ASSESSING STATE-LEVEL CIVIL PREPAREDNESS FOR A NUCLEAR ATTACK

WHAT ARE THE STANDARDS AND DO THEY REALLY MATTER?

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ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

SUBMITTED BY

Alex Moe

Aleyson Huesgen

Keane Ellis

Lauren Davis

Michael Draper

GUIDED BY

Dr. S. Vasu Vaitla

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Glossary of Terms and Acronyms

Acronym	Definition
ASWP	Alternate State Warning Point
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosives
CDC	Center for Disease Control and Prevention
CDWS	Civil Defense Warning System
CEMP	Comprehensive Emergency Management Plan
CIPF	Catastrophic Incident Planning Framework
CONUS	Contiguous United States
CPG	Comprehensive Preparedness Guide
CSZ	Cascadia Subduction Zone
DFO	Disaster Field Office
DHS	U.S. Department of Homeland Security
DIA	U.S. Defense Intelligence Agency
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOH	U.S. Department of Health
DOT	U.S. Department of Transportation
EAN	Emergency Action Notification
EAS	Emergency Alert System
EMAC	Emergency Management Assistance Compact
EMD	Emergency Management Division
EMP	Electromagnetic Pulse
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EPG	Emergency Preparedness Guide
ESF	Emergency Support Function
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FIOP	Federal Interagency Operational Plan
FRP	Federal Response Plan
GLCM	Ground-Launched Cruise Missile
HAWAS	Hawai'i Warning System
HHS	U.S. Department of Health and Human Services
HI-EMA	Hawai'i Emergency Management Agency
HMP	Hazard Mitigation Plan
IA	Incident Annex
ICBM	Intercontinental Ballistic Missile
IND	Improvised Nuclear Device
IPAWS	Integrated Public Alert and Warning System
JCPOA	Joint Comprehensive Plan of Action
MOA	Memorandum of Agreement

MOU	Memorandum of Understanding
NAWAS	National Warning System
NGO	Non-governmental Organization
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NOC	National Operations Center
NORAD	North American Aerospace Defense Command
NPG	National Preparedness Goal
NWS	National Weather Service
OCONUS	Outside the Contiguous United States
OEM	Oregon Emergency Management
OHA	Oregon Health Authority
PDA	Preliminary Damage Assessment
PEP	Primary Entry Point [Station]
PSWP	Primary State Warning Point
RCASP	Remote Community Alert System Program
RDD	Radiological Dispersal Device
RPS	Radiation Protection Services
SLBM	Submarine-Launched Ballistic Missile
SLV	Space Launch Vehicle
SOP	Standard Operation Procedure
STE	Secure Terminal Equipment
SWP	State Warning Point
USINDOPACOM	U.S. Indo-Pacific Command
USNORTHCOM	U.S. Northern Command
WA DOH	Washington State Department of Health
WEA	Wireless Emergency Alerts
WMD	Weapon of Mass Destruction

Glossary of Selected Terms
10-Kiloton Ground-Level Burst: A 10-kiloton nuclear device is considered by the U.S. Department of Homeland Security to be a low-yield nuclear weapon that would be detonated at the ground level. Planning guidance from the U.S. Department of Homeland Security and federal interagency have guidance for a 10-kiloton weapon that will help in response to what are deemed "nuclear effects" from such a weapon. Effects include the primary outputs of the nuclear explosion (blast, thermal, and radiation), which can cause a nuclear fireball of approximately 650 ft., a shock wave and corresponding large degree of destruction, and damage to the region from the blast zone up to 10-20 miles from the detonation site (*Planning Guidance for Response to a Nuclear Detonation,* 1st ed. and 2nd ed., Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats).
Blast Damage: The impacts of a shock wave of energy through the air caused by the detonation of a nuclear device. Blast is the primary effect of a nuclear explosion and originates from the fireball of the nuclear explosion. Blast is measure by overpressure and dynamic pressure (*Planning Guidance for Response to a Nuclear Detonation,* 1st ed. and 2nd ed., Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats).
Dirty Bomb: A radiological dispersal device that combines conventional explosives, such as dynamite or TNT, with radioactive materials. A dirty bomb will injure people and damage buildings in the vicinity of the blast area while projecting radioactive material into the area ("IA 9 – Nuclear/Radiological," *State of Oregon EOP*, Incident Annexes).
Electromagnetic Pulse: A high-intensity burst of electromagnetic energy resulting in: the disruption of electronics, including sensors, communication systems, and computers; lightning-like strikes capable of damaging critical infrastructure; and, a pulse that impacts electricity transmission lines. The result of these three effects can cause debilitating damage to electronic systems (Jena Baker McNeill and Richard Weitz, *Electromagnetic Pulse (EMP) Attack: A Preventable Homeland Security Catastrophe*).
Emergency Support Function: A grouping of related governmental and certain private sector capabilities into an organizational structure to provide structure for interagency response at the Federal level following an incident. FEMA has established fifteen Emergency Support Functions ("Emergency Support Functions," *Federal Emergency Management Agency*; and, "Emergency Support Functions," *U.S. Department of Health and Human Services*).
Interagency: Made up of, involving, or representing two or more government agencies. In common usage, the term "the interagency" refers to a collection of Federal government departments or independent agency stakeholders operating collaboratively to accomplish a specific goal.
National Planning Frameworks: National Planning Frameworks are established by the Federal Emergency Management Agency and outline how the interagency at all levels of government can work to achieve the National Preparedness Goal. There are Frameworks for each of FEMA's five designated mission areas: Prevention, Protection, Mitigation, Response, and Recovery ("National Planning Frameworks", *Federal Emergency Management Agency*).
National Preparedness Goal: The National Preparedness Goal is established through the Federal Emergency Management Agency vis-à-vis the U.S. Department of Homeland Security. The goal is: "A secure and resilient Nation with the capabilities required across the

whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk" (*National Preparedness Goal,* U.S. Department of Homeland Security).
Nuclear Attack: The use of a device that produces a nuclear explosion. A nuclear explosion is caused by an uncontrolled chain reaction that splits atomic nuclei (fission), causing an "intense wave of heat, light, air pressure, and radiation, followed by the production and release of radioactive particles" into the land, sea, and air ("Nuclear Attack Fact Sheet," *U.S. Department of Homeland Security*).
Nuclear Terrorism: The unlawful acquisition and use of, or threat to use, a nuclear weapon or an improvised nuclear device; or, sabotage and disruption of a nuclear facility causing the dispersal of radioactive materials**.** The definition includes the use or threat to use any nuclear installations, nuclear explosive, or radiation device, in order to kill or injure persons, damage property or the environment, or to compel persons, states, or international organizations to commit, or refrain from committing, an act. The use of an acquired nuclear weapon is assessed to be less likely than the use of a "dirty bomb", in which radioactive materials are dispersed upon detonation of the weapon ("Nuclear & Radiological Terrorism," *Federation of American Scientists*; 59/290. International Convention for the Suppression of Acts of Nuclear Terrorism, United Nations General Assembly, April 13, 2005).
Radiation Injury: Sickness or syndrome resulting from excessive exposure of the whole body to ionizing radiation. Symptoms include nausea, vomiting and fatigue, followed by the epilation, hemorrhage, loss of energy, and inflammation of the mouth and throat. Severe exposure may result in death within two to four weeks ("Radiation sickness (syndrome)," *United States Nuclear Regulatory Commission*).
Radiation Safety: The protection of people, infrastructure, and environment to exposure to excessive or unnecessary radiation resulting from human uses of nuclear materials ("Radiation Protection," *United States Nuclear Regulatory Commission*).
Steady State Operations: Steady State refers to the government's operations and activities during day-to-day, or normal, operations. The government may transition out of Steady State to an escalated or crisis-response mode of operations leading up to, during, or following a major disaster or catastrophe, whether natural or man-made.
Thermal Damage: Physical harm to persons or things resulting from exposure to intense heat. Near the fireball, thermal energy is so intense that immediate lethality and incineration would approach 100%. Thermal radiation is emitted by a nuclear detonation and causes burns directly through thermal energy, and indirectly from fires ignited by the detonation (*Planning Guidance for Response to a Nuclear Detonation,* 1st ed., Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats).

Executive Summary

The United States is today in greater peril from nuclear attack than at any time since the beginning of the Cold War. Bellicose rhetoric from its leader, coupled with dramatic advances in its nuclear weapons and ballistic missile technologies, render the Democratic People's Republic of Korea the most immediate threat. The United States' traditional strategic competitors, the People's republic of China and the Russian Federation, are pursuing assertive agendas, seeking to expand their influence and power, and are both rapidly modernizing their nuclear arsenals. Despite these developments, the United States remains woefully unprepared to contend with even a limited nuclear attack.

This paper examines the capacity of states to mitigate the hazards associated with a nuclear attack. Immediate response to any major disaster will be the responsibility of state and local governments. We analyzed the emergency plans of five states using a set of eleven attributes of a nuclear attack to assess their relative preparedness. We selected the westernmost states of Alaska, California, Hawai'i, Oregon, and Washington for this study as their proximity to North Korea places them at a slightly higher risk of nuclear attack than other states.

The federal government plays an integral role in incentivizing and preparing states for response and mitigation activities for a number of natural and man-made threats. In analyzing the varied emergency management, hazard mitigation, and catastrophic contingency plans published by the selected states, it is evident that these states have incorporated operational capabilities into their catastrophic and emergency management planning indices, many of which are applicable to a nuclear attack. These states share a planning deficiency: none of them incorporate explicit and specific planning guidance for state-level emergency mitigation, preparation, and response to a nuclear attack. This notable absence indicates the federal government has not adequately incentivized or prepared states to be capable of responding to a nuclear attack. The consequences of this lack of preparation could multiply the catastrophic effects of a nuclear attack, and yet the costs of incorporating a nuclear-specific annex into state planning guidance is relatively low.

Establishing incentives for states to incorporate the potential threat of nuclear attack via a ballistic missile into their hazard mitigation plans is a necessary first step. This could be accomplished in part by modifying provisions of the Stafford Act to include nuclear attack as a hazard eligible for enhanced federal disaster assistance just as natural hazards are today. Incorporation of the Nuclear/Radiological Incident Annex to the National Response Framework into state-level planning guidance is a low-cost, feasible solution to increasing preparedness, mitigation, and response planning to a nuclear attack without drawing resources, including funds and personnel, from other planning efforts. All five states possess capabilities – including radioactive decontamination training and capabilities, catastrophic incident triage plans, and established public communication platforms – which can easily be incorporated into and applied toward their response planning for a nuclear attack without incurring significant additional costs.

The revisions to federal guidance will incentivize all five states – and by extension their neighbors across the United States – to be better equipped to lead the response to a nuclear attack until support from federal government entities arrives. Incorporation of these documents should be implemented in conjunction with recommendations designed to fill the gaps in response activities for the eleven attributes (including public education, electromagnetic pulse, thermal damage, and the establishment of partnerships, liaisons, and agreements with other state governments) of a nuclear attack identified in this paper.

Introduction

Just after 8:00 am on a Saturday morning in January 2018, the Hawai'i Emergency Management Agency sent a dire warning to cell phones throughout the state: "BALLISTIC MISSILE THREAT INBOUND TO HAWAII. SEEK IMMEDIATE SHELTER. THIS IS NOT A DRILL."[i] While the alarm turned out to be false, the panic that ensued was quite real. Tension between the United States and the Democratic People's Republic of Korea ("North Korea") was high following a series of escalating rhetorical exchanges between Kim Jong-Un and Donald Trump, coupled with North Korea's 2017 nuclear weapon and ballistic missile tests.[ii] In the 38-minute period prior to officials sending out follow-up emergency alert system messages that there was no incoming missile, people scrambled for shelter and jammed communication networks seeking information and contacting loved ones.[iii] The false missile alert in Hawai'i highlights the problem of a general lack of state level preparedness for a nuclear attack.

The lack of adequate state preparedness for an attack by detonation of a nuclear-tipped ballistic missile (referred to hereafter as "nuclear attack") is partially attributable to the conspicuous absence of federal government incentives for state-level emergency planning to mitigate this threat. Specifically, the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* ("Stafford Act")[iv] authorizes increased federal assistance to states with Federal Emergency Management Agency (FEMA)-approved plans for mitigating natural disasters, but is silent on enhanced federal assistance for man-made disasters, such as a nuclear attack.[v]

This lack of preparedness is also partially attributable to a gradual reduction in perception of the risk of nuclear attack, and the corresponding decline in federal government emphasis on civil defense. Notwithstanding the unlikely nature of a nuclear attack, it is imperative that states have a fundamental understanding of the implications of a nuclear attack on the safety of their

citizens. Public education programs across states are lacking in this regard, as is the consideration of nuclear detonation in state-level emergency mitigation, preparation, and response planning. The consequences of this lack of preparation could multiply the catastrophic effects of a nuclear attack, and yet, relatively modest changes to their plans would allow the states to better address a significant portion of the hazards associated with a nuclear attack.

This paper examines the capacity of states to mitigate the hazards associated with a nuclear attack through review of publicly available literature relevant to emergency response, including interagency documents and Federal Emergency Management Agency (FEMA) guidelines. We examined states' publicly available emergency plans – including Emergency Operations Plans, Hazard Mitigation Plans, event-specific and crisis annexes, and public information documents – and conducted a limited number of interviews with state emergency management officials, either by telephone or email. Using *Planning Guidance for Response to a Nuclear Detonation* as a primary reference, we developed eleven factors specific to a nuclear attack, as highlighted in Annex B, to guide our analysis of publicly available state emergency planning documents in order to gauge their event-specific preparedness. Based on the identification of significant nuclear attack-specific planning and response gaps in the states' emergency response and preparedness documents, we developed a set of recommendations for improvement of states' preparedness. These recommendations include federal- and state-level legislative proposals and "best practices" that states should adopt.

Time and resource constraints prevented review of emergency planning for all 50 states; as such, we focused on a sample of five states. We selected U.S. states bordering the Pacific Ocean due to our assessment of their increased relative vulnerability to the most likely source of a nuclear missile strike: North Korea. These states' proximity to North Korea places them within range of a

larger portion of North Korea's missile arsenal, increasing the probability that Alaska, Washington, Oregon, California, and Hawai'i are in greater peril than other states. North Korea possesses at least five unique ballistic missiles capable of striking the United States.[vi] However, the threat of a nuclear missile strike is not limited to North Korea. Annex A: Threat Assessment provides a more detailed exploration of countries with the potential and motivation to attack the U.S. with a nuclear weapon.

Federal Guidance and Assistance

The federal government plays an integral role in the guidance, preparedness, and response to natural and man-made disasters. The authority for federal response to disasters was codified in the Stafford Act, the *Federal Response Plan* (FRP), and the *Homeland Security Act of 2002*[vii], and is accomplished through the federal government's cooperation with states, counties, and cities.[viii]

The Stafford Act in the Context of Man-Made Disasters

During the 1980s, several unpredictable natural disasters occurred in the United States causing negative impacts to land, property, human life, and the economy. In 1980, Mount St. Helens erupted in Washington; in 1974, the Super Outbreak tornado impacted 13 U.S. states and Ontario, Canada; and, in 1976, the Big Thompson Canyon flood occurred in Colorado. The Stafford Act was enacted in 1988 based on Congress' findings that disasters cause "loss of life, human suffering, loss of income, and property loss and damage," disrupt steady state operations, and negatively impact the public "with great severity".[ix] These findings led Congress to conclude that special measures aimed to help states expedite the provision of aid and emergency services during response, reconstruction, and rehabilitation efforts of affected areas were necessary in order to help states more effectively and efficiently respond to major disasters.

The Stafford Act obligates the federal government to respond to a request for assistance from a state once the governor has declared a "state of emergency". As prescribed by the FRP, the federal government may provide emergency assistance via established Emergency Support Functions (ESFs) to a state. Each ESF is led by a pre-designated agency and are categorized according to organizational and operational areas of responsibility.[x] Through an interagency process with state and local agencies, the federal government also coordinates assistance in filling resource or organizational gaps identified by state emergency management officials.

