IMAAC and conducts an initial response in about an hour, which includes notifying interagency partners, initiating modeling of the hazard, providing completed modeling products in the IMAAC Portal in CBRNResponder, hosting and coordinating an interagency meeting to exchange incident information and improve modeling products, and coordinating with the requester for recurring modeling updates as necessary.
- Addresses a wide range of nuclear phenomenology through available modeling tools, including space effects, high-altitude electromagnetic pulse, near-surface detonation, and ground shock on hard and deeply buried structures.
- Provides Hazard Prediction and Analysis Capability (HPAC), a fast-running Lagrangian atmospheric transport and dispersion tool for nuclear and radiological atmospheric hazards. Modules within HPAC provide a capability to model effects from a single nuclear device and up to hundreds of strategic incidents, a fissile material release from a nuclear device involved in a chemical explosion or fire, RDDs, and releases from fixed nuclear facilities.

Department of Veterans Affairs (VA)

The VA provides the following capability in support of response to and recovery from a nuclear/radiological incident:

- In coordination with HHS, provides medical assistance using the Medical Emergency Radiological Response Team (MERRT), which provides direct patient treatment, assists and trains local health care providers in the managing, handling, and treatment of radiation-exposed and contaminated casualties, assesses the impact on human health, and provides consultation and technical advice to federal and SLTT authorities.

Support and Coordination Elements

To facilitate federal interagency coordination and information sharing during a nuclear/radiological incident, several support and operational coordination elements may be utilized. These elements, combined with the assets, resources, and teams identified in Appendix H: Additional Assets, represent unique or critical federal nuclear/radiological capabilities that support federal and SLTT response and recovery operations.

Countering Weapons of Mass Destruction (CWMD)

Within DHS, Countering Weapons of Mass Destruction (CWMD) supports the deployment of an enhanced global nuclear detection architecture to identify and report on attempts to import, possess, store, transport, develop, or use an unauthorized nuclear explosive device, fissile material, or radiological material in the United States. CWMD serves as a focal point, within DHS, in the counter-WMD mission space, by strengthening DHS-wide coordination and federal interagency cooperation and providing direct support to DHS, federal interagency, and SLTT partners in equipment, research and development, training and exercises, among other activities. DHS CWMD also continuously operates a CWMD Watch within the DHS NOC.

Federal Radiological Monitoring and Assessment Center (FRMAC)

The FRMAC is an interagency coordination element responsible for coordinating all federal radiological monitoring and assessment activities. The FRMAC integrates radiological response resources from DOE/NNSA, EPA, the Advisory Team, and other federal D/As as needed in support of the FRMAC mission. FRMAC provides the following capabilities to support situational awareness and decision making during nuclear/radiological incident response and recovery:

- Ground and aviation-based monitoring and sampling
- Data assessment and management
- Sample processing and laboratory analysis
- Health and safety monitoring
- Technical coordination with radiological response authorities and decision makers
- Data product development and dissemination

FRMAC is activated and deployed for nuclear/radiological incidents that require significant federal interagency responses. FRMAC will activate when requested by a SLTT government,[42] LFA,[43] FEMA, responding Federal OSC,[44] or when a Stafford Act declaration is made in a nuclear/radiological incident.

The FRMAC is established at or near the incident location, in coordination with SLTT authorities, and FEMA or the appropriate LFA. The FRMAC initially coordinates and communicates with SLTT radiological response authorities and federal partners. Initial coordination with FEMA is through the NRCC and NRITF. At the local level, FRMAC field teams integrate with SLTT counterparts under field-level incident command to conduct coordinated monitoring and sampling operations, informed by FRMAC assessment and laboratory analysis requirements, to accomplish incident objectives.

DOE/NNSA leads the FRMAC for the initial response and coordinates all federal radiological monitoring and assessment activities including data management, assessment product development, and data and product distribution, regardless of LFA designation.[45] FRMAC

[42] A request from a state should be informed by the state radiological response authority and coordinated with the state emergency management entity.
[43] Table 1 of the NRIA details the agencies with primary authority based on incident type, facility, or materials involved.
[44] Federal On-Scene Coordinators under CERCLA and the NCP may activate and deploy FRMAC in accordance with statutory authorities and funding.
[45] This does not include offsite air monitoring and exposure data that is collected and collated by EPA's RadNet system.

leadership transitions to EPA when the immediate emergency operations shift predominantly to remediation and/or recovery, at which time EPA assumes responsibility as FRMAC lead for coordination of long-term radiological monitoring and assessment activities. Although it is difficult to specify in advance, specific conditions and guidance for this transition are established between DOE/NNSA and EPA. For operations of a scale or complexity such that this transition cannot occur within days to one week, DOE/NNSA expects substantial impacts to NEST's ability to sustain operations. These impacts would persist if substantial support from NEST resources is required following FRMAC leadership transition.

Some participating federal D/As have radiological planning and emergency responsibilities as part their statutory authority. FRMAC plans and procedures do not supersede these authorities and partner agencies do not abdicate authority or responsibility through FRMAC participation and integration. Instead, FRMAC plans and procedures facilitate coordination of various federal monitoring and assessment authorities by providing a framework to implement those authorities and responsibilities as part of an integrated response in a coordinated fashion. It does not alter these authorities and responsibilities but instead complements them.

Most nuclear/radiological incidents will not require a FRMAC activation. In those instances, federal D/As with radiological response missions will continue to execute their respective missions through their statutory authorities.

FRMAC standards and procedures are established through an interagency process led by DOE/NNSA. These standards and procedures are subject to extensive peer review and are published in FRMAC manuals. All nuclear/radiological response entities, including SLTT governments, are encouraged to adopt and implement these standards and procedures to facilitate integration with FRMAC.

FRMAC Responsibility

The FRMAC is only responsible for coordinating monitoring activities in areas affected by the release and those that are adjacent. Other D/As with fixed monitoring capabilities are responsible for maintaining those monitoring activities outside the affected areas and reporting the results. For example, EPA will continue to operate and maintain the RadNet system and report results through the normal channels.

Interagency Radiological Aerial Monitoring Concept of Operations

The Interagency Radiological Aerial Monitoring Concept of Operations provides an integration structure and supporting processes for coordinating all Nuclear Incident Response Team and all aerial assets engaged in radiological surveys during consequence management response and recovery operations. The concept of operations can be applied in support of the response to a range of radiological incident scenarios, including those of national significance covered under Stafford Act declarations. This concept of operations is intended for use by federal and SLTT entities, among others, that have the capability to provide aerial assets to assist in radiological monitoring. Central to the execution of this document is the staffing of a FRMAC position, the Radiological/Nuclear Aerial Coordinator

(RNAC), who will coordinate radiological aerial monitoring as part of the air operations group. This document is available on CMWeb along with the other FRMAC manuals.

Interagency Modeling and Atmospheric Assessment Center (IMAAC)

The Interagency Modeling and Atmospheric Assessment Center (IMAAC) is an interagency coordination element responsible for production, coordination, and dissemination of federal atmospheric dispersion modeling and hazard predictions for an airborne portion of a hazardous material release. The IMAAC provides the single federal consensus on atmospheric predictions of hazardous material concentration to all levels of the Incident Command and national response organizations. This is achieved through a partnership between DHS, DOC (NOAA), DOD, DOE (NNSA), EPA, HHS, and the NRC. Through plume modeling analysis, the IMAAC provides emergency responders with predictions of hazards associated with atmospheric releases to aid in the decision-making process to protect the public and the environment.

The National Atmospheric Release Advisory Center (NARAC) is the primary provider of the modeling for nuclear/radiological incidents for the IMAAC.

Advisory Team for Environment, Food, and Health (A-Team)

The Advisory Team for Environment, Food, and Health (A-Team) includes representatives from the EPA, USDA, FDA, Centers for Disease Control and Prevention (CDC), and other federal D/As as needed. The A-Team acts as an operational arm of the Federal Radiological Preparedness Coordinating Committee (FRPCC), which is organized under FEMA. The A-Team develops coordinated advice and recommendations on environmental, food, health, and animal health matters for the IC/UC, the JFO, the Unified Coordination Group (UCG), the LFA, and/or SLTT governments, as appropriate. The A-Team uses information provided by the IMAAC, FRMAC, and other relevant sources. The A-Team makes protective action recommendations, not decisions. It also provides coordinated technical and scientific advice through the LFA and SLTT governments and bases its recommendations on science and best practices. The A-Team is a coordinated asset that must be officially requested to be activated. Activation of the A-Team can be requested by any federal or SLTT entity through the FEMA Operations Center (FOC). It could also be activated through its participation on the NRITF. When the FRMAC is activated, the A-Team should be activated concurrently.

The A-Team provides advice on matters related to the following subjects:

- Protective Action Guides and their application to the incident
- Protective action recommendations using data and assessment from FRMAC
- Information needed to perform FRMAC environmental assessments (field monitoring) in support of protective action recommendations
- Health and safety advice or information for the public and for workers
- Estimated effects of radioactive releases on human health and the environment
- Measures to prevent or minimize contamination of milk, food, and water
- Recommendations for minimizing losses of agricultural resources from contamination

- Recommendations regarding the health, the management, and the disposition of livestock, poultry, pets, and other animals and the disposition of contaminated foods, especially perishable commodities
- Availability of food, animal feed, and water supply inspection programs to ensure wholesomeness
- Relocation of survivors, re-entry into the contaminated area, and other radiation protection measures
- Recommendations for recovery, return, and remediation activities of the contaminated area
- Other matters, as requested by the Incident Command or LFA

Nuclear/Radiological Incident Task Force (NRITF)

The NRITF is an interagency group that convenes within the NRCC to provide standardized nuclear/radiological subject matter expertise in support of national level incident planning and core capability delivery. The mission of the NRITF is to offer recommendations to the NRCC regarding technical insight, consequence management support, and other nuclear/radiological critical considerations as needed to inform response/recovery operations and future planning.[46]

The task force is scalable, based on the size, scale, and type of incident. The task force leadership is determined by the incident, designated by the NRCC Chief, and may be filled by the LFA. The task force includes, but is not limited to, the following entities that will provide support during a nuclear/radiological incident:

- A-Team
- DOC/NOAA
- DOD
- DOE/NNSA
- Department of Labor (DOL)/OSHA
- EPA
- DHS/FEMA
- HHS/ Administration for Strategic Preparedness and Response (ASPR)
- HHS/CDC
- HHS/FDA
- NRC
- USDA

Other federal D/As, and liaisons may support the NRITF on an ad hoc basis depending on the shifting needs surrounding the nuclear/radiological incident.

The NRITF will include a recovery liaison staffed by FEMA or an RSF coordinating, supporting, or primary agency.

[46] Additional operational information can be obtained in the Nuclear Radiological Incident Task Force Standard Operating Procedure (2022).

The NRITF does not take the place of any ESF, RSF, or federal agency; rather, it augments capabilities to focus on specific priorities defined by NRCC leadership. Besides the NRITF, many interagency organizations provide nuclear/radiological subject matter expertise. The NRITF will not duplicate efforts but rather conduct its primary mission within the NRCC complementary to other nuclear/radiological subject matter expert organizations.

The NRITF can be activated in two ways: (1) the LFA for a nuclear/radiological incident requests that the NRITF be activated; or (2) the FEMA Administrator activates the NRCC in anticipation of or in response to a nuclear/radiological incident, thereby activating the NRITF.

Unified Coordination Group (UCG)

The UCG is coordination structure composed of senior leaders representing federal and SLTT interests and, in certain circumstances, local jurisdictions and the private sector. The UCG acts as a decision-making body for interagency leadership during response and recovery operations. UCG members must have significant jurisdictional responsibility and authority. The composition of the UCG varies depending on the type, scope, and nature of the incident. Due to the complex nature of nuclear/radiological incidents, additional consideration must be given to ensure that all appropriate entities are represented on the UCG.

Radiological Operations Branch (Rad Branch)

The Radiological Operations Branch (Rad Branch) is a functional component of an Initial Operating Facility (IOF) or JFO operations section designed to coordinate federal radiological response operations and support. The Rad Branch coordinates federal radiological response activities, which may include, but are not limited to, the following areas: (1) environmental monitoring, (2) population and worker monitoring, (3) decontamination, (4) waste management, (5) health and safety, and (6) response to nuclear reactors.

The Rad Branch executes the following activities in support of response to and recovery from a nuclear/radiological incident:

- Maintains operational status of federal radiological response resources.
- Reviews and coordinates Action Request Forms (ARFs) for radiological response requests.
- Allocates radiological response resources in accordance with UCG guidance.
- Identifies additional radiological response resource requirements.
- Coordinates with deployed federal radiological response resources.
- Establishes technical response priorities and objectives.
- Reviews and coordinates radiological response mission assignments (MAs) across all ESFs.
- Assists in maintaining a radiological response common operating picture with the planning section and/or situation unit.
- Provides radiological expertise to other elements of the JFO operations section.
- Coordinates with the NRITF on radiological response operations, federal radiological response resource allocation, and situational awareness.

- Coordinates with ESFs that maintain radiological response capabilities, including, but not limited to ESF #8, ESF #10, and ESF #11.

Domestic Emergency Support Team (DEST)

The DEST is a rapidly deployable interagency team that supports the FBI. As part of its mission, the DEST supports the FBI OSC and other officials, such as the National Assets Commander, and supports the integration of law enforcement and counterterrorism operations with consequence management operations that may be taking place simultaneously. Based on the threat and requirements, the FBI determines the composition of the DEST and maintains operational control throughout its activation. The DEST can provide the FBI with expert advice and guidance that can inform Prevention Mission operations and may include a ready roster from FEMA, FBI, DOD, HHS ASPR, DOE, EPA, and others as appropriate. The FEMA Administrator, in support of the FBI, is responsible for policies and planning governing the use of the DEST and for facilitating approval for its deployment in accordance with agreed-upon policies and procedures.

Weapons of Mass Destruction Strategic Group (WMDSG)

The WMDSG is an FBI-led interagency crisis action team. When facing a credible WMD threat or incident, the WMDSG is activated within the FBI's Strategic Information and Operations Center (SIOC) located at FBI Headquarters. The WMDSG supports information exchange, deconfliction of law enforcement operations, and/or counterterrorism operations to prevent and resolve imminent WMD terrorist threats while simultaneously coordinating with federal D/As responsible for consequence management activities to save lives, protect property, critical infrastructure, and the environment. The WMDSG facilitates the integration and sharing of real-time investigative information, intelligence, and technical analysis; facilitates the identification, acquisition, and use of interagency assets; and enhances the synchronization and deconfliction of Prevention, Response, and Recovery Mission operations. The WMDSG can include subject matter experts from different D/As depending on the nature of the threat and its modality. For example, this can include representatives from DOE NNSA during nuclear/radiological threats.

The WMDSG contributes to risk-informed decision making at all levels of the response, including, when appropriate, with SLTT, public health, private sector, and international partners through its collaborative environment and informative products like the WMD Threat Profile. The WMDSG connects with other FBI command posts within the FBI SIOC, such as the FBI CIRG National Asset Command Post regarding all technical information represented by and collected from the WMD device, and to the operations centers of other federal D/As. It also connects to the FBI field office(s) and appropriate local/regional partners through the JOC(s). The WMDSG connects to the DHS NOC, which maintains the DHS common operating picture and situational awareness for the federal government during intentional threats or incidents.

Consequence Management Coordination Unit (CMCU)

FEMA staffs and manages the WMDSG's Consequence Management Coordination Unit (CMCU). The CMCU is the principal advisory unit for consequence management considerations within the WMDSG and provides strategic recommendations and integrated courses of action considering ongoing law enforcement operations. The CMCU supports

operational coordination and information sharing regarding response and protection activities. The CMCU is supported by federal technical capabilities provided through DOE/NNSA, HHS, DOD, and DHS. The CMCU responsibilities include the following activities:

- Coordination of the identification of potential risks for impacted populations
- Identification of potential preparatory consequence management actions to reduce risks to life and property by lessening the impact of the incident
- Positioning the response community to be able to respond should the incident occur
- Providing recommendations on sheltering and evacuating

Radiological Operations Support Specialist (ROSS)

During nuclear/radiological incidents, the Radiological Operations Support Specialist (ROSS) identifies and provides critical information to responders, key leaders, and decision makers. The ROSS is a state and local subject matter expert with the ability to bridge the gap between response and radiological knowledge in order to minimize the impact of a potential or actual incident involving the release of radiological or nuclear materials.

A ROSS provides SLTT leadership, decision makers, and responders with appropriate recommendations for hot zone definition, population monitoring and decontamination levels, patient handling, release of vehicles and equipment from a hot zone, responder PPE, decontamination techniques, and dose and turn-back guidance. The ROSS also gives SLTT response centers instant expertise in the federal radiological response framework, including assets, capabilities, deployment timelines, logistical needs, and contact information. During nuclear/radiological incidents, the ROSS helps responders and decision makers interpret federal and local data products, and deconflict contradictory measurements and models.

Planning and Preparedness Support Elements

The following support elements are active before nuclear/radiological incidents occur and provide planning and preparedness expertise. While not the focus of this annex, pre-incident preparedness can influence the effectiveness of response/recovery operations and must be considered. The following support elements execute pre-incident planning and preparedness activities that inform successful response/recovery operations.

Federal Radiological Preparedness Coordinating Committee (FRPCC)

The FRPCC is an interagency body composed of subject matter experts from 20 federal D/As that work together to ensure that the United States is prepared for incidents involving nuclear or radioactive materials, including acts of terrorism.

The FRPCC is a national-level forum for the development and coordination of radiological preparedness policies and procedures. Chaired by FEMA, it assists FEMA and other federal D/As on policy development and direction concerning federal assistance to SLTT governments in their nuclear/radiological emergency planning and preparedness activities. The FRPCC also coordinates the research study activities of its member agencies related to SLTT government radiological emergency preparedness, which ensures minimum duplication of efforts and maximum benefits to SLTT governments.

Radiological Emergency Preparedness (REP) Program

FEMA's Radiological Emergency Preparedness (REP) Program coordinates the national effort to provide SLTT governments with relevant and executable planning, training, and exercise guidance. The REP Program advises SLTT governments of policies to increase capabilities to protect against, mitigate the effects of, respond to, and recover from incidents involving commercial nuclear power plants. The REP program assists SLTT governments in the development and conduct of offsite radiological emergency preparedness activities within the emergency planning zones of NRC-licensed commercial nuclear power facilities. The REP Program's activities integrate and enhance SLTT and federal governments' preparedness planning and response capabilities for radiological emergencies involving commercial nuclear power plants.

DHS Science and Technology Directorate (DHS S&T)

DHS Science and Technology Directorate (DHS S&T) is the primary research and development arm of DHS, promoting the development of homeland security technologies and providing the scientific expertise, assessments, and knowledge products that enable risk-based funding and deployment decisions by the Homeland Security Enterprise (HSE). DHS S&T, in coordination with the Assistant Secretary for CWMD, produces the Chemical, Biological, Radiological, and Nuclear (CBRN) Strategic Risk Assessment. Since this assessment includes a significant number of radiological and nuclear attack scenarios, these assessments are used to inform immediate mitigation measures, including protective and consequence management efforts.

Critical Information Requirements

The following critical information requirements are supplemental to those outlined in the Response and Recovery FIOP and are linked to key decisions where appropriate.

Radiation Identification

- Identification of the radiation source elements and their half-life,[47] as well as the area of highly hazardous or lethal radiation, and the identification of areas not subject to elevated radiation
- Movement and timing of fallout/plume, if present
- Baseline background radiation levels[48] in affected areas, if available[49]

Incident Characterization

- Identification of damage zones and fallout/plume pathway to determine safe locations for initial support bases and staging areas, and identification of where to deploy response teams

[47] Radioactive half-life is the time required for any given radionuclide to decrease to one-half of its original radioactivity amount. For example, after a time of three half-lives, a given radionuclide will decrease to 1/8 of the original radioactivity amount.
[48] Background radiation is ionizing radiation from natural sources such as terrestrial radiation due to radionuclides in the soil or cosmic radiation originating in outer space.
[49] See the NCRP's Decision Making for Late-Phase Recovery from Major Nuclear or Radiological Incidents, Report No. 175, (2014).

- Deployment of rescue and triage resources, which requires estimates of where survivors can be found and extraction considerations
- Current and projected weather conditions
- Identification of command structure for operational communications

Protective Actions

- Current protective action recommendations issued to the public and to response and recovery workers, including any changes or conflicts with protective actions ordered by non-federal entities
- Identification of response and recovery tasks specific to the incident that workers can safely perform

Radiation Exposure

- Projections and real-time data for population and response and recovery worker radiation exposure, food contamination, and environmental contamination
- Determination of recommended operational exposure guidance
- Ongoing assessment of the radiation dose threat

Resource Availability

- Availability of radiological response assets within the impacted area, which will affect response and recovery options
- Identification of private sector radiological response and recovery resources
- Status of SLTT radiological response resources

Evacuation and Sheltering

- A map of the plume/fallout to identify safe (lowest risk) routes for evacuation and locations for triage sites and community reception centers[50]
- Locations of host communities with concentrations of evacuees

Temporary Housing and Relocation

- Long-term evacuee/displaced persons status tracking (employment, temporary housing, preferences for permanent relocation versus return, if applicable)

Health Effects

- Dose and exposure limits for workers (authorities for approving modification of dose/exposure limits)
- Potential long- and short-term physical and behavioral health effects to the affected population and responders

[50] See the FEMA *Planning Guidance for Response to a Nuclear Detonation* (2022), Chapter 5, Section 5.3, for information on CRCs.

- Availability of treatment and prophylaxis agents (including delivery time and total doses available) for both public and responder use
- Dosing guidelines for treatment and prophylaxis agents
- Guidelines for diagnosis and treatment of radiation injury or injury complicated with concomitant radiation exposure
- Evaluation of both penetrating radiation exposure and internal/external radioactive material contamination for effective diagnosis, triage, and treatment

Reentry/Reoccupation

- Acceptable levels of contamination to determine reentry and/or relocation of impacted individuals and households
- Acceptable levels of radiation to allow homeowners to reoccupy contaminated areas, using the EPA's PAG Manual (January 2017)

Infrastructure Impacts

- Forecasted impacts to transportation infrastructure, which may affect mobility within the area for an extended period of time
- Determination of whether transportation modes will enter the contaminated area
- Forecasted prolonged impacts and/or degradation to communications and public safety infrastructure due to exposure to radiation, which may affect communications within the area for an extended period of time
- Potential cascading impacts from affected critical infrastructure, which may not be operational and could impact surrounding areas

Responsible Party Liability

- Insurance coverage, to include the Price Anderson Act (when applicable) and private party resources available

SLTT Plans/Agreements

- Pre-incident waste management plans and potential sites for temporary debris/waste storage
- Host community agreements to support displaced populations, etc.

Mass Fatality Management

- Assessment of known radiation information and determination of what level of PPE personnel must wear for each phase of the operation
- Determination of what conditions, if any, human remains can be safely recovered and processed for disposition
- Identification of facility sites for contaminated remains, to include capability and capacity

ADMINISTRATION, RESOURCES, AND FUNDING

Administration

Federal D/As are responsible for managing their own financial activities during all operational phases and across all mission areas within their established processes and resources. The *Financial Management Support Annex to the NRF* provides basic financial management guidance for all federal D/As that provide support for incidents that require a coordinated federal response.

Resources

Federal D/As are responsible for personnel augmentation to support operations under this annex. Each federal agency possesses individual policies for personnel augmentation that is predicated on its authorities, various policies, memorandums of understanding, and mutual aid agreements. Federal D/As must ensure that their employees who are engaged in incident response activities are able to perform in accordance with operational requirements.

Pursuant to HSPD-5, the Secretary of Homeland Security is designated as the principal federal official for domestic incident management. Federal D/As are expected to provide their full and prompt cooperation, resources, and support to the Secretary, as appropriate and consistent with their own authorities, roles, and responsibilities for protecting national security and their respective missions for domestic incident management.

Funding

Nuclear/radiological incidents that require a federal interagency response could be covered by the Stafford Act if an emergency or major disaster is declared. In addition to the Stafford Act, several other funding mechanisms are available for federal response operations depending on the incident. Those most likely to be utilized to fund nuclear/radiological incident response and recovery activities are described below.

Stafford Act

The Stafford Act authorizes the President to issue a disaster or emergency declaration upon the request of a governor of a state or territory or the chief executive of a federally recognized Indian tribe when an incident overwhelms SLTT governments.

The Disaster Relief Fund is not available for activities not authorized by the Stafford Act, for activities undertaken under other authorities or agency missions, or for non-Stafford Act incidents requiring a coordinated federal response.

If a state or tribal government needs direct federal assistance, it can request (written or verbal) an emergency declaration for direct federal assistance. If a state or tribal entity requests reimbursement or individual assistance, then the standard preliminary damage assessment process applies. Direct federal assistance requested by the state for resources is provided to the affected SLTT jurisdictions when they do not have the resources to provide specific types of disaster assistance. This activity is subject to the cost-share provision designated for that specific disaster. Cost-share provisions are normally 75 percent federal

share and 25 percent state share. However, the President can waive the cost-share requirement and make this type of assistance 100 percent federally funded. An example of this type of assistance is providing generators.