Provisions of the Stafford Act incentivize states to conduct emergency planning and to identify and mitigate hazards before disaster strikes. States that apply FEMA's standard frameworks to their emergency plans can gain access to additional federal funds. Qualifying states are able to increase their share of federal assistance devoted to hazard mitigation grants from 7.5% up to 20% after an event addressed in their FEMA-approved emergency plans.[xi] The Stafford Act also authorizes technical and financial support to states "to assist in the implementation of predisaster hazard mitigation measures that are cost-effective and are designed to reduce injuries, loss of life, and damage and destruction of property."[xii] However, the Stafford Act only provides these incentives to states for the mitigation plans of natural hazards.[xiii] A state that experiences a nuclear attack would undoubtedly incur significant loss of life, human suffering, loss of income, property loss, damage, and disruption to steady state operations, reflecting the original intent of Congress for the Stafford Act. And to be clear, the Stafford Act would permit federal assistance to a state in the event of a nuclear attack (as an explosion) under the definition of a "major disaster":

> Any natural catastrophe (including any hurricane, tornado, storm, high water, winddriven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources

> of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.[xiv]

However, the exclusion of incentives for states to prepare for man-made hazards appears arbitrary and is at odds with the Act's declaration of policy, which concludes:

> The Federal Government shall provide necessary direction, coordination, and guidance, and shall provide necessary assistance as authorized in this title so that a comprehensive emergency preparedness system exists for all hazards.[xv]

Federal Guidance and Response

FEMA leads the organizational and operational document development and planning process for disaster response. These guidelines establish clear organizational paths via standard operating procedures (SOPs) at both the federal and state levels for the entire life cycle of a disaster.[xvi] SOPs are used to synchronize local- and state-level emergency management priorities with National Planning Frameworks in order to achieve the National Preparedness Goal (NPG). The NPG is a succinct expression of FEMA's intended outcome: "A secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk."[xvii]

Once a state governor declares a 'State of Emergency' and requests federal assistance, a chain of administrative and organizational steps is initiated to aid the affected area. This begins with a federal-state Preliminary Damage Assessment (PDA) that documents the scope of the disaster and the type and scale of assistance required. The PDA informs the governor's request that the President of the United States issue a formal disaster declaration.[xviii] This declaration allows FEMA to develop a FEMA-State Agreement that prescribes the terms by which federal assistance will be administered to the affected area, including: which agencies will take part in the disaster response; agency tasking; the amount of aid to be provided; cost sharing; and, timeframes for the availability of federal assistance.[xix] The acknowledgement that FEMA, along with other

federal departments and agencies, may be unable to respond for up to three days should have considerable bearing on states' planning efforts.[xx]

Analysis of Current Event-Specific Plans

The second edition of *Planning Guidance for Response to a Nuclear Detonation*, a document developed by a federal interagency committee, underscores the argument that states should undertake emergency planning for a nuclear attack:

> There will be no significant Federal response at the scene for 24 hours and the full extent of Federal assets will not be available for several days. Emergency response is principally a local function. Federal assistance will be mobilized as rapidly as possible; however, for purposes of this document, no significant Federal response is assumed for 24 – 72 hours.[xxi]

Despite the federal government's planning guidance and explicit warnings regarding expected aid delays following a disaster, each of the five states examined has significant gaps in their preparedness for a nuclear attack. While the selected states acknowledge the threat of a nuclear attack, analysis of the current planning efforts and published hazard mitigation and response guidance from Alaska, California, Hawai'i, Oregon, and Washington indicates there is little event-specific guidance for policymakers, emergency response and planning personnel, and the public.

The implications of the lack of planning for a nuclear attack at the state level will be echoed throughout the remainder of this analysis. FEMA's Nuclear/Radiological Incident Annex has not been incorporated or referred to by any of the five states' planning guidance.[xxii] This Annex is a valuable primer for states wishing to improve the efficacy of state emergency response plans for a nuclear attack. FEMA incorporated this Annex into the National Response Framework for federal agency planning efforts in response to a nuclear or radiological incident, noting that state governments would find the Annex both useful and complementary to their state plans.[xxiii]

Hawai'i is the only state analyzed that has released state-level planning guidance and supporting documents for response to a nuclear attack. One such document titled "Emergency Preparedness" details common questions and responses to state-level preparedness for a nuclear attack and is easily accessible on Hawai'i Emergency Management Agency's (HI-EMA's) website.[xxiv] This document identifies the need for unified messaging to the public as a means of streamlining communications in times of crisis.[xxv] While Alaska does not have open-source state-level planning guidance for a nuclear attack, it has promulgated a short public information document titled "Fact Sheet: Preparing for a Nuclear Missile Threat" that provides practical advice on preparing for and responding to a nuclear attack.[xxvi]

Alaska and Oregon are similar in that they have adopted an all-hazards approach to planning for a catastrophic event. In its chapter outlining hazard characteristics**,** Alaska's *Hazard Mitigation Plan* (HMP) contains a section on nuclear attacks that acknowledges the threat of a nuclear attack, but asserts that general all-hazard mitigation actions "will often support loss reduction" when applied to a specific event, such as a nuclear attack.[xxvii] As identified throughout this paper, though, it is evident that certain attributes of a nuclear attack, such as electromagnetic pulse (EMP), are not addressed in these all-hazard mitigation actions. Similarly, Oregon's Emergency Management Department has published plans covering catastrophic events, such as a nuclear/radiological event and large-scale terrorist attacks, but not nuclear attack.[xxviii]

California has event-specific plans, though the state's plans generally reflect its reactive structure for emergency response planning. Furthermore, and due in part to the state's vast area, the majority of emergency response planning in California is conducted at the regional- or city-level. Most planning is centered on minimizing the impacts of the recurrence of previous disasters common to the state, such as earthquakes. This is purported to be for efficient resource allocation

but postures the state to be reactionary. Consequently there are no publicly available plans in California pertaining to minimizing the impact of a nuclear attack.

Washington is put in a unique position by state law that prevents planning for a nuclear attack.[xxix] Accordingly, Washington does not have an event-specific plan, though the state's Emergency Management Division (EMD) acknowledges nuclear terrorism as a threat.[xxx] In analyzing Washington's planning documents, it is worth noting that weapons of mass destruction (WMDs) are scarcely referenced. The only explicit reference to a nuclear attack is a single citation of DHS's fifteen catastrophic incident scenarios, of which one is a ground-level nuclear detonation of a 10-kiloton bomb.[xxxi]

Differentiating Nuclear Terrorism from a Nuclear Attack

Analysis of the selected states' planning documents reveals tacit bias toward associating nuclear hazards with terrorism rather than with a nuclear-tipped ballistic missile.[xxxii] While an improvised nuclear device (IND) and a nuclear-tipped ballistic missile share the attributes of a nuclear detonation, including blast damage, thermal damage, radiation, and EMP, the unique delivery mechanism of a ballistic missile could potentially allow for more timely forewarning of the population than an act of nuclear terrorism or the detonation of a dirty bomb. This report focuses on nuclear attack by means of a nuclear-tipped ballistic missile because this case represents the most challenging scenario for state emergency planners.

Use of Federal Planning Guidance

Guidance from a plethora of federal planning documents was incorporated into the emergency response plans of the selected states. DHS and FEMA are the United States' leading federal bodies for homeland security and disaster response efforts, including guidance on emergency response efforts. However, in assessing documents cited by each state, it is evident that

planning guidance at the federal level for a nuclear attack has not be adequately incorporated into state-level emergency response planning for crises. The interagency documents listed below are fundamental references for state-level planning for a response to a nuclear attack:

- *Comprehensive Planning Guidance 101: Developing and Maintaining Emergency Operations Plans*, Federal Emergency Management Agency, November 2010
- *Comprehensive Planning Guidance 201: Threat and Hazard Identification and Risk Assessment Guide*, Federal Emergency Management Agency, August 2013
- Homeland Security Presidential Directive (HSPD) 5, February 28, 2003
- *National Response Framework,* Federal Emergency Management Agency, July 2014
- Nuclear/Radiological Incident Annex to the National Response Framework*,* Federal Emergency Management Agency, June 2008
- *Planning Guidance for Response to a Nuclear Detonation,* 2nd ed., National Security Staff Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats, June 2010

State Analysis of Population and Infrastructure Vulnerabilities

Recognition of specific areas within a state considered to be at increased risk of becoming the target of any man-made disaster will precipitate increased preparedness in these areas. These include: improved public education regarding disasters; evacuation routes; and, shelter-in-place procedures. Adversaries of the United States will seek to maximize the damage caused by a nuclear attack on the United States. Accordingly, densely populated cities and areas of states with important critical infrastructure are the most likely to be hit by a nuclear missile. States' recognition of the relative vulnerability of cities and corresponding targeted planning efforts are thus crucial preparedness activities.

To assess each state's analysis of their vulnerabilities to an attack, in terms of both population and infrastructure, we analyzed state-level planning documents, catastrophic incident annexes, and event-specific documents to determine if states recognized their vulnerabilities to a number of man-made attacks. We specifically opted to disregard state vulnerability assessments for natural disasters given the greater predictability of such events in certain areas of the state.

References to particularly vulnerable cities or critical infrastructure in states to nuclear attack, as well as terrorism, are noted below as partially sufficient to meet this standard for nuclear attack planning. However, it is imperative that states similarly identify their greatest vulnerabilities specifically for a nuclear attack.

As a consequence of the lack of state-level planning for a nuclear attack, analysis of at-risk counties and cities is not immediately apparent in the selected states' planning guidance; however, references to the threat terrorism poses has led some states to cite likely targets of an attack. This assessment presumes that the localities identified by state governments as being most vulnerable to a terrorist attack are similar to those that would be selected by foreign adversaries as optimal targets for a nuclear attack.

California's vast geographic expanse, wide array of potential threats, and numerous likely targets has led state-level planners to leave threat assessments to local planners at the level of counties and cities.[xxxiii] County-level planning is similarly seen in Oregon's planning guidance in the state's assessment of at-risk cities and counties.[xxxiv] Alaska's HMP establishes a high-priority goal of identifying vulnerabilities to terrorism, with an explicit objective of identifying potential terrorist targets and determining their vulnerability to attack.[xxxv] Alaska's *Emergency Operations Plan* (EOP) suggests that potential targets might include: military bases; the Trans-Alaska Pipeline System; crude oil, zinc, or tin production sites; and, commercial ports.[xxxvi] Alaska's planning does not, however, cite specific cities assessed to be likely targets of an attack.

Hawai'i's planning guidance does not specifically mention location as a driving variable for the selection of a target in the state because of the perceived vulnerability of the entire state to all relevant disasters. This is due to the small geographic area of the state, general proximity to major disaster epicenters, and the general distribution of military and civilian targets across all

seven inhabited islands.[xxxvii] The guidance for civilian disaster preparedness does not purposefully focus on urban populations, but all Hawai'i guidance is provided under the assumption that the population is near a major urban center.[xxxviii]

Planning guidance published by Washington's EMD provides some location-specific guidance derived from FEMA's preparations for a Cascadia Subduction Zone (CSZ) [xxxix] earthquake and from the eruption of Mount St. Helens in 1980.[xl] In a terrorism hazard profile annex, the EMD noted that counties that have the largest populations and highest critical infrastructure density in Washington are at increased risk of becoming the target of a terrorist attack.[xli]

Limited Warning and Forecasting Capabilities

Recognizing and planning for the limited warning that will precede a nuclear attack is a crucial element of state-level emergency response planning. Limited warning of catastrophic events has been inscribed into both Alaska and Hawai'i's planning guidance, possibly as a consequence of both states' geographic separation from the contiguous United States (CONUS) and proximity to potential threats discussed above. California, Oregon, and Washington, by contrast, do not acknowledge limited warning as a potential factor in their planning guidance.

Limited warning is a recurring theme for a number of hazards evaluated in Alaska's HMP, which discusses warning in the context of relatively unpredictable natural hazards, such as earthquakes, avalanches, and tsunami events.[xlii] Given concerns about limited warning, the HMP also established goals for improved warning of severe weather, floods, and tsunamis.[xliii]

Hawai'i similarly factors limited warning and forecasting into its plans because of the prevalence of natural hazards with sudden onset, namely volcanic eruptions, earthquakes, and tsunamis in the Pacific Ocean. Hawai'i attempts to mitigate these risks by employing early warning

detection systems around the borders of the state as well as through multinational warning systems and information dissemination centers such as the Pacific Disaster Center.[xliv]

Radiation Decontamination and Response Plans

All five states incorporate robust discussion of response to radiation and radioactive contamination into their plans. Radiation is a major attribute of a nuclear attack that can have catastrophic and long-term consequences if not dealt with adequately and immediately. Alaska's HMP contains the least concrete planning guidance for radiation emergency response of the states assessed. While it identifies the need to develop and implement instructional programs for treating chemical, biological, and radiological injuries as a medium priority, it notes that, as of 2016, no progress has been made toward satisfying this need.[xlv]

Alaska's EOP, which is in many ways a parallel document to the HMP, cites radiation emergencies in the context of addressing chemical, biological, radiological, nuclear, and explosives (CBRNE) attacks under the "Technological, Human Caused, and Terrorism" section of state hazards, and incorporates CBRNE response into several of its contingency plans.[xlvi] While radiation stemming from a nuclear explosion mentioned in the EOP is in the context of terrorism rather than the detonation of a nuclear-tipped ballistic missile, planning for response to CBRNE weapons highlights Alaska's significant preparation for this aspect of a nuclear attack.

In Hawai'i, Oregon, and Washington, each state's National Guard is cited as playing a key role in responding to a radiation event. These states indicate that their National Guard is responsible for providing radiological monitoring and radiological data from sites within their jurisdiction. [xlvii] In Hawai'i, specifically, the Hawai'i National Guard and Hawai'i State Department of Defense have published guidance for radiation dispersion and contamination as it relates to a nuclear attack. Hawai'i's National Guard Chemical, Biological, Radiological and

Nuclear Enhanced Force Package team also trains with DOE Nuclear Emergency Support Team and other multinational nuclear response teams in coordination with the Hawai'i State Department of Homeland Security and Emergency Management Agency.

In Oregon and Washington, each state's respective Health and Human Services Department is engaged in planning for radiation disaster response. In Washington, though, the Washington DOH Office of Emergency Preparedness, and not its Office of Radiation Protection, was incorporated in planning activities.[xlviii] It is thus difficult to determine the extent to which Washington has incorporated the Office of Radiation Protection – which is responsible for protecting the people from "unnecessary exposure to radiation" – into planning activities.[xlix]

Oregon's *Nuclear/Radiological Incident Annex* outlines the most robust response planning of the states analyzed. It includes explicit information regarding: necessary preparations for a radiation emergency; which agencies in Oregon are prepared for radiation emergencies; how to minimize radiation exposure; how to gather information during a radiation emergency; and, how to shelter in place.[l] The Oregon Health Authority (OHA) Radiation Protection Services, in conjunction with the state's regional hazardous materials teams, is listed as the lead group for radiological and decontamination expertise during recovery operations.[li]

Oregon's robust radiation response planning extends to situations where food supply contamination may be of concern, and documents Oregon's Departments of Agriculture and Fish and Wildlife roles as complementing OHA efforts to ensure that fish, meat, dairy products, and crops intended for human consumption are not contaminated above acceptable limits.[lii] Oregon's Occupational Safety and Health Division has a large inventory of sampling equipment for a variety of substances and hazards, as well as staff trained in their use.[liii] California similarly is prepared

for supply decontamination and measurement activities, though emphasis for such activities is based on smaller scale nuclear terrorism.[liv]

Oregon's plan also includes requesting the DOE's Aerial Measuring System to characterize ground-deposited radiation. This system includes fixed-wing and rotary-wing aircraft outfitted with radiological measuring equipment. The system imparts an analysis of aerial measurements, which provides the ability to locate lost radioactive sources, conduct aerial surveys, or map large areas of contamination.[lv] These platforms and activities therein are an important aspect of mitigating the mid- and long-term effects of radiation on a selected area or state.

Blast Damage, Thermal Damage, and Electromagnetic Pulse

The most immediately evident and widespread effects of a nuclear attack are blast damage, thermal damage, and EMP. States will need to respond to these impacts immediately and with assets at hand given the expected 72-hour delay before the arrival of federal government assistance.[lvi] Accordingly, significant and explicit planning efforts for the response to blast damage, thermal damage, and EMP are critical to event-specific state preparedness. Effective mitigation and response planning for these attributes of a nuclear detonation have the potential to greatly limit the scope and effects of damage in the days and weeks following a nuclear attack.

Alaska, Oregon, and Washington mention blast damage in their emergency planning documents. Alaska's HMP and Washington's catastrophic planning guidance both discuss lateral blasts in the context of volcanic eruptions, but neither state has explicitly provided specific mitigation planning for the blast damage in the context of a nuclear attack. Alaska's EOP also mentions blast damage, but only in the context of its effect on the bodies of decedents; guidance for response to blast damage is vague and insufficient. Annex L: Mass Fatality of the EOP emphasizes that, "Many major categories of service response must be adapted to the nature of

disasters, ranging from naturally occurring events (floods, fires, earthquakes, etc.) to man-made events including delivery of weapons of mass destruction."[lvii]

Washington has uniquely dealt with a catastrophic blast incident in the eruption of Mt. Saint Helens. However, blast damage from a nuclear attack would likely occur in a much more densely populated area and have more lasting and widespread effects relative to a volcanic blast. Washington's planning guidance contains no information for the impacts and mitigation of blast damage as it pertains to a different location or event. Areas of northern Oregon were also subject to fallout and secondary effects of blast damage, including ash from Mt. Saint Helens; however, Oregon does not have specific guidance for dealing with blast damage beyond the designation of certain agencies and personnel as response effort leads.[lviii]

None of the five states analyzed mention thermal damage within their planning guidance beyond discussion of fire damage as related to a volcanic eruption or wildfire. While it can be assumed that these plans would be implemented in response to the mass fires that could occur after a nuclear event, the scope, range, and intensity of fires initiated from a nuclear attack, particularly in conjunction with radiation, would be far different than that of a wildfire, warranting additional planning guidance and training for emergency response personnel.