FEMA may direct another agency to utilize the agency resources to address an identified unmet need. FEMA may mission assign another agency with or without reimbursement.

Other federal D/As have authority to provide assistance to support jurisdictions during nuclear/radiological incidents. Assistance provided by FEMA under the Stafford Act may not duplicate the assistance provided or available under the authority of another federal agency. Where the task falls within the statutory authority of the other federal agency, the mission assignment should be without funding.[51]

Federal to Federal Support – Non-Stafford Act

Federal D/As may not have designated funds available to cover emergency/disaster operations; however, they may respond if the requested operations fall within their statutory role and responsibility. For federal D/As requested to provide assistance through FEMA to support a nuclear/radiological incident response, funding may occur through the agencies' existing funding streams. Additional funding to support a specific federal-to-federal support request may likely require implementation of the Economy Act or additional appropriations other than what is appropriated to operate existing department and agency programs.

Federal D/As called upon to provide supplemental capabilities or support will seek reimbursement from the LFA, as depicted in Table 1, and funding sources through an interagency agreement under the Economy Act.

The Economy Act of 1932

The Economy Act of 1932, as amended, 31 USC § 1535, permits federal government agencies to purchase goods or services from other federal government agencies or other major organizational units within the same agency. An Economy Act purchase is permitted only if (1) amounts for the purchase are actually available, (2) the purchase is in the best interest of the federal government, (3) the ordered goods or services cannot be provided by contract from a commercial enterprise (i.e., the private sector) as conveniently or cheaply as could be by the federal government, and (4) the agency or unit to fill the order is able to provide or get by contract the ordered goods or services.

Defense Production Act (DPA)

The Defense Production Act (DPA) is the primary source of Presidential authorities to expedite and expand the supply of critical resources from the U.S. industrial base to support the national defense and homeland security. In addition to military, energy, and space activities, the DPA definition of “national defense” includes emergency preparedness activities conducted pursuant to Title VI of the Stafford Act; protection and restoration of critical infrastructure; and activities to prevent, reduce vulnerability to, minimize damage from, and recover from acts of terrorism within the United States. The President's DPA authorities are delegated to the heads of various federal departments in Executive Order 13603.[52]

[51] Notable exceptions may occur, for example, codified policies pursuant to 6 USC 314 (a) (3).
[52] See National Defense Resources Preparedness, Executive Order 13603 (2012).

Highlights of DPA Provisions

The following bullets are highlights of the DPA:

- Provides authority to require acceptance and priority performance of contracts and orders to promote the national defense.
- Provides various types of financial incentives and assistance for industry to expedite production and deliveries or services under government contracts and to provide for creation, maintenance, protection, expansion, and restoration of production capabilities needed for national defense.
- Provides antitrust protection for actions conducted in accordance with voluntary agreements among business competitors to enable cooperation to plan and coordinate measures to increase the supply of materials and services needed for national defense purposes.
    - A "voluntary agreement" is an association approved by the federal government and entered into freely by two or more representatives of industry, business, financing, agriculture, labor, or other private interests, with the intent to plan and coordinate measures to increase the supply of materials and services needed for national defense and homeland security purposes, including emergency preparedness and response activities.
- Provides authority to establish the National Defense Executive Reserve, a cadre of persons with recognized expertise for employment in executive positions in the federal government in the event of an emergency.

The DPA's priorities and allocations authorities can be utilized to ensure the timely delivery of resources required to meet national defense requirements, including emergency preparedness (nuclear/radiological incident) and critical infrastructure protection and restoration activities. USDA, DOE, HHS, DOT, and the DOC have issued priorities and allocations regulations that can be used to prioritize contracts for food resources, all forms of energy, health resources, all forms of civil transportation, and industrial resources under each department's resource jurisdiction from the U.S. industrial base to meet national defense and emergency preparedness requirements of approved programs. The DOC has delegated authority to DHS/FEMA to place priority ratings on contracts for industrial resources to support DHS/FEMA's response activities under emergency and non-emergency conditions.

OVERSIGHT, COORDINATION, AND COMMUNICATIONS

Oversight

FEMA, in close coordination with the DHS Office of the Secretary and with the Federal Radiological Preparedness Coordinating Committee, is the executive agent for this annex

and is responsible for its management and maintenance. This annex will be updated periodically, as required, to incorporate new presidential directives, legislative changes, and procedural changes based on lessons learned from exercises and actual incidents.

Coordination

Radiological Data Sharing

The CBRNResponder Network

The CBRNResponder Network is the national standard and whole community solution for the management of radiological data. It is a product of collaboration between FEMA, DOE/NNSA, the EPA, and states within the Conference of Radiation Control Program Directors.[53]

CBRNResponder is provided to all SLTT response organizations and allows individual users to leverage information from across the nation to uniformly establish a flexible, efficient, and networked approach to radiological data management. CBRNResponder can be accessed on smartphones, tablets, and via the Web, allowing it to be seamlessly and rapidly employed at all levels of government during a response to a radiological or nuclear emergency. Partnership functions within the network provide flexibility for organizations allowing them to manage how, with whom, and when they share radiological data.

The entire CBRNResponder initiative adheres to the field data management protocols established by the FRMAC.[54] Moreover, during a radiological and nuclear emergency, all environmental data collected by organizations using the CBRNResponder Network can be quickly verified by the FRMAC to support rapid assessment and critical decision making.

Data Sharing

A well-coordinated response in a nuclear/radiological emergency will be heavily dependent on quick and accurate data analysis across numerous responding organizations.[55] Note that communications and data sharing could be substantially impeded by the effects of the nuclear/radiological incident.

- States have the authority to grant access to their data to other states. Data sharing among state programs can happen at any time.
- When a coordinated federal response is warranted (for a national-level incident), environmental data collected by state programs in CBRNResponder shall automatically be shared with federal response officials.
- Federal data should be shared with SLTT governments in a timely fashion using CBRNResponder.
- CBRNResponder should never be locked or turned off during an incident; organizations should always be able to access their input data.

[53] Conference of Radiation Control Program Directors is an organization whose members represent state radiation protection programs. For more information, visit the CRCPD website at http://www.crcpd.org.
[54] See FRMAC Monitoring and Sampling Manual Volume II, Revision 3, (2021) and FRMAC Monitoring and Sampling Manual Volume I, Revision 3 (2019) for more information.
[55] A committee of the Conference of Radiation Control Program Directors provided these data sharing recommendations.

- Access to FRMAC information management systems shall not be taken away in an emergency. Previously identified state radiation control program staff and other government emergency response partners need continuous access to view data streams and products.
- Products developed from FRMAC databases will always be made available to approved representatives of the response organizations responsible for public protection.
- To provide confidence in the environmental data posted in CBRNResponder, each partner organization should have a documented quality assurance process that can be applied to the collected data.
- Confidence in data or data providers can be indicated by the organization's quality assurance program/process and a description of the sample collection and analysis protocols (geometry, standard operating procedures, meter type, count time) to account for variability in sample collection and analysis. This will enable independent assessment by other organizations accessing the data. All data should be verified and validated as defined by the organization's documented quality assurance process and this status reflected in the database it is stored in to be considered final.
- Data from FRMAC and the EPA's RadNet monitoring system, which tracks levels of radiation in the environment, should be shared promptly with SLTT partners. This data may not yet be fully validated but is still shared to facilitate quick emergency assessments.[56]

Coordination with Infrastructure Owner/Operators

The following bullets provide examples of how the federal government can coordinate with infrastructure owner/operators:

- Federal D/As collect, share, and disseminate status updates on critical infrastructure operations, impact, consequences and analysis, and recommendations for restoring critical infrastructure in coordination with the DHS Cybersecurity and Infrastructure Security Agency (CISA) and relevant Sector Risk Management Agencies (SRMAs).
- The federal government coordinates support through public-private partnerships, associations, and contractual agreements in responding to and recovering from a disaster or emergency in collaboration with the appropriate sector-specific agency.
- DHS CISA will provide visibility on the status of private sector–operated critical infrastructure, identify direct or cascading effects of private sector critical infrastructure failure, and coordinate with private sector partners to identify potential support requirements to ensure rapid stabilization and access to impacted private sector critical infrastructure.

[56] For more information on data validation methods, see *FRMAC Laboratory Analysis Manual* (2013).

- Independent regulatory agencies have established relationships, outage reporting mechanisms, and the ability to provide regulatory relief that will assist in response and recovery operations, as well as contribute to a common operating picture of the impacted critical infrastructure.

Non-Governmental Organizations (NGOs)

The following bullets provide examples of how NGOs support nuclear/radiological operations:

- Voluntary Agency Liaisons coordinate federal support for non-governmental organizations' volunteers and programs and should perform the following activities:
  - Assess needs generated by the incident to coordinate the provision of timely and efficient services.
  - Coordinate with SLTT agencies to determine the need for any federal resource requests for needed mass care items and help facilitate their deployment and arrival.
  - Determine federal support for SLTT recovery activities to include referrals for housing, unmet needs, case management, and referral services.

Communications

It is essential to ensure early coordinated, consistent, and unified public messaging that is credible and provides clear, timely, and actionable information that is accessible and culturally and linguistically appropriate for all affected populations. This public messaging must be accessible to individuals with disabilities, understood by individuals who are limited English proficient, and available to older adults and others without access to the Internet. Public messaging should adhere to the principles of risk communications, even in areas unaffected by the incident, and include information regarding the threat, hazard, or incident, as well as the actions being taken and the assistance that is available, including addressing behavioral health impacts that may be significant in impacted populations. Communication systems for federal and SLTT agencies should coordinate to maintain situational awareness and permit timely assessments of the status of critical services, resources, and infrastructure.

The Domestic Communications Strategy developed and maintained by the DHS Office of Public Affairs will be activated for federal interagency responses to a nuclear/radiological incident. The White House Office of Communications reviews and approves its content and provides strategic direction during its employment. The Domestic Communications Strategy is intended for the U.S. domestic audience, but its execution is coordinated and shared with federal partners to ensure consistency with international activities. The strategy is adaptable and can be adjusted as necessary to support emergency planning activities, particularly during the pre-incident phase.

The potential effects from a nuclear/radiological incident may destroy or degrade communication infrastructure in the immediate area and severely hinder communications. The survivability and operational capacity of both existing emergency communications networks and interoperable communication systems may be negatively affected.

The National Response Framework ESF #2 Communications Annex provides support to federal and SLTT governments and first responders when their systems have been impacted and provides communication and information technology support to the Joint Field Office and federal field teams.

FEMA's Integrated Public Alert and Warning System provides significant capability for public messaging, including capability to broadcast an alert message to all cellular phones in a given area as a Wireless Emergency Alert, and access to the Emergency Alert System, NOAA All Hazards Weather Radio network, and internet connected alerting tools.

The FEMA Mobile Emergency Response Support (MERS) element will provide communications connectivity for FEMA and other federal responders to the maximum extent possible. This connectivity consists of, but is not limited to, satellite, high frequency, and microwave line-of-sight interconnected by fiber optic cables to voice and data switches, local area networks, and desktop devices such as personal computers and telephones. The MERS element will assist in establishing initial communications operations at the Joint Field Office once it is established.

The primary reporting methods for interagency information flow are Homeland Security Information Network (HSIN) and FEMA's Crisis Management System, formally known as WebEOC™. Each federal department and agency will use HSIN common operating picture for incident reporting. The HSIN Intelligence portal will be used for the dissemination, collaboration, and notification of unclassified information and intelligence.

HSIN provides information capability that supports both National Infrastructure Protection Plan and National Response Framework. In addition, HSIN provides situational awareness and facilitates information sharing and collaboration with homeland security partners throughout federal, SLLT, and private sector partners. Each federal D/A will use HSIN common operating picture for incident reporting.

Additional threat-reporting mechanisms are in place through the FBI, where information is assessed for credibility and possible criminal investigation. The FBI-led interagency WMDSG threat products may also be useful to inform operations and decisions by the response community.

Prior to the release of information involving a potential terrorist incident, to ensure that sensitive law enforcement information is not improperly released, federal D/As must coordinate their public messaging communications with the Attorney General of the United States.

Additional information can be found in the interagency document *Communicating During and After a Nuclear Power Plant Incident*.[57]

[57] See FEMA's Communicating During and After a Nuclear Power Plant Incident (2013) for additional guidance.

This page intentionally left blank.

Appendix A: Federal Response Coordination Constructs

This appendix expands on the discussion of the four federal response coordination constructs identified in "Response/Recovery Coordination Constructs" (page 15) and Figure 2. These constructs are based upon a graduated scale that ranges from localized nuclear/radiological incidents requiring no additional federal resources to those that require a large-scale federal interagency response.

Application of one of the four federal response coordination constructs is based upon the severity of the incident, its impact on the population and environment, and the resources required and available to respond to the incident. The Federal On-Scene Coordinator (OSC) makes the initial assessment of which federal coordination construct is required to respond to a nuclear/radiological incident. As an incident escalates in size and complexity, the level of response scales to the appropriate response construct.

Initial Actions

For a Federal OSC to become aware of a nuclear/radiological incident and complete their initial assessment of the situation, multiple initial actions must be completed. After discovery of the incident, Federal OSCs must be notified and conduct the preliminary assessment to determine the appropriate level of federal response required.

Discovery and Notification

Federal OSCs may become aware of nuclear/radiological incidents from any of the following sources:

- Notifications made to the NRC under federal laws and regulations
- Reported observations from government agencies or the public, government patrols or investigations, or citizen petitions
- Operational coordination with federal law enforcement

Federal OSC Assessment and Determination of Response Coordination Constructs

The Federal OSC makes a preliminary assessment of impacts to determine the appropriate level of federal response, as depicted in Figure 2. The Federal OSC collects pertinent information, to the extent practicable, about the incident. These assessments may include the following information:

- Magnitude and severity of the discharge or threat
- Identification of potential owner/operators
- Nature, amount, and location of materials released
- Probable direction and time of travel of materials released
- Pathways to human and environmental exposure
- Potential impact on human health, welfare, safety, and the environment

- Natural resources and property affected
- Impacts to critical infrastructure such as closure of waterways, ports, and locks; shutdown of water intakes; and disruptions to critical supply chains
- Priorities for protecting human health, welfare, and the environment
- The need for lifesaving, life-sustaining, and protective measures such as evacuation, mass care, and health measures
- Description of responder and owner/operators' initial actions

The Federal OSC may collect information by telephone and may deploy to the incident scene. The Federal OSC typically coordinates with SLTT or insular governments on the need for a federal response, but in all cases, the Federal OSC makes an independent assessment of this need.

Response Coordination Constructs

Following is a detailed breakdown of the four federal response coordination constructs including a description of each construct and the D/As and other organizations involved in coordination and response. These response coordination constructs depict the consequence management coordination structure during a federal interagency response only. Law enforcement response coordination is discussed in a separate section starting on page A-6, as well as in Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents.

No Federal Response Required

Under this construct, the Federal OSC has evaluated the situation and determined that owner/operator(s) (O/O) and SLTT responders have enough resources to manage and control the response to a nuclear/radiological incident, as depicted in Figure A-1. The resources provided by a federal interagency response are not required, but the Federal OSC continues to act as a federal liaison to the response operation.

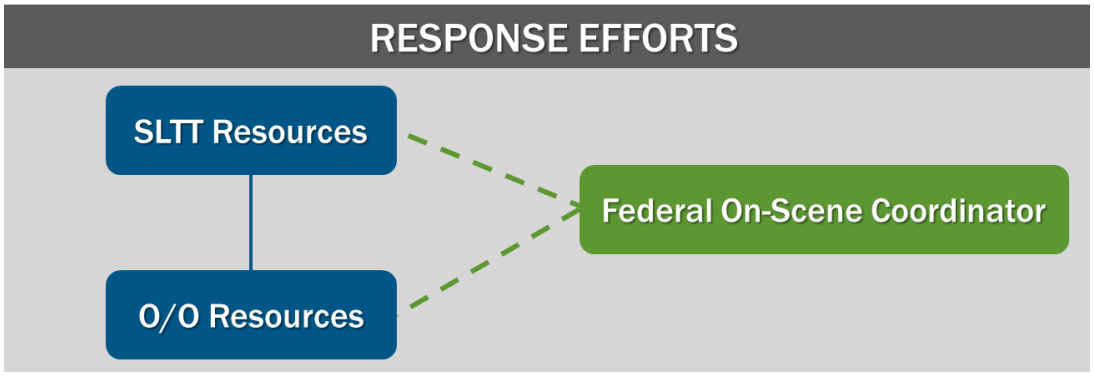

Figure A-1: No Federal Response Required Coordination Construct

Unified Command Response

Under this construct, the Federal OSC has evaluated the situation and determined the incident requires federal coordination to deliver appropriate resources to support response/recovery operations. Many federal D/As with different authorities may respond to nuclear/radiological incidents and may be designated as the LFA. However, initially, most

federal nuclear/radiological incidents will be evaluated by a competent federal authority listed in Table 1 until an LFA is determined. An LFA is determined based on the incident's characteristics and coordinates with the SLTT authorities and owner/operators to execute response operations. In addition to the LFA resources, capabilities and assets from other federal D/As may be requested to support response/recovery operations. The Federal OSC and LFA will coordinate the federal incident response with various agency, SLTT, and owner/operator resources using a unified command structure as depicted in Figure A-2.

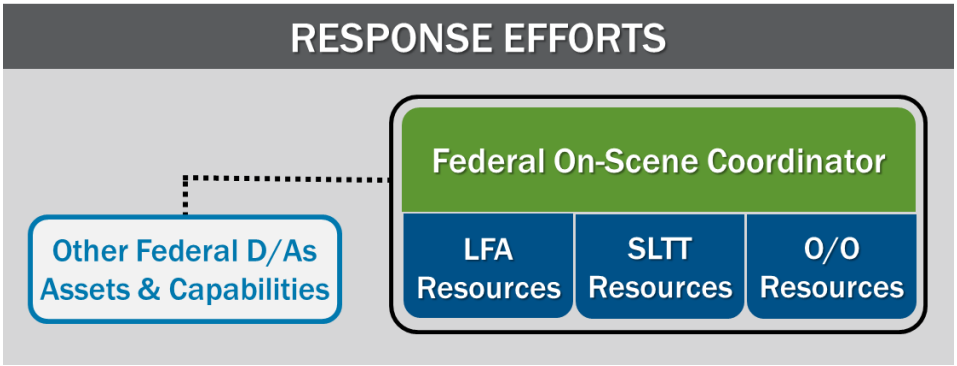

Figure A-2: Unified Command Response Coordination Construct

The National Response System (NRS), established by the NCP, provides access to organizations that routinely and effectively prepare for and respond to a wide range of oil and hazardous-substance releases. Key federal response components of the NRS include the National Response Center, Federal OSCs, thirteen Regional Response Teams (RRTs), the National Response Team (NRT), and NCP federal special teams. When a Federal OSC determines that a federal response is needed, the NRT, RRT, and special teams are available to the Federal OSC to support the response.

National Response System (NRS)

The NRS is a multi-layered system of individuals and teams from SLTT and federal D/As, industry, and other organizations that share expertise and resources to ensure that response to an oil spill or hazardous material release, including nuclear/radiological incidents, is timely and efficient and that threats to human health and the environment are minimized.

Unified Command Response with ESFs

When the effects of a nuclear/radiological incident require federal resources significantly beyond those that can be delivered solely through the unified command response construct, the Secretary of Homeland Security, acting through the FEMA Administrator, may be asked to facilitate assistance through the ESF response structure. It should be assumed that a nuclear incident response will likely require this additional assistance beyond the basic unified command structure. Figure A-3 illustrates the unified command response with ESFs that is typically deployed in this case.

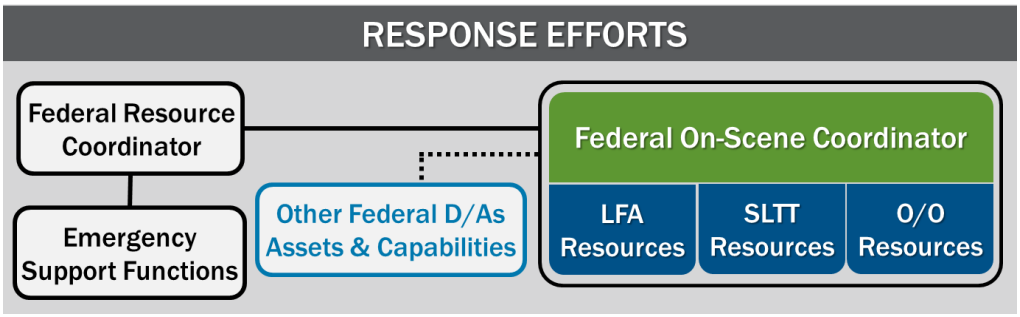

Figure A-3: Unified Command Response with ESFs Coordination Construct

Federal Resource Coordinator

When the LFA requests the assistance of DHS to obtain support from other federal D/As through the ESF response structure, the FEMA Administrator may designate a Federal Resource Coordinator (FRC). The FRC's responsibilities may include the following activities:

- Coordinating timely delivery of resources to the requesting D/A using interagency agreements and memorandums of understanding
- Coordinating the ESFs as necessary to support the Federal OSC or other senior officials and to address broader incident impacts
- Providing support to the Federal OSC or other senior officials in the identification, deployment, and coordination of federal resources
- Tasking federal ESF lead D/As with providing needed federal-to-federal assistance

Stafford Act Response

When a nuclear/radiological incident is of increased size and complexity, SLTT resources are overwhelmed, and the incident will require an extensive federal interagency response. In these incidents, the governor of a state or territory or the chief executive of a federally recognized Indian tribe may request federal assistance under the Stafford Act. When the President approves a Stafford Act declaration request, a major disaster or emergency declaration is issued, which makes federal financial and other support to SLTT governments available for response and recovery. In incidents that are primarily the responsibility of the federal government, the President can issue a Stafford Act declaration without a request. FEMA leads the federal response and recovery during a Stafford Act incident and designates a Federal Coordinating Officer (FCO) to coordinate the overall federal response. This response typically includes a Unified Coordination Group that oversees the Unified Command Response with the support of both the ESFs and RSFs as depicted in Figure A-4.

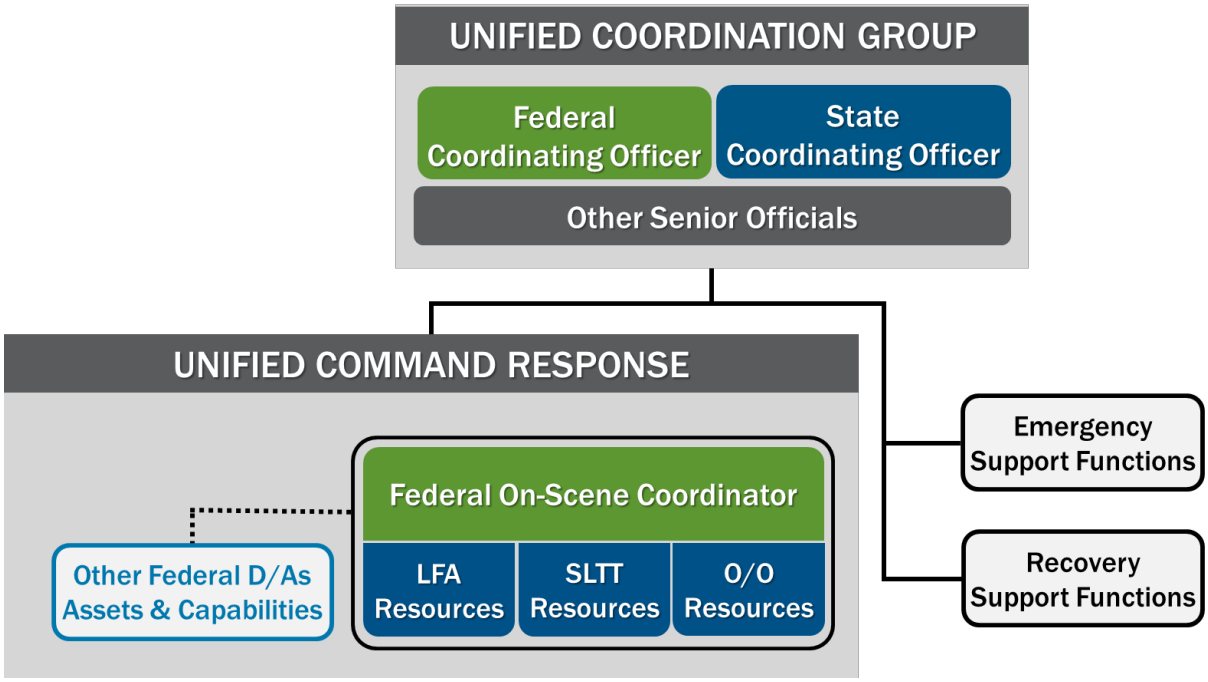

Figure A-4: Stafford Act Response Coordination Construct

Stafford Act Federal Activities

The federal response under a Stafford Act declaration is described in the Response and Recovery FIOP. After a Presidential declaration of a major disaster or emergency, a FEMA Regional Response Coordination Center (RRCC) will coordinate initial regional and field activities until a JFO is established.