Alaska, California, Hawai'i, and Washington make no mention of EMP in their state-level plans or requirements for redundant and varied communication networks to mitigate EMP impacts. Oregon recognizes the possibility of and results from EMP as generated by a WMD explosion. Nuclear and radiological planning guidance in Oregon highlights the need to use "backup communications" in order to replace irreparably damaged wired and wireless communication networks. The document also emphasizes the potential impact of EMP at the national level, noting

it "could disrupt and/or destroy wired and wireless communications as a result of an attack on Oregon or the United States."[lix]

Warning Messages and Protocols

Understanding the federal government's processes for disseminating warnings and other relevant information pertaining to a nuclear attack is crucial to states' ability to relay information to the public. An apt understanding of this process, in conjunction with the use of specific warning messages, protocols, and public education, is essential to minimizing chaos, poor response, and shelter-in-place decisions in the minutes preceding an imminent nuclear attack. Per the Stafford Act, the President is authorized to "utilize and make available the federal component of the CDWS[lx], NAWAS[lxi], for the purpose of providing warning to government authorities and the civilian population in areas endangered by disasters."[lxii]

States should be notified of any national-level event, including nuclear attack, through receipt of an Emergency Action Notification (EAN) by the President of the United States or his authorized designee via a designated Primary Entry Point station. The EAN will be relayed from the White House through FEMA's Operations Center.[lxiii] Federal government warnings to state governments are further relayed through other channels and warning systems, including NAWAS and IPAWS. NAWAS, a federal-level warning system, is noted by all five states' emergency management teams in relation to each state's EOC as a crucial component of state-level communications, alert, warning, and notification activities in a crisis.

The FCC, in order to ensure integration of state-level communication networks with the federal government, requires that all radio stations and cable systems be connected to IPAWS to maximize the federal government's ability to warn the public.[lxiv] Per FCC requirements, FEMA issues a weekly test to ensure that participants' equipment is polling the IPAWS server.[lxv]

Contingent on approval by FEMA, IPAWS can also be utilized by local- and county-level facilities, which is particularly useful in large states like California.[lxvi]

Of the five selected states, only Hawai'i has established unique warning messages and protocols for alerting the public of a nuclear attack. States have various ways of disseminating messages, including those received from the DHS National Operations Center, which is responsible for monitoring all activities and threats to the United States. In 2018, following the chaos surrounding the false alert of an incoming ballistic missile, Hawai'i's Department of Defense published *All-Hazards Preparedness Improvement Action Plan and Report*, which outlines the state's protocols for an imminent nuclear attack. In this regard, Hawai'i's planning is derived primarily from the incorporation of USINDOPACOM into the Emergency Operations Center (EOC), which is responsible for Hawai'i's Siren Activation Control System. [lxvii] USINDOPACOM utilizes Secure Terminal Equipment (STE) to directly alert and notify the HI-EMA and other appropriate agencies in the state of a ballistic missile threat or imminent attack, affording Hawai'i the ability to immediately disseminate alerts to the public.[lxviii]

Hawai'i also uses the Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), and National Oceanic and Atmospheric Administration (NOAA) Weather Radio to better disseminate information and warnings to the public. These systems are explicitly referenced throughout Washington's guidance for alert, warning, and notification systems. Washington's plans outline the role of the Washington EOC which, in the instance of a catastrophic incident, will activate to Level 1: Full Operations and utilize available subject matter experts to support or direct response and recovery operations for an event.[lxix] To facilitate warnings to the public, Washington's planning guidance also cites EAS, WEA, and NOAA as means of communication in a crisis or impending catastrophic event, in addition to the potential use of available outdoor

sirens and voice alert systems, local school and organization notification systems, and enhanced telephone notification systems.[lxx]

California's planning guidance outlines different plans and protocols for warning of a nuclear incident. In such cases, California will receive a NAWAS warning directly to the California Warning System Center, which is responsible for nuclear incidents but not necessarily other catastrophic incidents, such as those of radiation.[lxxi] The California Warning System is explicitly part of NAWAS and establishes clearly delineated metrics for the complexity of event in relation to the degree of intra-state response it yields. Little information is known, though, about the content of the messaging or the process for disseminating messages.

Communication with the Public

Effective communication with the public preceding and following a disaster reduces chaos surrounding initial emergency response efforts. Full integration of communications systems into NAWAS, which can reach people via phone, radio, and television, is one means of ensuring the ability to continuously contact a population in a time of crisis. Each of the states analyzed has planning guidance that either indirectly or directly indicates the state's ability to continuously update affected populations as necessary, though only Oregon plans for degraded communications resulting from EMP or a nuclear attack. 'Redundant communication capabilities' is explicitly noted in both Hawai'i's and Washington's planning guidance. In Washington's *Catastrophic Incident Planning Framework* (CIPF), for example, Phase 1 (Prepare) operational communication tasks for both state- and local-level actors include "build redundant communication systems" and "train and exercise on redundant communication systems".[lxxii]

In Alaska, the vast size and low population density of the state present particular challenges to continuously updating the population during an emergency event. The state relies on a network

of FCC-licensed radio broadcast stations to ensure the dissemination of state-level emergency alerts. Such stations have key roles in the EAS network given their importance to Alaska's emergency communications network and must follow the guidelines in the *Emergency Alert System Plan* (EASP).[lxxiii] Alaska's HMP notes that the State of Alaska also funds a Remote Community Alert Systems Program to install multi-hazard community warning sirens providing initial warning for remote communities with limited 911 service, cell phone access, and communications capabilities.[lxxiv]

Most of the selected states' continuous communications capabilities are predicated upon the implicit assumption that EMP will not significantly degrade communication networks. The fact that the selected states' plans do not account for the EMP-induced degradation of communication infrastructure is another indication that states do not prioritize nuclear detonation as a hazard. Should a nuclear attack occur in the state in which EMP destroys communications capabilities, it is unclear how messages would be disseminated to survivors and affected populations. While not specifically referencing EMP, Oregon's EOP, in its Communications ESF annex, adopts several planning assumptions regarding contending with degraded communications systems, particularly in the early aftermath of a disaster.[lxxv]

Federal and State Liaisons and Partnerships

Liaisons and partnerships with the federal government, as well as with neighboring states, are critical to ensuring support in terms of finances, resources, and personnel in an efficient and unduplicated manner following a catastrophic incident. Partnerships and coordination with various levels of governments can take the form of liaisons between departments and agencies, memoranda of agreement (MOA), or memoranda of understanding (MOU); however, states with liaisons, MOA, and MOU are the best equipped to respond to a nuclear attack.

DOD will provide resources, as available, in response to a major disaster or emergency as part of a federal response.[lxxvi] However, neither U.S. Northern Command (USNORTHCOM) nor NORAD has a direct liaison with any particular state in the United States, despite the presence of the military via the Adjutant General and National Guard in each state.[lxxvii]

Washington notably incorporates ESF 20 (Defense Support to Civil Authorities)[lxxviii] into its *Comprehensive Emergency Management Plan*, which recognizes USNORTHCOM as a "supporting agency" to the Washington Military Department National Guard. NORAD is not referenced.[lxxix] Given Hawai'i's strategic importance and colocation with USINDOPACOM's headquarters, a unique relationship exists between the military and the state. Hawai'i also references ESF 20 in its planning guidance, recognizing U.S. Pacific Command (now USINDOPACOM) as a supporting agency in its concept of operations.[lxxx]

All 50 states, the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands are parties to the Emergency Management Assistance Compact (EMAC), an all hazards/all disciplines mutual aid compact ratified by the U.S. Congress and codified in law. [lxxxi] EMAC provides timely and cost effective relief to states that request assistance from the member states, thereby acting as a complement to the federal disaster response system.[lxxxii] EMAC establishes a legal foundation for sharing resources between states. Once the conditions for aiding a requesting state have been established, the terms constitute a legally binding agreement. EMAC legislation solves the problems of liability and responsibilities of cost and allows for credentials, licenses, and certifications to be honored across state lines.[lxxxiii]

Similar to other CONUS states, Oregon has established terms for mutual aid via MOA with neighboring states and is also part of the Pacific Northwest Emergency Management Arrangement, which allows for resources to be shared between the states and provinces in the Pacific Northwest.

Washington does not reference specific agreements of MOA in its planning guidance, though the CIPF indicates the state will require help from "NGOs, the private sector, neighboring states, provinces, and the federal government" following a catastrophic incident. The Plan, however, notes that when "The scope of response in impacted jurisdictions greatly exceeds surviving resources and established mutual aid agreements [and] assistance from adjacent communities is unavailable" the state may seek out MOU with nontraditional partners in jurisdictions adjacent to the state or impacted county[lxxxiv]

OCONUS states like Alaska have established intrastate MOA and systems, such as the Alaska Intrastate Mutual Aid System, which provides a similar means of requesting and sharing emergency response resources from governmental entities within the state.[lxxxv]Alaska and Hawai'i are geographically isolated from other states, complicating their ability to draw up and execute MOA/MOU and common response protocols. Yet Alaska, unlike Hawai'i, has an advantage in that it is not entirely isolated from neighboring states (or nations), allowing for an increased number of means of transportation not isolated to sea and air.

To limit the negative impacts that geographic isolation lends, both Alaska and Hawai'i require additional explicit collaboration efforts. Of particular importance to Alaska, the Stafford Act directs the FEMA Administrator to help states arrange, through the Department of State, mutual emergency preparedness aid between states and neighboring countries.[lxxxvi] Alaska is a signatory of the Pacific Northwest Emergency Management Arrangement, a mutual aid agreement patterned after EMAC that provides a streamlined mechanism for sharing emergency response resources with the Pacific Northwest, and British Columbia and the Yukon Territory in Canada.[lxxxvii]

First Response and Medical Care

Given the nature of a nuclear attack, first responders must be well equipped to deal with catastrophic blast damage, thermal damage, radiation injuries and radioactive contamination. First response is a critical, time-sensitive activity required of a state following a nuclear attack. The ability to execute these activities in an effective and rapid manner will serve to mitigate some post-blast chaos. Each of the states analyzed displays differing levels of preparedness for the medical response to a nuclear attack, with Washington being the most prepared.

Washington's significant preparation for a CSZ earthquake is applicable to a nuclear attack and has provided the state with a greater level of preparedness compared to its West Coast neighbors. However, Washington's CSZ plan doesn't account for radiation or incineration and thermal damage on the scale of a nuclear attack event, and focuses on the cities along the Puget Sound and coastal regions, as opposed to other major cities located elsewhere in the state.

Oregon and Washington have similar levels of training in radiation response and both states' health departments are explicitly responsible for training oversight.[lxxxviii] In both states, training includes education on radiation monitoring and detection systems.[lxxxix] Washington DOH offers year-round training for a number of individuals, including those from emergency management agencies, fire departments and law enforcement, hospitals, and public health officials. Various forms of training, ranging from classroom presentations to field operations in which radioactive materials are utilized, highlights the robust nature of the state's training programs.[xc]Annually, Washington DOH and select officials and first responders participate in radiological emergency response training for a nuclear power plant issue and for nonspecific radiological emergencies. Washington DOH also works with FEMA annually on hostile-action based drills for a radiological emergency.[xci]

Alaska and Hawai'i do not list radiation injury response in their plans. The need for training for response to radiation is outlined in California's *Emergency Plan*, though it is done so with an emphasis on responding to small-scale terrorism and not a nuclear attack, thus leaving many aspects of the state's ability to respond effectively to public health issues ambiguous.[xcii] California's Department of Public Health has a Radiologic Health Branch dedicated to providing public health functions as part of a state-wide radiation control program, but indicates no preparations for the provision of functions on the scale of a nuclear attack response.[xciii]

In Hawai'i, first responders are trained in radiation safety through the Multi-Year Training and Exercise Plan (2016-2018).[xciv] This training applies solely to state and local-level first responders. No determination could be made for the status of training and certification for radiation safety and measurement of Alaska's emergency response personnel based on examined emergency planning documents. Alaska's HMP identified the need to develop and implement instructional programs for treating chemical, biological, and radiological injuries as a medium priority. However, as of 2016, no progress had been made toward satisfying this need.[xcv]

Public Education

Alaska, California, and Hawai'i have public education programs specific to a nuclear attack. Oregon and Washington, by contrast, have robust state-level public education programs and reference federal education programs, including ready.gov, but do not specifically reference nuclear attacks. Alaska's Division of Homeland Security and Emergency Management's website contains links to several documents to educate the public on hazards related to nuclear attack, including a pamphlet titled "Preparing for a Nuclear Attack."[xcvi] California similarly has event-specific public education programs dedicated to mitigating the consequences of a nuclear attack at the individual level.[xcvii]

Prior to the false alert for an incoming ballistic missile, Hawai'i developed a robust ballistic missile preparedness work plan, which it began implementing in April 2017. In conjunction with this plan, public education campaigns were launched across Hawai'i, with HI-EMA sponsoring 41 town halls, six fairs, over one hundred media engagement events, 1,200 radio specials, and 1,449 TV public service announcements, all with the purpose of increasing public awareness for what to do in the event of an imminent nuclear attack.[xcviii] However, as noted in HI-EMA's *All-Hazards Preparedness Improvement Action Plan and Report*, "… the events and panic observed following the January 13, 2018 false missile alert clearly showed that the outreach campaign was limited in its success".[xcix]

As mentioned earlier, Washington does not have a dedicated public education program for a nuclear attack; however, Washington's *Emergency Preparedness Guide For Disasters* has a preparedness guide and handbook with several pages dedicated to other events with responses that could easily be applied to a nuclear attack. For example, there are guidelines dedicated to response to terrorism, bomb threats, and radiological threats.[c] Washington's Guide also contains detailed information for what to do if sheltering in place is advised following a chemical, biological, or radiological threat.[ci]

To foster the ability to shelter in place, Washington's guidance advocates the purchase and use of a radio by all citizens.[cii] The state specifically promotes the purchase of NOAA Weather Radios, which are connected to the National Weather Service (NWS) and broadcast warning messages for enemy attacks and nuclear accidents.[ciii] The promotion of the purchase of battery-powered radios is similarly advocated in available public education documents published by the states of Alaska, California, Hawai'i, and Oregon.[civ]

While all states propose and provide guidance on sheltering in place, none of the states analyzed have readily available information on the locations of pre-designated fallout shelters. Alaska's HMP notes that in many Alaskan communities school facilities serve as the primary emergency shelter and are considered critical infrastructure.[cv] The capacity of these shelters, though, is not further explored in the HMP.[cvi] In Washington's planning guidance and related publicly available information, there is no information provided on whether fallout shelters exist, much less where they are located. Oregon does not have fallout shelters for a nuclear attack, but because Oregon houses the Hanford nuclear site, the state notes it is equipped to deal with mass shelter needs if necessary for a 'nuclear event'.[cvii] Hawai'i also does not have public shelters pre-designated for such an attack on the basis that funding was exhausted in providing public shelters following the end of the Cold War, and existing shelters were subsequently decommissioned or repurposed.[cviii]

Implications of Current Planning Guidance

For a visual comparative analysis of the five selected states' performance across all eleven findings identified below, see Annex B. While each of the selected states have different levels of preparedness for a nuclear attack relative to its neighbors, it is evident that none of the selected states are adequately prepared to respond to all eleven identified attributes of a nuclear attack. The degree to which the states have satisfied these standards of civil preparedness for a nuclear attack are the as follows:

1. The selected states have defined "nuclear terrorism" but have all failed to explicitly define "nuclear attack".
2. Though each state has used federal planning documents to write emergency response plans, no state has utilized FEMA's Nuclear/Radiological Incident Annex and *Planning Guidance for Response to a Nuclear Detonation*.

3. Though the selected states have identified population and infrastructure vulnerabilities for certain disasters, including terrorism, none of the states have adequately conducted a risk assessment of its most at-risk counties and cities.
4. Each state requires additional planning for the limited warning and forecasting inherent to an impending nuclear attack on their state. Specifically, each state requires additional communication gateways to federal officials at DHS, DOD, and NORAD.
5. Each state's emergency response personnel are trained in radiation response and decontamination, but none of the states are adequately prepared to respond to event-scale radiation.
6. Each state fails to define and prepare for event-scale blast damage, thermal damage, and EMP; failures to prepare for these attributes of a nuclear detonation will have debilitating effects on emergency response efforts.
7. Most selected states have failed to prepare event-specific warning messages and protocols; only Hawai'i has established specific warning protocols, and these are largely the result of the warning fiasco in January 2018.
8. All states have established capabilities to communicate with the public.
9. The selected states have adequate MOAs and MOUs but each lacks a clear communication chain with the federal government. The federal government is a critical component of response to a nuclear attack, and it is therefore imperative that clear communication between state and federal governments is established.
10. Only Washington has adequately prepared for the scale of a nuclear attack in terms of first response and medical care given its preparations for a CSZ earthquake. The other selected states require explicit planning efforts and exercises in order to adequately meet the requirements of first response for a nuclear attack.
11. The selected states have differing levels of public education campaigns specific to a nuclear attack. Analysis of available documents in all states indicates that public education for a nuclear attack is generally inadequate to prepare the population for a nuclear attack.