A FEMA FCO will deploy to coordinate the overall federal response in support of the Federal OSC, operating from an IOF until the JFO is established. When established, the JFO provides a central location coordinating the activities of the federal government, SLTT governments, and private sector and NGOs with primary responsibility for response and recovery operations. The JFO is organized, staffed, and managed in a manner consistent with principles of NIMS.

Personnel from federal and state D/As, other jurisdictional entities, the private sector, and NGOs staff various positions within the JFO, depending on the requirements of the incident. These personnel constitute the Unified Coordination Staff (UCS). The UCS is led by the UCG, which is composed of an FCO, State Coordinating Officer, and other senior officials, as necessary.

Although the UCS uses the structure of the Incident Command System, it does not manage on-scene operations. Instead, it focuses on providing support to on-scene response activities and conducting broader support operations that may extend beyond the incident site.

The FCO coordinates the overall federal response, and the Federal OSC conducts response actions with other federal D/As, as described in the NRF's ESF annexes and in the Response and Recovery FIOP. During response, the Federal OSC retains the authority to take action following NCP procedures, including direction and oversight of owner/operator responses.

Under a Stafford Act declaration, ESFs provide representatives to the RRCC, JFO, and FEMA NRCC when requested and may send liaisons to SLTT emergency operations centers (EOCs). Where nuclear/radiological response is a significant component of the overall response, the FCO should ask the LFA and/or other relevant federal D/As to designate a senior official to be part of the UCG.

Coordination with Federal Law Enforcement

For federal interagency responses to suspected or actual intentional nuclear/radiological incidents, federal law enforcement includes two major components: (1) law enforcement and investigative operations led by the FBI and (2) public safety and security activities led by ESF #13 as seen in Figure A-5.

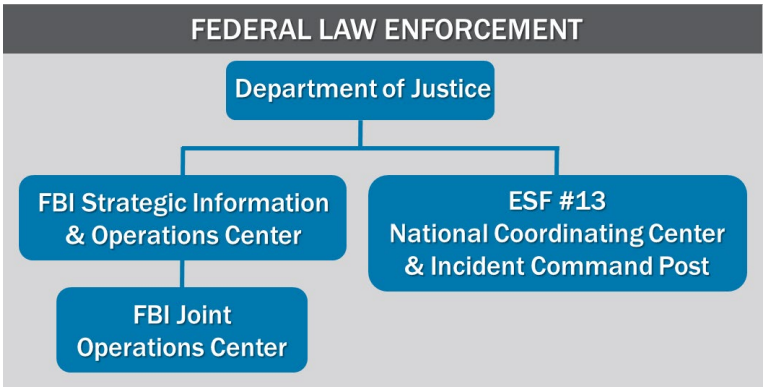

Figure A-5: Federal Law Enforcement Components Involved in Nuclear/Radiological Incident Response

If the incident involves a suspected or confirmed terrorist attack or other federal crime under its jurisdiction, the FBI will establish a local command post, referred to as the Joint Operations Center (JOC), to manage law enforcement and investigative operations. During a threat or incident involving a WMD or chemical, biological, radiological, and nuclear (CBRN) materials or devices, the JOC will include a consequence management group staffed by representatives of other D/As. When such incidents affect multiple locations, additional JFOs and FBI JOCs may be established. JFO elements will coordinate at the local level with the JOC consequence management group and at the national level with the FBI-led WMDSG and embedded CMCU. For additional information regarding the WMDSG and the CMCU, see page 44-45. For additional details concerning the law enforcement response, see Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents.

During the initial response to a suspected or actual intentional nuclear/radiological incident, the priority will be on protecting human health and safety (of both the public and responders), while also considering the need for evidence preservation, documentation, and collection in a potentially contaminated environment. In addition to consequence management and law enforcement operations, there will also be a simultaneous need for environmental response. Every effort will be made to share information between response and law enforcement activities to support respective missions.

If a Federal OSC discovers evidence of suspected criminal activity associated with the incident, the Federal OSC will contact, consult, and coordinate with the local FBI field office and the FBI Special Agent in Charge (SAC).

In addition to law enforcement investigation and intelligence operations, DOJ, through the ESF #13 National Coordinator, is responsible for coordinating the federal interagency law enforcement response related to public safety and security activities.

For more detailed information on law enforcement operations following a nuclear/radiological incident and how law enforcement coordinates with consequence management operations, refer to Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents.

Recommendations and Decision Making

The Federal OSC leads the federal response and coordinates operational recommendations and decisions. Federal D/As provide recommendations or related technical support to SLTT governments for the following protective actions:

- Public sheltering in place or evacuation
- Responder protective actions
- Potable water, food safety, and other health and safety issues

SLTT governments typically decide sheltering and evacuation actions; however, various federal D/As have the expertise and authority to provide recommendations and technical assistance for incident response, if necessary.

In some cases, federal statutory and regulatory requirements may determine protective actions for the public and responders. For example, the USDA provides federal recommendations on the safety of meat, poultry, and processed egg products. Depending on jurisdiction, OSHA, states, or EPA recommends actions to protect response workers. For a federally led response, the Federal OSC also develops a site safety plan for the nuclear/radiological incident response site.

Several laws and executive orders may also apply to response actions, to protect natural and cultural resources and historic properties and to ensure consultation with tribes.

This page intentionally left blank.

Appendix B: Community Lifelines

Community lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security. Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. Lifelines are the integrated network of assets, services, and capabilities that are used day to day to support the recurring needs of the community. When a lifeline is disrupted, decisive intervention (such as rapid service reestablishment or employment of contingency response solutions) is required to stabilize the situation. For a nuclear/radiological incident, the lifeline concept may be applied to prioritize the delivery of critical services that alleviate immediate threats to life and property.

Lifelines help frame how disaster impacts are identified, assessed, and addressed. Figure B-1 illustrates the seven lifelines: Safety and Security; Food, Water, Shelter; Health and Medical; Energy (Power & Fuel); Communications; Transportation; and Hazardous Materials.

Figure B-1: Community Lifelines

Lifeline Stabilization and Condition Determination

When a nuclear/radiological incident disrupts lifeline services to the point that survivors and property are severely affected, stabilizing the lifelines becomes the highest priority. Lifelines provide a framework for responders to use in assessing disruption to critical lifesaving and life-sustaining services. These services are assessed at each level of government.

Lifeline Stabilization

Assessing lifeline status allows for more efficient decision-making during response by gathering critical information associated with the following response activities:

- Determine the severity of impact on critical infrastructure.
- Identify limiting factors and gaps to address those impacts.
- Quickly prioritize solutions to alleviate threats to life and property.
- Provide stabilization to survivors by rapidly reestablishing critical services.

Stabilization may occur through the employment of a temporary solution to restore a lifeline until a permanent solution can be established. When a lifeline has been restored, follow-on events may lead to lifeline degradation. Therefore, lifelines must be continually resourced, and their condition monitored. Depending on severity of impact on each lifeline, some lifelines may be restored earlier than others.

For the hazardous materials lifeline, an example of a stabilization target could be the identification and securing of all affected areas from a nuclear/radiological incident as shown in Table B-1.

Table B-1: Hazardous Materials Lifeline Examples

Item	Examples for Hazardous Materials
Planning factors	▪ Number of facilities damaged ▪ Amount of total debris (tons)
Stabilization targets	▪ All affected areas are identified and secured
Related federal assistance	▪ Debris management ▪ Environmental cleanup

Determining Lifeline Status

Once situational awareness is attained, leadership determines the status of the lifelines within the affected area. The status indicates the level of degradation of lifeline services and provides a snapshot for an operational period. Lifeline statuses should be determined collaboratively and continually as circumstances evolve over the course of an incident. FEMA's reporting products use four colors (grey, red, yellow, and green) for operational reporting on lifelines as given in Table B-2.

Table B-2: Lifeline Operational Status Reporting

Status	Description
Unknown: Grey	Disruption and impacts to lifeline services are unknown
Unstable: Red	Lifeline services disrupted, with no solution identified or in progress
Stabilizing: Yellow	Lifeline services disrupted but solution in progress with estimated time to stabilization identified
Stable: Green	Lifeline services stabilized, reestablished, or not affected

Hazardous Materials Lifeline and Nuclear/Radiological Incidents

The Hazardous Materials lifeline monitors the status of hazardous materials and facilities, pollutants, and contaminants during an incident. A nuclear/radiological incident may disrupt multiple lifelines. For example, if an accidental nuclear release occurs at a power plant, then the response must stabilize both the Hazardous Material lifeline and the Energy lifeline. If a radiological release causes more people to seek medical care than local hospitals can handle, then response must stabilize both the Hazardous Materials lifeline and the Health and Medical lifeline.

The Hazardous Materials (HAZMAT) lifeline has two components: (1) infrastructure and (2) contaminants and exposure. Figure B-2 shows the components and subcomponents.

Figure B-2: Components of the Hazardous Materials Lifeline

For the affected communities to be fully stabilized after a nuclear/radiological incident, all lifelines must be stable, including Hazardous Materials. Stabilization targets are developed for all components and subcomponents of every lifeline early in the response process—typically immediately following completion of component assessment. Initial stabilization targets should be revisited and refined periodically throughout the response. Stabilization targets drive key leadership decisions and prioritization of response resources and actions, including the development of strategies, operational priorities, and objectives. Due to the unique and complex nature of nuclear/radiological incidents, other stabilization targets will need to be identified, in addition to the Hazardous Materials lifeline stabilization targets, as multiple community lifelines will likely be impacted. This may include the Food, Water, Shelter lifeline, the Health and Medical lifeline, and the Safety and Security lifeline, among others.

Nuclear/Radiological Recovery Outcomes

When stabilization of community lifelines is achieved, the focus of the mission shifts to achieving recovery outcomes. The outcome-driven recovery model is an approach that emphasizes long-term, resilient solutions across all lifelines and other aspects of a community and would be used following a nuclear/radiological incident. To the greatest extent possible, recovery operations will use reporting templates similar to those used during response but modified to reflect recovery outcomes by RSFs rather than stabilization targets by lifeline.

Table B-3 provides an example of recovery outcomes by RSF. These are the national-level outcomes as approved by Recovery Support Function Leadership Group (RSFLG) undersecretaries. SLTT leaders can use these as a reference point for tailoring their own recovery outcomes in circumstances such as a nuclear/radiological incident.

Table B-3: Examples of Recovery Outcomes by RSF

Recovery Support Function	Recovery Outcome
Community Planning and Capacity Building	Aid SLTT governments in building their local capabilities to effectively plan for and manage recovery.
Economic	Return economic and business activities to a state of health and develop new economic opportunities that result in a sustainable and economically viable community.

Recovery Support Function	Recovery Outcome
Health and Social Services	Support locally led recovery activities to address public health, health care facilities and coalitions, and essential social services' needs.
Housing	Implement adequate, affordable, and accessible housing solutions that effectively support the needs of the community and contribute to its sustainability and resilience.
Infrastructure Systems	Facilitate the restoration of infrastructure systems and services to support a viable, sustainable community and improve resilience to and protection from future hazards.
Natural and Cultural Resources	Preserve, conserve, rehabilitate, and restore natural and cultural resources and historic properties consistent with post-disaster community priorities and in compliance with applicable environmental and historical preservation laws and executive orders.

Appendix C: Law Enforcement Coordination for Intentional Nuclear/Radiological Incidents

The appendix addresses incidents involving nuclear/radiological materials, weapons, and devices that are intentionally imported, possessed, stored, transported, developed, or used without authorization by the appropriate regulatory authority. The focus is on such incidents for which (1) immediate federal support or assistance is required, (2) resource pre-positioning could be complex or not possible, or (3) the requirements for resources and support are not fully known. Any possible terrorist incident involving nuclear/radiological materials, weapons, or devices will be treated as an actual terrorist incident until otherwise determined by the Attorney General, acting through the FBI Director. This appendix does not address acts of nuclear war.

Background

In the event of an intentional nuclear/radiological threat or incident, the federal government will work to save lives and minimize the damage to property, critical infrastructure, and the environment by resolving the threat and preventing further potential attacks. Operational coordination, information sharing, and decision-making help to ensure an effective response and recovery. Federal D/As will coordinate with and support SLTT authorities to respond to and recover from nuclear/radiological incidents affecting their jurisdictions.

The Protection and Prevention Mission areas include core capabilities necessary to prevent or stop an imminent or ongoing act of terrorism and follow-on attacks. This appendix outlines the federal interagency coordination mechanisms that ensure the integration of these two mission areas with those of Response and Recovery Missions during a suspected or actual intentional incident. This integration involves coordination and timely information sharing that will achieve unity of effort to inform operations and decisions across the mission areas. Given the complexity of response across mission areas, unity of effort is essential to avoid unintended consequences that may otherwise result from independent or unilateral response and recovery operations. Unity of effort increases the likelihood of saving lives; protecting property, critical infrastructure, and the environment; and successfully resolving or preventing intentional threats and incidents.

Information regarding imminent credible threats from law enforcement will be communicated to the relevant consequence management organizations through established interagency coordination mechanisms identified in the National Prevention Framework[58] and the Prevention FIOP,[59] such as the FBI's Weapons of Mass Destruction Strategy Group (WMDSG) for the national-level coordination and the FBI's Joint Operations Center (JOC) for local-level coordination. In rare instances, however, concerns for national security, counterterrorism, or law enforcement operational security may limit the release of certain

[58] See the *National Prevention Framework*, Second Edition (2016).

[59] The Prevention FIOP contains sensitive information and is not publicly available on unclassified systems in the interest of national security. Stakeholders can receive a copy through their local Fusion Center.

information. Therefore, during any response to a credible threat involving suspected or actual criminal or terrorist activity, federal D/As must follow the applicable policies, including any classified Presidential policies, and closely coordinate their proposed public messaging and SLTT outreach activities. Close coordination also will ensure that federal leadership is well informed for making decisions.

Prevention Federal Interagency Operational Plan (FIOP)

The Prevention FIOP describes the federal law enforcement investigative, intelligence, and operational response to a terrorist threat or attack. It also describes how federal law enforcement entities will coordinate with SLTT agencies and other federal D/As with law enforcement responsibilities.

The Attorney General, acting through the Director of the FBI, leads and coordinates the operational law enforcement response to terrorist threats and incidents, which include the law enforcement activities at the crime scene and related law enforcement investigative and intelligence activities. Acting through the FBI, and in cooperation with other federal D/As engaged in activities to protect national security, the Attorney General also coordinates the activities of other members of law enforcement community to detect, prevent, preempt, and disrupt terrorist attacks against the United States. The Attorney General, acting through the FBI Director, also has primary responsibility for investigating, locating, assessing, interdicting, recovering, rendering safe, and neutralizing a WMD within the United States.

The following are descriptions of the methods, weapons, materials and/or devices that may be employed during suspected or actual intentional nuclear/radiological incidents. Intentional nuclear/radiological incidents are the most likely to require heavy law enforcement involvement because of the presumption of terrorist and/or criminal activity. During intentional nuclear/radiological incidents, law enforcement operations and activities will be severely impacted due to contaminated environments, reduced resource availability, and potential damage to critical infrastructure.

Nuclear Detonation

Nuclear detonations release intense light, a pulse of heat and radiation, and a blast wave. In many circumstances, additional effects include residual radiation in the form of fallout and an electromagnetic pulse. Even a small nuclear detonation produces an explosion and effects far surpassing that of a radiological dispersal device, radiological exposure device, or conventional explosives. For more information about nuclear detonations, see Appendix F: Nuclear Detonations and Radiation Dispersal.

Radiological Dispersal Device (RDD)

An RDD is any device that disperses radioactive material or emits radiation by conventional explosive or other mechanical means, such as a spray, at a harmful level without a nuclear detonation occurring. The harm caused by an RDD can include radioactive contamination, increased public fear of radioactive contamination, and denial of use of the contaminated area, perhaps for many years, which would also have an economic impact and require costly remediation. For more information about the radiation zones used to respond to an RDD incident, see Appendix F: Nuclear Detonations and Radiation Dispersal.

An RDD that uses explosives for spreading or dispersing radioactive material is called an "explosive RDD." A well-known, non-technical term for an explosive RDD is a "dirty bomb." For an explosive RDD, the explosion adds an immediate threat to human life and property. Most RDDs would not release enough radiation to kill people or cause severe illness. The conventional explosive itself would be more harmful to individuals than the radioactive material.

Non-explosive RDDs could spread radioactive material using common items such as pressurized containers, fans, building air-handling systems, sprayers, or crop dusters or even spreading by hand.

Radiological Exposure Device (RED)

An RED is also sometimes called a "hidden sealed source." An RED is a device incorporating radioactive material designed to harm or injure people by passively exposing them to ionizing doses of radiation without their knowledge. Constructed from partially or fully unshielded radioactive material, an RED could be hidden from sight in a public place (e.g., under a subway seat, in a food court, or in a busy hallway), exposing those who sit or pass close by. Health effects may take hours, days, or weeks to appear. These effects range from mild to severe including cancer or death.

If a sealed source is breached and the radioactive materials are released and dispersed, the device could become an RDD, capable of causing radiological contamination.

RED incidents are more likely to include multiple devices or successive occurrences. This may significantly alter the federal response to assure resources remain available for follow-on incidents.

Unique Characteristics of an Intentional Nuclear/Radiological Incident

Intentional nuclear/radiological incidents have unique characteristics that must be considered by federal and SLTT law enforcement and consequence management responders. The following characteristics pertain to suspected or actual intentional nuclear or radiological incidents:

- During the response to an intentional nuclear/radiological incident, law enforcement operations, including investigative activities and evidence collection, will be conducted in contaminated environments, which will be considered a crime scene.
- An intentional nuclear/radiological incident will result in many casualties that will quickly overwhelm law enforcement resources, which will impact investigative and operational activities.
- During the response to an intentional nuclear/radiological incident, law enforcement will need to coordinate with the private sector to conduct investigative activities, protect critical infrastructure, and prevent follow-on incidents.

- The complexity, scope, and consequences from an intentional nuclear/radiological incident will require multi-agency and multi-jurisdictional coordination at all levels with law enforcement, including with the public health and medical response communities.
- An intentional incident will be presumed to include potential follow-on threats and incidents. Planning to address such additional attacks will need to consider that resources may be limited, as they are already in use to response to the immediate incident.
- Although an intentional nuclear/radiological incident will be presumed to be a terrorist attack until determined otherwise, initial indications may be inconclusive, and responders' identification of suspicious activity and potential evidence will be key for triggering further federal law enforcement operational activities.
- The release of information to the public during and in connection with suspected or actual intentional incidents must be coordinated through the White House, the Secretary of DHS, and the Attorney General. This is to ensure sensitive law enforcement information is protected and for various other security considerations.
- Persons who may be witnesses or otherwise possess evidence relevant to the criminal investigation will be relocated and transported to locations that are outside the immediate crime scene after decontamination, as applicable.

Law Enforcement Operational Coordination

Although saving lives remains the highest priority, coordination between response and recovery operations and law enforcement operations during response to a suspected or actual intentional nuclear/radiological incident is critical to ensure that the federal response is unified and well-organized.

Information collection and sharing is crucial for effective decision making, while interagency coordination ensures that consequence management operations and law enforcement activities are deconflicted and coordinated. Prior to the release of information involving an actual or suspected intentional incident pertaining to investigation or other law enforcement operations, the proposed communication must be coordinated with the Attorney General, acting through the FBI Director.

Information Collection and Sharing

Information collected domestically about terrorist threats, including reports of suspicious activity involving suspected federal crimes of terrorism, must be shared immediately and comprehensively with the FBI-led Joint Terrorism Task Forces (JTTFs) so that threats can be investigated and resolved as soon as practical. In addition to the JTTFs, this information should also be reported to the nearest FBI field office and FBI Headquarters.

FBI JTTFs include federal and SLTT law enforcement personnel and are located nationwide. The National JTTF, located at FBI Headquarters, coordinates the activities of local JTTFs to ensure that information and intelligence is continually shared. JTTFs investigate terrorism threats including WMDs and resolve reports of possible terrorist activity from all sources, including those submitted from the public.

When a nuclear/radiological incident occurs as a result of suspected criminal activity or terrorism, the Attorney General, acting through the FBI Director, will use national-level command posts located in or connected through the FBI Strategic Information and Operations Center (SIOC), as well as the local-level command post established by the FBI field office (e.g., the JOC in Figure C-1), to coordinate law enforcement activities, which includes deconflicting activities with the consequence management operations that are taking place simultaneously. These command posts ensure effective operational coordination and information sharing among federal and SLTT partners. They also enable the FBI to manage the law enforcement, investigative, and intelligence domestic threat response. In addition, several other structures support coordination and information sharing to monitor terrorist threats. Other national-level coordinating structures include the DHS's National Operations Center (NOC), the Office of the Director of National Intelligence's National Counterterrorism Center, and the DOD's National Military Command Center. Other field coordinating structures, such as state and major urban area fusion centers and SLTT counterterrorism and intelligence units also play critical roles.

Joint Operations Center (JOC)

FBI JOCs are local-level command posts from which the FBI manages its law enforcement response, investigation, intelligence collection, and counterterrorism operations. A JOC complies with the National Incident Management System (NIMS). The JOC is led by the FBI OSC and is staffed by federal and SLTT agencies. The JOC coordinates operations and shares information with other regional command and intelligence centers, including state emergency operations centers (EOCs) and fusion centers. The JOC includes the following groups.

- **Command Group:** The multiagency Command Group, led by the FBI OSC, ensures that conflicts are resolved, and priorities and objectives are established. Members of the Command Group play an important role in ensuring information sharing and coordinating federal counterterrorism operations with consequence management. The Command Group provides strategic recommendations and advice to resolve the threat and save lives. It also approves the employment of law enforcement investigative and intelligence resources. The Command Group is composed of senior officials with decision-making authority from federal and SLTT agencies and private partners based upon the circumstances of the threat or incident. It is supported by federal and state prosecutors, legal counsel, and media representatives.
- **Operations Group:** This group manages all investigative, intelligence, and operational functions related to the imminent threat or incident. The Operations Group usually consists of the following functions: (1) Intake, (2) Intelligence, and (3) Investigation. The Operations Group is staffed by subject matter experts and specific operational components, such as tactical, negotiations, hazardous evidence, forensics, surveillance, and technical.
- **Operations Support Group:** This group is staffed by coordinators who provide advice and assistance within their areas of expertise, such as victim and witness coordination, communications, administration and logistics, liaison, and information management.

- **Consequence Management Group:** This group is staffed as needed by representatives from the FEMA region, DOD, SLTT governments, and private-sector partners. These agencies and organizations have expertise in consequence management, emergency management, and related technical matters. The group helps establish joint priorities that inform law enforcement operations and decision making.

The JOC can also be augmented by the Domestic Emergency Support Team (DEST), a rapidly deployable interagency team that supports the FBI. As part of its mission, the DEST supports the FBI OSC and other officials (e.g., the National Assets Commander) and supports the integration of law enforcement and counterterrorism operations with consequence management operations that may be taking place simultaneously. The DEST provides the FBI with expert advice and guidance about crisis and consequence management capabilities that can inform Prevention Mission operations. DEST composition includes a ready roster from FEMA, FBI, DOD, HHS, DOE, EPA, and others as appropriate. Based upon the threat and requirements, the FBI determines the composition of the DEST and maintains operational control throughout its activation. The FEMA Administrator, in support of the FBI, is responsible for policies and planning governing the use of the DEST in accordance with agreed-upon policies.

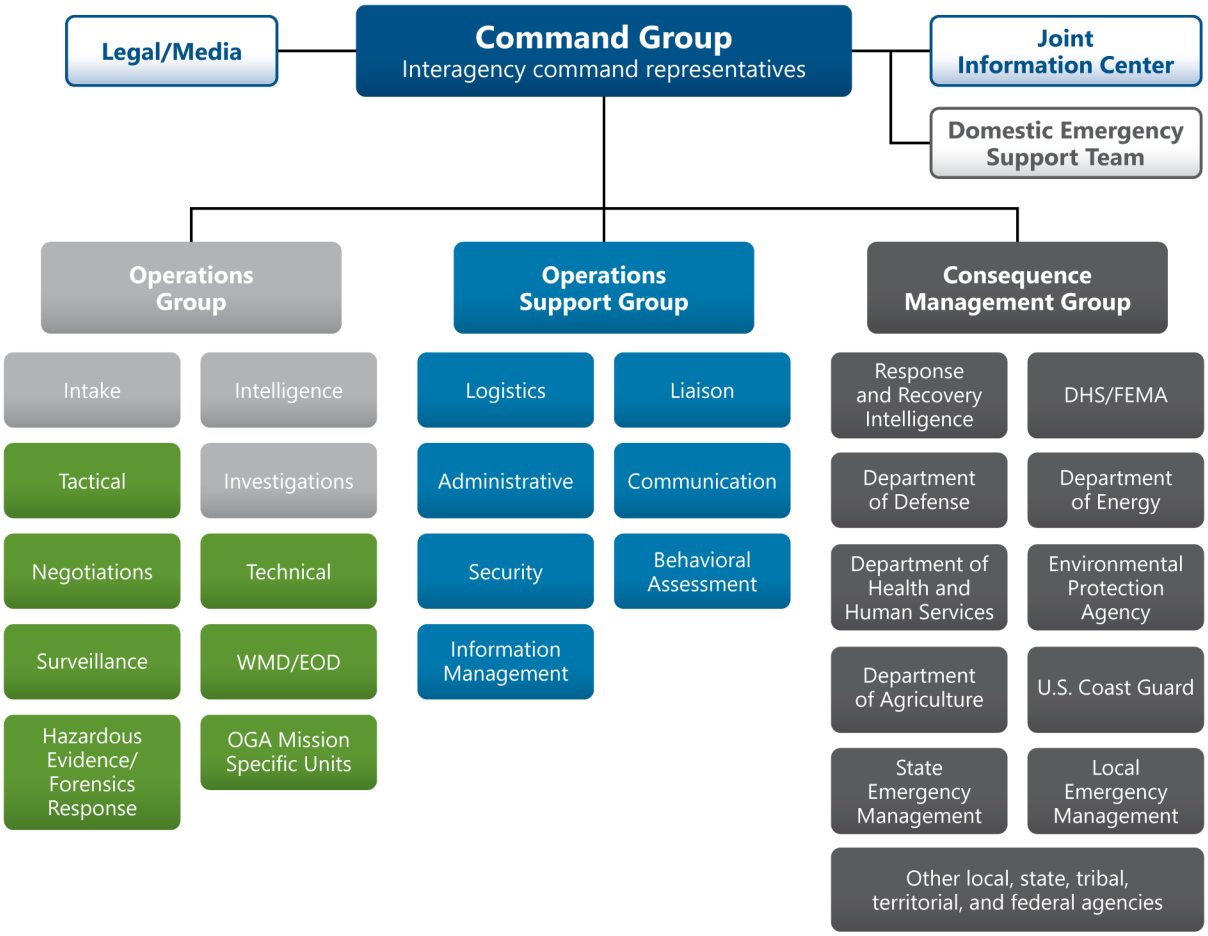

Figure C-1: Example of a Joint Operations Center Configuration[60]

The location of a suspected or actual intentional nuclear/radiological incident will be treated as a federal crime scene. Preserving and collecting evidence is critical to determining the identity of culpable parties and obtaining information about additional planned attacks. Those engaged in response and recovery should establish joint priorities with those engaged in law enforcement operations within the JOC to save lives, protect property, resolve threats, and prevent further attacks.

Fusion centers are state owned and operated centers that serve as focal points in states and major urban centers for the receipt, analysis, gathering, and sharing of threat-related information among federal, SLTT, and private-sector partners. More information on fusion centers can be found at http://www.dhs.gov/fusion-centers.

Interagency Coordination

Interagency coordination is critical to ensure both law enforcement and consequence management response and recovery operations are aligned in their activities. This includes

[60] For a graphical representation of the relationship between the FBI JOC and other coordination structures, see page A-2, Figure A-1, in the *Response and Recovery FIOP*.

coordination at the both the national and FBI field office levels, as well as within the Emergency Support Function (ESF) and Recovery Support Function (RSF) structures.

Weapons of Mass Destruction Strategic Group (WMDSG)

At the national level, when facing a credible WMD threat or incident, the FBI-led WMDSG is an interagency crisis-action team that is activated within the FBI SIOC. The WMDSG supports information exchange and deconfliction of law enforcement and/or counterterrorism operations to prevent imminent threats from occurring, while simultaneously coordinating with the activities of federal D/As responsible for public health and other consequence management activities to save lives and protect property, critical infrastructure, and the environment.

The WMDSG includes a Consequence Management Coordination Unit (CMCU) led by FEMA to ensure information is shared and coordinated among authorized partners. The WMDSG's CMCU provides a critical coordination link between FBI-led operations and FEMA-coordinated consequence management operations through the FEMA home team. After FBI notification of a credible terrorist threat or actual incident, the FBI will activate the WMDSG, and FEMA will staff the CMCU. This unit is also supported by federal technical capabilities provided through NNSA in DOE, HHS, DOD, and DHS. As the principal advisory unit for consequence management within the WMDSG, the CMCU recommends courses of action for ongoing and evolving operations.

The WMDSG connects with the FBI JOC and its WMD desk to support risk-informed decisions and operations. The WMDSG also connects with other FBI command posts (e.g., the CIRG National Asset Command Post regarding all technical information represented by and collected from the WMD device) within the FBI SIOC, and to the operations centers of other federal D/As and to local and regional partners through the FBI JOC. These links also enable the WMDSG to connect to the Unified Coordination Group (UCG) that may be established.

At the FBI field office level, response and recovery activities should be coordinated with the FBI OSC, who is managing law enforcement activities through the JOC. The FBI OSC retains the authority to enforce the law through all phases of the response. However, the FBI OSC fulfills this responsibility concurrently with other activities led by other D/As.

Emergency Support Function (ESF) Integration

Each ESF should review the tasks contained in the Response and Recovery FIOP for Phase 2 (Coordinated Response and Recovery and Operations) to identify tasks that may be required to support law enforcement in crisis operations. During this type of response, any pre-incident activity, including pre-staging, must be closely coordinated to avoid compromising law enforcement and intelligence operations.

In addition to law enforcement investigation and intelligence operations, DOJ, through the ESF #13 National Coordinator, is responsible for coordinating the federal interagency law enforcement response related to public safety and security activities. ESF #13 activations focus on support to the impacted SLTT law enforcement D/As and their ability to provide public safety and security within their jurisdictions, as well as support for other federal D/As, including the FBI. During a nuclear/radiological incident, ESF #13 may be asked to perform duties such as facility security, protection of emergency responders, and other public safety missions related to the incident.

In response to complex incidents, the Attorney General may appoint a Senior Federal Law Enforcement Official (SFLEO). If an SFLEO is appointed, the FBI remains the primary investigative agency for threats and incidents with ties known or suspected terrorism. The SFLEO is primarily responsible for addressing federal criminal investigative and intelligence missions, which are not commonly needed in disaster response. On the rare occasion an SFLEO is appointed by the Attorney General, ESF #13's mission as performed by DOJ remains unchanged. ESF #13 is responsible for coordinating the federal law enforcement support for public safety and security assistance during response, while the SFLEO is responsible for coordinating the criminal investigative and law enforcement intelligence aspects of the response. Any resource conflicts or mission overlaps between ESF #13 and the SFLEO are adjudicated through the UCG. If an SFLEO is not appointed, but the FBI JOC is operationally related to a federally coordinated incident response, ESF #13 and the FBI exchange liaison officers to prevent and address any resource conflicts or mission overlaps.

Operational Phases

The following describes the critical activities during each operational phase that ensure law enforcement and consequence management operations align during a federal interagency response to a suspected or actual intentional nuclear/radiological incident. These activities demonstrate how the coordination mechanisms described above integrate into response and recovery.

Phase 1: Pre-Incident Operations

The FBI and federal and SLTT law enforcement partners are constantly vigilant for threats of terrorism, including nuclear/radiological-related terrorism. During Sub-Phase 1a, the FBI distributes terrorism-related information via classified and unclassified intelligence products, notes, placards, posters, and bulletins and conducts training with law enforcement. The public health community and emergency management officials should work closely with law enforcement regarding posturing resources and appropriate capabilities in the event of an intentional nuclear/radiological incident.

During Sub-Phases 1b and 1c, discovering and locating nuclear/radiological threats and/or hazards may be accomplished through active and passive surveillance and search procedures, which may include the use of systematic examinations and assessments, sensor technologies, or physical investigation and intelligence. Elevated threat or credible threat information may be provided by law enforcement officials; therefore, operations may begin with recognition of the threat.

Law enforcement personnel may be confronted with several situations involving the actual or threatened use of nuclear/radiological material, devices, or weapons. These can range from non-credible threats (hoaxes[61]), announcements or indications that a release of nuclear/radiological material has occurred (overt), or unannounced releases of nuclear/radiological material (covert). Threat information is provided through a variety of sources, including open source, private sector, and SLTT partners; federal D/As; the intelligence community; or foreign governments. Potential threats and incidents must be

[61] If the threat is deemed non-credible, the FBI may initiate an investigation to identify and prosecute those responsible for creating the perception that there was a threat (i.e., a hoax). Under federal law (18 U.S.C. 2332a, 18 U.S.C. 831, and 18 U.S.C. 832), a threat involving radiological/nuclear material is a criminal act, whether or not the perpetrator actually possesses the radiological/nuclear material.

immediately evaluated to determine if they may be a WMD-related incident and possibly linked to crime or terrorism.

No single agency, department, or level of government can independently complete a threat picture of all terrorism and national security threats. If a potential exists for a WMD, the threat information must be immediately passed to the FBI to begin the Threat Credibility Evaluation (TCE) process, which is facilitated by the FBI's Weapons of Mass Destruction Directorate (WMDD) and the FBI WMD Coordinators located in all FBI field offices. The TCE process is used (1) to evaluate the credibility of the actual or potential WMD threat or incident; (2) to discuss whether it may pose a risk of substantial loss of life or substantial damage to property; and (3) to support the coordination of initial operations, if necessary. TCE participants share information and discuss potential courses of action, including whether additional resources, assets, or capabilities are needed to augment those in the affected FBI field office to resolve the threat or incident. During credible WMD threats and incidents, interagency crisis action teams and other coordination mechanisms and command posts will be activated, as discussed above.

If a WMD device is suspected or known, unless specifically contradicted by observations, assessments, or other relevant information, the policy of the U.S. government is to treat the device under the following assumptions:

- The WMD device is credible.
- The threat actor intends to defend and use the WMD device.
- The WMD device will function as designed unless specific and authorized actions are taken by the designated, trained, and equipped response forces.

Phase 2: Coordinated Response and Recovery and Operations

Sub-Phase 2a includes all lifesaving operations at federal and SLTT levels, while law enforcement and counterterrorism operations are actively underway. During this sub-phase, the FBI OSC, operating out of the FBI's JOC, will lead and coordinate the federal operational law enforcement response and all investigative activities necessary to resolve the terrorist threat or incident.

Law enforcement and counterterrorism operations will be taking place in contaminated environments during this sub-phase. Consistent with relevant Presidential directives, FBI Special Agent Bomb Technicians will be responsible for responding to and conducting WMD device defeat and mitigation actions for WMD devices and materials and serve as a point of contact for public safety bomb squad coordination.

Sub-Phase 2a is also dominated by activities to provide accurate and credible information to survivors to enable initial shelter-in-place and delayed evacuation actions. Further, the White House is actively involved in coordinating the implementation of the Domestic Communications Strategy using primarily ESF #8 (Public Health and Medical) and ESF #15 (Public Information and Warning).

During Sub-Phase 2b, law enforcement and counterterrorism operations will be continuing while lifesaving operations are implemented and ongoing. Most survivors will have been located and evacuated and will be receiving life-sustaining support services. These survivors may be witnesses or otherwise possess information or evidence relevant to the law enforcement investigation.

During Sub-Phase 2c, all survivors will have been evacuated and are being sustained through mass care and recovery activities. Ongoing crime scene investigations and evidence recovery in contaminated areas will continue to take place. Normal response and recovery operations are resumed in the impacted area, except for in any of the remaining Dangerous Radiation Zone.

Phase 3: Recovery and Restoration Operations

Recovery operations begin during Phase 2, but they will continue after response operations have concluded. SLTT planners and decision makers, in collaboration with federal D/As, are also engaging stakeholders and technical experts to develop recovery priorities and long-term recovery outcomes. The law enforcement investigation and attribution activities are ongoing, as are activities to investigate and prevent any follow-on attacks.

This page intentionally left blank.

Appendix D: International Nuclear/Radiological Incidents

A significant nuclear/radiological incident, whether caused by accidental or intentional means, may disperse radioactive material beyond the site of release, causing harm not only to a specific area or country but also to the international community. This could result in adverse consequences for the health, safety, and security of populations across international borders. An international nuclear/radiological incident demands careful and thorough coordination of all U.S. national capabilities and capacities to mount an appropriate response to such a catastrophic incident. Special consideration must be paid to Chief of Mission authority. All federal D/As conducting work in the affected foreign country must do so with the approval of the U.S. Chief of Mission in that country.

This appendix provides supplemental information specific to international incidents. It also addresses incidents that have international impacts leading to requests for U.S. assistance. This appendix guides federal interagency partners to respond in a coordinated fashion to support foreign government response during nuclear/radiological incidents (1) to save lives, protect property and the environment, and meet basic human needs; (2) to coordinate the assessment of potential impacts of a foreign nuclear incident; and (3) to communicate risks, consequences, and protective actions to inter-government partners and the public within the United States and abroad. There is also a responsibility to protect U.S. citizens abroad, as well as other U.S. resources such as military installations and equipment, embassies, and consulates.

During a nuclear/radiological incident, the affected nation will have primary responsibility for all aspects of consequence management, including incident command and response. The affected nation is also responsible for requesting bilateral and/or multilateral international assistance, deploying its domestic emergency response forces, and coordinating with foreign partners and international organizations to augment the existing capabilities and resources.

Background

This appendix applies to all federal response and recovery activities, as they pertain to the unique circumstances of the following types of international nuclear/radiological incidents:

- Accidental or intentional foreign incidents involving nuclear/radiological material that directly impact or threaten to impact the United States
- U.S. government support to foreign government operations in response to and/or recovery from a foreign incident

Brief descriptions of these two circumstances follow.

International Incidents That Directly Impact or Threaten to Impact the United States

Incidents at foreign facilities could directly impact U.S jurisdictions and interests. A nuclear liability insurance framework does not exist to protect those impacted by these foreign

nuclear/radiological incidents. Impacted SLTT governments may require additional federal support to respond to and recover from these foreign incidents. The Department of State (DOS) will lead coordination with foreign governments and the International Atomic Energy Agency (IAEA).

Depending upon the nation where the nuclear/radiological incident is located, nuclear liability insurance may be available to protect those impacted. U.S. citizens may be able to make claims for damages or injuries incurred in the incident nation. If the incident nation is a party to the Convention on Supplementary Compensation for Nuclear Damage, U.S. victims should be able to obtain compensation for damages and injury.

U.S. Government Assistance to Foreign Governments

In June 2014, a National Security Council Interagency Policy Committee finalized and approved the International Chemical, Biological, Radiological, Nuclear Response (ICBRNR) Protocol.[62] The protocol provides principles, guidance, and considerations for the U.S. government response to a catastrophic, international CBRN incident. In addition, the protocol calls for the development of an associated ICBRNR Concept of Operations that will be used as an implementing guide for all U.S. D/As involved in a CBRN response. All planning and guidance being offered within this document regarding international response shall adhere to the ICBRNR Protocol and the ICBRNR Concept of Operations.[63] This appendix also addresses U.S. assistance for incidents that originate in the United States that have international impacts leading to requests for U.S. assistance.

Unique Characteristics of an International Nuclear/Radiological Incident

Due to the complex nature of international nuclear/radiological incidents, the following unique characteristics must be considered by the U.S. government:

- An international nuclear/radiological response will most likely be conducted by the affected country, along with members of the international community, including the United States.
- Several days may elapse after a catastrophic international nuclear/radiological incident before the affected nation can assess the magnitude of hazards, its internal ability to respond effectively to those hazards, and its need for assistance from the U.S. government and international community.
- Requests for U.S. government assistance after an international nuclear/radiological incident may come from affected partner nations or international organizations, such as the IAEA or the World Health Organization (WHO) and are coordinated by DOS.[64]

[62] See the United States Government International Chemical, Biological, Radiological, and Nuclear Response (ICBRNR) Protocol (2014).
[63] See the United States Government International Chemical, Biological, Radiological, and Nuclear Response (ICBRNR) Concept of Operations (2017).
[64] Under the *International Health Regulations Framework* (2005), the World Health Organization is responsible for declaring a Public Health Emergency of International Concern, which may include a nuclear/radiological incident.

- All requests for U.S. government assistance following an international nuclear/radiological incident will follow the structure outlined in the ICBRNR Protocol and associated Concept of Operations.
- DOS will serve as the LFA for U.S. response assistance to a nation affected by an international nuclear/radiological incident for proper coordination.
- Requests for U.S. government resources will depend on the capabilities and capacity of the affected nation, its allies, and neighboring countries, as well as intergovernmental, international, and non-governmental organizations. Requests for U.S. government assistance may also be made by nations party to the IAEA Convention on Assistance in the Cases of a Nuclear Accident or Radiological Emergency.[65] Under this convention, member states may offer or request assistance in the event of a radiological or nuclear incident under the Response and Assistance Network (RANET). The DOS coordinates all U.S. government offers or requests for assistance.
- Media will have an intense interest in any response to an international nuclear/radiological incident, and their coverage will influence important political decisions in the United States and abroad.
- U.S. government public communication activities will be coordinated with affected partner nations and international organizations via DOS to ensure consistent messaging.
- In addition to evaluating domestic implications of response operations, federal D/As shall consider the following actions:
    - Ensure U.S. government response operations or activities are respectful of the affected nations' sovereignty and laws and comply with the following: (1) relevant U.S. statutory requirements and restrictions on foreign aid, (2) existing international treaties and conventions, agreements, and (3) applicable policy arrangements with foreign countries and international organizations.
    - In extreme situations, be prepared to develop options to exercise the President's responsibilities to safeguard the lives of U.S. citizens when the affected nation(s) are unable to do so after an international nuclear/radiological incident.
    - Understand the mechanisms and authorities that may be available to allocate funding for nuclear/radiological support, when required.

[65] *The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency* (1986) sets out an international framework for cooperation among member states and with the IAEA to facilitate prompt assistance and support in the event of nuclear accidents or radiological emergencies. It requires member states to notify the IAEA of their available experts, equipment, and materials for providing assistance.

- In response to an international nuclear/radiological incident, all federal D/As must conduct their activities abroad under the authority and permission of the U.S. Chief of Mission in the relevant foreign nation(s). In addition, federal D/As must report all requests and offers of assistance and stand prepared to work with any task force established by the DOS to address the U.S. government's response to the incident.

Federal Agency Roles and Responsibilities

National Security Council (NSC)

The NSC is the President's principal forum for considering national security and foreign policy matters with senior national security advisors and cabinet officials. The NSC is the forum for providing input to the President to determine U.S. government policy in the event of an international nuclear/radiological incident. Among its other considerations in determining the U.S. government's response, the NSC will be required to balance the needs of the requesting country/international organization with any potential domestic needs within the United States, especially when directing national resources. The NSC will coordinate with the DOS, the Office of Management and Budget, and other White House offices when managing the U.S. government's response to an incident.

U.S. Department of State (DOS)

DOS has the lead responsibility for matters involving protection of U.S. government personnel on official duty abroad and their accompanying dependents and promoting the safety and security of private U.S. citizens. DOS is the lead coordinating agency for U.S. government response to U.S. Chief of Mission and/or host nation requests for support to international nuclear/radiological incidents. DOS will manage the provision of humanitarian assistance to refugee populations affected by the incident, in coordination with U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA). For nuclear/radiological incidents that may be terrorist-related, DOS coordinates the overall U.S. government response to the incident and will also coordinate with the Attorney General and the FBI Director whenever those incidents are perpetrated by or directed at U.S. citizens, interests, or institutions abroad and when those incidents fall within the federal criminal jurisdiction of the United States. DOS is responsible for issues related to the safety and security of U.S. private citizens abroad, which includes compliance with the DOS "No Double Standard" policy of providing members of the official and non-official U.S. community with relevant security information. DOS also coordinates U.S. government assistance to U.S. private citizens and provides information regarding other assistance that may be available to them from host country officials or non-governmental entities, as appropriate. DOS will be the point of contact for notifications under the Convention on Early Notification of a Nuclear Accident and for requests under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

DOS will likely stand up a state task force to expedite communication and coordination within the U.S. government and provide decision makers with the most current and accurate information available. The state task force will receive all requests/offers of assistance from U.S. government D/As and the embassy Emergency Action Committee. Furthermore, the state task force consolidates, validates, and disseminates requirements to the interagency for the development of solution packages. The state task force will recommend completed

solution packages to the NSC for approval. The DOS Bureau of International Security and Nonproliferation will contact relevant U.S. government D/As to request the necessary interagency personnel to augment the state task force, if needed.

U.S. Chief of Mission

The U.S. Chief of Mission, typically an ambassador, is the President's official representative in a foreign country and, under the direction of the President, has responsibility for the direction, coordination, and supervision of all U.S. government executive branch employees in that country. However, those under the command of a U.S. area military commander, under another chief of mission, or on the staff of an international organization are not under the authority of the U.S. Chief of Mission. These responsibilities include the following:

- Speak with one voice to others on U.S. policy and ensuring mission staff do likewise.
- Cooperate with the U.S. legislative and judicial branches so that U.S. foreign policy goals are advanced; security is maintained; and executive, legislative, and judicial responsibilities are carried out.
- Review communications to or from mission elements.
- Take direct responsibility for the security of the mission and protecting U.S. government personnel on official duty (other than those personnel under the command of a U.S. area military commander) and their dependents.

The mission's Emergency Action Committee supports the U.S. Chief of Mission in crisis and consequence planning and management. Through the Emergency Action Plan, DOS and the U.S. Mission maintain formal processes for crisis and consequence management and coordination at post for incidents that affect the Mission or the host country.

The Chief of Mission will lead the coordination of the U.S. government response within the affected nation. The Chief of Mission may request the deployment of an interagency team to support the collection of information, validation of requests to/from the affected nation, and coordination of assistance packages from the United States and their corresponding implementation. This interagency team will serve as a liaison between the host country and U.S. Embassy. DOS will contact relevant D/As to request the necessary personnel to augment the U.S. Chief of Mission's goal, as necessary.

U.S. Agency for International Development (USAID) Office of U.S. Foreign Disaster Assistance (OFDA)

The U.S. Agency for International Development (USAID) Office of Foreign Disaster Assistance (OFDA) is the federal lead for managing the provision of U.S. government international humanitarian assistance and disaster response as specified under the Foreign Assistance Act of 1961. The USAID Administrator is the President's special coordinator for international disaster assistance as established in section 493 of the Foreign Assistance Act. With a mandate to save lives and reduce human suffering, OFDA's approach to a nuclear/radiological response will focus on providing lifesaving assistance (food, water, shelter, and medicine) to the population that is affected by the incident as afforded in USAID's broad authority to provide disaster assistance pursuant to section 491 of the Foreign Assistance Act. OFDA provides yearly guidance to all posts for disaster planning and response outlining the support from OFDA before, during, and after the occurrence of

natural and human-caused disasters abroad. Procedures highlight the need for continuous collaboration in the planning process for disaster response, as well as regular and sustained communication between mission disaster relief officers and the USAID OFDA regional staff to ensure timely, appropriate, and effective U.S. government emergency response and humanitarian assistance.

U.S. Department of Defense (DOD)

When requested by DOS and directed by the Secretary of Defense, DOD can support international nuclear/radiological incident operations to the extent allowed by law and agreement and subject to the availability of DOD nuclear/radiological capabilities and resources. At the request of foreign civilian officials in geographic proximity to DOD installations in affected partner nations, a U.S. military commander with assigned forces at or near the immediate scene of a foreign disaster may take prompt action to save human lives.

National Nuclear Security Administration (NNSA)

Through its Nuclear Emergency Support Team (NEST), DOE/NNSA provides the U.S. government with nuclear/radiological expertise and assessments via field and/or remote technical and scientific support. NEST serves as part of the response force in accordance with established interagency protocols domestically and overseas. The NEST mission spans the national security and public health and safety domains through all stages of a response, from initial technical assessments to final forensic disposition. Specific mission areas include countering WMD threats, responding to U.S. nuclear weapon accidents, protecting the public from radiation emergencies, and attributing the source of any material associated with a nuclear incident.

NEST assets fall into two primary mission categories: Render Safe programs and Public Health & Safety (PHS). During an incident involving a possible nuclear/radiological device, NEST Render Safe assets provide remote and on-scene scientific and technical support to device defeat operations. This includes the DOE triage process, in which DOE collaborates with the FBI domestically and DOD internationally to provide an initial assessment of whether a device or material represents a nuclear/radiological threat. NEST PHS capabilities support all nuclear/radiological incidents for which a U.S. government response is required, including search operations, radiological monitoring and modeling, medical expertise on radiation health effects, and consequence management guidance.