There is much to be learned from the historic and present practices of other countries to which the threat of nuclear attack has previously, or is currently, perceived to be more grave or immediate. One of the greatest advantages the United States has in preparing for and preventing nuclear attacks is its geographic separation from the majority of its adversaries with nuclear capabilities. This geographic separation along with the relative dispersion of its population has afforded the United States the flexibility of not having to bolster its public shelter, sustenance, and warning systems to the degree that some other countries have.

Policy Proposals

While the selected states all have planning guidance for response to a number of natural and man-made disasters, all share the commonality of an inadequate plan for response to a nuclear attack. The federal government, despite having established planning guidance for response to a nuclear attack, has failed to incentivize state-level governments to adequately prepare for such an event. Policy changes to address this deficiency include, first and foremost, leveraging the same incentives from the federal government that lead states to improve their planning for a natural disasters, by applying them to a nuclear attack. Specific measures include leveraging the successful incentive program for Enhanced Hazard Mitigation Plans by which states with FEMA-compliant plans are authorized access to increased federal funding following a disaster by listing "nuclear attack" as a qualifying event, making additional federal funds available for states with FEMA-compliant plans. Revisions could also leverage the Act's Pre-Disaster Hazard Mitigation Assistance Program, again by listing nuclear attack as a qualifying hazard. This action would enable states to make applications for federal grants to mitigate hazards before disaster strikes.

These recommendations are entirely consistent with the Stafford Act's "all hazards" approach espoused in the Act's declaration of policy noted earlier. These measures could improve state preparedness. This assertion is qualified by highlighting that threat assessment and prioritization are local processes. States will prepare for the hazards they assess as most significant, and they are under no obligation to emphasize nuclear attack. However, what this proposal, if implemented, would do, is place nuclear attack on an equal footing with natural disaster preparedness.

The promotion of state-level planning by the federal government, which could be inscribed into a revised Stafford Act, should include references to the Nuclear/Radiological Incident Annex

and *Planning Guidance for Response to a Nuclear Detonation,* and advocate for the incorporation of this document into all state-level planning guidance for response to a nuclear attack. Incorporation of these documents will establish common terminology and expectations across all levels of government within the United States and greatly improve and streamline the response process.

Recommendations for the Federal Government

Amendment of the Stafford Act is not the only solution for improving the federal government's ability to provide states with assistance or incentives to improve upon their nuclear attack planning. The promotion of state-level planning by the federal government should improve direct education campaigns to expand response and preparedness information beyond ready.gov. Expanded efforts, while modest, would impact governments' ability to educate an otherwise unaware population that may be otherwise unaware of how to act in the event of an imminent nuclear attack.

The federal government should provide prompt warning of an imminent nuclear attack to state-level emergency management authorities, including each state's governor and adjutant general, through streamlined communication networks. Federal-state communication channels such as this should be streamlined and made more transparent to state-level emergency management officials in order to prevent conflicting information or lack of communication, both of which would increase chaos and prevent an efficient and effective response to an attack. The federal government should additionally include specifications for compatible secure communications equipment and facilities for select state-level officials, and define requirements for vetting and training personnel assigned to operate this equipment. Personnel should include

relevant National Guard, state-level emergency management, and DHS and FEMA personnel located within each state, as well as a direct liaison from USINDOPACOM or USNORTHCOM.

FEMA should continue to conduct table-top/command-port exercises regarding nuclear detonation situations and should lead additional training with state-level emergency planners and responders. FEMA and DHS should also provide additional training guidance for state-level emergency planners in the drafting of contingency plans or catastrophic incident planning annexes for a state's response to a ballistic nuclear attack.

Recommendations for State Governments

State planning documents are notably vague in identifying the differences between nuclear attack and nuclear terrorism. States should differentiate nuclear terrorism from a nuclear attack in order to better outline the unique factors of each event and the corresponding differences in response requirements. This differentiation should serve to support a more aggressive public education campaign that seeks to actively engage and reach a larger percentage of the state's population. While public education programs exist in varying degrees across the selected states and at the federal level, the majority of the population is both unaware of websites and programs such as ready.gov, and may not have access to this information in a time of crisis.

It is likely that an adversary capable of and willing to conduct a nuclear attack on the United States would also target specific vulnerabilities in order to maximize the effects of the attack. It is therefore imperative that emergency planners conduct event-specific risk and vulnerability assessments for their states in order to develop prioritized mitigated and response plans. Specific factors relevant to analyzing the level of threat in each area should include the population's size and demographics, and the locality of military infrastructure in relation to the area being analyzed.

States should also consider evaluations of critical infrastructure to include the designation of shelter-in-place and fallout shelter locations (if not already in place), as well as evacuation routes.

States should incorporate more explicit information at the state-, county-, and city-level regarding limited warning and should identify areas in communications operations and systems that can be improved to achieve a more timely and accurate warning process. Additionally, the state should provide the public with clear information regarding established communication procedures for the public and should promote the purchase of battery-powered radios. All communications systems within each state should be frequently tested and their redundancy ensured; furthermore, states should establish unique messages specific to a nuclear attack. These messages should be tested at the state-level and independent of federal-level alert systems in order to promote redundancy of communications and the education and preparedness within the state's population.

Given the inconsistencies in preparations for radiation response analyzed in the states and the long-term catastrophic impacts radiation poisoning can have on affected population, states should prioritize radiation response training for emergency response personnel. An educated and well-trained emergency response body will better be able to respond quickly and effectively to radiation poisoning in the population in order to limit radiation's long-term consequences. In addition to co-operation with FEMA, states should have established training programs in place for radiation response, similar to that in Washington. Training should include first-response training and include appropriate hospital personnel. Similar to Oregon, states should have established plans for the consumption, monitoring, decontamination of food and water. States should also require that all National Guard personnel, in addition to firefighting personnel, receive regular radiological hazard response training.

In view of the scope and immediate impacts of blast damage, such as accessibility to the area of detonation and ability to navigate through damaged infrastructure, states should incorporate event-specific planning and training guidance into their contingency plans for response to blast damage. To establish planning requirements for response to blast damage resulting from a nuclear attack, states should seek to answer the following questions: what are the effects of blast damage on the population, infrastructure, and surrounding land; how will blast damage affect other response efforts, such as debris impeding access to an area; and, what equipment and training will first responders need in order to be adequately prepared to deal with blast damage on the scale of this event?

States should also incorporate event-specific planning and training guidance into their contingency plans for response to thermal damage. In addition to asking questions similar to those listed above in the development of thermal damage response plans, states should assess the unique effects of thermal damage from a nuclear attack as compared to other events, such as wildfires. The five analyzed states should also collaborate with the ten identified burn centers along the West Coast[cix] for training and preparation.

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[i] "Timeline of the Hawaii false missile alert shows how drill went wrong," *CNN*, updated January 30, 2018, https://www.cnn.com/2018/01/30/us/hawaii-false-missile-alert-timeline/index.html.

[ii] "Chronology of U.S.-North Korean Nuclear and Missile Diplomacy," *Arms Control Association*, 2018, accessed November 12, 2018, https://www.armscontrol.org/factsheets/dprkchron.

[iii] "'The whole state was terrified': How Hawaii reacted to false missile alert," *BBC News*, January 13, 2018, accessed November 12, 2018, https://www.bbc.com/news/world-us-canada-42675666.

[iv] Public Law 93-288, as amended.

[v] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title III, Section 322.

[vi] "Missiles of Iran," *Missile Threat, Center for Strategic and International Studies,* June 14, 2018, accessed September 21, 2018. https://missilethreat.csis.org/country/iran/.

See also: "Missiles of North Korea," *Missile Threat, Center for Strategic and International Studies,* June 14, 2018, accessed 21 September 2018. https://missilethreat.csis.org/country/dprk/.

[vii] Public Law 107-296, as amended.

[viii] Federal entities that play a role in mitigation and response to a nuclear attack and which are involved in the interagency include, but are not limited to: U.S. Department of Homeland Security (DHS), FEMA, Federal Communications Commission (FCC), U.S. Department of Defense (DOD), U.S. Department of Health and Human Services, U.S. Department of Energy (DOE), and U.S. Department of Transportation.

[ix] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title I, Section 101.

[x] *Unit 3 Disaster Sequence of Events*, Federal Emergency Management Agency. Taken from the "State Disaster Management Course – IS 208," retrieved from https://training.fema.gov/emiweb/downloads/is208sdmunit3.pdf.

[xi] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title III, Section 322.

See also: 42 U.S. Code § 5165, subpart (e).

[xii] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title II, Section 203.

See also: 42 U.S.C. § 5133.

[xiii] 42 U.S. Code § 5133, subpart (c) and 42 U.S. Code § 5165, subpart (c).

[xiv] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title I, Section 102.

[xv] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title VI, Subtitle A, Section 601.

[xvi] "Strategic and Operational Planning," FEMA, updated September 4, 2018, https://www.fema.gov/plan.

[xvii] "National Preparedness Goal," FEMA, updated May 2, 2018, https://www.fema.gov/national-preparedness-goal.

[xviii] "The Disaster Declaration Process," *Federal Emergency Management Agency,* updated January 1, 2018. https://www.fema.gov/disaster-declaration-process.

[xix] *Unit 3 Disaster Sequence of Events*, Federal Emergency Management Agency, at 3.11.

[xx] *Planning Guidance for Response to a Nuclear Detonation,* 2nd edition, National Security Staff Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats, June 2010.

[xxi] *Planning Guidance for Response to a Nuclear Detonation,* 2nd edition, at 11.

[xxii] For more information on this Annex, see Nuclear/Radiological Incident Annex to the National Response Framework, U.S. Department of Homeland Security, October 2016.

[xxiii] "Nuclear/Radiological Incident Annex," *Federal Emergency Management Agency,* March 6, 2017, accessed September 1, 2018, https://www.fema.gov/media-library/assets/documents/25554.

[xxiv] For more information, see: "Get Ready Hawai'i," *State of Hawaii; Hawaii Emergency Management Agency,* 2018, http://dod.hawaii.gov/hiema/get-ready/.

[xxv] *Emergency Preparedness*, Hawaii Emergency Management Agency, 2017. Retrieved from https://dod.hawaii.gov/hiema/files/2017/11/HI-EMA-PUBLIC-BMP-working-brief-NOV-2017.pdf.

[xxvi] "Fact Sheet: Preparing for an Nuclear Missile Threat," *State of Alaska Division of Homeland Security and Emergency Management.*

[xxvii] *State of Alaska Hazard Mitigation Plan,* Alaska Department of Military and Veteran Affairs, Division of Homeland Security and Emergency Management, October 2013, at 3-105 through 3-106.

[xxviii] For more information on the OEM Department's nuclear/radiological and large-scale terrorist attack plans, see "IA 9 – Nuclear/Radiological," *State of Oregon EOP; Incident Annexes,* 2015.

See also: "IA 8 – Terrorism," *State of Oregon EOP; Incident Annexes,* 2015.

[xxix] For more information on the prevention for certain nuclear attack mitigation and response planning activities in Washington, see Washington State Legislature, RCWs, Title 38, Chapter 38.52, Section 38.52.010.

[xxx] "Final Hazard Profile – Terrorism," *Washington State Threat Mitigation Plan,* October 2012, Tab 5.16, retrieved March 27, 2018.
Note that this publication has been removed from the website since first retrieved in March 2018.

[xxxi] "Catastrophic Incident Annex," *Washington State CEMP,* Washington Military Department Emergency Management Division, November 2013, at CIA-4.
See also: Zachary Keck, "The Most Dangerous Nuclear Weapon in America's Arsenal," *The National Interest,* July 28, 2015, accessed September 1, 2018, https://nationalinterest.org/blog/the-buzz/the-most-dangerous-nuclear-weapon-americas-arsenal-13433.

[xxxii] Specifically, state plans focusing on terrorism tend to prepare for radiological hazards, such as "dirty bombs," which use conventional explosives to distribute radioactive contamination, or the compromise of

nuclear plants, discounting the less likely but vastly more destructive use of an improvised nuclear device (IND).

[xxxiii] In 2014, California's County of Ventura launched a county-wide nuclear preparedness campaign on its website, complete with a planning guidance document and YouTube videos. These plans have since been removed from the County's website, though videos are still publicly available. For more information on county-level planning in California, see *Ready Ventura County,* Ready Ventura County, 2018, https://www.readyventuracounty.org/.

[xxxiv] *Jackson County Emergency Preparedness Plan for Families,* Jackson County Emergency Management Advisory Council, revised and reprinted January 2006, Medford, Oregon: Jackson County Board of Commissioners.

[xxxv] *State of Alaska Hazard Mitigation Plan,* at 5-88 through 5-89.

[xxxvi] *State of Alaska Emergency Operations Plan,* State of Alaska, Division of Homeland Security and Emergency Management, 2016, at 16.

[xxxvii] *State of Hawaii Emergency Operations Plan – Basic Plan*, Hawaii Emergency Management Agency, May 2017.

[xxxviii] *Emergency Preparedness*, Hawaii Emergency Management Agency, 2017. Retrieved from https://dod.hawaii.gov/hiema/files/2017/11/HI-EMA-PUBLIC-BMP-working-brief-NOV-2017.pdf.

See also: *State of Hawaii Emergency Operations Plan – Basic Plan*, Hawaii Emergency Management Agency, May 2017.

[xxxix] The Cascadia Subduction Zone (CSZ) is a "megathrust" fault separating the North America and San Juan plates that stretches from Vancouver Island, Canada, to Cape Mendocino, California. Friction between these two plates caused a massive 9.0-magnitude earthquake in January 1700. Geologists predict that an earthquake of this magnitude occurs every several hundred years.

For more information, see "Cascadia Subduction Zone," *Pacific Northwest Seismic Network,* 2018, https://pnsn.org/outreach/earthquakesources/csz.

[xl] "Catastrophic Incident Annex," *Washington State CEMP*, at CIA-2.

[xli] "Final Hazard Profile – Terrorism," *Washington State Threat Mitigation Plan,* at 2.
Note that this publication has been removed from the website since first retrieved in March 2018.

[xlii] *State of Alaska Hazard Mitigation Plan,* at 3-57, 4-39 through 4-41, and 5-51 through 5-54.

[xliii] Ibid, at 5-17, 5-29, and 5-63.

[xliv] "Early Warning and Decision Support," *Pacific Disaster Center*, 2018, accessed September 1, 2018, https://www.pdc.org/solutions/early-warning-and-decision-support-solutions/.

[xlv] *State of Alaska Hazard Mitigation Plan,* at 5-89.

[xlvi] *State of Alaska Emergency Operations Plan,* at 51 through 80.

[xlvii] *Washington State Comprehensive Emergency Management Plan; Basic Plan,* at 54 through 55.

See also: *ANNUAL REPORT Fiscal Year 2015,* Hawaii Department of Defense, 2015.

[xlviii] Non-Attribution Interview w/ WA DOH Office of Radiation Protection official. Interview conducted via phone call on August 13, 2018. Interview conducted on condition of anonymity.

[xlix] "Radiation Protection," *Washington State Department of Health,* updated 2018, accessed September 1, 2018, https://www.doh.wa.gov/CommunityandEnvironment/Radiation.

[l] *Radiation Emergencies; Frequently Asked Questions,* Oregon Health Authority; Radiological Emergency Response, updated 2018.

[li] "IA 9 – Nuclear/Radiological," *State of Oregon EOP; Incident Annexes,* 2015, IA 9-1 through IA 9-21.

[lii] Ibid.

[liii] Ibid.

[liv] *State of California Emergency Plan.* California Governor's Office of Emergency Services. October 1, 2017.

[lv] "IA 9 – Nuclear/Radiological," *State of Oregon EOP; Incident Annexes,* 2015, IA 9-1 through IA 9-21.

[lvi] *Planning Guidance for Response to a Nuclear Detonation,* 2nd edition, National Security Staff Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats, June 2010.

[lvii] *State of Alaska Emergency Operations Plan.*

[lviii] "IA 6 – Volcano," *State of Oregon EOP; Incident Annexes,* 2015, IA 6-1 through IA 6-13.

See also: *Central Cascades Volcano Coordination Plan,* The Central Cascades Facilitating Committee, May 31, 2007.

[lix] "IA 9 – Nuclear/Radiological," *State of Oregon EOP; Incident Annexes.*

[lx] The Civil Defense Warning System is responsible for providing the nation, and all of its states, with warning of an incoming nuclear attack.

For more information, see "National Warning System," *Emergency Management Division; Washington Military Department,* updated 2018. https://www.mil.wa.gov/other-links/national-warning-system.

[lxi] NAWAS specifically provides nationwide warning and information for certain events, such a nuclear attack and is a major component of the CDWS.

[lxii] Ibid.

See also: Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended.

[lxiii] *State of Alaska Emergency Alert System Plan,* State of Alaska, 2016, at 11.

[lxiv] *Washington State EAS Handbook,* Approved by the Washington State Emergency Communications Committee, May 13, 2014, at 4.

[lxv] *State of Alaska Emergency Alert System Plan,* at 11.

See also: *Review of the Emergency Alert System; Independent Spanish Broadcasters Association, the Office of Communication of the United Church of Christ, Inc., and the Minority Media and Telecommunications Council, Petition for Immediate Relief,* Docket/RM: 04-294, April 19, 2012, retrieved from https://www.fcc.gov/document/review-emergency-alert-system-1.