NNSA works with many foreign governments and international counterparts to build capacity for effective emergency response, and NEST responds to nuclear/radiological incidents of all types, both domestically and internationally.

Nuclear Regulatory Commission (NRC)

The Nuclear Regulatory Commission (NRC) provides subject matter expertise on radiological and technical issues related to nuclear power plant and nuclear fuel cycle technologies and radioactive materials to the U.S. Chief of Mission in the affected country. In support of the U.S. Chief of Mission, the NRC can provide ongoing assessment of radiological conditions, dose predictions, and protective action recommendations for U.S. citizens abroad. The NRC also maintains working relationships with many international regulatory counterparts. Depending upon incident specifics, the NRC could use these established relationships to

facilitate incident-related communication and provide technical advice and assistance to the affected country.

U.S. Department of Health and Human Services (HHS)

The Department of Health and Human Services (HHS), through the Administration for Strategic Preparedness and Response (ASPR), the Office of Global Affairs (OGA), the Centers for Disease Control and Prevention (CDC), and the Office of the Assistant Secretary of Health (OASH), provides the following capabilities to address an international nuclear/radiological incident:

- Provides leadership in international programs, initiatives, and policies with public health and medical emergency preparedness and response.
- Provides leadership for HHS activities during the U.S. nuclear/radiological response to an affected nation in close coordination with other U.S. government D/As.
- In collaboration with DHS, implements the following activities:
    - ASPR exercises the responsibilities and authorities of the HHS Secretary with respect to use of the Strategic National Stockpile (a stockpile of drugs, vaccines, biological products, medical devices, and other supplies to provide for U.S. emergency health security).
    - ASPR directs the deployment of Strategic National Stockpile assets in ESF #8 responses and has deployment authority for federal (non-DOD) medical personnel (including the National Disaster Medical System).
    - OGA coordinates international health and human services policy, research, and global health diplomacy for HHS.
    - OGA manages the U.S. International Health Regulations (IHR) National Focal Point (NFP). This endeavor facilitates the timely flow of information with the WHO, other countries' IHR NFPs, and U.S. government partners. OGA coordinates with U.S. government D/As (a) to notify WHO and other international partners of public health incidents with potential of spreading across international borders, including potential public health emergencies of international concern (PHEICs); (b) to share contact tracing information with other countries; (c) to lead and coordinate assessments of IHR capacities, including radiological emergencies; and (d) to collaborate with WHO and other NFPs on IHR-relevant programmatic activities.
    - CDC supports the U.S. mission with technical assistance and messaging to U.S. citizens in or near the affected country.
    - CDC monitors potential public health impacts from fallout coming from an international incident affecting U.S. states or territories.
    - If requested, CDC may provide technical assistance to public health officials of the affected country.

- OASH can deploy the Public Health Service Commissioned Corps internationally when appropriately authorized, which may be done under DOD or DOS authorities.

In response to an international incident, HHS core public health capabilities that may support the U.S. government response include public health assessment and disease control, mass disaster response, protection of responder/worker safety and health, nuclear/radiological public health and medical consultation, technical assistance and support, and health/medical equipment and supplies.

U.S. Department of Homeland Security (DHS)

In the event that a major nuclear/radiological incident happens anywhere in the world, DHS would immediately begin reassessing threats, vulnerabilities, and the protective posture for the homeland. DHS, in coordination with interagency partners, will monitor the requests for international deployment of federal resources. When the international deployment of a federal resource creates a potential shortfall in the U.S. government's ability to safeguard the homeland, DHS shall immediately notify the relevant D/A and the NSC of the potential conflict. DHS would also take steps to assess and mitigate any direct impacts from the nuclear/radiological incident on DHS operations, particularly in cases that involve its neighbors in the Caribbean, Mexico, or Canada. For example, DHS will assess the need to increase its border and/or transportation security screening procedures, implement specific protocols to resolve any security or safety risks that are identified with inbound travelers and/or cargo, and consider requests for deployment of specialized DHS capabilities within its existing authorities. The DHS National Operations Center (NOC) will produce a common operating picture available on the Homeland Security Information Network (HSIN) for an international nuclear/radiological incident when it affects or threatens U.S. interests. DHS will include consolidated State Task Force status reports in the national common operating picture which enables all agencies, including embassy personnel, to have situational awareness from anywhere in the world. FEMA will activate the IMAAC to coordinate the U.S. government's atmospheric modeling activities consistent with interagency agreements. CISA will provide visibility on the status of private sector–operated critical infrastructure through ESF 14 Business & Industry Stakeholder's Coordination Calls. CISA will also identify direct or cascading effects of private sector critical infrastructure failure, and coordinate with private sector partners to identify potential support requirements to ensure rapid stabilization and access to impacted private sector critical infrastructure.

U.S. Environmental Protection Agency (EPA)

During an international incident that causes real or perceived environmental impacts in the United States or its territories, the EPA is the lead agency for the domestic response that focuses on assessing any radiological effects on the United States and informing the public of health risks or long-term consequences.[66] The EPA maintains a continuous nationwide environmental radiation monitoring program, RadNet. The EPA can support foreign assistance operations with technical expertise relating to preparedness, assessment, and cleanup. Within the United States, the EPA can provide dose assessment and environmental survey support, remediation and waste management advice, and technical

[66] DOS is the lead coordinating agency for U.S. Government response to U.S. Chief of Mission and/or host nation requests for support to international nuclear/radiological incidents.

recommendations on various environmental concerns relating to the release of radioactive material. The EPA has agreements in place with Canada and Mexico and has also historically provided assessment and technical assistance on matters related to environmental contamination and incident recovery all over the world.

U.S. Department of Agriculture (USDA)

The USDA can support an international nuclear/radiological incident through the following capabilities:

- Assist in the assessment of damage to crops, soil, livestock, and poultry, and related processing facilities.
- Assess agricultural trade impacts.
- Provide technical assistance for the management of contaminated animals, crops, and related products and facilities.
- Provide technical assistance for the management of contaminated non-agricultural animals.

National Oceanic and Atmospheric Administration (NOAA)

The National Oceanic and Atmospheric Administration (NOAA) provides predictions of weather, atmospheric and oceanic dispersion, ocean state, and marine debris. NOAA is the U.S.-designated Regional Specialized Meteorological Centre for the World Meteorological Organization. In that role, NOAA provides atmospheric dispersion predictions to other World Meteorological Organization member states and would be prepared to share its predictions with requesting federal D/As, including the State Task Force. NOAA is a member of the IMAAC, which would coordinate any use of these predictions as the U.S. government position.

U.S. Department of Justice (DOJ) Federal Bureau of Investigation (FBI)

The Attorney General, acting through the FBI, has lead responsibility for investigations of terrorist acts or threats. These include those involving WMDs and those that are perpetrated by or directed at U.S. citizens, interests, or institutions abroad where such acts are within the federal criminal jurisdiction of the United States. In coordination with DOS, where appropriate and in a manner consistent with U.S. Chief of Mission authorities, the Attorney General and FBI have lead responsibility for the U.S. government's investigative response abroad to acts of terrorism. By policy, if a U.S. citizen or interest is affected by a suspected or actual intentional international nuclear/radiological incident, the presumption is terrorism, and it will be investigated by the FBI as such until determined otherwise. The FBI has WMD Coordinators located abroad in different countries and will designate a senior representative who will coordinate the FBI's response with the appropriate embassy personnel. Requests for access to international crimes scenes that the FBI is authorized to process for evidence should be coordinated with this senior FBI representative.

Operational Coordination

After the discovery or notification of an international nuclear/radiological incident, the response begins with operations to understand the potential and actual radioactive releases impacting the United States to provide accurate information to the public to convey

protective action decisions. Actions intended to support U.S. citizens abroad and the delivery of resources intended to assist the affected nation will likely be initial priorities of the U.S. government. The Chief of Mission will engage the affected nation on needs, capabilities, and assistance requests.

As response operations progress, monitoring and sampling capabilities will be operational and public information will have been provided. At this time, requests for assistance from the affected nation are received and offers of assistance by the U.S. government are initially developed.

As part of the emergency action plan, DOS and the U.S. Mission maintain formal processes for crisis management and coordination on site for incidents that affect the Mission or the host country. The Chief of Mission, based on the plan, may make a disaster declaration, as appropriate.

DOS will open dialogue with other foreign governments and non-governmental organizations to seek information transfer and response support. DOS will also determine the content and timing of public messaging, coordinating with the NSC staff as necessary. Operations transition to be recovery-focused when all in-country U.S. citizens have been evacuated (if appropriate) and are being sustained through mass care activities as needed.

International Nuclear and Radiological Event Scale

The International Nuclear and Radiological Event Scale is a worldwide tool for communicating to the public in a consistent way the safety significance of international nuclear/radiological events. The International Nuclear and Radiological Event Scale applies to any event associated with the transport, storage, and use of radioactive material and radiation sources, whether or not the event occurs at a facility. It covers a wide spectrum of practices, including industrial use such as radiography, use of radiation sources in hospitals, activity at nuclear facilities, and transport of radioactive material. It also includes the loss or theft of radioactive sources or packages and the discovery of orphan sources, such as sources inadvertently transferred into the scrap metal trade.

The Event Scale is used by the international scientific community to coordinate and communicate between countries and governments. The Event Scale explains the significance of events from a range of activities, including industrial and medical use of radiation sources, operations at nuclear facilities, and transport of radioactive material. Events are classified on the scale at seven levels: Levels 1 to 3 are called “incidents” and Levels 4 to 7 “accidents.” The scale is designed so that the severity of an event is about 10 times greater for each increase in level on the scale. Events without safety significance are called “deviations” and are classified Below Scale/Level 0. The scale is only intended for use in civil applications and only relates to the safety aspects of an incident. The International Nuclear and Radiological Event Scale is not intended for use in rating security-related incidents or intentional acts to deliberately expose people to radiation.

Table D-1 describes the seven event levels of international nuclear/radiological incidents in terms of three areas of impact along with the seven event levels.

Table D-1: Event Level Descriptions for the International Nuclear and Radiological Event Scale[67]

INES LEVEL	PEOPLE AND ENVIRONMENT	RADIOLOGICAL BARRIERS AND CONTROL	DEFENSE-IN-DEPTH
MAJOR ACCIDENT **LEVEL 7**	• Major release of radioactive material with widespread health and environmental effects requiring implementation of planned and extended countermeasures		
SERIOUS ACCIDENT **LEVEL 6**	• Significant release of radioactive material likely to require implementation of planned countermeasures		
ACCIDENT WITH WIDER CONSEQUENCES **LEVEL 5**	• Limited release of radioactive material likely to require implementation of some planned countermeasures • Several deaths from radiation	• Severe damage to reactor core • Release of large quantities with a high probability of significant public exposure. This could arise from a major criticality accident or fire.	
ACCIDENT WITH LOCAL CONSEQUENCES **LEVEL 4**	• Minor release of radioactive material unlikely to result in implementation of planned countermeasures other than local food controls • At least one death from radiation	• Fuel melt or damage to fuel resulting in more than 0.1% release of core inventory • Release of significant quantities of radioactive material within an installation with a high probability of significant public exposure	
SERIOUS INCIDENT **LEVEL 3**	• Exposure in excess of ten times the statutory annual limit for workers • Non-lethal deterministic health effect (e.g., burns) from radiation	• Exposure rates of more than one Sv/hour in an operating area • Severe contamination in an area not expected by design, with a low probability of significant public exposure	• Near accident at a nuclear power plant with no safety provisions remaining • Lost or stolen highly radioactive sealed source • Mis-delivered highly radioactive sealed source without procedures in place to handle it
INCIDENT **LEVEL 2**	• Exposure of member of the public in excess of 10 mSv • Exposure of a worker in excess of the statutory annual limits	• Radiation levels in an operating area of more than 50 mSv/hour • Significant contamination within the facility into an area not expected by design	• Significant failures in safety provisions but with no actual consequences • Found highly radioactive sealed orphan source, device or transport package with safety provisions intact • Inadequate packaging of a highly radioactive sealed source
ANOMALY **LEVEL 1**			• Overexposure of a member of the public in excess of statutory annual limits • Minor problems with safety with components with significant defense-in-depth remaining • Low activity lost or stolen radioactive source, device or transport package

[67] 1 Sv = 100 rem; 1 mSv = 100 mrem

This page intentionally left blank.

Appendix E: Incidents Involving Commercial Nuclear Facilities

This appendix will address the unique nature of federal response and recovery operations for incidents involving commercial nuclear facilities. Federal interagency partners can respond in a lead role or in support to SLTT governments to save lives; protect property, critical infrastructure, and the environment; and meet basic human needs. In addition to federal and SLTT capabilities, response to incidents involving commercial nuclear facilities may also include assets and resources provided by the private sector owner/operators.

Nuclear Regulatory Commission (NRC) Incident Response

If an emergency occurs at a facility licensed by the NRC, the licensee's primary responsibility is to mitigate the emergency to protect public health, safety, and the environment. The licensee will promptly notify SLTT governments and, when required, will provide a protective action recommendation such as evacuation or sheltering. The licensee will also notify the NRC Headquarters Operations Center, which is continuously staffed 24 hours a day, 7 days a week.

The Headquarters Operations Officer (HOO) and/or the Headquarters Emergency Response Official (HERO) are the initial points of contact for the licensee. Depending on the nature of the reported incident, the HOO and/or HERO notifies designated headquarters and regional management-level decision makers. In addition to internal notifications, the HOO and/or HERO notify other federal D/As and, if necessary, state agencies and other licensees. The headquarters and regional offices are staffed with trained and qualified responders. These responders include scientists, engineers, and operations experts who analyze the incident and evaluate possible recovery strategies. They perform independent assessments, project the future status of the plant, and continuously assess the licensee's response to ensure that procedural actions taken to mitigate the emergency are appropriate. The incident response organization provides technical expertise and support to the NRC Response Director. The NRC incident response organization includes the following components.

NRC Response Teams

NRC response teams maintain communications with their licensee counterparts in their response facilities and the control room of the nuclear power plant. NRC resident inspectors assigned to the specific facility maintain communications with their respective regional office and headquarters. During the incident, the NRC continues these assessments and maintains communications with the facility and stakeholders until the emergency is over and the facility is stable.

Liaison Team

The Liaison Team is responsible for the response activities and interactions with representatives of federal, state, local, tribal, territorial, congressional, and international organizations and is responsible for information flow between the NRC response organization and external agencies/stakeholder groups.

Public Information Team

The Public Information Team provides continuous support during an incident or accident to ensure that accurate information is reaching the public. Once the NRC is involved in a response, this team produces coordinated messages to inform the public. The team dispatches staff as needed to appropriate response facilities such as licensee, SLTT, or federal Joint Information Centers.

Reactor Safety or Fuel Cycle Group

These groups evaluate incident information, assess licensee actions to ensure safety, perform independent calculations to confirm the extent of damage, and project what may happen next during the incident.

Protective Measures Group

The Protective Measures Group prepares an independent assessment of possible radiological exposure to the public and reviews the licensee's protective action recommendations and SLTT protective action decisions. This team provides the "source term" to the IMAAC to develop plume projections for federal decision making.

Security Group

The Security Group assesses licensee actions during security-related incidents and coordinates the security response with law enforcement and intelligence agencies.

Senior Agency Representatives

The NRC may deploy Senior Agency Representatives (SARs) to a licensee's emergency facility and to a JFO to serve on the UCG during radiological incidents.

The NRC SAR at the licensee's emergency facility interfaces primarily with the licensee's emergency director but may also interact with the media, public, and SLTT government officials.

The NRC SAR at the JFO interfaces primarily with the other members of the UCG. The SAR has the authority to speak on behalf of the NRC at the UCG, including the authority to commit NRC resources to UCG priorities, enter into cost-sharing agreements to support UCG priorities, and loan or share NRC resources with other jurisdictions.

Emergency Classifications

An emergency classification is one of a set of names or titles established by the NRC for grouping off-normal events or conditions according to (1) potential or actual effects or consequences and (2) resulting onsite and offsite response actions.

Emergency Classifications for Nuclear Power Plants and Research and Test Reactors

The emergency classification levels, in ascending order of severity, are notification of unusual event, alert, site area emergency, and general emergency. Nuclear power plants and research and test reactors use these emergency classifications as defined below.

Notification of Unusual Event

The classification of "notification of unusual event" includes events that indicate a potential degradation of the level of safety of the plant or indicates a security threat to facility protection. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur. This term is sometimes shortened to "unusual event."

Alert

The classification of "alert" includes events that involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life-threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guide (PAG) exposure levels.

Site Area Emergency

The classification of "site area emergency" includes events that involve actual or likely major failures of plant functions needed for protection of the public or hostile action that results in intentional damage or malicious acts. These malicious acts may be directed toward site personnel or equipment that could lead to facility failure. Malicious acts may also prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels that exceed the EPA PAG recommendations beyond the site boundary.

General Emergency

The classification of "general emergency" includes events that involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or hostile action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed the EPA PAG exposure levels offsite for more than the immediate site area.

Emergency Classifications for Nuclear Materials and Fuel Cycle Facility Licensees

Alert

The classification of "alert" includes events that could lead to a release of radioactive material(s), but the release is not expected to require a response by a non-facility response team to protect people offsite.

Site Area Emergency

The classification of "site area emergency" includes events that could lead to a significant release of radioactive material(s) that may require a response by a non-facility response team to protect people offsite.

Zoned Approach for Fixed Nuclear Facilities

Fixed nuclear facilities provide a unique opportunity for the planning of nuclear/radiological incident response before an incident occurs. While radiation levels and contamination will

still require the use of zone designations during incident response, these zones can be estimated using modeling tools during planning activities.

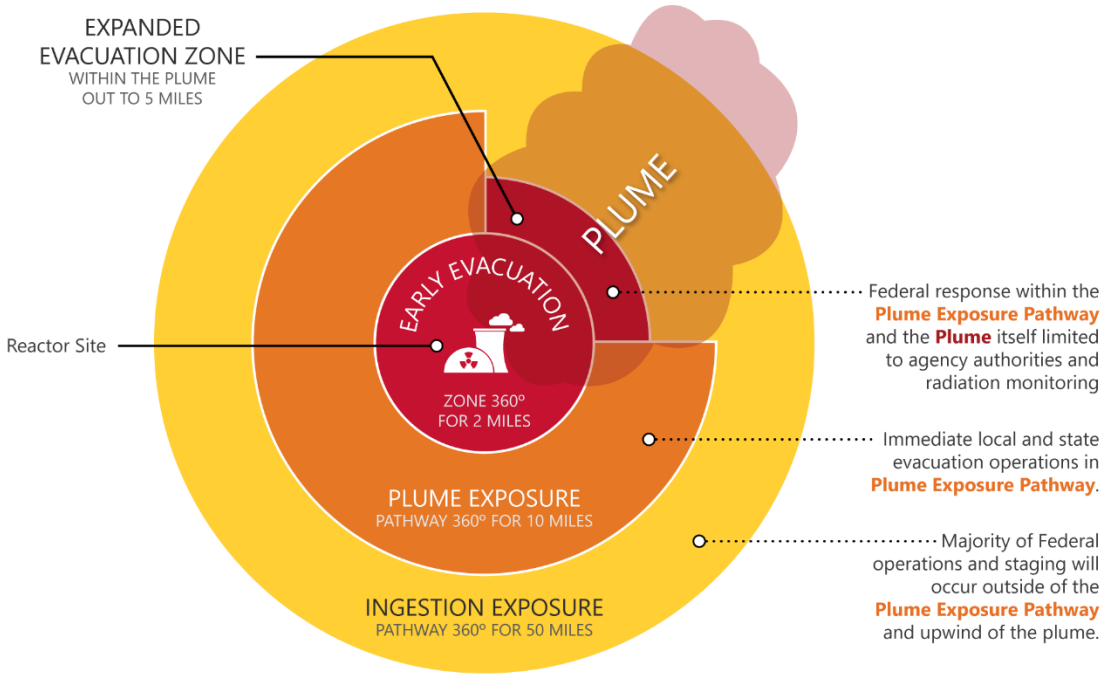

Figure E-1: Zoned Approach to Fixed Nuclear Facility

Emergency Planning Zones

To facilitate a preplanned strategy for protective actions during an emergency, two emergency planning zones are defined (Figure E-1[68]) around each commercial nuclear power plant. The exact size and shape of each emergency planning zone depends on the specific conditions at each site, unique geographical features of the area, and demographic information. This strategy provides a substantial basis to support activity beyond the planning zones in the extremely unlikely event it would be needed. The two emergency planning zones are described below.[69]

Plume Exposure Pathway

The plume exposure pathway[70] emergency planning zone has a radius of about 10 miles from the reactor site. Predetermined protective action plans are in place for this emergency planning zone and are designed to avoid or reduce doses from potential exposure of radioactive materials. These actions include sheltering, evacuation, and the use of potassium iodide where appropriate.

---

[68] The zoned approach depicted in Figure E-1 is consistent with the guidance set forth in the joint NRC and FEMA document, *Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants,* NUREG-0654/FEMA-REP-1 (2019), which codified a structure of Emergency Planning Zones and corresponding Exposure Pathways.

[69] For information on developing evacuation time estimates for fixed nuclear facilities, see the NRC's *Criteria for Development of Evacuation Time Estimate Studies*, NUREG/CR-7002 (2020).

[70] Exposure pathway is a route by which a radionuclide or other toxic material can enter the body. The main exposure routes are inhalation, ingestion, absorption, and entry through a cut or wound in the skin.

Ingestion Exposure Pathway

The ingestion exposure pathway emergency planning zone has a radius of about 50 miles from the reactor site. Predetermined protective action plans are in place for this emergency planning zone and are designed to avoid or reduce doses from potential ingestion of radioactive materials. These actions include evaluation; movement control; and dispositions for unsafe livestock, poultry, water, crops, food, and medicines.

Evacuation Zones

Evacuation does not always call for completely emptying the 10-mile zone around a nuclear power plant. In most cases, the release of radioactive material from a plant during a major incident would move with the wind, not in all directions surrounding the plant. The release would also expand and become less concentrated as it travels away from a plant. Therefore, evacuations should be mapped to anticipate the path of the release. Generally, as a minimum, in the event of a General Emergency, a 2-mile ring around the plant is evacuated, along with people living in the 5-mile zone directly downwind and slightly to either side of the projected path of the release. This helps account for potential wind shifts and fluctuations in the release path. Evacuation beyond 5 miles is assessed as the accident progresses. Also, in response to a General Emergency, people living in the remainder of the 10-mile zone will most likely be advised to go indoors to monitor emergency alert system broadcasts.

This page intentionally left blank.

Appendix F: Nuclear Detonations and Radiation Dispersal

A nuclear detonation produces effects that are overwhelmingly more consequential than those produced by a radiological dispersal device (RDD), radiological explosive device (RED), or conventional explosive. A nuclear detonation differs from a conventional explosion in the following ways:

- Produces energy that, pound for pound, is much greater than that produced by conventional explosives.
- Instantaneously produces a very large and hot nuclear fireball.
- Instantaneously generates an electromagnetic pulse that can destroy or disrupt electronic equipment.
- Transmits a large percentage of energy in the form of heat and light within a few seconds that can cause burns, fires, and visual impairment or injuries at great distances.
- Emits highly penetrating prompt nuclear radiation (defined as that radiation emitted within the first minute, although intense radiation will continue to be emitted after one minute) that could be harmful to life and damaging to electronic equipment, and depending on proximity, causes humans and animals to receive significant doses of radiation including at levels high enough to cause acute radiation sickness (ARS)[71] and death.
- Generates, if it is a surface or near-surface burst,[72] a shock wave that can destroy underground critical infrastructure.
- Generates, if it is a surface or near-surface burst, radioactive products that emit residual nuclear radiation over an extended period of time, some of which are fallout that can be distributed by wind currents over wide areas, requiring extensive cleanup and rendering some locations uninhabitable and unsuitable for agriculture.
- Can cause extended infrastructure damage as well as a high volume of simultaneous communication traffic, both of which will impair or prevent transmission of communications signals.

The response to a nuclear detonation is unique compared to other types of radiological and nuclear incidents. A nuclear detonation will result in extensive destruction of critical infrastructure and great numbers of casualties and displaced people, causing needs for response capabilities that will rapidly outstrip available resources. Protective actions in areas with high radiation emissions due primarily to fallout require self-decontamination and sheltering in place after the blast, waiting 12–48 hours in locations with radiation protection

[71] Acute Radiation Syndrome (ARS), or radiation sickness, is a serious illness that can happen when a person is exposed to very high levels of radiation, usually over a short period of time.
[72] Surface burst is a nuclear weapon explosion that is close enough to the ground for the radius of the fireball to vaporize surface material. Fallout from a surface burst contains very high levels of radioactivity.

for fallout emissions to diminish, rather than universal prompt evacuation and mass decontamination. Effective communication will be important of where sheltering is needed, what type of shelter can be effective, and where potential immediate and subsequent exposures to radiation are likely sufficient to require early clinical or diagnostic evaluation and provision and administration of medical countermeasures. Federal response will be very limited in the first 24 hours after a detonation and substantially limited for up to 72 hours.

For additional information about nuclear detonations and preparedness for, response to, and recovery from them, see the *FEMA Planning Guidance for Response to a Nuclear Detonation* (2022).

Zoned Approach

Although the NRIA is not an operational plan, effective nuclear/radiological incident response requires understanding a zoned approach to facilitate achievement of the following goals:

- Prioritize response and recovery activities.
- Coordinate and allocate scarce resources among jurisdictions.
- Adapt response and recovery operations to allow flexibility depending on incident circumstances.

A zoned approach provides a tailored response to the various hazards present surrounding the nuclear/radiological incident depending on their severity and proximity to the incident site. The traditional approach of deploying the maximum number of resources and responders to the incident area as quickly as possible is not realistic or effective for response to nuclear detonation due to the scope and complexity of the scenario. The goal of a zoned approach is to save lives while managing risks to emergency responder life and health.

A zoned approach (Figure F-1) for response to a nuclear detonation is based on two types of zones, radiation zones and blast zones. Recognizing how response operations relate to the various zones facilitates achievement of the following goals:

- Lifesaving operations
- Safety of responders
- Effectiveness of responder activities

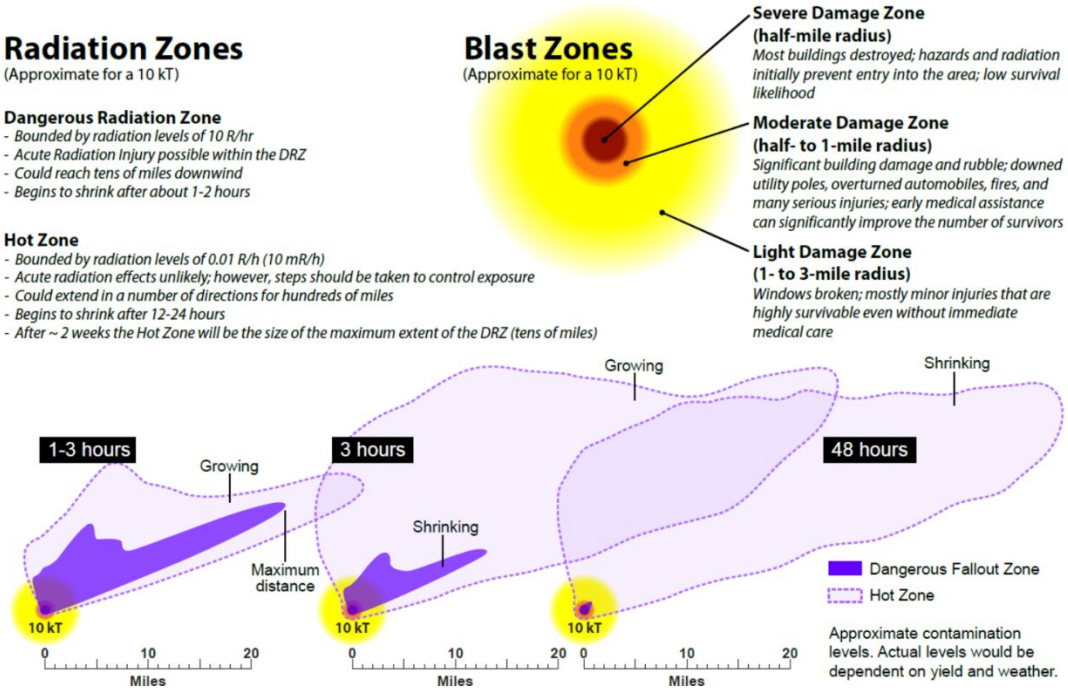

Figure F-1: Example of Radiation and Blast Damage Zones used in a Zoned Approach

Radiation Zones

The radiation zones in the following text are not visually distinguishable or capable of precise geographic boundaries and must be determined by actual radiation level measurements. Radiation zones include both the Dangerous Radiation Zone and the Hot Zone. These radiation zones are also applicable in response to other nuclear/radiological incidents that include radiological dispersal including those caused by an RDD.

Dangerous Radiation Zone (DRZ)

Unlike the damage zones, the DRZ is distinguished by radiation levels, not by structural damage. Exposure to radioactivity levels within the DRZ has the potential to produce ARS. Radiation exposure rates in high-fallout areas can deliver doses that are fatal. The DRZ is the area that could cause ARS and poses the greatest challenge for lifesaving operations.

The DRZ is defined as the area where a radiation exposure rate of 0.1 sievert/hour (Sv/hour) (10 rem/hour or ~10 roentgen/hour) or greater exists. This area may include parts of the Light Damage Zone, Moderate Damage Zone, and/or Severe Damage Zone, as well as areas outside the blast damage zones. The highest radiation level from fallout occurs within the first 4 to 6 hours and continues to drop as the fission products decay. As radioactivity levels drop, the DRZ will steadily shrink in size. Response operations within this zone must be avoided and, if necessary, undertaken by extreme exception only and with time limitations or other provisions to minimize exposure. Using personal protective equipment (PPE) and properly monitoring radiation levels is essential for entering the DRZ. Any operation near the DRZ must be justified, optimized, and planned to ensure responders refrain from undertaking missions in areas where radioactivity levels have not yet been accurately determined and readily monitored.

In areas where the DRZ overlaps with either the Light or Moderate Damage Zones, response activities should be planned according to the potentially lethal radiation levels present.

The most important mission in the DRZ is communicating protective action guidance to the public. Effective preparedness requires public education, effective communication plans, messages, and means of delivery in the DRZ.

Hot Zone (HZ)

The HZ is the area covered by fallout that creates radiation exposure rates from 0.1 millisieverts/hour (mSv/hr) (0.01 rem or ~0.01 roentgen) to 0.01 Sv/hour (10 rem/hour or ~10 roentgen/hour). These levels do not present an acute threat, but the HZ may warrant protective actions. Fallout deposition at great distances is dictated by the parameters of winds at altitudes of the fallout cloud. The 0.1 mSv/hour (0.01 rem/hour or ~0.01 roentgen/hour) line can reach a maximum extent of several hundred miles within hours of the incident and then shrink in size due to decay. Using PPE and properly monitoring radiation levels are essential for entering the HZ.

Emergency operations can be safely performed in the HZ as long as responders undertake appropriate planning, dose monitoring measures, and protective measures. Staging, triage, and reception centers should be established outside of this area whenever possible.

Blast Damage Zones

Generally, no clear boundaries exist between the representative blast damage zones resulting from a nuclear detonation, but the general characteristics of each follow.[73]

- Light Damage Zone – all or most windows broken and few serious injuries
- Moderate Damage Zone – significant building damage, rubble, downed utility lines and poles, overturned automobiles, fires, and serious injuries
- Severe Damage Zone – completely destroyed infrastructure and high radiation levels resulting in unlikely survival of victims

Light Damage Zone (LDZ)

Damage is caused by shocks, similar to those produced by a thunderclap or a sonic boom but with much more force. Although some windows may be broken over miles away, injury associated with flying glass will generally occur at overpressures above 0.5 pounds per square inch. Blast overpressures for the LDZ will be about 0.5 pounds per square inch at the outer boundary and 2 to 3 pounds per square inch at the inner boundary. The damage in this area will be highly variable as shock waves rebound multiple times off buildings, the terrain, and even the atmosphere.

Damage may include windows and doors being blown in. Gutters, window shutters, roofs, and lightly constructed buildings may experience even more structural damage. Emergency vehicles may have difficulty maneuvering as they near the incident site as both stalled and crashed automobiles and litter and rubble will progressively increase.

Most of the injuries incurred within the LDZ are not expected to be life threatening and will be associated with flying glass, debris, and traffic accidents. If injured survivors are

[73] See FEMA's Planning Guidance for Response to a Nuclear Detonation (2022).

ambulatory, emergency responder actions should focus on the Moderate Damage Zone, where victim rescue will be most effective in saving lives.

Responders should only focus medical attention in the Light Damage Zone on severe injuries and should encourage and direct individuals to shelter in safe locations to expedite access to severely injured individuals.

Moderate Damage Zone (MDZ)

The transition from the LDZ to the MDZ occurs when building damage becomes substantial. The determination is made by ground level and/or overhead imagery.

Damage in the MDZ includes significant structural damage, blown out building interiors, blown down utility lines, overturned automobiles, caved roofs, collapsed buildings, and extensive fires. Telephone poles and street light poles will be blown over. Sturdier buildings will remain standing, while lighter commercial and multi-unit residential buildings may collapse or become structurally unstable. Most wood frame houses will be destroyed.

Substantial rubble and damaged vehicles in the streets will make evacuation and access difficult or impossible without street clearing. Moving towards the incident site in the MDZ, rubble will completely block streets and require heavy equipment to clear. Urban search and rescue operations will be most efficiently and effectively engaged in non-radiation contaminated areas of the MDZ.

Most survivors in the MDZ will likely require medical care. The MDZ will be encumbered with several hazards including the following:

- Elevated radiation levels
- Potentially live power lines
- Ruptured, burning gas lines
- Unstable structures
- Sharp metal objects and broken glass
- Burning vehicles

Visibility in much of the MDZ will be limited for an extended period after the incident because of dust raised by the shock wave and from collapsed buildings. Smoke from fires will also obscure visibility.

The MDZ should be the focus of early lifesaving operations. Early response activities should focus on medical triage with constant consideration of radiation dose minimization.

Severe Damage Zone (SDZ)

The SDZ will begin where most of the buildings are severely damaged or collapsed. Blast overpressure that characterizes the SDZ is 5 to 8 pounds per square inch and greater. Few, if any, buildings are expected to be structurally sound or even standing in the SDZ, and very few people would survive. Radiation and other hazards will be extremely dangerous in the SDZ. Therefore, focus on lifesaving and critical infrastructure missions in the other blast damage zones will be more advantageous. Rubble will make streets impassable in the SDZ,

making response impossible. Approaching the incident site, all buildings will be destroyed, and the debris piles will be extremely large.

Response within the SDZ should not be attempted until radiation dose rates have dropped substantially in the days following the incident and the response within MDZ is significantly advanced. All response missions must be justified to minimize responder risks to ensure that responders' radiation exposures are below the occupational exposure limit.

Appendix G: Data & Models

Following a nuclear/radiological incident, a critical task is to identify and assess the nature and extent of contamination to inform response and recovery activities. The most effective way to assess the current and future extent of contamination following a nuclear/radiological incident is through data collection and modeling. This appendix is focused on the datasets and models used to guide response for nuclear/radiological incidents. The datasets and models useful for operational decision making are described in this appendix. The utility of each for different types of nuclear or radiological release incidents is highlighted where applicable.

In the following sections, specific models and datasets are identified and described with respect to how they meet nuclear/radiological incident response data requirements. Some of these models will be run by subject matter experts in dedicated modeling centers, while some are available to the end user to operate on their smartphone. The results of some models are classified, which could cause challenges for effective information sharing. An explanation of who has access and is expected to run or analyze each type of data or model is described.

Emergency Support Function Leadership Group (ESFLG) Modeling and Data Inventory

FEMA's Emergency Support Function Leadership Group (ESFLG) Modeling and Data Inventory[74] contains the technical contact information for each modeling tool mentioned in this appendix, which can be used to request assistance in compiling impact libraries for planning documents. By looking up the Modeling and Data Inventory entry for the models/datasets identified in this document, one can click the "Related Models/Datasets" button to access additional models developed for research and planning. This will allow for identification of models that serve analogous functions. All relevant models/datasets can be browsed by applying a hazard filter for nuclear detonation and then examining each category of model/dataset (raw data, incident characterization, situational awareness, consequence models, impact estimates, decision support tools, and mission-specific requirements).

The Modeling and Data Inventory includes all-hazards models/datasets automatically, even when a hazard-specific filter is applied. Additional filters can be selected to identify models that fulfill particular aspects of planning needs (e.g., filter by ESF or by keyword).

Interagency Modeling and Atmospheric Assessment Center (IMAAC)

The Interagency Modeling and Atmospheric Assessment Center (IMAAC) is mandated as the coordinating body for atmospheric plume modeling for radiological and nuclear incidents. The IMAAC is tasked with requesting and validating the plume model outputs and disseminating those validated results to the interagency in a standardized format within 30 minutes of the incident. The outputs released by the IMAAC can then be used to guide protective actions (shelter or evacuation) and emergency management operations for the

[74] The ESFLG Modeling and Data Inventory can be found at https://gis.fema.gov/Model-and-Data-Inventory/.

incident. Standardized IMAAC modeling and analysis products are available for shelter and evacuation strategies/protective action guidelines, guidance for responder exposure by geographic region, casualty estimates, estimated percentages of major injuries and burns, and blast effects including degree of damage to buildings by type of construction.

Federal Radiological Monitoring and Assessment Center (FRMAC)

Radiological Monitoring and Assessment System

The FRMAC is responsible for collating radiation measurements from various sources and recording those data in the FRMAC database, managed by the Department of Energy/National Nuclear Security Administration (DOE/NNSA). CBRNResponder data is included in this data set.

As soon as possible following the release, the FRMAC will incorporate radiation readings taken by aircraft from DOE/NNSA (Aerial Measuring System), EPA (Airborne Spectral Photometric Environmental Collection Technology), or SLTT responders. The FRMAC will integrate aerial monitoring data along with CBRNResponder data, EPA's RadNet monitoring system, and other measurements.

TurboFRMAC

The FRMAC also runs a suite of models including the TurboFRMAC model to assess the impacts of the release. These collated data and additional analysis from FRMAC are provided to SLTT responders to be used to develop protective actions and by the IMAAC to provide updated models and more detailed guidance. As sufficient data about the radiation release becomes available, these updates will provide fatality estimates and refine evacuation recommendations to include non-life-threatening consequences, such as reducing radiation exposure to minimize the potential increased cancer risk.

National Atmospheric Release Advisory Center (NARAC) Modeling System

The National Atmospheric Release Advisory Center (NARAC) has primary responsibility for modeling atmospheric releases for nuclear/radiological incidents. During an incident, the IMAAC utilizes NARAC models and then automatically distributes results to the NARAC, along with interpretations, explanations, and non-technical summaries. The NARAC models define the areas that should be considered for protective actions based on federal guidance and include evacuation along with other recommendations. The NARAC models can also estimate the scale of damage caused by a nuclear detonation and project initial trajectory information for a radioactive plume. IMAAC analysis products using these models are available through the IMAAC Portal on the CBRNResponder website and CMWeb on the llnl.gov website, both of which require prior access requests.

Real-time data measuring the radiation levels on the ground and in the atmosphere become available in the hours following a nuclear detonation. The data are collated and processed by the FRMAC using various methods and tools. The results are supplied to NARAC to refine the outputs of the NARAC modeling system and accompanying IMAAC summary analysis products. This analysis continues iteratively throughout the response.

Access and contact information are available in the Modeling and Data Inventory; see the "How do I get it?" shortcut for the NARAC Modeling System.

CBRNResponder

All pre-established partnerships will have access to the incident information on the CBRNResponder network and additional organizations can be rapidly added. During a Stafford Declaration, all cooperating federal partners will be incorporated into the CBRNResponder Event Space. CBRNResponder incorporates nuclear/radiological data and IMAAC models into a mapped database. CBRNResponder can be used to provide real-time data to decision makers. Data can be collected using the CBRNResponder website, smartphone/tablet applications, fixed monitoring stations, and any other integrated equipment, networks, or systems.

CRC SimPLER

Community Reception Center Simulation Program for Leveraging and Evaluating Resources (CRC SimPLER) helps radiation emergency decision makers understand their current capacity, potential bottlenecks, and additional resource needs when preparing for population monitoring during response to a radiation emergency. It provides predictions of throughput capacity, utilization of resources, wait times, and line lengths by hour and over the course of a shift. CRC SimPLER was developed using modelling software and incorporates timing data collected from Community Reception Center (CRC) exercises across the country.

CRC SimPLER is available for free online at https://ephtracking.cdc.gov/Applications/simPler/crc/home. Upon request, custom CRC layouts can be simulated within the model and results provided by emailing simpler@cdc.gov.

Radiation Emergency Medical Management (REMM)

Nuclear/radiological incidents cause widespread injuries ranging from minor cuts from broken glass to complex cases of trauma combined with radiation exposure. Large, complex nuclear/radiological incident may destroy local medical treatment capability and capacity. Radiation Emergency Medical Management (REMM) provides guidelines and information for patient triage and treatment following a nuclear or radiological incident, including management and treatment of combined physical injuries and radiation exposure (e.g., decontamination of open wounds or burns plus high radiation exposure).

The Radiation Emergency Medical Management website maintained by HHS contains many specific tools very focused on health care professionals in addition to useful general resources to understand different types of radiological incidents and how radiation injuries and illness result from exposure and contamination. This information is useful for first responders and anyone working to develop a better understanding of the health consequences of radiological incidents. The tool is open access; a link is available in the Modeling and Data Inventory.

Data and Modeling Assets for Decontamination and Cleanup

Decontamination and disposal of radioactive waste will be a long-term process, ongoing throughout recovery, but it will also be an urgent consideration. Access to the damage zones

requires the displacement and removal of contaminated debris to make roads passable and remove hazards from response areas. Debris removal will require safe disposal and decontamination, which can be guided by two resources: (1) the Incident Waste Decision Support Tool and (2) the RDD Waste Estimation Support Tool. Neither of the tools require specific subject matter expertise or special computing resources for use, but both require advanced access and experience to operate effectively.

Incident Waste Decision Support Tool (I-WASTE DST)

The Incident Waste Decision Support Tool (I-WASTE DST) provides comprehensive information on the handling, transporting, decontaminating, and disposing of contaminated waste and debris. This includes calculations of waste quantity and guidelines to protect the workers who will handle it. I-WASTE DST was developed to provide technical information, regulations, and guidance on important disposal issues for all types of debris, including hazardous waste and specifically nuclear/radiological waste. The I-WASTE DST suite of resources can be accessed from the website https://iwaste.epa.gov.

RDD Waste Estimation Support Tool (RDD WEST)

The RDD Waste Estimation Support Tool (RDD WEST) is a planning tool for estimating the volume and radioactivity levels of waste generated by a nuclear/radiological incident (especially RDDs) and determining subsequent decontamination activities. Though not developed for nuclear detonations, the RDD WEST can still be useful. The RDD WEST[75] allows users to evaluate various decontamination/demolition strategies to examine the impacts of those strategies on secondary waste generation (e.g., estimating the amount of debris produced by demolitions).

In addition to RDD WEST, EPA also maintains the Waste Estimation Support Tool 5.0 (WEST 5.0).[76] While not specifically for estimating nuclear/radiological waste, WEST 5.0 includes a nuclear/radiological scenario tool.

Additional EPA decision support tools for waste management can be found via the website https://www.epa.gov/emergency-response-research/decision-support-tools-waste-management.

Preliminary Remediation Goals Calculator

Radionuclide Preliminary Remediation Goals are radionuclide exposure concentrations that the EPA has developed to prevent harm from long-term radiation exposure. Using exposure assumptions and EPA toxicity data, the Preliminary Remediation Goals Calculator[77] generates target radionuclide concentrations, which can be used as site cleanup goals for areas that have been contaminated with radionuclides. After a nuclear detonation, the Preliminary Remediation Goals Calculator can be used with site-specific data to ensure cleanup actions are targeted according to priorities.

---

[75] The RDD WEST is run from the user's computer after downloading the necessary software from http://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=246738 and a technical contact is available via the website.

[76] WEST 5.0 can be accessed via the website https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NHSRC&dirEntryId=342918.

[77] The Preliminary Remediation Goals Calculator is open access and available at http://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search/.

Residual Radioactivity Family of Codes

The Residual Radioactivity Family of Codes (RESRAD Family of Codes) has codes used to develop cleanup and decontamination criteria for residual radioactive material and to assess its associated radiation dose or risks. The models compute soil cleanup guidelines using dose- or risk-based cleanup standards. They can be used to project annual doses or lifetime risks to workers or members of the public resulting from exposures to residual radioactive material in soil. (The models project concentrations of radionuclides in various media resulting from residual radioactivity in soil.)

RESRAD Family of Codes requires prior request for access but is designed to be run by a skilled end user following an incident.[78]

Data and Modeling Assets for Electromagnetic Effects

Multiple communication systems may be disrupted following a nuclear/radiological incident due to electromagnetic effects. These effects may be a product of a nuclear detonation and may not occur during other nuclear/radiological incidents. During an exercise or incident, the Electromagnetic Pulse Response may be used to make projections for the damage caused by EMP.

Electromagnetic Pulse Response Model

The Electromagnetic Pulse Response Model can provide information about the electromagnetic effects on select equipment following a nuclear/radiological response. Defense Threat Reduction Agency (DTRA) then distributes this information to the interagency response, through the IMAAC analysis. If access is available, the Electromagnetic Pulse Response Model can also be accessed through the DHS Standard Unified Modeling, Mapping, and Integration Toolkit platform.

[78] Requests for download and more information can be found via the website https://resrad.evs.anl.gov/.

This page intentionally left blank.

Appendix H: Additional Assets

Organization	Resource Name	Description
DHS (CBP Laboratories and Scientific Services)	Weapons of Mass Radiological/Nuclear Reachback	Provides national-level 24/7 nuclear/radiological reachback capability to federal D/As and SLTT governments.
DHS (CWMD Office)	Mobile Detection Deployment Units	Provides radiological/nuclear detection equipment capability that allows end users to screen, search, and detect radiological/nuclear materials.
DHS (Federal Protective Service)	Hazardous Response Program	Includes initial investigations of suspicious or threatening chemical, biological, radiological, nuclear, and explosive (CBRNE) incidents; conduction of CBRNE threat assessments; confirmations of unauthorized presence of CBRNE agents and materials; and the conduct of emergency operations. The Hazardous Response Program also provides evacuation support during CBRNE incidents, CBRNE mutual aid response through agreement, and training assistance. The program is compliant with OSHA and National Fire Protection Association guidance and regulations.
DHS (FEMA)	Radiological Operations Support Specialist (ROSS)	Provides technical radiological/nuclear support to Incident Command at the state emergency operations center level.
DOC/NOAA	Air Resources Laboratory (ARL)	Focuses its dispersion research on the development and improvement of sophisticated dispersion models and other tools for air quality and emergency response applications. This includes volcanic eruptions, forest fires, nuclear accidents, and homeland security incidents. ARL also designs and evaluates high resolution observing networks, develops instrumentation, and conducts tracer field studies to improve the accuracy of atmospheric transport and dispersion projections.
DOD	CBRN Response Enterprise: Command and Control CBRN Response Elements (C2CREs)	Designed to be employed by U.S. Northern Command (USNORTHCOM) or U.S. Indo-Pacific Command (USINDOPACOM) in support of a federal response to a CBRN incident and are designed to provide incident commanders with the following capabilities: urban search and rescue, mass casualty decontamination, and emergency medical triage and stabilization. Additionally, the C2CREs may be able to support mission assignments in the functional areas of logistics, transportation, and CBRN assessment. C2CREs can easily scale down for incidents that do not require all resident capability sets.

Organization	Resource Name	Description
DOD	CBRN Response Enterprise: Defense CBRN Response Force (DCRF)	Designed to be employed by USNORTHCOM or USINDOPACOM in support of a federal response to a CBRN incident. Joint Task Force – Civil Support is the designated headquarters of the DCRF. This DCRF is designed to provide incident commanders with the following capabilities: urban search and rescue, mass decontamination, emergency medical triage and trauma care (including limited surgical and intensive care), limited patient holding, and patient movement via both ground and rotary-wing MEDEVAC/CASEVAC. Additionally, the DCRF may be able to support mission assignments in the functional areas of logistics, ground/air transportation, site assessment, road clearing, and horizontal engineering. A health physicist from Air Force Radiological Assistance Team or another DOD organization will likely serve as an interface to the FRMAC and Advisory-Team (A-Team). The DCRF can easily scale down for incidents that do not require all resident capability sets. Furthermore, if additional assets are needed, DOD can request forces that are available and appropriate to support Lead Federal Agency requests for capabilities.
DOD	CBRN Response Enterprise: National Guard Teams	Comprised of Active Duty and Reserve Component forces in a Title 10 (federalized) duty status and National Guard forces in a Title 32 (non-federalized) duty status that provide life-saving capabilities for a national and regional CBRN response during major or catastrophic CBRN incidents. National Guard forces consist of Weapons of Mass Destruction-Civil Support Teams (WMD-CSTs), CBRNE Enhanced Response Force Packages (CERFPs), and Homeland Response Forces (HRFs) employed under state control. In extremis, all CRE units may be federalized to a title 10 status and allocated to U.S. Northern Command (USNORTHCOM) for command and control. WMD-CSTs are full-time National Guard units and provide 24/7 CWMD and CBRN detection, identification and threat characterization for prevention and response missions in support of federal and SLTT responders in all 54 states and territories. All National Guard CRE forces support National Special Security Events (NSSEs) and other Special Event Assessment Rating (SEAR) events.
DOD/Armed Forces Radiobiology Research Institute (AFRRI)	Medical Radio-Biology Advisory Team	Provides health physics, medical, and radiobiological advice to military and civilian command and control operations worldwide in response to nuclear and radiological incidents requiring a coordinated federal response. Through “reach back,” the deployed team of radiation medicine physicians and senior health physicists can call on the knowledge and skills of radiobiologists, biodosimetrists, and other research professionals at AFRRI as well as those of other DOD response teams.