[lxvi] *Washington State EAS Handbook,* at 5.

[lxvii] *All-Hazards Preparedness Improvement Action Plan and Report.*

[lxviii] Ibid.

[lxix] *Catastrophic Incident Planning Framework,* Version 1, Statewide Catastrophic Incident Planning Team, October 12, 2017, at R-6.

[lxx] *Emergency Preparedness Guide For Disasters,* Washington State Emergency Management, 2016, at 1.

[lxxi] "About; Wireless Emergency Alerts," *California Governor's Office of Emergency Services,* 2014, accessed September 1, 2018, http://calalerts.org/about.html.

See also: "California State Warning Center," *California Government's Office of Emergency Services,* updated 2018, accessed September 1, 2018, http://www.caloes.ca.gov/cal-oes-divisions/warning-center.

[lxxii] *Catastrophic Incident Planning Framework,* at 45.

[lxxiii] *State of Alaska Emergency Alert System Plan,* at 8.

[lxxiv] *State of Alaska Hazard Mitigation Plan,* at 6-7.

[lxxv] "ESF 2 – Communications," *State of Oregon EOP; Emergency Support Functions.*

[lxxvi] *Washington State Comprehensive Emergency Management Plan; Basic Plan,* at 62.

[lxxvii] Non-Attribution Interview with USNORTHCOM/NORAD official. Interview conducted in Washington, D.C. on July 26, 2018. Interview conducted on condition of anonymity.

[lxxviii] While FEMA established 15 ESFs, states are not prevented from incorporating additional ESFs into their planning guidance if they deem doing so necessary or beneficial to their planning guidance. Washington has incorporated ESF 20, Defense Support to Civil Authorities, in order to establish procedures for the Governor to order the Washington National Guard into state activity duty in response to an emergency or disaster. Hawai'i has incorporated ESF 20 for the same purpose. Oregon, Alaska, and

California do not incorporate ESF 20 into their respective emergency management plans. However, Oregon -- and by extension many of its counties -- has established an "ESF 13" titled "Military Support", although this strays from FEMA's 15 ESFs, as outlined in the *National Response Framework*.

For more information on Washington's incorporation of ESF 20, see: "Emergency Support Function 20 Defense Support to Civil Authorities," *Washington State Military Department National Guard*, last updated 2014, retrieved from https://mil.wa.gov/uploads/pdf/PLANS/esf20.pdf.

For more information on Oregon's "ESF 13", see: "Emergency Support Function Annex; ESF 13. Military Support." *Clackamas County EOP.* No date. Retrieved from https://dochub.clackamas.us/documents/drupal/e91cec3d-9de6-4fbc-bff5-81a136c7767f.

See also: *State of Oregon Emergency Management Plan, Vol. III: Emergency Operations Plan*, Oregon Office of Emergency Management, April 2017, at 24.

For more information on FEMA's 15 ESFs from the National Response Framework, see: "Emergency Support Function Annexes: Introduction," *Federal Emergency Management Agency,* January 2008.

[lxxix] "Emergency Support Function 20 Defense Support to Civil Authorities," *Washington State Military Department National Guard*, last updated December 2014, retrieved from https://mil.wa.gov/uploads/pdf/PLANS/esf20.pdf

[lxxx] *State of Hawaii Emergency Operations Plan – Basic Plan*, Hawaii Emergency Management Agency, at 3-13 through 4-2.

[lxxxi] Emergency Management Assistance Compact, Pub. L. 104-321. 110 Stat. 3877, October 19, 1996.

[lxxxii] "Mutual Aid Resources," *Oregon Military Department Office of Emergency Management,* updated 2018, accessed August 20, 2018, https://www.oregon.gov/oem/emresources/Pages/Mutual-Aid-Agreements.aspx.

[lxxxiii] "What is EMAC?" National Emergency Management Association, 2018, accessed September 1, 2018, https://www.nemaweb.org/index.php/76-mainmenucontent/frequently-asked-questions/199-what-is-emac-.

[lxxxiv] *Catastrophic Incident Planning Framework,* Version 1, at R-8 through R-11.

See also: "Understanding EMAC for Washington State," *Emergency Management Division,* no date, presentation, retrieved September 1, 2018, from https://mil.wa.gov/uploads/pdf/LogisticsResources2/emac-intro-thru-reimbursement_dec2016.pdf.

[lxxxv] *Alaska Intrastate Mutual Aid System (AIMAS),* Alaska Division of Homeland Security Emergency Management (DHS&EM), 2014.

[lxxxvi] Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), Title VI, Subtitle A, Section 612.

[lxxxvii] *State of Alaska Emergency Operations Plan,* at 3.

[lxxxviii] "Oregon Radiation Protection Services," *Oregon Health Authority,* updated 2018, accessed August 20, 2018, https://www.oregon.gov/oha/PH/HealthyEnvironments/RadiationProtection/Pages/index.aspx.

See also: "Training; Radiological Emergency Preparedness," *Washington State Department of Health,* updated 2018, https://www.doh.wa.gov/CommunityandEnvironment/Radiation/RadiologicalEmergencyPreparedness/Training.

[lxxxix] *State of Oregon Emergency Management Plan, Vol. III: Emergency Operations Plan*, Oregon Office of Emergency Management, April 2017.

See also: "Oregon Radiation Protection Services."

See also: "ESF 10 – Environmental Protection and Hazardous Materials," *State of Oregon EOP; Emergency Support Functions,* last updated March 4, 2016, ESF 10-1 through ESF 10-15.

Information also taken from Non-Attribution Interview with Washington State Department of Health Office of Radiation Protection official. Interview conducted via phone call on August 13, 2018. Interview conducted on condition of anonymity.

[xc] "Training; Radiological Emergency Preparedness," *Washington State Department of Health.*

[xci] Non-Attribution Interview with Washington State Department of Health Office of Radiation Protection official. Interview conducted via phone call on August 13, 2018. Interview conducted on condition of anonymity.

[xcii] *State of California Emergency Plan,* California Governor's Office of Emergency Services, October 1, 2017.

[xciii] "Radiologic Health Branch (RHB)," *California Department of Public Health,* last updated July 6, 2018, accessed September 1, 2018, https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB.aspx#.

[xciv] *Multi-Year Training and Exercise Plan 2016-2018*, Hawaii Emergency Management Agency, 2017.

[xcv] *State of Alaska Hazard Mitigation Plan,* at 5-89.

[xcvi] For more information, see: "Fact Sheet: Preparing for an Nuclear Missile Threat," *State of Alaska Division of Homeland Security and Emergency Management,* no date, accessed March 30, 2018, retrieved from https://www.ready.alaska.gov/Documents/Fact%20Sheet%20-%20Preparing%20for%20A%20Nuclear%20Attack.pdf.

[xcvii] "For Individuals & Families," *California Governor's Office of Emergency Services,* 2018, accessed September 1, 2018, http://www.caloes.ca.gov/for-individuals-families.

[xcviii] *All-Hazards Preparedness Improvement Action Plan and Report,* Hawaii Department of Defense, 2018, at 11.

[xcix] Ibid.

[c] *Emergency Preparedness Guide For Disasters,* Washington State Emergency Management, 2016, at 43 through 48.

[ci] Ibid, at 49.

[cii] Ibid, at 2, 43.

[ciii] Ibid.

[civ] Alaska's Sources: "Building a 7 Day Emergency Kit," *State of Alaska; Department of Military and Veteran Affairs; Homeland Security & Emergency Management,* no date.
See also: "Emergency Supply Kit," *Municipality of Anchorage; Emergency Management,* 2018, accessed November 24, 2018, https://www.muni.org/Departments/OEM/Prepared/Pages/SupplyKit.aspx.

Hawai'i's Sources: "Take 10," *Hawaii State Department of Health,* February 2018.
See also: "Preparedness Information," *State of Hawaii; Hawaii Emergency Management Agency,* 2018, accessed November 24, 2018, http://dod.hawaii.gov/hiema/public-resources/preparedness-information/.

Oregon's Sources: "Emergency Go – Kit Passport," *Oregon Military Department; Office of Emergency Management,* no date.

California's Sources: "Emergency Supplies Checklist," *Earthquake Preparedness Tips; California Governor's Office of Emergency Services,* no date.
See also: "Be Prepared," *California Department of Public Health,* last updated April 27, 2017, accessed November 24, 2018,
https://www.cdph.ca.gov/Programs/EPO/Pages/PrepareanEmergencySupplyKit.aspx.

[cv] *State of Alaska Hazard Mitigation Plan,* at 4-2.

[cvi] Ibid.

[cvii] "Nuclear Emergency Information," *Oregon Department of Energy,* updated 2018, accessed August 20, 2018, https://www.oregon.gov/energy/safety-resiliency/Pages/Emergency-Information.aspx.

[cviii] *Frequently Asked Questions with Answers: Ballistic Missile Preparedness,* Hawaii State Department of Defense, Emergency Management Agency, 2017.

[cix] Across California and Washington, there are eleven burn centers verified by the American Burn Association equipped in responding to mass casualty incidents. For more information, see: "Verified Burn Centers," *American Burn Association,* last updated September 11, 2018, accessed October 25, 2018, http://ameriburn.org/quality-care/verification/verified-burn-centers/#washington.

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Annex A : Threat Assessment

The international threat environment of the 21st century is a driving factor in the states' need for the development of an event-specific emergency response plan for a nuclear attack. Though the threat of nuclear attack during the Cold War given tensions between the United States and former Soviet Union was real to the United States, the United States today faces numerous nuclear-capable adversaries on the global stage. Some of today's nuclear powers, including France and the United Kingdom, are allies of the United States, while others are fundamentally at odds with the United States' strategies, geopolitics, and global position.

Russia today continues to possess the world's most robust nuclear triad of air, land, and sea-based weapons, and poses a great power rivalry, rendering it a continued threat to the United States. China has risen to a position of world power and has projected its power through political statements, naval strategy, and its global economic policies. China's strategies ultimately indicate that it is already engaged in a great power rivalry with the United States. China's covert nuclear and missile programs, and its known missile capabilities, render China a significant nuclear threat to the United States.

Other regimes are not posed to credibly contest the United States, but have nonetheless made aggressive statements and utilized asymmetrical warfare to challenge the United States' global position in regional politics, cyberspace, and economics. Iran refers to the United States as the "great Satan" and has made clear its animosity towards the United States, both in the Middle East and on the world stage. Its missile and nuclear programs preceding the Joint Comprehensive Plan of Action made clear Iran's intent to acquire nuclear weapons, and its patronage of terrorist organizations deemed to be significant threats to the United States, its allies, and global interests render Iran a nuclear threat to the United States in the coming decades.

Echoing the aggressive rhetoric of Iran has been the Democratic People's Republic of Korea, particularly under the leadership of Kim Jong-Un. The world has witnessed a robust and rapid nuclear program take place under Kim Jong-Un's leadership and has heard the regime's statements against the United States, its interests and strategies, and its leadership and government. The Democratic People's Republic of Korea's nuclear build-up in the last five years, in conjunction with its strategic position vis-à-vis the United States, renders it a significant threat to the United States today and in the future. See below for a more robust assessment of each regime's nuclear capabilities.

Democratic People's Republic of Korea

The Democratic People's Republic of Korea ("North Korea") has made significant strides toward acquiring strategic nuclear capabilities, including six nuclear device tests – one in 2006, 2009, 2013, two in 2016, and one in 2017. On the basis of its tests, of which not all were successful, North Korea's leadership declared the country a nuclear-armed state. After the Six-Party[cx] nuclear talks in 2009, North Korea temporarily halted its nuclear testing activities. Shortly thereafter, however, North Korea restarted its plutonium-production reactor, built a uranium enrichment plant, and may have developed other clandestine enrichment facilities.[cxi]

Some nongovernmental experts estimate that North Korea has potentially produced enough enriched nuclear material for 13 to 21 nuclear weapons, and could produce enough nuclear material for an additional seven warheads per year.[cxii] In August 2017, *The Washington Post* reported that one component of the U.S. intelligence community, the Defense Intelligence Agency (DIA), assessed that North Korea had achieved this capability. DIA, according to the report, also asserted that North Korea may have a stockpile of up to 60 nuclear warheads, a figure much higher than most open-source estimates.[cxiii] North Korea has threatened to use its nuclear weapons in an EMP

attack, which involves detonating a nuclear warhead above the earth's atmosphere in order to disrupt and damage critical infrastructure including communication systems.[cxiv]

Though the pace of North Korea's missile development has been uneven, current Chairman of the Workers' Party of Korea Kim Jong-Un has overseen an ambitious acceleration of ballistic missile development, launching 92 missiles since he came to power in 2011 - far more than the combined 61 launches during the regimes of his father, Kim Jong-Il, and his grandfather, Kim Il-Sung.[cxv] The missiles developed during Kim Jong-Un's administration are increasingly powerful, with longer range and potentially greater payload capacity than older versions.

North Korea's missile technology has matured significantly over the past 20 years. In that time, North Korea has attempted six satellite launches using long-range ballistic missile technology, with reported evidence that each held a small satellite payload. While the first four satellite launches failed, launches in 2012 and 2016 successfully placed satellites in orbit.[cxvi] These satellite launches, coupled with the U.S. intelligence community assessment that North Korea's space launch capabilities share similar technologies used in an intercontinental ballistic missile (ICBM) program, are causes for concern that North Korea is advancing both its nuclear weapon and delivery programs.

In July 2017, North Korea successfully tested a miniaturized nuclear warhead and brought its nuclear program significantly closer to a weapon capable of successfully attacking the United States. The test consisted of two long-range ballistic missiles that some analysts characterized as having intercontinental range, achieving a capability that is years earlier than predicted.[cxvii] This specific test sent a message to the United States that the window of opportunity to prevent North Korea from acquiring a nuclear weapon capable of reaching the United States was rapidly closing. The North Korean liquid-fueled test missiles flew in a lofted, or very high, trajectory,

demonstrating a theoretical range that could potentially hit Hawai'i, Alaska, Guam or the continental United States.[cxviii]

On November 28, 2017, North Korea launched its first Hwasong-15 ballistic missile that overflew Japan, reaching a maximum altitude of over 2,750 miles before splashing into the Pacific Ocean approximately 600 miles from its launch pad.[cxix] Experts assessed that had it followed a more efficient flight path, this missile could have travelled as far as 8,100 miles -- a range sufficient to strike Washington, D.C.[cxx]

These events appear to have fundamentally altered U.S. perceptions of the threat the Kim Jong-un regime poses to the United States and its allies. While it is unlikely that North Korea would attack the United States unprovoked given that North Korea's fundamental priority is its own leadership survival, the fact remains that North Korea possesses a credible nuclear deterrent, and therefore poses a significant threat to the United States. On October 20, 2017, Choe Son Hui, a North Korean Foreign Ministry official, stated her government's "nuclear arsenal is meant to deter attack from the United States", and continued by stating that keeping and maintaining the regime's current arsenal "is a matter of life and death."[cxxi] Rhetoric such as this has led analysts to believe that if North Korea assumed a U.S. invasion or strike was imminent, it would launch a preemptive nuclear strike.[cxxii]

In the case that tensions rise to a level of action, there are many scenarios that could unfold. The North Korean regime could respond to any kind of U.S. military activity through a variety of conventional and unconventional means, any use of which could escalate into a full-scale war on the Korean Peninsula. The highest level of a conflict with North Korea would be the escalation into nuclear warfare. Such a result would include radioactive contamination affecting the immediate and surrounding regions where a nuclear strike occurred. Analysts also believe it is

possible that a nuclear attack against the United States could be delivered covertly by smuggling a nuclear weapon into the United States, such as through a container ship delivering goods to a U.S. port of entry.[cxxiii]

Islamic Republic of Iran

The Islamic Republic of Iran's ("Iran's") continued enhancement of ballistic missile technology poses a serious threat to the United States, particularly given the Iranian regime's open animosity towards the United States. Further, the country has become a major proliferator in supplying weapons and technology to terrorist organizations, including Hezbollah.[cxxiv] With Iran's sentiments and missile capabilities combined with its civil nuclear program, its abilities become lethal to a country like the United States. While the Joint Comprehensive Plan of Action (JCPOA) paused Iran's nuclear program for a period of time, the United States recently withdrew from the agreement. The United States' withdrawal may allow Iran to resume its nuclear development in the very near future.[cxxv] Furthermore, the JCPOA's so-called "sunset clause" only temporarily halts Iran's activities. Without a renegotiation of the nuclear deal, Iran is free to resume nuclear enrichment and development without sanction following the termination of the deal.[cxxvi]

Despite the JCPOA, Iran continues to tout hostile rhetoric and ballistic missile testing, further escalating tension between the West and Iran. While the JCPOA barred Iran from testing nuclear weapons for eight years, the deal does not prohibit Iran from testing other missiles, including ballistic missiles. Although Iran's nuclear and ballistic missile arsenals are unknown to intelligence analysts, many point out that Iran has had years to copy, develop, and modify foreign weapons designs, including missile technology designs received from countries including North Korea, Russia, and China.[cxxvii]