Organization	Resource Name	Description
DOE (NNSA)	Nuclear Radiological Advisory Team	Provides an emergency response capability for on-scene scientific and technical advice for both domestic and international nuclear or radiological incidents. It is led by a Senior Energy Official who runs the NNSA field operation and who coordinates NNSA follow-on assets as needed.
DOE (NNSA)	Nuclear Weapons Accident Response Group	Provides technical guidance and responds to U.S. nuclear weapons accidents. The team assists in assessing weapons damage and risk and in developing and implementing procedures for safe weapon recovery, packaging, transportation, and disposal.
DOE (NNSA - NEST)	Radiological Assistance Program	First responder program for assessing and characterizing radiological hazards from nine regional offices at DOE sites throughout the United States. Each region has a minimum of three teams with a standard composition of eight personnel. Teams can be augmented with other specialists and will be tailored to the specific mission. The team conducts field monitoring and sampling measurements and provides radiological advice to protect the health and safety of responders and the public.
DOE (NNSA - NEST)	NEST Incident Management Team (IMT)	A Type 1 capable IMT that is flexible, scalable, and deploys to support the management of nuclear/radiological incidents. The NEST IMT effectively and efficiently organizes, coordinates, supports, and manages the NEST field-level response. The NEST IMT is led by the DOE/NNSA Senior Response Official (SRO).
DOE (NNSA - NEST)	Aerial Measuring System (AMS)	A fleet of rapidly deployable aircraft equipped with specialized radiation detection systems to provide real-time measurements of ground radiation contamination.
DOE (NNSA - NEST)	Consequence Management Home Team (CMHT)	Provides analytical and operational support to NEST responders in the field, which includes the analysis and interpretation of the initial release based on early data. The CMHT also provides map products, coordination of laboratory assets, and situational awareness of response teams deployed to an incident.
DOE (NNSA - NEST)	Consequence Management Response Team (CMRT)	A multi-functional team that conducts radiological monitoring and sampling, data assessment, laboratory analysis, and radiological health and safety support. CMRT can deploy the Consequence Management Advanced Command (CMAC) in advance of the rest of the team. CMRT is the foundation of the FRMAC, a DOE/NNSA led interagency entity to coordinate federal radiological monitoring and assessment in response to nuclear/radiological incidents.
DOE (NNSA - NEST)	National Atmospheric Release Advisory Center (NARAC)	Provides tools and expertise to map and model the spread of hazardous and radioactive material in the atmosphere.

Organization	Resource Name	Description
DOE (NNSA - NEST)	National Search Program (NSP)	A rapidly deployable scientific and technical advisory team that supports and conducts search operations.
DOE (NNSA - NEST)	Accident Response Group (ARG)	A team of nuclear weapons experts that respond to incidents involving U.S. nuclear weapons or weapons components
DOE (NNSA - NEST)	Radiation Emergency Assistance Center/Training Site (REAC/TS)	The foremost center in the United States for medical advice on the management of radiation injuries, scientific expertise, specialized training, and onsite assistance for the treatment for radiation exposure incidents to medical professionals around the world.
DOE (NNSA - NEST)	Joint Technical Operations Team (JTOT)	Provides real-time scientific and technical support, including assessments based on nuclear design principles during nuclear/radiological and/or WMD incidents.
DOJ (FBI)	Evidence Response Team Unit (ERTU): Hazardous Evidence Response Team (HERT)	Provides training, leadership, and subject matter expertise in hazardous evidence collection, as well as in the management and processing of forensic evidence in CBRN crime scenes. ERTU also provides coordination and oversight for operational response and activities of FBI field office HERTs. These teams are DOJ/FBI field teams trained, equipped, and authorized to collect CBRNE evidence in contaminated environments.
EPA	Airborne Spectral Photometric Environmental Collection Technology (ASPECT)	The ASPECT aircraft is managed by EPA's CBRN Consequence Management Advisory Team and provides remotely sensed chemical/radiological (gamma and neutron) data and imagery (situational awareness). It can identify, quantify, and map chemical plumes and ground-based radiation. It is also capable of collecting high-resolution digital photography and video products. Data products are transferred to ground base support within minutes of collection through satellite communications, while in flight.
EPA	CBRN Consequence Management Advisory Division (CMAD)	Provides scientific and technical support for all phases of environmental response to a CBRN incident, including health and safety site characterization, environmental sampling and analysis, environmental monitoring, risk assessment building and structure decontamination, waste treatment environmental cleanup, and clearance; manages the EPA's ASPECT fixed-wing aircraft, which provides chemical/radiological data; and deploys and operates ground-based characterization and mapping capability for radiological incidents.
EPA, Integrated Consortium of Laboratory Networks (ICLN)	Environmental Response Laboratory Network	Provides capability to perform routine and emergency radio analysis of environmental samples.

Organization	Resource Name	Description
EPA	Environmental Response Team	Provides scientific and technical expertise, including health and safety, environmental sampling, air monitoring, toxicology, risk assessment, waste treatment, contaminated water/scientific divers, and site decontamination and remediation; provides field-analytical and real-time air monitoring with the EPA mobile laboratories known as Trace Atmospheric Gas Analyzers.
EPA	Homeland Security Research Program	EPA Office of Research and Development's Homeland Security Research Program provides the science and technology needed to effectively respond to and recover from radiological incidents and other disasters. Subject matter experts in sampling, sample analysis, decontamination, fate and transport, and waste management are available to provide support in decision-making based on cutting-edge science.
EPA	National Criminal Enforcement Response Team	Provides technical, safety, hazardous evidence collection, and other forensic support to law enforcement in the event of a weapon of mass destruction terrorist attack or environmental catastrophe.
EPA, DOE, DOD, DHS (USCG)	On-Scene Coordinators for oil and hazardous materials consequence management	Coordinate the on-scene tactical response to oil and hazardous materials incidents. Actions include assessment of the extent and nature of environmental contamination; assessment of environmental cleanup options; and implementation of environmental remediation, including decontaminating buildings and structures and management of wastes. For nuclear/radiological incidents, USCG provides the Federal OSC for incidents in certain areas of the coastal zone, and EPA provides the Federal OSC for incidents in the inland zone and in other areas of the coastal zone.
EPA	Radiation Task Force Leaders (RTFLs)	A sampling and monitoring force multiplier comprised of EPA Response Support Corps members based throughout EPA's Regions and Labs. The RTFLs are specially trained EPA personnel who will lead small teams of personnel in performance of tasks including field radiological measurements, contamination monitoring, soil sampling, air sampling, decontamination line setup and support, radiological control area support, and dose management support.
EPA	Radiological Emergency Response Team	Provides advice on protective measures to ensure public health and safety; assessments of dose and impact of release to public health and the environment; monitoring, sampling, laboratory analyses, and data assessments to assess and characterize environmental impact; and technical advice and assistance for containment, cleanup, restoration, and recovery.
EPA	Radiological Environmental Assessment Equipment	Sample preparation trailers and mobile laboratories carry electrical generators and supplies for approximately one week, not applicable for other assets.

Organization	Resource Name	Description
HHS (ASPR)	Radiation Injury Treatment Network (RITN)	A memorandum of understanding exists between the HHS ASPR and the National Marrow Donor Program on behalf of the RITN to utilize expertise available at bone marrow transplant and cancer centers for the treatment of patients of radiation exposure. RITN is led by the National Marrow Donor Program and American Society for Transplantation and Cellular Therapy, with essential support from the U.S. Office of Naval Research.
HHS (CDC/ATSDR)	Epidemiologic Contact Assessment Symptom Exposure (Epi CASE) Team	Enrollment forms give SLTT entities a tool to register responders and other persons exposed to chemical, biological, or nuclear agents from a disaster. The enrollment form is a two-page form that can be distributed on paper or electronically. It can be implemented quickly to collect information rapidly to identify and locate survivors and people displaced or affected by a disaster.
HHS (ASPR)	Strategic National Stockpile Agents for Nuclear/Radiological Incidents	National repository of antibiotics, chemical antidotes, antitoxins, life support medications, IV administration, airway maintenance supplies, and medical/surgical items. Nuclear/radiological-specific resources include chelating agents (calcium and zinc diethylenetriamine pentaacetate), Prussian blue, and growth factors/cytokines for white blood cells.
HHS (CDC/NIOSH)	Emergency Responder Health Monitoring and Surveillance™ (ERHMS™) guidance and tools	The ERHMS™ system is a health monitoring and surveillance framework that includes recommendations and tools specific to protect emergency responders during all phases of a response, including pre-deployment, deployment, and post-deployment phases. The intent of ERHMS™ is to identify exposures and/or signs and symptoms early in the course of an emergency response, prevent or mitigate adverse physical and psychological outcomes, ensure workers maintain their ability to respond effectively and are not harmed during response work, evaluate protective measures, and identify responders for medical referral and possible enrollment in a long-term health surveillance program.
HHS (ASPR)	Tactical Medicine Resources	HHS's Office of Emergency Management and Medical Operations, Special Operations Branch, TAC-Med Team has the capability to provide direct operational medical support (low-signature/footprint medical capability, high-threat/risk medical response), as well as tactical medical education, law enforcement medical direction, law enforcement liaison/force protection coordination, and medical consultation. Special Operations/TAC-Med has a limited capability for detection and decontamination (1 or 2 patients) for CBRN.

Organization	Resource Name	Description
NRC	Incident Response Program	Implements the NRC primary authority role. Communicates and coordinates directly with NRC licensed facilities or licensed material holders during an incident. Performs an independent assessment of facility conditions or material conditions to ensure a clear understanding of the significance of the incident and the possible sequence of future incidents. Advises on any conditions that could affect public health and safety or threaten the environment. Assesses potential consequences of an incident, the status of protective actions underway, and any conditions that might impede necessary protective actions. Communicates and coordinates with other federal D/As to ensure a common understanding of all aspects of an incident.
U.S. Department of Veterans Affairs	Medical Emergency Radiological Response Team (MERRT)	The MERRT responds to radiological disasters that require medical assistance and/or radiological decontamination of survivors. The MERRT provides medical assistance including direct patient treatment, assisting and training local health care providers in managing, handling, and treatment of radiation exposed and contaminated casualties; assesses the impact on human health; and provides consultation and technical advice to federal and SLTT authorities. When the Stafford Act is declared, MERRT will be doing their work in coordination with ESF #8.

This page intentionally left blank.

Appendix V: AUTHORITIES

Authorities applicable to this annex include PPD-8: National Preparedness, PPD-35: United States Nuclear Weapons Command, Control, Safety and Security, PPD-44: Enhancing Domestic Incident Response, HSPD- 5: Management of Domestic Incidents, NSM-16: Strengthening the Security and Resilience of United States Food and Agriculture, the Homeland Security Act of 2002, the Post-Katrina Emergency Management Reform Act of 2006 (PKEMRA), the Pets Evacuation and Transportation Standards Act of 2006, the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), the Sandy Recovery Improvement Act of 2013, NSM-19: Counter Weapons of Mass Destruction (WMD) Terrorism and Advance Nuclear and Radioactive Material Security worldwide (classified), NSPD 42 / HSPD-14: Domestic Nuclear Detection, NSPM-36: Guidelines for U.S. Government Interagency Response to Terrorist Threats and Incidents in the United States and Overseas (classified), and numerous federal criminal statutes. Certain federal D/As are authorized to respond directly to specific nuclear/radiological incidents. Nothing in this annex alters or impedes the ability of federal D/As to carry out their respective authorities and associated responsibilities under law. This annex does not create new authorities nor change existing ones.

Federal D/As may take appropriate independent emergency actions within the limits of their own statutory authority to protect their workers (including contractors) and the public, mitigate immediate hazards, and gather information concerning the emergency to avoid delay.

In addition to the authorities referenced above, which include classified policy directives and memoranda, the following key legal authorities are applicable to this annex.

Atomic Energy Act of 1954 (as amended)

The Atomic Energy Act (42 United States Code [U.S.C]. §§ 2011–2297 (2003)) stipulates the DOD and DOE responsibilities for protection of certain nuclear materials, facilities, information, and nuclear weapons under their control. Energy Reorganization Act of 1974 (5 USC §§ 5313–5316, 42 USC §§ 5801–5891 (2002)) split these functions, assigning to one agency, the DOE, the responsibility for the development and production of nuclear weapons, promotion of nuclear power, and other energy-related work. To the other agency, the NRC, it assigned all nuclear regulatory work. However, the statutory authority for the regulation of defense nuclear facilities is assigned to both DOE and the NRC. The two acts also provide the foundation for NRC regulation of the nation's civilian use of byproduct, source, and special nuclear materials to ensure adequate protection of public health and safety, to promote the common defense and security, and to protect the environment. For incidents involving NRC or agreement state-regulated facilities, activities, or material, the NRC or agreement state has the authority to perform an independent assessment of the safety of the facility or material; evaluate licensee protective action recommendations; perform oversight of the licensee (monitoring, advising, assisting, and/or directing); and report information, as appropriate, to media and public entities.

The Atomic Energy Act also charges the EPA with additional responsibilities regarding radiation matters that directly or indirectly affect public health.[79] Under these authorities, the EPA has a mission for publishing PAGs,[80] providing technical assistance to SLTT governments, conducting long-term monitoring of ambient radiation levels, and taking other actions to prevent adverse effects to public health due to unnecessary exposure to ionizing radiation. The FBI is responsible to investigate and enforce violations of the Act.

Price-Anderson Nuclear Industries Indemnity Act

Title 42 USC § 2210 establishes an insurance framework applicable to the nuclear energy industry to compensate the public for certain damages, including personal injury and property damages in the event of a nuclear incident at a commercial nuclear facility. The Price-Anderson Act also covers DOE facilities, private licensees, and their subcontractors. Under the existing framework, owners of nuclear plants pay a yearly premium for private insurance coverage (primary tier). If a nuclear accident were to cause damages in excess of the primary tier, each owner would be assessed a prorated share of the excess (up to approximately $138 million per reactor). The total amount of the secondary tier of funds will vary as the number of operating reactors changes. A single pool of insurance companies currently issues all policies for the primary and secondary tiers for all U.S. reactors. In the event of a nuclear incident, if the federal court with geographic jurisdiction finds that damages from the nuclear incident may exceed the amount of nuclear liability insurance available under the first and secondary tier funds, prioritization of remaining compensation will be managed by the court. The Price-Anderson Act specifies that the NRC must file with the court a proposed plan for an equitable allocation of available funds. The Price-Anderson Act also requires the President to submit to Congress proposed compensation plans for valid claims in excess of the first and secondary tier funds and any legislative authorities necessary to implement those compensation plans. The Price-Anderson Act commits Congress to thoroughly review the particular incident and to take whatever actions it deems necessary and appropriate to protect the public in that situation. Price-Anderson covers bodily injury, sickness, disease, or resulting death; property damage and loss; and living expenses for displaced individuals. The current insurance policy covers some environmental cleanup costs for large scale nuclear incidents. The extent of coverage for environmental cleanup will require legal resolution. than being based upon the number of plants contributing to the fund.

[79] The Atomic Energy Act authorizes the NRC to enter into agreements that allow states to assume regulatory authority over specified types of radioactive materials. The NRC has relinquished to 39 states portions of its regulatory authority to license and regulate byproduct materials (radioisotopes), source materials (uranium and thorium), and quantities of special nuclear materials under critical mass. The mechanism for the transfer of the NRC's regulatory authority to a state is an agreement signed by the governor of the state and the Chairman of the Commission.

[80] A much more extensive write-up of the legal basis for the PAGs can be found in Section 1.3.1 (Legal Basis) of the 2017 PAG Manual.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[81] gives the federal government authority to respond to the release or threatened release of hazardous substances (including radionuclides[82]) that may endanger public health or the environment. CERCLA also gives the federal government the authority to compel responsible parties to respond to releases of hazardous substances. CERCLA is implemented through the National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan (NCP), a regulation found in 40 CFR Part 300. At the on-scene level, Federal OSCs implement this response authority. On-Scene Coordinators may assist SLTT governments in responding to releases but also have the authority to direct and coordinate the response when needed to ensure protection of public health and the environment. Typical response actions include, but are not limited to, air monitoring; assessment of the extent of the contamination; stabilization of the release; decontamination; and waste treatment, storage, and disposal. Four federal D/As have On-Scene Coordinator authority for hazardous substance emergencies: EPA, DHS/USCG, DOD, and DOE. CERCLA is applicable for releases of certain materials and may not be available as an authority to respond to a nuclear/radiological incident.

CERCLA also established the Agency for Toxic Substances and Disease Registry (ATSDR)[83] to serve as a science-based public health agency working to address community concerns about hazardous waste. ATSDR is directed by congressional mandate to perform specific functions concerning the effect on public health of hazardous substances in the environment.

The National Oil and Hazardous Substances Pollution Contingency Plan

The National Oil and Hazardous Substances Pollution Contingency Plan, more commonly called the National Contingency Plan (NCP), is the federal government's blueprint for responding to both oil spills and hazardous substance releases. The NCP is the result of efforts to develop a national response capability and promote coordination among the

---

[81] CERCLA provides broad authority to carry out removal and remedial actions and pursue recovery of costs incurred. CERCLA authorizes EPA [the President] to sample and investigate as an initial matter (42 USC 9604(e)(1)). This information would allow EPA [the President] to evaluate what was released, including both radioactive and non-radioactive contamination. There may be a potential CERCLA exclusion where it has been determined based on sufficient information that all the relevant conditions in the exclusion (CERCLA Section 101(22)(C)) have been met. See 42 USC 9601(22)(C). Potential application of any exclusion under this CERCLA provision would require more specific factual development. As a result, CERCLA would authorize EPA to proceed in the early data-gathering stages of response, and EPA would need to consider the potential CERCLA exclusion as to later stages of response. In the early stages, CERCLA would authorize EPA [the President] to sample and gather data (42 USC 9604(e)(1)). The data would help show whether the release included commingled non-radioactive hazardous substances (e.g., PCBs from the fire) or radioactive material other than the certain, specified radioactive material listed in the exclusion (CERCLA Section 101(22)). EPA [The President] has full CERCLA authority over non-radioactive hazardous substances and radioactive material other than the certain, specified radioactive material listed in the exclusion (CERCLA Section 101(22)). If, on the other hand, the release consisted of only the certain, specified radioactive substances listed in the exclusion (CERCLA Section 101(22)), then the CERCLA exclusion could possibly limit use of this response authority if the other conditions in that exclusion also were met.

[82] Radioactive forms of elements are called radionuclides. Some occur naturally in the environment, while others are human made, either deliberately or as byproducts of nuclear reactions.

[83] See 42 USC 9604 (i) for more information about ATSDR and their legal authorities.

hierarchy of responders and contingency plans. As required by the Clean Water Act of 1972, the NCP was revised to include a framework for responding to hazardous substance releases, as well as oil spills. Following the passage of Superfund legislation in 1980, the NCP was broadened to cover releases at hazardous waste sites requiring emergency removal actions. Over the years, additional revisions have been made to the NCP to keep pace with the enactment of legislation.

Under the NCP, federal D/As should plan for emergencies and develop procedures for addressing oil discharges and releases of hazardous substances, pollutants, or contaminants; coordinate their planning, preparedness, and response activities with one another; coordinate their planning, preparedness, and response activities with affected SLTT governments and private entities; and make available those facilities or resources that may be useful in a response situation, consistent with agency authorities and capabilities. Once a response has been triggered, the USCG or EPA is authorized to initiate and, in the case of a discharge posing a substantial threat to public health or welfare of the United States, is required to initiate and direct, appropriate response activities. Such response activities must occur when the EPA Administrator or DHS Secretary determines that any oil or Clean Water Act (CWA) hazardous substance is discharged, or a substantial threat exists of such discharge:

- Into or on navigable waters
- On the adjoining shorelines to the navigable waters
- Into or on the waters of the exclusive economic zone
- That may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States

Clean Water Act

The Clean Water Act employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into the nation's waterways, finance wastewater treatment facilities, and manage polluted runoff. It also gives the EPA the authority to implement pollution control programs and to set wastewater standards for industry and limitations on contaminants in surface waters. The broader goal of the Act is to help restore and maintain the chemical, biological, and physical integrity of the nation's waters.

The Act prohibits industrial sources and publicly owned treatment works from discharging pollutants into navigable waters without a permit. It also provides the EPA and USCG with broad hazardous substance removal authorities. However, these do not include authority over source, byproduct, or special nuclear material.

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA), the EPA sets legal limits on the levels of certain radionuclides in drinking water. These limits are applicable to all federal and SLTT jurisdictions, including local city public works facilities. Under SDWA, the Agency established a dose-based maximum contaminant level (MCL) for beta particle and photon (gamma) radioactivity of 4 mrem/yr. The MCL is based on lifetime exposure criteria, which assume 70 years of continued exposure to contaminants in drinking water.

The Defense Against Weapons of Mass Destruction Act

In accordance with Title 50 USC § 2313, the Assistant Secretary of Defense for Homeland Defense is responsible for the coordination of DOD assistance to federal and SLTT officials. This responsibility is in responding to threats involving nuclear, radiological, biological, chemical weapons, or high-yield explosives or related materials or technologies, including assistance in identifying; neutralizing; dismantling; and disposing of nuclear, radiological, biological, chemical weapons, and high-yield explosives and related materials and technologies. DOE is directed to designate an Executive Agent for the coordination of DOE assistance to federal and SLTT officials in responding to threats involving nuclear, chemical, and biological weapons or related materials or technologies, including assistance in identifying, neutralizing, dismantling, and disposing of nuclear weapons and related materials and technologies and the coordination of DOE assistance to the DOD in carrying out that department's responsibilities under subsection (a) of this section.

Resource Conservation and Recovery Act (RCRA)

The objectives of the Resource Conservation and Recovery Act (RCRA) are to protect human health and the environment from the potential hazards of waste disposal to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. The RCRA regulates the management of solid waste, hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Under RCRA, hazardous waste treatment, storage, and disposal facilities are requiredto have permits, comply with operating standards, meet financial requirements in case of accidents, and comply with design requirements. The hazardous waste generated by a nuclear/radiological incident may have to be disposed of at these facilities. Source, byproduct, or special nuclear waste falls outside of the RCRA and under the jurisdiction of the NRC. If a radioactive waste is mixed with a hazardous waste, the resultant mixture is regulated by both the Atomic Energy Act and the RCRA as a mixed waste.

Project BioShield Act

In 2004, the Project BioShield Act (the BioShield Act) amended the Public Health Service Act (PHSA) and the Federal Food, Drug, and Cosmetic Act (FD&C Act) to provide flexible authorities to expedite and enhance research, development, procurement, and stockpiling of medical countermeasures (MCM) for chemical, biological, radiological, and nuclear (CBRN) threat agents and authorized funding for procurement of those MCM. The BioShield Act also provided HHS with broader ability to quickly authorize use of certain MCM during emergencies. The BioShield Act amended the FD&C Act to authorize the Commissioner of Food and Drugs to issue emergency use authorizations (EUAs) for the use of MCM during public health emergencies (PHEs). The authorities enacted under the Project BioShield Act were further clarified and expanded under Pandemic and All-Hazards Preparedness Act (PAHPA), Pub. L. No. 109-417, PAHPRA, Pub. L. No. 113-5 and Pandemic and All-Hazards Preparedness and Advancing Innovation Act (PAHPAIA), Pub. L. No. 116-22.

Pandemic and All-Hazards Preparedness Act

The Pandemic and All-Hazards Preparedness Act (PAHPA) of 2006 addressed a broad range of issues to further strengthen the nation's public health preparedness. It identified the

Secretary of HHS as the lead federal official for public health emergency preparedness and response and established a new Administration for Strategic Preparedness and Response (ASPR) within HHS. PAHPA provided new authorities for a number of programs, including the Biomedical Advanced Research and Development Authority within HHS for the advanced development and acquisition of MCM. PAHPA also placed the National Disaster Medical System under the purview of HHS and called for the establishment of a quadrennial National Health Security Strategy. It authorized the ASPR to exercise operational control of federal public health and medical response assets in a PHE operation, with the exception of DOD resources.