To date, Iran has not tested or deployed a missile capable of striking the United States; however, it continues to hone longer-range missile technologies under the alias of its space-launch program. Under this alias, Iran has also increased the quantity of its missile arsenal and invested in improvements to its missiles' accuracy and lethality. Iran has also become a center for missile proliferation, supplying terrorist organizations and adversaries of the United States, including Hezbollah and Syria's al-Assad regime, with a steady supply of missiles and rockets.[cxxviii]

Iran's aggressive space launch program also poses a threat to the United States. The U.S. intelligence community assesses that, "Tehran's desire to deter the United States might drive it to field an ICBM. Progress on Iran's space program, such as the launch of the Simorgh space launch vehicle (SLV) in July 2017, could shorten a pathway to an ICBM because space launch vehicles use similar technologies."[cxxix] In 1999, U.S. intelligence analysts assessed that Iran could test an ICBM in the coming decades if it received sufficient foreign assistance, especially from countries such as China or Russia.[cxxx] In 2016, Admiral Gortney, a former USNORTHCOM Commander, noted, "Iran has successfully orbited satellites using its ICBM-class booster as early as [2016]. In light of these advances, Iran may be able to deploy an operational ICBM by 2020 if the regime chooses to do so."[cxxxi]

Previous reporting notes that Iran is approximately a decade away from obtaining an ICBM capable of reaching the U.S. homeland. After the U.S. withdrawal from the JCPOA, Iran stated it will resume its missile development if Europe is unable to guarantee stable Iranian oil sales. The lack of plutonium enrichment allowed under the Iran deal also limited the progress Iran could make in developing a weapon cable of delivering a nuclear payload to the United States. However, now that Iran may be released from the terms of the JCPOA, there are no safeguards on Iranian plutonium enrichment. U.S. forces and allies in the Middle East thus remain under threat from

Iranian ballistic missiles in the current term and may face a nuclear-capable adversary in the coming decades.[cxxxii]

People's Republic of China

The People's Republic of China ("China") has developed over the past few decades a modernized missile stockpile. U.S. and Allied intelligence analysts know little of China's missile program as the Chinese have shrouded it in secrecy in order to evade arms control agreements with countries such as the United States. China has spent significant resources and time developing a number of advanced weapon systems, including maneuverable anti-ship ballistic missiles, multiple independently targetable reentry vehicles, and hypersonic glide vehicles, all of which are capable of evading U.S. missile defense systems. These capabilities degrade U.S. power projection in the region and globally, particularly in times of war. China also possesses a small arsenal of ICBMs capable of striking the United States, in addition to submarine-launched ballistic missiles (SLBMs).[cxxxiii]

China's nuclear weapons program began in 1955 and the country performed its first successful nuclear test in 1964. Since that time, China has conducted 45 nuclear tests and is estimated to now possess approximately 260 nuclear warheads.[cxxxiv] In the past, China has been known to participate in nefarious activities regarding nuclear material and designs. Most notably, the Chinese are widely understood to have supplied design information, including warhead designs and fissile material, to Pakistan for the development of its own nuclear weapons program. This design information, along with fissile materials, was later transferred for the development of a nuclear program in Libya. These activities are in stark contrast to U.S. policy and thus pose a credible threat to U.S. interests and personnel around the world.[cxxxv]

Russian Federation

The Russian Federation ("Russia") possesses the largest inventory of ballistic and cruise missiles in the world. Russia remains a major power in the development of missiles, and Russian strategic rocket forces represent a substantial element of Moscow's military strategy.[cxxxvi] Russian missiles are meant to perform a wide range of missions, from anti-access/area denial to the delivery of strategic nuclear weapons across long distances. A significant modernization program continues in Russia, producing new variants in both ballistic and cruise missiles with noteworthy new capabilities.[cxxxvii] Russia views modernization as a means to counteract the conventional superiority of the North Atlantic Treaty Organization, as well as a way to retain its status as a major military power.[cxxxviii]

Russia retains a nuclear triad—air, land, and sea-based nuclear weapons—deploying 1,444 warheads on 527 strategic nuclear delivery systems[cxxxix]; twelve submarines of three different classes each carrying a different model of SLBM[cxl]; and air-launched nuclear weapons from the Kh-55 and Kh-102 platforms.[cxli] Furthermore, Russia recently tested a ground-launched cruise missile (GLCM), which has a maximum range of 3,400 miles, despite GLCM development and testing being a violation of the Intermediate-Range Nuclear Forces Treaty.[cxlii] In March 2018, President Vladimir Putin showcased a variety of developmental weapons, including new strategic nuclear delivery systems such as a nuclear-powered intercontinental cruise missile, a nuclear capable underwater drone, and a hypersonic glide vehicle.[cxliii] One such hypersonic weapon debuted is allegedly capable of delivering ten large thermonuclear warheads, sixteen smaller ones, or a combination of both.[cxliv]

Russia inherited a massive nuclear weapons production complex, along with large stockpiles of weapons-grade fissile material, after the collapse of the Soviet Union. While some

progress was made in arms reduction and nonproliferation efforts between the United States and Russia in the 1990s, Russia has either allowed many of those agreements to expire or expressly violated those agreements still in effect.[cxlv] Tensions continue to rise between the U.S. and Russia over circumstances such as the ongoing conflict in Syria, expulsion of its foreign diplomats, and its aggressive rhetoric that could ultimately lead to war, but in the worst circumstance, nuclear war.

[cx] The Six Party talks in 2009 were attended by North Korea, South Korea, Japan, the United States, China, and Russia.

[cxi] Steven A. Hildreth and Mary Beth D. Nikitin, *North Korea's Nuclear and Ballistic Missile Programs*, Congressional Research Service, August 8, 2018.

[cxii] David Albright, "Future Directions in the DPRK'S Nuclear Weapons Program: Three Scenarios for 2020," February 2015, http://38north.org/2015/02/dalbright022615/.

[cxiii] Ellen Nakashima, Anna Fifield and Joby Warrick, "North Korea could cross ICBM threshold next year, U.S. officials warn in new assessment," *The Washington Post,* July 25, 2017, https://web.archive.org/web/20170908131324/https://www.washingtonpost.com/world/national-security/north-korea-could-cross-icbm-threshold-next-year-us-officials-warn-in-new-assessment/2017/07/25/4107dc4a-70af-11e7-8f39-eeb7d3a2d304_story.html?utm_term=.cb73110bcbed.

[cxiv] Tom Porter, "Could a North Korean EMP attack on the U.S. really cause mass starvation and societal collapse?" *Newsweek*, October 25, 2017, http://www.newsweek.com/could-north-korean-emp-attack-could-cause-mass-starvation-and-societal-691736.

See also: Jack Liu, "A North Korean Nuclear EMP Attack? … Unlikely," *38North*, May 5, 2017, http://www.38north.org/2017/05/jliu050517/.

See also: Peter V. Pry, "North Korea Nuclear EMP Attack: An Existential Threat," Testimony to the U.S. House of Representatives Committee on Homeland Security, Subcommittee on Oversight and Management Efficiency Hearing on "Empty Threat or Serious Danger: Assessing North Korea's Risk to the Homeland," October 12, 2017.

[cxv] Ian Williams, *North Korean Missile Launches & Nuclear Tests: 1984-Present*, Center for Strategic and International Studies, April 2017, accessed September 19, 2018, retrieved from https://missilethreat.csis.org/north-korea-missile-launches-1984-present/.

[cxvi] Daniel R. Coats (Director of National Intelligence), *Statement for the Record. Worldwide Threat Assessment of the US Intelligence Community,* Senate Select Committee on Intelligence, May 11, 2017, at 10.

[cxvii] Terri Moon Cronk, "U.S. Condemns North Korean Ballistic Missile Launch," *U.S. Department of Defense,* February 13, 2017, accessed September 22, 2018, https://dod.defense.gov/News/Article/Article/1082001/us-condemns-north-korean-ballistic-missile-launch/.

[cxviii] Terri Moon Cronk, "U.S., South Korea Conduct Exercise Following North Korean Missile Launch," *U.S. Department of Defense*, July 5, 2017, accessed September 22, 2018, https://dod.defense.gov/News/Article/Article/1237914/us-south-korea-conduct-exercise-following-north-korean-missile-launch/.

[cxix] Sang-Hun Choe and David E. Sanger, "North Korea Fires Missile Over Japan," *The New York Times,* August 28, 2018, accessed September 19, 2018, https://www.nytimes.com/2017/08/28/world/asia/north-korea-missile.html?login=email&auth=login-email.

[cxx] Ryan Browne, Zachary Cohen and Nicole Gaouette, "New missile test shows North Korea capable of hitting all of US mainland," *CNN,* November 30, 2017, accessed September 21, 2018, https://www.cnn.com/2017/11/28/politics/north-korea-missile-launch/index.html.

[cxxi] "North Korea: U.S.' Actions Will Determine If There Is a Summit or a 'Nuclear-to-Nuclear Showdown.'" *CBS News*, CBS Interactive, 24 May 2018, www.cbsnews.com/news/north-korea-summit-choe-son-hui-remarks-2018-05-24/.

[cxxii] Mark Fitzpatrick and Michael Elleman, "Deterring North Korea the wrong way," *Politics and Strategy: The Survival Editors' Blog,* IISS, August 11, 2017, https://www.iiss.org/en/politics%20and%20strategy/blogsections/2017-6dda/august-b877/deterring-north-korea-the-wrong-way-4bd9.

[cxxiii] Michael Morell, "North Korea may already be able to launch a nuclear attack on the U.S.," *The Washington Post*, September 6, 2017, https://www.washingtonpost.com/opinions/north-korea-may-already-be-able-to-launch-a-nuclear-attack-on-the-us/2017/09/06/.

See also: "A Conversation with James Clapper," Council on Foreign Relations Event Transcript, October 25, 2016, https://www.cfr.org/event/conversation-james-clapper.

[cxxiv] Hezbollah is equipped with a robust arsenal of missiles and rockets, including land attack weapons, and antitank, anti-ship, and anti-air weapons. Hezbollah possesses a variety of cruise missiles developed in several other countries, including Russia and China, that were purchased later purchased by Iran and covertly transferred to Hezbollah in Lebanon.

For a more robust analysis of Hezbollah's missile arsenal and capabilities, as well as its relationship with Iran, see: "Missiles and Rockets of Hezbollah," *CSIS Missile Defense Project,* Center for Strategic & International Studies, last modified October 30, 2018, accessed November 16, 2018, https://missilethreat.csis.org/country/hezbollahs-rocket-arsenal/.

[cxxv] "Iran." *Missile Defense Advocacy Alliance,* August 14, 2018, missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/iran/.

[cxxvi] For more information on the exact timeline of the provision of authority of the JCPOA, see pages 5 through 6 and 18 of *Joint Comprehensive Plan of Action,* July 14, 2015, retrieved from the U.S. Department of State on November 16, 2018, at https://www.state.gov/documents/organization/245317.pdf.

[cxxvii] Ibid.

[cxxviii] "Missiles of Iran," *CSIS Missile Defense Project*, Center for Strategic & International Studies, published June 14, 2018, last modified June 15, 2018, https://missilethreat.csis.org/country/iran/.

[cxxix] "U.S. Says Iran Rocket Test Breaches U.N. Resolution," *Reuters*, July 27, 2017, www.reuters.com/article/us-iran-satellite-idUSKBN1AC1YY.

[cxxx] "Foreign Missile Developments and the Ballistic Missile Threat," *Central Intelligence Agency,* April 7, 2013, www.cia.gov/news-information/speeches-testimony/1999/walpole.htm.

[cxxxi] Ian Williams, Tom Karako and Wes Rumbaugh, "Missile Defense 2020: Next Steps for Defending the Homeland," *CSIS Missile Defense Project*, Center for Strategic and International Studies, published April 7, 2017, last modified June 15, 2018, https://missilethreat.csis.org/missile-defense-2020/.

[cxxxii] "Iran," *Missile Defense Advocacy Alliance.*

[cxxxiii] "Missiles of China," *CSIS Missile Defense Project*, Center for Strategic & International Studies, published June 14, 2018, last modified June 15, 2018, https://missilethreat.csis.org/country/china/.

[cxxxiv] Hans Kristensen and Robert S. Norris, "Chinese Nuclear Forces, 2013," *Bulletin of the Atomic Scientists*, 69.6 (2013). 79-85.

[cxxxv] Joby Warrick and Peter Slevin, "Libyan Arms Designs Traced Back to China," *Washington Post*, February 15, 2004, https://www.washingtonpost.com/archive/politics/2004/02/15/libyan-arms-designs-traced-back-to-china/2aacac24-4d49-4198-9aa0-7d68962fd8c2/?utm_term=.710e5583dc3f.

[cxxxvi] "Missiles of Russia," *CSIS Missile Defense Project*, Center for Strategic & International Studies, published June 14, 2018, last modified June 15, 2018, https://missilethreat.csis.org/country/russia/.

[cxxxvii] Ibid.

[cxxxviii] "Russia." *Nuclear Threat Initiative*, August 2018, accessed September 22, 2018, www.nti.org/learn/countries/russia/.

[cxxxix] "New START Treaty Aggregate Numbers of Strategic Offensive Arms," *U.S. Department of State*, April 1, 2017, accessed September 22, 2018, https://www.state.gov/t/avc/newstart/269406.htm.

[cxl] Pavel Podvig, "Strategic fleet," *Russian Strategic Nuclear Forces,* April 8, 2016, http://russianforces.org/navy/.

[cxli] Hans Kristensen and Robert S. Norris, "Russia Nuclear Forces, 2017," at 121 through 122.

See also: "Kh-101/Kh-102," *CSIS Missile Defense Project,* Center for Strategic & International Studies, 2018, accessed October 29, 2018, https://missilethreat.csis.org/missile/kh-101-kh-102/.

See also: "Missiles of Russia," *CSIS Missile Defense Project,* Center for Strategic & International Studies, 2018, accessed October 29, 2018, https://missilethreat.csis.org/country/russia/.

[cxlii] *Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments,* U.S. Department of State, July 2014.

See also: Daniel R. Coats (Director of National Intelligence), *Statement for the Record. Worldwide Threat Assessment of the US Intelligence Community,* Senate Select Committee on Intelligence, May 11, 2017, at 6.

[cxliii] "Putin announces Russia possesses hypersonic weapons," *Tass,* March 1, 2018, http://tass.com/defense/992214.

[cxliv] Tim Collins, "Russia's Nuclear Weapons Can Wipe out an Area 'the Size of Texas'," *Daily Mail Online*, July 24, 2018, www.dailymail.co.uk/sciencetech/article-5985985/Russias-new-nuclear-weapons-able-wipe-area-size-Texas-France.html.

[cxlv] Ibid.

Annex B : Comparative Analysis of U.S. Westernmost States

Attribute of Nuclear Attack	Alaska	California	Hawai'i	Oregon	Washington
Differentiating Nuclear Terrorism from Nuclear Attack			+		
Utilization of Federal Planning Guidance[1]					
Analysis of Population and Infrastructure Vulnerabilities	+		+		+
Limited Warning	+		+		
Radiation and Decontamination	+	+	+	+	+
Blast Damage	+			+	+
Thermal Damage					
Electromagnetic Pulse				+	
Warning Messages and Protocols			+		
Communication with the Public	+	+	+	+	+
Federal and State Liaisons and Partnerships			+		+
First Response and Medical Care					+
Public Education	+	+	+		

[1] While each of the selected states incorporates a number of federal planning guidance documents into their respective plans, each fails to incorporate the two documents identified as fundamental to mitigation and response planning specific to a nuclear attack. Those documents are *Planning Guidance for Response to a Nuclear Detonation* and the Nuclear/Radiological Incident Annex to the National Response Framework.

Bibliography

42 U.S. Code § 5165 – Mitigation planning, as amended.

Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments. U.S. Department of State. July 2014.

Alaska Intrastate Mutual Aid System (AIMAS). Alaska Division of Homeland Security Emergency Management (DHS&EM). 2014.

Albright, David. "Future Directions in the DPRK'S Nuclear Weapons Program: Three Scenarios for 2020." February 2015. Retrieved from http://38north.org/2015/02/dalbright022615/.

All-Hazards Preparedness Improvement Action Plan and Report. Hawaii Department of Defense. 2018.

ANNUAL REPORT Fiscal Year 2015. Hawaii Department of Defense. 2015.

Browne, Ryan, Zachary Cohen and Nicole Gaouette. "New missile test shows North Korea capable of hitting all of US mainland." *CNN.* November 30, 2017. Accessed September 21, 2018. https://www.cnn.com/2017/11/28/politics/north-korea-missile-launch/index.html.

Catastrophic Incident Planning Framework. Version 1. Statewide Catastrophic Incident Planning Team. October 12, 2017.

Central Cascades Volcano Coordination Plan. The Central Cascades Facilitating Committee. May 31, 2007.

Choe, Sang-Hun and David E. Sanger. "North Korea Fires Missile Over Japan." *The New York Times.* August 28, 2018. Accessed September 19, 2018. https://www.nytimes.com/2017/08/28/world/asia/north-korea-missile.html?login=email&auth=login-email.

Chung, Jane and Haejin Choi. "South Koreans practice in case of North Korea attack, but with little urgency." *Reuters.* August 23, 2017. Accessed September 25, 2018. https://www.reuters.com/article/us-northkorea-missiles-southkorea-civild/south-koreans-practice-in-case-of-north-korea-attack-but-with-little-urgency-idUSKCN1B30YL.

Coats, Daniel R. (Director of National Intelligence). *Statement for the Record. Worldwide Threat*

Assessment of the US Intelligence Community. Senate Select Committee on Intelligence. May 11, 2017.

Collins, Tim. "Russia's Nuclear Weapons Can Wipe out an Area 'the Size of Texas'." *Daily Mail Online.* July 24, 2018. www.dailymail.co.uk/sciencetech/article-5985985/Russias-new-nuclear-weapons-able-wipe-area-size-Texas-France.html.

Cronk, Terri Moon. "U.S. Condemns North Korean Ballistic Missile Launch." *U.S. Department of Defense.* February 13, 2017. Accessed September 22, 2018. https://dod.defense.gov/News/Article/Article/1082001/us-condemns-north-korean-ballistic-missile-launch/.

Cronk, Terri Moon. "U.S., South Korea Conduct Exercise Following North Korean Missile Launch." *U.S. Department of Defense*. July 5, 2017. Accessed September 22, 2018. https://dod.defense.gov/News/Article/Article/1237914/us-south-korea-conduct-exercise-following-north-korean-missile-launch/.

Dickson, Daniel. "Sweden is sending its citizens Cold War-style instructions on what to do 'if crisis or war comes'." *Business Insider.* May 21, 2018. Accessed September 25, 2018. https://www.businessinsider.com/sweden-sends-cold-war-style-instructions-for-cases-of-of-war-or-crisis-2018-5.

Emergency Management Assistance Compact. Pub. L. 104-321. 110 Stat. 3877. October 19, 1996.

Emergency Preparedness. Hawaii Emergency Management Agency. 2017. Retrieved from: https://dod.hawaii.gov/hiema/files/2017/11/HI-EMA-PUBLIC-BMP-working-brief-NOV-2017.pdf.

Emergency Preparedness Guide For Disasters. Washington State Emergency Management. 2016. Retrieved at https://www.mil.wa.gov/uploads/pdf/Publications/emergencypreparednessguide2016.pdf.

Federal Law on Civil Protection System and Protection & Support Service. October 4, 2002. SR 520.1 (Switzerland). Law reviewed in English and retrieved from http://www.ifrc.org/docs/IDRL/Laws/Switzerland_Civil%20Protection%20System.pdf.

FEMA Manual 211-2-1: NATIONAL WARNING SYSTEM (*NAWAS*) *OPERATIONS,* Version 2. Federal Emergency Management Agency. July 2016.

Fitzpatrick, Mark and Michael Elleman. "Deterring North Korea the wrong way." *Politics and*

Strategy: The Survival Editors' Blog. International Institute for Strategic Studies. August 11, 2017. https://www.iiss.org/en/politics%20and%20strategy/blogsections/2017-6dda/august-b877/deterring-north-korea-the-wrong-way-4bd9.

Frequently Asked Questions with Answers: Ballistic Missile Preparedness. Hawaii State Department of Defense, Emergency Management Agency. 2017.

Hildreth, Steven A. and Mary Beth D. Nikitin. *North Korea's Nuclear and Ballistic Missile Programs*. Congressional Research Service. August 8, 2018.

Homeland Security Act of 2002 (Public Law 107-296), as amended.

Hunt, Julie. "How ready is Switzerland for a nuclear disaster?" *Swissinfo.ch.* November 29, 2017. Accessed September 25, 2018. https://www.swissinfo.ch/eng/business/always-be-prepared_how-ready-is-switzerland-for-a-nuclear-disaster-/43570374.

If Crisis or War Comes. Swedish Civil Contingencies Agency (MSB). Karlstad: Stibo Graphic A/S. May 2018.

International Convention for the Suppression of Acts of Nuclear Terrorism. United Nations General Assembly. Resolution 59/290. April 13, 2005.

Jackson County Emergency Preparedness Plan for Families. Jackson County Emergency Management Advisory Council. Revised and Reprinted January 2006. Medford, Oregon: Jackson County Board of Commissioners.

Joint Comprehensive Plan of Action. July 14, 2015. Text retrieved from U.S. Department of State.

Kang, Haeryun. "In South Korea we're scared by we've normalized fear." *The Guardian.* August 7, 2017. Accessed September 25, 2018. https://www.theguardian.com/commentisfree/2017/aug/09/south-korea-normalised-fear-north-korea-missile-kim-jong-un.

Keck, Zachary. "The Most Dangerous Nuclear Weapon in America's Arsenal." *The National Interest.* July 28, 2015. Accessed September 1, 2018. https://nationalinterest.org/blog/the-buzz/the-most-dangerous-nuclear-weapon-americas-arsenal-13433.

Kristensen, Hans and Robert S. Norris. "Chinese Nuclear Forces, 2013." *Bulletin of the Atomic Scientists*, 69:6 (2013). 79-85.

Kristensen, Hans and Robert S. Norris. "Russia Nuclear Forces, 2017." *Bulletin of the Atomic Scientists*, 73:2 (2017). 115-126.

Liu, Jack. "A North Korean Nuclear EMP Attack? … Unlikely." *38North*. May 5, 2017. http://www.38north.org/2017/05/jliu050517/.

Mariani, Daniele. "Bunkers for all." *Swissinfo.ch.* July 3, 2009. Accessed September 25, 2018. https://www.swissinfo.ch/eng/prepared-for-anything_bunkers-for-all/995134.

Mass Fatality Management Field Operations Guide. City and County of Honolulu. 2013.

McNeill, Jena Baker and Richard Weitz. "Electromagnetic Pulse (EMP) Attack: A Preventable Homeland Security Catastrophe." *The Heritage Foundation* no. 2199. October 20, 2008.

Morell, Michael. "North Korea may already be able to launch a nuclear attack on the U.S." *The Washington Post*. September 6, 2017. https://www.washingtonpost.com/opinions/north-korea-may-already-be-able-to-launch-a-nuclear-attack-on-the-us/2017/09/06/

Multi-Year Training and Exercise Plan 2016-2018. Hawaii Emergency Management Agency. 2017.

Nakashima, Ellen, Anna Fifield and Joby Warrick. "North Korea could cross ICBM threshold next year, U.S. officials warn in new assessment." *The Washington Post.* July 25, 2017. https://web.archive.org/web/20170908131324/https://www.washingtonpost.com/world/national-security/north-korea-could-cross-icbm-threshold-next-year-us-officials-warn-in-new-assessment/2017/07/25/4107dc4a-70af-11e7-8f39-eeb7d3a2d304_story.html?utm_term=.cb73110bcbed.

National Preparedness Goal. U.S. Department of Homeland Security. 2015.

Noack, Rick. "Sweden has 65,000 nuclear shelters. Now, in era of Trump, it wants more." *The Washington Post.* November 3, 2017. Accessed September 25, 2018. https://www.washingtonpost.com/news/worldviews/wp/2017/11/03/sweden-has-65000-nuclear-bunkers-now-in-the-era-of-trump-it-wants-more/?noredirect=on&utm_term=.15ef07870a05.

Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans. U.S. Department of Homeland Security Federal Emergency Management Agency. October 2016.

Planning Guidance for Response to a Nuclear Detonation, 2nd edition. National Security Staff Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats. June 2010.

Podvig, Pavel. "Strategic fleet." *Russian Strategic Nuclear Forces.* April 8, 2016, http://russianforces.org/navy/.

Porter, Tom. "Could a North Korean EMP attack on the U.S. really cause mass starvation and societal collapse?" *Newsweek*. October 25, 2017. http://www.newsweek.com/could-north-korean-emp-attack-could-cause-mass-starvation-and-societal-691736.

Pry, Peter V. "North Korea Nuclear EMP Attack: An Existential Threat." Testimony to the U.S. House of Representatives Committee on Homeland Security, Subcommittee on Oversight and Management Efficiency Hearing on "Empty Threat or Serious Danger: Assessing North Korea's Risk to the Homeland." October 12, 2017.

Radiation Emergencies; Frequently Asked Questions. Oregon Health Authority; Radiological Emergency Response. Updated 2018. Retrieved from https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RADIATIONPROTECTION/EMERGENCYRESPONSE/Documents/radiationemergencies.pdf.

Radiologic Health Branch Organizational Chart. California Department of Public Health. No date. Retrieved September 1, 2018, from https://www.cdph.ca.gov/Programs/CEH/DRSEM/CDPH%20Document%20Library/RHB/RHB-OrgChart.pdf.

Ready Ventura County. Ready Ventura County. 2018. https://www.readyventuracounty.org/.

Review of the Emergency Alert System; Independent Spanish Broadcasters Association, the Office of Communication of the United Church of Christ, Inc., and the Minority Media and Telecommunications Council, Petition for Immediate Relief. Docket/RM: 04-294. April 19, 2012. Retrieved from https://www.fcc.gov/document/review-emergency-alert-system-1.

Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended.

State of Alaska Emergency Alert System Plan. State of Alaska. 2016.

State of Alaska Emergency Operations Plan. State of Alaska, Division of Homeland Security and Emergency Management. 2016.

State of Alaska Hazard Mitigation Plan. Alaska Department of Military and Veteran Affairs, Division of Homeland Security and Emergency Management. October 2013.

State of California Emergency Management Mutual Aid Plan. California Governor's Office of Emergency Services. November 2012.

State of California Emergency Plan. California Governor's Office of Emergency Services.

October 1, 2017.

State of Hawaii Emergency Operations Plan; Basic Plan. Hawaii Emergency Management Agency. May 2017.

State of Oregon Emergency Management Plan, Vol. III: Emergency Operations Plan. Oregon Office of Emergency Management. April 2017.

Unit 3 Disaster Sequence of Events. Federal Emergency Management Agency. Taken from the "State Disaster Management Course – IS 208." Retrieved from https://training.fema.gov/emiweb/downloads/is208sdmunit3.pdf.

Vaughn, John K. (Lt. Col., U.S. Army). *The Nitze Criteria and the Bush Missile Defense Architecture.* Carlisle Barracks: U.S. Army War College. 2002.

Warrick, Joby and Peter Slevin. "Libyan Arms Designs Traced Back to China." *Washington Post*. February 15, 2004. Accessed September 22, 2018. https://www.washingtonpost.com/archive/politics/2004/02/15/libyan-arms-designs-traced-back-to-china/2aacac24-4d49-4198-9aa0-7d68962fd8c2/?utm_term=.710e5583dc3f.

Washington State Comprehensive Emergency Management Plan; Basic Plan. Washington Military Department Emergency Management Division. June 2016.

Washington State EAS Handbook. Approved by the Washington State Emergency Communications Committee. May 13, 2014. https://www.mil.wa.gov/uploads/pdf/EAS-state-plan/eas%20plan%20text.pdf.

Washington State Legislature. RCWs. Title 38, Chapter 38.52, Section 38.52.010.

Williams, Ian. *North Korean Missile Launches & Nuclear Tests: 1984-Present*. Center for Strategic and International Studies. Last updated November 29, 2017. Accessed September 19, 2018. Retrieved from https://missilethreat.csis.org/north-korea-missile-launches-1984-present/.

Williams, Ian, Tom Karako and Wes Rumbaugh."Missile Defense 2020: Next Steps for Defending the Homeland." *CSIS Missile Defense Project*. Center for Strategic and International Studies, published April 7, 2017, last modified June 15, 2018. https://missilethreat.csis.org/missile-defense-2020/.

"A Conversation with James Clapper." *Council on Foreign Relations.* Event Transcript. October 25, 2016. Retrieved from https://www.cfr.org/event/conversation-james-clapper.

"About; Wireless Emergency Alerts." *California Governor's Office of Emergency Services.* 2014. Accessed September 1, 2018. http://calalerts.org/about.html.

"Be Prepared." *California Department of Public Health.* Last updated April 27, 2017. Accessed November 24, 2018. https://www.cdph.ca.gov/Programs/EPO/Pages/PrepareanEmergencySupplyKit.aspx.

"Building a 7 Day Emergency Kit." *State of Alaska; Department of Military and Veteran Affairs; Homeland Security & Emergency Management.* No date.

"California State Warning Center." *California Government's Office of Emergency Services.* Updated 2018. Accessed September 1, 2018. http://www.caloes.ca.gov/cal-oes-divisions/warning-center.

"Cascadia Subduction Zone." *Pacific Northwest Seismic Network.* 2018. https://pnsn.org/outreach/earthquakesources/csz.

"Catastrophic Incident Annex." *Washington State CEMP.* Washington Military Department Emergency Management Division. November 2013.

"Chronology of U.S.-North Korean Nuclear and Missile Diplomacy." *Arms Control Association*. 2018. Accessed November 12, 2018. https://www.armscontrol.org/factsheets/dprkchron.

"Civil Protection is Teamwork." *AlertSwiss.* 2018. Accessed September 25, 2018. https://alertswiss.ch/en/facts-and-tips/network-of-partners/.

"Early Warning and Decision Support." Pacific Disaster Center. 2018. Accessed September 1, 2018. https://www.pdc.org/solutions/early-warning-and-decision-support-solutions/.

"Emergency Go – Kit Passport." *Oregon Military Department; Office of Emergency Management.* No date.

"Emergency Supplies Checklist." *Earthquake Preparedness Tips; California Governor's Office of Emergency Services.* No date.

"Emergency Supply Kit." *Municipality of Anchorage; Emergency Management.* 2018. Accessed November 24, 2018. https://www.muni.org/Departments/OEM/Prepared/Pages/SupplyKit.aspx.

"Emergency Support Function Annexes: Introduction," *Federal Emergency Management Agency,* January 2008.

"Emergency Support Function Annex; ESF 13. Military Support." *Clackamas County EOP.* No date. Retrieved from https://dochub.clackamas.us/documents/drupal/e91cec3d-9de6-4fbc-bff5-81a136c7767f.

"Emergency Support Function 20 Defense Support to Civil Authorities." Washington State Military Department National Guard. December 2014.

"ESF 2 - Communications." *State of Oregon EOP; Emergency Support Functions.* Last updated December 1, 2014. ESF 2-3 – ESF 2-22.

"ESF 10 – Environmental Protection and Hazardous Materials." *State of Oregon EOP; Emergency Support Functions.* Last updated March 4, 2016. ESF 10-1 – ESF 10-15.

"Fact Sheet: Preparing for an Nuclear Missile Threat." *State of Alaska Division of Homeland Security and Emergency Management.* No date. Accessed March 30, 2018. Retrieved from https://www.ready.alaska.gov/Documents/Fact%20Sheet%20-%20Preparing%20for%20A%20Nuclear%20Attack.pdf.

"Final Hazard Profile – Terrorism." *Washington State Threat Mitigation Plan.* October 2012. Tab 5.16. Retrieved March 27, 2018.

"Foreign Missile Developments and the Ballistic Missile Threat." *Central Intelligence Agency.* April 7, 2013. www.cia.gov/news-information/speeches-testimony/1999/walpole.htm.

"For Individuals & Families." *California Governor's Office of Emergency Services.* 2018. Accessed August 19, 2018. http://www.caloes.ca.gov/for-individuals-families.

"IA 6 – Volcano." *State of Oregon EOP; Incident Annexes.* 2015. IA 6-1 – IA 6-13.

"IA 8 – Terrorism." *State of Oregon EOP; Incident Annexes.* 2015. IA 8-1 – IA 8-19.

"IA 9 – Nuclear/Radiological." *State of Oregon EOP; Incident Annexes.* 2015. IA 9-1 – IA 9-21.

"Iran." *Missile Defense Advocacy Alliance.* August 14, 2018 http://www.missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/iran/.

"Kh-101/Kh-102." *CSIS Missile Defense Project*. Center for Strategic & International Studies. 2018. Accessed October 29, 2018. https://missilethreat.csis.org/missile/kh-101-kh-102/.

"Missiles and Rockets of Hezbollah." *CSIS Missile Defense Project.* Center for Strategic & International Studies. Last modified October 30, 2018. Accessed November 16, 2018. https://missilethreat.csis.org/country/hezbollahs-rocket-arsenal/.

"Missiles of China." *CSIS Missile Defense Project*. Center for Strategic & International Studies. June 14, 2018. Last modified June 15, 2018. Accessed September 21, 2018. https://missilethreat.csis.org/country/china/.

"Missiles of Iran." *CSIS Missile Defense Project*. Center for Strategic & International Studies. June 14, 2018. Last modified June 15, 2018. Accessed September 21, 2018. https://missilethreat.csis.org/country/iran/.

"Missiles of North Korea." *CSIS Missile Defense Project.* Center for Strategic & International Studies. June 14, 2018. Accessed September 21, 2018. https://missilethreat.csis.org/country/dprk/.

"Missiles of Russia." *CSIS Missile Defense Project*. Center for Strategic and International Studies. June 14, 2018. Last modified June 15, 2018. Accessed September 21, 2018. https://missilethreat.csis.org/country/russia/.

"Mutual Aid Resources." *Oregon Military Department Office of Emergency Management.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oem/emresources/Pages/Mutual-Aid-Agreements.aspx.