Pandemic and All-Hazards Preparedness Reauthorization Act

The Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 (PAHPRA) reauthorized PAHPA and enhanced HHS public health emergency preparedness and response capabilities, including funding for public health and medical preparedness programs (i.e., the Hospital Preparedness Program and Public Health Emergency Preparedness Cooperative Agreement) and for the purchase of MCM. PAHPRA increased the flexibility of Project BioShield as well as the flexibility of state health departments in dedicating staff resources to meet critical community needs in a disaster. In addition, PAHPRA enhanced the authority of the FDA to support rapid responses in advance of a PHE by amending EUA authorities to permit EUAs for potential PHEs and provided additional emergency authorities for FDA relating to emergency dispensing, expiration dating extensions, development and distribution of emergency use instructions, and waivers of certain requirements.

Pandemic and All-Hazards Preparedness and Advancing Innovation Act

The Pandemic and All-Hazards Preparedness and Advancing Innovation Act (PAHPAIA) of 2019 amends the Public Health Service Act to build on work HHS has undertaken to advance national health security. Amendments include enhancing the authorities of the HHS Secretary, HHS ASPR, and the Director of the CDC to prepare for and respond to public health emergencies. PAHPAIA also authorizes uses for the Public Health Emergency Fund when the HHS Secretary declares a public health emergency or determines that a significant potential exists for a public health emergency and authorizes advance funding for buying medical countermeasures under the Project BioShield Act or to support advanced research and development of potential medical countermeasures. PAHPAIA also amends the Federal Food, Drug, and Cosmetic Act to enhance the authority of the FDA to support rapid responses to public health emergencies. PAHPAIA authorizes new public health and medical preparedness programs for regional health care preparedness and military and civilian partnerships and reauthorizes funding and enhances authorities for other public health and medical preparedness programs.

Public Readiness and Emergency Preparedness Act (PREP Act)

The Public Readiness and Emergency Preparedness Act of 2005 (PREP Act) authorizes the Secretary of HHS to issue a declaration (PREP Act declaration) that provides immunity from

liability (except for willful misconduct) for claims of loss caused, arising out of, relating to, or resulting from administration or use of countermeasures to diseases, threats, and conditions determined by the Secretary to constitute a present or credible risk of a future public health emergency to entities and individuals involved in the development, manufacture, testing, distribution, administration, and use of such countermeasures. A PREP Act declaration is specifically for the purpose of providing immunity from liability and is different from and not dependent on other emergency declarations. The PREP Act also authorizes a fund in the U.S. Treasury to provide compensation to eligible individuals for physical injuries or death directly caused by administration or use of medical countermeasures covered by the declaration.

Public Health Service Act

The Public Health Service Act forms the foundation of the HHS legal authority for responding to PHEs. Among other things, it authorizes the HHS Secretary to declare a PHE and take such actions as may be appropriate to respond to the emergency consistent with existing authorities; to lead all federal public health and medical response to PHEs and incidents covered by the NRF; to direct the U.S. Public Health Service and other departmental response components; to assist states in meeting the requirements of response to PHEs; to control communicable diseases; to maintain the Strategic National Stockpile; to provide for the operation of the National Disaster Medical System; to establish and maintain a Medical Reserve Corps; and to potentially provide targeted liability immunity for covered countermeasures to manufacturers, distributors, and certain classes of people involved in the administration of a program to deliver covered treatments to patients, their employees, and agents.

Section 311 of the PHSA provides the Secretary of HHS with authority to extend temporary assistance to states or localities to meet health emergencies at the request of SLTT authorities, including utilizing HHS personnel, equipment, medical supplies, and other resources, when SLTT resources are overwhelmed by an emergency situation. The HHS Secretary may authorize assistance regardless of a formal PHE or Stafford Act declaration.

Under Section 319 of the Public Health Service Act, when the Secretary has declared a PHE, he or she can take appropriate actions consistent with other authorities to respond to the emergency, including making grants; entering into contracts; and investigating the cause, treatment, or prevention of the disease or disorder. In addition, the Secretary may access the Public Health Emergency Fund if appropriated by Congress. Under 42 U.S. Code § 247d, the Emergency Fund is made available without fiscal year limitation if a PHE has been declared by the HHS Secretary. Funding is authorized to be appropriated to the Public Health Emergency Fund as may be necessary to respond to (1) a disease or disorder that presents a PHE or (2) a PHE, including significant outbreaks of infectious diseases or bioterrorist attacks.

The Strategic National Stockpile is authorized under Section 319F-2 of the PHSA and is maintained by the HHS Secretary to provide for the emergency health security of the United States. The Secretary of HHS may deploy the stockpile to respond to an actual or potential PHEs or to otherwise protect public health and safety or as required by the Secretary of the DHS to respond to an actual or potential emergency.

Social Security Act, Section 1135

When the President declares a major disaster or an emergency under the Stafford Act or an emergency under the National Emergencies Act, and the HHS Secretary declares a public health emergency, the Secretary is authorized to take certain actions in addition to his or her regular authorities under section 1135 of the Social Security Act. The Secretary may waive or modify certain Medicare, Medicaid, Children's Health Insurance Program (CHIP) and Health Insurance Portability and Accountability Act (HIPAA) requirements as necessary to ensure to the maximum extent feasible that, in an emergency area during an emergency period, sufficient health care items and services are available to meet the needs of individuals enrolled in Social Security Act (SSA) programs and that providers of such services in good faith who are unable to comply with certain statutory requirements are reimbursed and exempted from sanctions for noncompliance other than fraud or abuse.

Federal Food, Drug, and Cosmetic Act

The Federal Food, Drug, and Cosmetic Act is the foundation for FDA authority and responsibility to protect and promote the public health by ensuring the safety and effectiveness of human and veterinary drugs, biological products, and medical devices and ensuring the safety and security of the nation's food supply. When certain conditions are met, the Federal Food, Drug, and Cosmetic Act authorizes the HHS Secretary to declare circumstances exist justifying EUA of unapproved drugs, devices, or biological products or of approved drugs, devices, or biological products for an unapproved use. Importantly for preparedness, pre-submission to the FDA of EUA-supportive information for important products in development when no incident response is in progress may expedite EUA determination when an incident occurs, to an extent that could substantially mitigate morbidity and mortality.

Once a Secretarial determination is made, the Commissioner of the FDA may issue an EUA for particular products, assuming other statutory criteria and conditions are met. The Commissioner may allow unapproved medical products or unapproved uses of approved medical products to be used in an emergency to diagnose, treat, or prevent serious or life-threatening diseases or conditions caused by CBRN threat agents or emerging infectious disease when, among other criteria, there are no adequate, approved, and available alternatives. An EUA can be revoked when it is determined that the criteria for issuance are no longer met, or revocation is appropriate to protect public health or safety.

The Office of Federal Procurement Policy Act

The Office of Federal Procurement Policy Act authorizes emergency procurement activities government-wide (1) in support of a contingency operation or (2) to facilitate the defense against or recovery from a CBRN attack against the United States. See also Federal Acquisition Regulation Part 18.2.

Foreign Assistance Act of 1961

The Foreign Assistance Act reorganized the structure of existing U.S. foreign assistance programs, separated military from non-military aid, and created USAID to administer those non-military, economic assistance programs. USAID OFDA is responsible for leading and coordinating the U.S. government's response to disasters overseas.

Defense Production Act

The Defense Production Act[84] is the primary source of Presidential authorities to expedite and expand the supply of critical resources from the U.S. industrial base to support the national defense and homeland security. In addition to military, energy, and space activities, the Defense Production Act definition of "national defense" includes emergency preparedness activities conducted pursuant to Title VI of the Stafford Act; protection and restoration of critical infrastructure; and activities to prevent, reduce vulnerability to, minimize damage from, and recover from acts of terrorism within the United States. The President's Defense Production Act authorities are delegated to the heads of various federal departments in Executive Order (EO) 13603.[85]

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act (HMTA), enacted in 1975, is the principal federal law in the United States regulating the transportation of hazardous materials. Its purpose is to "protect against the risks to life, property, and the environment that are inherent in the transportation of hazardous material in intrastate, interstate, and foreign commerce" under the authority of the U.S. Secretary of Transportation.

The Act was passed as a means for improving the uniformity of existing regulations when transporting hazardous materials and to prevent spills and illegal dumping endangering the public and the environment, a problem exacerbated by uncoordinated and fragmented regulations. Regulations are enforced through four key provisions encompassing federal standards under Title 49 of the United States Code, Procedures and Policies, Material Designations & Labeling, Packaging Requirements and Operational Rules. Violation of the HMTA regulations can result in civil or criminal penalties unless a special permit is granted under the discretion of the Secretary of Transportation.

The Occupational Safety and Health Act of 1970

The Occupational Safety and Health Act of 1970, Pub L. No. 651-678 (as amended at 29 USC) (OSH Act) was passed to prevent workers from being killed or seriously harmed at work. This law created OSHA, which sets and enforces protective workplace safety and health standards. OSHA also provides information, training, and assistance to employers and workers. Under the OSH Act, employers in all 50 states and U.S. territories have the responsibility to provide a safe workplace. Basic program elements for federal employee occupational safety and health programs and related matters are set out in 29 CFR 1960. OSHA's role primarily is to provide oversight and guidance for federal D/As' individual occupational safety and health programs through the Designated Agency Safety and Health Official and agency safety and health management staff.

During disaster response and recovery operations, even when OSHA is operating in a technical assistance and support mode, the agency's established standards remain in effect, and OSHA retains its ability to enforce the standards under its legal authority. For example, certain provisions of the Hazardous Waste Operations and Emergency Response (29 CFR 1910.120), Ionizing Radiation (29 CFR 1910.1096), and other standards may

[84] See the *Defense Production Act*, 50 U.S.C. App. 4501 et seq. (1950), as amended.
[85] See the *National Defense Resources Preparedness*, Executive Order 13603 (2012).

apply during response to and recovery from a nuclear/radiological incident under this annex. Although some states operate their own OSHA-approved occupational safety and health programs (state plans), OSHA's federal offices provide coordination, technical assistance, support services, and oversight in all 50 states, U.S. territories, and the District of Columbia.

EO 12196 extends protections for private sector employees provided under the OSH Act to federal employees. Generally, federal employer responsibilities under the EO and OSH Act apply no matter where the federal employee is located (e.g., outside the continental United States). The EO and OSH Act do not cover uniformed military personnel, U.S. Coast Guard personnel, nor members of the National Oceanic and Atmospheric Administration Commission Corps or U.S. PHS commissioned corps serving on active duty.

10 CFR § 20 – Standards for Protection Against Radiation

10 CFR § 20 establishes standards for protection against ionizing radiation resulting from activities conducted under licenses issued by the Nuclear Regulatory Commission. The purpose of these regulations is to control the receipt, possession, use, transfer, and disposal of licensed material by any licensee in such a manner that the total dose to an individual (including doses resulting from licensed and unlicensed radioactive material and from radiation sources other than background radiation) does not exceed the standards for protection against radiation.

10 CFR § 61.55 – Waste Classification

10 CFR § 61.55 provides the classification of low-level radioactive waste according to its radiological hazard. The classes include Class A, B, and C, with Class A being the least hazardous and accounting for 96 percent of low-level radioactive waste. As the waste class and hazard increase, the regulations established by the NRC require progressively greater controls to protect the health and safety of the public and the environment.

Reorganization Plan No. 3 of 1970

Reorganization Plan No. 3 of 1970 transferred to EPA certain radiation authorities and responsibilities from other federal D/As. The applicable authorities transferred include certain sections from the PHSA and the Atomic Energy Act (AEA). This includes the authorities of the Federal Radiation Council, which were originally designated through EO and later codified in the AEA. Under these and other authorities, EPA has a mission for publishing Protective Action Guides (PAGs), providing technical assistance to SLTT governments, conducting long-term monitoring of ambient radiation levels, and taking other actions to prevent adverse effects to public health due to unnecessary exposure to ionizing radiation.

44 CFR § 350 – Review and Approval of State and Local Radiological Emergency Plans and Preparedness

The purpose of 44 CFR § 350 in this part is to establish policy and procedures for review and approval by FEMA of SLTT emergency plans and preparedness for the offsite effects of a radiological emergency that may occur at a commercial nuclear power facility.

44 CFR § 351 – Radiological Emergency Planning and Preparedness

44 CFR § 351 sets out federal roles and assigns tasks regarding federal assistance to SLTT governments in their radiological emergency planning and preparedness activities. This is applicable to radiological accidents at fixed nuclear facilities and transportation accidents involving radioactive materials. It relates to consequences and activities beyond the boundaries of any fixed nuclear facility with a potential for serious consequences and the area affected by a transportation accident involving radioactive materials. It includes the responsibility for developing federal response plans to implement various D/As' statutory authorities when responding to radiological emergencies.

28 CFR § 0.85 – Federal Bureau of Investigation General Functions

28 CFR § 0.85 identifies authorities of the Director of the FBI, including the authority to exercise lead agency responsibility in investigating all crimes for which the FBI has primary or concurrent jurisdiction, and which involve terrorist activities or acts in preparation of terrorist activities within the statutory jurisdiction of the United States.

Title 50, USC, War and National Defense

As it applies to nuclear/radiological accidents or incidents, this statute provides a military commander the authority to establish a temporary National Defense Area around an accident/incident site to protect nuclear weapons and materials in DOD custody. This authority includes denial of access to an accident/incident site and removal of individuals who threaten orderly administration of the accident/incident site.

- §§ 2406, 2511 (codifying Executive Order 12344): Naval Nuclear Propulsion - These statutes established the Naval Nuclear Propulsion Program under the Department of Energy and Department of the Navy to provide for the safety of, the control of radiation and radioactivity associated with, and the response to radiological emergencies involving U.S. naval nuclear reactors and associated propulsion plants. The Naval Nuclear Propulsion Program is the lead federal agency for emergencies involving U.S. naval reactors, associated radiological and nuclear material, and radiological and nuclear material at Naval Nuclear Propulsion Program DOE facilities.

Title 18, USC, Crimes and Criminal Procedure

Various sections of Title 18 USC: Crimes and Criminal Procedure, including but not limited to those referenced below, apply to nuclear/radiological incidents.

- § 831: Prohibited Transactions Involving Nuclear Materials
- § 2332a: Use of Weapons of Mass Destruction
- § 2332b(f): The Attorney General of the United States has primary investigative responsibility for all federal crimes of terrorism and certain other designated offenses
- § 2332f: Bombings of places of public use, government facilities, public transportation systems and infrastructure facilities

- § 2332h: Radiological Dispersal Devices
- § 2332i: Acts of Nuclear Terrorism

Title 28, USC Judiciary and Judicial Procedure

Various sections of Title 28 USC, including but not limited to those referenced below, apply to nuclear/radiological incidents.

- § 533: Investigative and other officials; appointment

Convention on Supplementary Compensation for Nuclear Damage

The Convention on Supplementary Compensation for Nuclear Damage was developed under the aegis of the International Atomic Energy Agency (IAEA) to be the basis for a global legal framework and mechanism for compensating survivors of nuclear damage that results from a nuclear incident. It entered into force on April 15, 2015; seven countries are presently party to the Convention, including the United States. In the event of a nuclear incident in the United States, funds could be made available to survivors; the first level would be from U.S. operators in the amount of 300 Special Drawing Rights or about $420 million dollars. Another subsequent source of funds, if required, could be made from Parties to the Convention on Supplementary Compensation, presently in the amount of about $140 million dollars.

Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency

The Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency establishes a notification system for nuclear accidents that have the potential for international transboundary release that could be of radiological safety significance for another IAEA Member States. It requires IAEA Member States to report the accident's time, location, radiation releases, and other data essential for assessing the situation. DOS is the agency through which notifications are made and received under this Convention. Notification is to be made to affected IAEA Member States directly or through the IAEA and to DOS. The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency sets out an international framework for cooperation among IAEA Member States and with the IAEA to facilitate prompt assistance and support in the event of nuclear accidents or radiological emergencies. It requires IAEA Member States to notify DOS of their available experts, equipment, and other materials for providing assistance. In case of a request, each IAEA Member State decides whether it can render the requested assistance as well as its scope and terms. DOS is the agency through which requests for assistance either to or from the United States are directed. The United States is party to both conventions.

Executive Order 12656 of November 18, 1988 (as amended)

As amended, EO 12656, assigns national security emergency preparedness responsibilities to numerous federal D/As, as well as the National Security Council and the Homeland Security Council. National security emergency preparedness functions that are shared by more than one agency must be coordinated by the federal D/As having primary responsibility and must be supported by the other D/As having related responsibilities. In addition, each federal D/A must consider national security emergency preparedness factors to ensure an adequate response capability is maintained. Emergency plans and programs and an appropriate state of readiness, including organizational infrastructure, must be developed as an integral part of the continuing activities of each federal D/A.

This page intentionally left blank.

Appendix Y: Acronyms and Abbreviations

To promote readability, this annex utilizes acronyms only after the first occurrence of the proper name of a Federal Executive Branch department or agency. The exception to this rule applies to acronyms that only appear within tables and figures in the document, where space considerations and readability render the use of abbreviations optimal.

Acronym / Abbreviation	Definition
AEA	Atomic Energy Act
AFRRI	Armed Forces Radiobiology Research Institute
AMS	Aerial Measuring System
ARF	action request form
ARG	Accident Response Group
ARL	Air Resources Laboratory
ASPECT	Airborne Spectral Photometric Environmental Collection Technology
ASPR	Administration for Strategic Preparedness and Response
A-Team	Advisory Team for Environment, Food, and Health
ATSDR	Agency for Toxic Substance and Disease Registry
BioShield Act	Project BioShield Act
C2CREs	Command and Control CBRN Response Elements
CASE	casualty assistance support element
CBP	U.S. Customs and Border Protection
CBRN	chemical, biological, radiological, and nuclear
CBRNE	chemical, biological, radiological, nuclear, and explosive
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFP	CBRN Enhanced Response Force Package
CI	critical infrastructure
CIRG	Critical Incident Response Group
CISA	Cybersecurity and Infrastructure Security Agency
CMAC	Consequence Management Advanced Command
CMAD	Consequence Management Advisory Division
CMCU	Consequence Management Coordination Unit
CMHT	Consequence Management Home Team
CMRT	Consequence Management Response Team
CONOPS	concept of operations
CRC	Community Reception Center
CRC SimPLER	Community Reception Center Simulation Program for Leveraging and Evaluating Resource
CWA	Clean Water Act
CWMD	Countering Weapons of Mass Destruction
D/A	department/agency
DCRF	Defense CBRN Response Force
DEST	Domestic Emergency Support Team

Acronym / Abbreviation	Definition
DHS	U.S. Department of Homeland Security
DHS S&T	DHS Science and Technology Directorate
DOC	U.S. Department of Commerce
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOJ	U.S. Department of Justice
DOL	U.S. Department of Labor
DOS	U.S. Department of State
DOT	U.S. Department of Transportation
DPA	Defense Production Act
DRZ	Dangerous Radiation Zone
DTRA	Defense Threat Reduction Agency
ECC	Environmental Compliance Coordinator
EO	Executive Order
EOC	emergency operations center
EPA	U.S. Environmental Protection Agency
ERHMS	Emergency Responder Health Monitoring and Surveillance
ERTU	Evidence Response Team Unit
ESF	Emergency Support Function
ESFLG	Emergency Support Function Leadership Group
EUA	emergency use authorization
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FBI OSC	FBI On-Scene Commander
FCC	Federal Communications Commission
FCO	Federal Coordinating Officer
FD&C Act	Federal Food, Drug, and Cosmetic Act
FDA	Food and Drug Administration
Federal OSC	Federal On-Scene Coordinator
FEMA	Federal Emergency Management Agency
FEMA EOC	FEMA Emergency Operations Center
FIOP	Federal Interagency Operational Plan
FRC	Federal Resource Coordinator
FRMAC	Federal Radiological Monitoring and Assessment Center
FRPCC	Federal Radiological Preparedness Coordinating Committee
FSRT	Fatality Search and Recovery Team
HAZMAT	hazardous materials
HERO	Headquarters Emergency Response Official
HERT	Hazardous Evidence Response Team
HHS	U.S. Department of Health and Human Services
HMTA	Hazardous Materials Transportation Act
HOO	Headquarters Operations Officer
HRF	Homeland Response Force
HSE	Homeland Security Enterprise

Acronym / Abbreviation	Definition
HSIN	Homeland Security Information Network
HSPD	Homeland Security Presidential Directive
HZ	Hot Zone
IAEA	International Atomic Energy Agency
IC/UC	Incident Command/Unified Command
ICBRNR Protocol	International Chemical, Biological, Radiological, Nuclear Response Protocol
ICLN	Integrated Consortium of Laboratory Networks
ICS	Incident Command System
IHR	U.S. International Health Regulations
IMAAC	Interagency Modeling and Atmospheric Assessment Center
IMT	Incident Management Team
IND	improvised nuclear device
IOF	Initial Operating Facility
I-WASTE DST	Incident Waste Decision Support Tool
JACCIS	Joint Analysis Center: Collaborative Information System
JFO	Joint Field Office
JOC	Joint Operations Center
JTOT	Joint Technical Operations Team
JTTF	Joint Terrorism Task Force
LDZ	Light Damage Zone
LFA	Lead Federal Agency
MA	mission assignment
MCL	maximum contaminant level
MCM	medical countermeasures
MDZ	Moderate Damage Zone
MERRT	Medical Emergency Radiological Response Team
MERS	Mobile Emergency Response Support
MSRT	USCG Maritime Security Response Team
NARAC	National Atmospheric Release Advisory Center
NASA	National Aeronautics and Space Administration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDA	National Defense Area
NDRF	National Disaster Recovery Framework
NEST	Nuclear Emergency Support Team
NFP	National Focal Point
NGO	non-governmental organization
NIMS	National Incident Management System
NIRT	Nuclear Incident Response Team
NNSA	National Nuclear Security Administration
NOAA	National Oceanic and Atmospheric Administration
NOC	National Operations Center
NRC	Nuclear Regulatory Commission
NRCC	National Response Coordination Center
NRF	National Response Framework
NRIA	Nuclear/Radiological Incident Annex

Acronym / Abbreviation	Definition
NRITF	Nuclear/Radiological Incident Task Force
NRS	National Response System
NRT	National Response Team
NSA	national security area
NSC	National Security Council
NSF	National Strike Force
NSM	National Security Memorandum
NSP	Nuclear Search Program
NSPM	National Security Presidential Memorandum
OASH	Office of the Assistant Secretary of Health
OFDA	Office of Foreign Disaster Assistance
O/O	owner/operator
OSH Act	Occupational Safety and Health Act of 1970
OSHA	Occupational Safety and Health Administration
PAG	Protective Action Guide
PAHPA	Pandemic and All-Hazards Preparedness Act
PAHPAIA	Pandemic and All-Hazards Preparedness and Advancing Innovation Act
PAHPRA	Pandemic and All-Hazards Preparedness Reauthorization Act
PHE	public health emergency
PHEIC	public health emergency of international concern
PHMSA	Pipelines and Hazardous Material Safety Administration
PHS	public health & safety
PKEMRA	Post-Katrina Emergency Management Reform Act
PPD	Presidential Policy Directive
PPE	personal protective equipment
PREP Act	Public Readiness and Emergency Preparedness Act
PSA	Protective Security Advisor
Rad Branch	Radiological Operations Branch
RANET	Response and Assistance Network
RAP	Radiological Assistance Program
RCRA	Resource Conservation and Recovery Act
RDD	radiological dispersal device
RDD WEST	RDD Waste Estimation Support Tool
REAC/TS	Radiation Emergency Assistance Center/Training Site
RED	radiological exposure device
rem	roentgen equivalent in man
REMM	Radiation Emergency Medical Management
REP Program	Radiological Emergency Preparedness Program
RESRAD	Residual Radioactivity Family of Codes
RITN	Radiation Injury Treatment Network
RNAC	Radiological/Nuclear Aerial Coordinator
ROSS	Radiological Operations Support Specialist
RPM	Remedial Project Manager
RRCC	Regional Response Coordination Center
RRT	Regional Response Team

Acronym / Abbreviation	Definition
RSF	Recovery Support Function
RSFLG	Recovery Support Function Leadership Group
RTFL	Radiation Task Force Leader
SABT	Special Agent Bomb Technician
SAC	Special Agent in Charge
SAR	Senior Agency Representatives
SDWA	Safe Drinking Water Act
SDZ	Severe Damage Zone
SFLEO	Senior Federal Law Enforcement Officer
SIOC	Strategic Information and Operations Center
SLTT	state, local, tribal, and territorial
SRMA	Sector Risk Management Agency
Sv	sievert
TCE	Threat Credibility Evaluation
UCG	Unified Coordination Group
UCS	Unified Coordination Staff
USACE	U.S. Army Corps of Engineers
USAID	U.S. Agency for International Development
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USINDOPACOM	U.S. Indo-Pacific Command
USNORTHCOM	U.S. Northern Command
VA	U.S. Department of Veterans Affairs
WEST 5.0	Waste Estimation Support Tool 5.0
WHO	World Health Organization
WMD	weapons of mass destruction
WMD-CST	Weapons of Mass Destruction Civil Support Team
WMDD	Weapons of Mass Destruction Directorate
WMDSG	Weapons of Mass Destruction Strategic Group

This page intentionally left blank.