"National Preparedness Goal." FEMA. Updated May 2, 2018. https://www.fema.gov/national-preparedness-goal.

"National Warning System." *Emergency Management Division; Washington Military Department.* Updated 2018. https://www.mil.wa.gov/other-links/national-warning-system.

"New START Treaty Aggregate Numbers of Strategic Offensive Arms." *U.S. Department of State*. April 1, 2017.

"North Korea: U.S.' Actions Will Determine If There Is a Summit or a 'Nuclear-to-Nuclear Showdown'." *CBS News*. May 24, 2018. www.cbsnews.com/news/north-korea-summit-choe-son-hui-remarks-2018-05-24/.

"Nuclear/Radiological Incident Annex." *Federal Emergency Management Agency.* March 6, 2017. Accessed September 1, 2018. https://www.fema.gov/media-library/assets/documents/25554.

"Nuclear & Radiological Terrorism." *Federation of American Scientists.* 2018. Accessed November 13, 2018. https://fas.org/issues/nuclear-and-radiological-terrorism/.

"Nuclear Emergency Information." *Oregon Department of Energy.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/energy/safety-resiliency/Pages/Emergency-Information.aspx.

"Oregon Radiation Protection Services." *Oregon Health Authority.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oha/PH/HealthyEnvironments/RadiationProtection/Pages/index.aspx.

"Preparedness Information." *State of Hawaii; Hawaii Emergency Management Agency.* 2018. Accessed November 24, 2018. http://dod.hawaii.gov/hiema/public-resources/preparedness-information/.

"Putin announces Russia possesses hypersonic weapons." *Tass.* March 1, 2018. http://tass.com/defense/992214.

"Radiation Protection." *United States Nuclear Regulatory Commission.* Last updated September 25, 2017. Accessed November 24, 2018. https://www.nrc.gov/about-nrc/radiation.html.

"Radiation Protection." *Washington State Department of Health.* Updated 2018. Accessed September 1, 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation.

"Radiation sickness (syndrome)." *United States Nuclear Regulatory Commission.* Updated July 6, 2018. Accessed November 24, 2018. https://www.nrc.gov/reading-rm/basic-ref/glossary/radiation-sickness-syndrome.html.

"Radiologic Health Branch (RHB)." *California Department of Public Health.* Last updated July 6, 2018. Accessed September 1, 2018. https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB.aspx#.

"Russia." *Nuclear Threat Initiative*. August 2018. Accessed September 22, 2018. www.nti.org/learn/countries/russia/.

"Strategic and Operational Planning." Federal Emergency Management Agency. 2018. Accessed September 21, 2018. https://www.fema.gov/plan.

"Swiss assess effects of Chernobyl disaster." *Swissinfo.ch.* April 18, 2006. Accessed September 25, 2018. https://www.swissinfo.ch/eng/swiss-assess-effects-of-chernobyl-disaster/5003874.

"Take 10." *Hawaii State Department of Health.* February 2018.

"Timeline of the Hawaii false missile alert shows how drill went wrong." *CNN*. Updated January 30, 2018. https://www.cnn.com/2018/01/30/us/hawaii-false-missile-alert-timeline/index.html.

"The Disaster Declaration Process." *Federal Emergency Management Agency.* Updated January 1, 2018. Accessed October 19, 2018. https://www.fema.gov/disaster-declaration-process.

"'The whole state was terrified': How Hawaii reacted to false missile alert." *BBC News*. January 13, 2018. Accessed November 12, 2018. https://www.bbc.com/news/world-us-canada-42675666.

"Threat of annihilation hangs over daily life in South Korea's capital." *CTV News.* February 8, 2018. Accessed September 25, 2018. https://www.ctvnews.ca/world/threat-of-annihilation-hangs-over-daily-life-in-south-korea-s-capital-1.3794765.

"Training; Radiological Emergency Preparedness." *Washington State Department of Health.* Updated 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation/RadiologicalEmergencyPreparedness/Training.

"Understanding EMAC for Washington State." *Emergency Management Division.* No date. Presentation. Retrieved September 1, 2018, from https://mil.wa.gov/uploads/pdf/LogisticsResources2/emac-intro-thru-reimbursement_dec2016.pdf.

"U.S. Says Iran Rocket Test Breaches U.N. Resolution." *Reuters*. July 27, 2017. www.reuters.com/article/us-iran-satellite-idUSKBN1AC1YY.

"Verified Burn Centers." *American Burn Association.* Last updated September 11, 2018. Accessed October 25, 2018. http://ameriburn.org/quality-care/verification/verified-burn-centers/#washington.

"What is EMAC?" National Emergency Management Association. 2018. Accessed September 1, 2018. https://www.nemaweb.org/index.php/76-mainmenucontent/frequently-asked-questions/199-what-is-emac-.

State Plans and Documents Assessed

A Final Report of the Hawaii RCPG FY09 Public Awareness Project. Tetra Tech. GetReadyHI.org. 2012.

All-Hazards Preparedness Improvement Action Plan and Report. Hawaii Department of Defense. 2018.

ANNUAL REPORT Fiscal Year 2015. Hawaii Department of Defense. 2015.

Catastrophic Incident Planning Framework. Version 1. Statewide Catastrophic Incident Planning Team. October 12, 2017.

Do The Drill! Oregon Office of State Fire Marshal. January 2016.

Emergency Operations Plan. City and County of Honolulu. March 2014.

Emergency Preparedness. Hawaii Emergency Management Agency. 2017. Retrieved from https://dod.hawaii.gov/hiema/files/2017/11/HI-EMA-PUBLIC-BMP-working-brief-NOV-2017.pdf.

Emergency Preparedness Guide For Disasters. Washington State Emergency Management. 2016.

Frequently Asked Questions with Answers: Ballistic Missile Preparedness. Hawaii State Department of Defense, Emergency Management Agency. 2017.

Guidance Summary for Coordinated Public Messaging, Nuclear Detonation. Hawaii State Department of Defense. 2017.

Hawaii Catastrophic All Hazards Concept Plan (CONPLAN). Federal Emergency Management Agency. 2009.

Jackson County Emergency Preparedness Plan for Families. Jackson County Emergency Management Advisory Council. Revised and Reprinted January 2006. Medford, Oregon: Jackson County Board of Commissioners.

Law Enforcement Mutual Aid Plan, 2016 Edition. California Governor's Office of Emergency Services. 2016.

Mass Fatality Management Field Operations Guide. City and County of Honolulu. 2013.

Multi-Year Training and Exercise Plan 2016-2018. Hawaii Emergency Management Agency.

2017.

Nuclear Preparedness Guide. Hawaii Emergency Management Agency. 2017.

Occupational safety for the death care industry. Oregon Occupational Safety and Health Administration and Oregon Mortuary and Cemetery Board. June 2014.

Radiation Emergencies; Frequently Asked Questions. Oregon Health Authority; Radiological Emergency Response. Updated 2018.

Radiologic Health Branch Organizational Chart. California Department of Public Health. No date.

Ready Ventura County. Ready Ventura County. 2018. https://www.readyventuracounty.org/.

Shelter-in-Place Guidance for Ballistic Missile Threats. Department of Education. State of Hawaii. 2018.

State of Alaska Emergency Alert System Plan. State of Alaska. 2016.

State of Alaska Emergency Operations Plan. State of Alaska, Division of Homeland Security and Emergency Management. 2016.

State of Alaska Hazard Mitigation Plan. Alaska Department of Military and Veteran Affairs, Division of Homeland Security and Emergency Management. October 2013.

State of California Emergency Management Mutual Aid Plan. California Governor's Office of Emergency Services. November 2012.

State of California Emergency Plan. California Governor's Office of Emergency Services. October 1, 2017.

State of Hawaii Emergency Operations Plan; Basic Plan. Hawaii Emergency Management Agency. May 2017.

State of Oregon Emergency Management Plan, Vol. III: Emergency Operations Plan. Oregon Office of Emergency Management. April 2017.

Washington State Comprehensive Emergency Management Plan; Basic Plan. Washington Military Department Emergency Management Division. June 2016.

Washington State EAS Handbook. Approved by the Washington State Emergency

Communications Committee. May 13, 2014.

Washington State Legislature. RCWs, Title 38, Chapter 38.52, Section 38.52.010.

"About; Wireless Emergency Alerts." *California Governor's Office of Emergency Services.* 2014. Accessed September 1, 2018. http://calalerts.org/about.html.

"Background; Commercial Low Level Radioactive Waste Disposal." *Washington State Department of Health.* Updated 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation/WasteManagement/CommercialLowLevelRadioactiveWasteDisposal/Background.

"Be Prepared." *California Department of Public Health.* Last updated April 27, 2017. Accessed November 24, 2018. https://www.cdph.ca.gov/Programs/EPO/Pages/PrepareanEmergencySupplyKit.aspx.

"Building a 7 Day Emergency Kit." *State of Alaska; Department of Military and Veteran Affairs; Homeland Security & Emergency Management.* No date.

"California: Sales Tax Handbook." *Sales Tax Handbook.* Last updated 2018. Accessed August 19, 2018. https://www.salestaxhandbook.com/california/sales-tax-holidays.

"California State Warning Center." *California Government's Office of Emergency Services.* Updated 2018. Accessed September 1, 2018. http://www.caloes.ca.gov/cal-oes-divisions/warning-center.

"Catastrophic Incident Annex." *Washington State CEMP.* Washington Military Department Emergency Management Division. November 2013.

"Emergency Go – Kit Passport." *Oregon Military Department; Office of Emergency Management.* No date.

"Emergency Supplies Checklist." *Earthquake Preparedness Tips; California Governor's Office of Emergency Services.* No date.

"Emergency Supply Kit." *Municipality of Anchorage; Emergency Management.* 2018. Accessed November 24, 2018. https://www.muni.org/Departments/OEM/Prepared/Pages/SupplyKit.aspx.

"Emergency Support Function Annex; ESF 13. Military Support." *Clackamas County EOP.* No date. Retrieved from https://dochub.clackamas.us/documents/drupal/e91cec3d-9de6-4fbc-bff5-81a136c7767f.

"Executive Summary." *Multi-Hazard Pre-Disaster Mitigation Plan*. Department of Emergency Management, City and County of Honolulu. July 2012.

"Exhibit 3; Oregon Hospital Trauma Team Activation Criteria." *Oregon Administrative Rules* Chapter 333, Division 200 (OAR 333-200). Effective January 1, 2016.

"Emergency Support Function 20 Defense Support to Civil Authorities." Washington State Military Department National Guard. December 2014.

"ESF 2 - Communications." *State of Oregon EOP; Emergency Support Functions.* Last updated December 1, 2014. ESF 2-3 – ESF 2-22.

"ESF 10 – Environmental Protection and Hazardous Materials." *State of Oregon EOP; Emergency Support Functions.* Last updated March 4, 2016. ESF 10-1 – ESF 10-15.

"Fact Sheet: Preparing for an Nuclear Missile Threat." *State of Alaska Division of Homeland Security and Emergency Management.* No date. Accessed March 30, 2018. Retrieved from https://www.ready.alaska.gov/Documents/Fact%20Sheet%20-%20Preparing%20for%20A%20Nuclear%20Attack.pdf.

"Final Hazard Profile – Terrorism." *Washington State Threat Mitigation Plan.* October 2012. Tab 5.16. Retrieved March 27, 2018.

"For Individuals & Families." *California Governor's Office of Emergency Services.* 2018. Accessed August 19, 2018. http://www.caloes.ca.gov/for-individuals-families.

"IA 6 – Volcano." *State of Oregon EOP; Incident Annexes.* 2015. IA 6-1 – IA 6-13.

"IA 8 – Terrorism." *State of Oregon EOP; Incident Annexes.* 2015. IA 8-1 – IA 8-19.

"IA 9 – Nuclear/Radiological." *State of Oregon EOP; Incident Annexes.* 2015. IA 9-1 – IA 9-21.

"Mutual Aid Resources." *Oregon Military Department Office of Emergency Management.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oem/emresources/Pages/Mutual-Aid-Agreements.aspx.

"Nuclear Emergency Information." *Oregon Department of Energy.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/energy/safety-resiliency/Pages/Emergency-Information.aspx.

"Nuclear Waste in California: A Timeline." *Tiki-Toki.* March 2011. Accessed September 1,

2018. https://www.tiki-toki.com/timeline/entry/6207/Nuclear-Waste-in-California-A-Timeline/#vars!date=1953-09-08_04:53:31.

"Oregon's Radiation Monitoring Efforts." *Oregon Health Authority.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oha/PH/HealthyEnvironments/RadiationProtection/RadiationMonitoring/Pages/index.aspx.

"Oregon Radiation Protection Services." *Oregon Health Authority.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oha/PH/HealthyEnvironments/RadiationProtection/Pages/index.aspx.

"Plans and Procedures for Radiological Emergency Preparedness." *Washington State Department of Health.* Updated 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation/RadiologicalEmergencyPreparedness/PlansandProcedures.

"Preparedness Information." *State of Hawaii; Hawaii Emergency Management Agency.* 2018. Accessed November 24, 2018. http://dod.hawaii.gov/hiema/public-resources/preparedness-information/.

"Radiation Protection." *Washington State Department of Health.* Updated 2018. Accessed September 1, 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation.

"Radioactive Waste Disposal in Oregon." *Oregon Department of Energy.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/energy/safety-resiliency/Pages/Radioactive-Waste-Disposal.aspx.

"Radioactive Waste Transport." *Oregon Department of Energy.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/energy/safety-resiliency/Pages/Radioactive-Waste-Transport.aspx.

"Radiologic Health Branch (RHB)." *California Department of Public Health.* Last updated July 6, 2018. Accessed September 1, 2018. https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/RHB.aspx#.

"State Capability Assessment." *Oregon Military Department Office of Emergency Management.* Updated 2018. Accessed August 20, 2018. https://www.oregon.gov/oem/emresources/Plans_Assessments/Pages/State-Capability-Assessment.aspx.

"Take 10." *Hawaii State Department of Health.* February 2018.

"Training; Radiological Emergency Preparedness." *Washington State Department of Health.* Updated 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation/RadiologicalEmergencyPreparedness/Training.

"Waste Disposal; Commercial Low Level Radioactive Waste Disposal." *Washington State Department of Health.* Updated 2018. https://www.doh.wa.gov/CommunityandEnvironment/Radiation/WasteManagement/CommercialLowLevelRadioactiveWasteDisposal/WasteDisposal.

Federal Guidance and References

2018-2022 Strategic Plan. Federal Emergency Management Agency. March 15, 2018.

42 U.S. Code § 5133 – Predisaster hazard mitigation, as amended.

42 U.S. Code § 5165 – Mitigation planning, as amended.

Daniel R. Coats. *Statement for the Record; Worldwide Threat Assessment of the US Intelligence Community.* Office of the Director of National Intelligence. February 13, 2018.

Civil Defense and Homeland Security: A Short History of National Preparedness Efforts. U.S. Department of Homeland Security National Preparedness Task Force. September 2006.

Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans. Federal Emergency Management Agency. November 2010.

Comprehensive Preparedness Guide 201: Threat and Hazard Identification and Risk Assessment Guide (2nd Edition). Federal Emergency Management Agency. August 2013.

Defense Against Weapons of Mass Destruction. 50 U.S.C. §§ 2313-2353, as amended.

Homeland Security Act of 2002 (Public Law 107-296), as amended.

Homeland Security Presidential Directive (HSPD) 5. February 28, 2003.

Moss, Mitchell, Charles Schellhamer, and David A. Berman. "The Stafford Act and Priorities for Reform." *Journal of Homeland Security and Emergency Management* 6, no. 1 (2009).

National Disaster Recovery Framework. 2nd ed. Federal Emergency Management Agency. June 2016.

National Incident Management System (NIMS). Federal Emergency Management Agency. December 2008, as amended.

National Mitigation Framework, 2nd ed. Federal Emergency Management Agency. June 2016.

National Preparedness Goal, 2nd ed. Federal Emergency Management Agency. September 2015.

National Preparedness System. Federal Emergency Management Agency. November 2011, as amended.

National Prevention Framework, 2nd ed. Federal Emergency Management Agency. June 2016.

National Protection Framework, 2nd ed. Federal Emergency Management Agency. June 2016.

National Response Framework, 3rd ed. Federal Emergency Management Agency. July 2014.

Nuclear/Radiological Incident Annex to the National Response Framework. June 2008, as amended.

Planning Guidance for Response to a Nuclear Detonation, 1st edition. Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats. January 16, 2009.

Planning Guidance for Response to a Nuclear Detonation, 2nd edition. National Security Staff Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats. June 2010.

Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended.

Statement of General Lori J. Robinson, United States Air Force Commander, United States Northern Command and North American Aerospace Defense Command. Before the Senate Armed Services Committee Strategic Forces Subcommittee. Washington, D.C. March 21, 2018.

"Emergency Support Function Annexes." *Federal Emergency Management Agency.* Updated 2018. Accessed September 1, 2018. https://www.fema.gov/media-library/assets/documents/25512.

"Integrated Public Alert & Warning System." *Federal Emergency Management Agency*. Updated 2018. Accessed August 24, 2018. https://www.fema.gov/integrated-public-alert-warning-system.