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THESIS

COLLABORATIVE RADIOLOGICAL RESPONSE PLANNING

by

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From the events of September 11, 2011, the United States learned a large-scale disaster can strike without warning. President Bush issued a series of Homeland Security Presidential Directives (HSPD) intended to increase coordination among response agencies. However, despite the enactment of the HSPDs, coordination and collaboration among response agencies is significantly lacking with respect to radiological emergency planning and preparedness activities. Planning for nuclear/radiological events is unique in that they often occur with no notice, with great complexity, and require broad scenario planning to cover the important potential contingencies. Radiological events demand that actions be taken by responsible organizations, in a timely and effective manner to mitigate consequences on populations, infrastructure and environment. This thesis is intended to help officials better understand the many factors that impact coordination and collaboration. These factors range from information sharing to multidisciplinary participation. This thesis will also assist officials in better understanding the Capabilities Based Planning Model and how it may be implemented to enhance radiological emergency planning and preparedness. The elements included in this paper are intended to enhance the planning and associated decisions made by all partners involved in local radiological planning efforts. In conclusion, the thesis recommends enhancing radiological emergency planning and preparedness at the local level, through integrating the jurisdictions approach with the use of the Capabilities Based Planning Model to encourage performance partnership and collaborative methods.

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COLLABORATIVE RADIOLOGICAL RESPONSE PLANNING

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LIST OF ACRONYMS AND ABBREVIATIONS

CBP	Capabilities Based Planning
CBRNE	Chemical, Biological, Radiological, Nuclear, Explosive
CIA	Central Intelligence Agency
DoD	Department of Defense
DHS	Department of Homeland Security
DOE	Department of Energy
EEG	Exercise and Evaluation Guide
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FRERP	Federal Radiological Emergency Response Plan
GAO	Government Accountability Office
HHS	Health and Human Services
HSEEP	Homeland Security Exercise and Evaluation Program
HSPD	Homeland Security Presidential Directive
IED	Improvised Explosive Device
IND	Improvised Nuclear Device
MOA	Memoranda of Agreement
MYTEP	Multi-Year Training and Exercise Plan
NIMS	National Incident Management System
NPF	National Planning Framework
NPG	National Preparedness Guidelines
NPS	National Preparedness System
NRC	Nuclear Regulatory Commission
NRP	National Response Plan
OIA	Office of Intelligence and Analysis
PPD	Presidential Policy Directive
RDD	Radiological Dispersion Devices
TCL	Target Capabilities List
UTL	Universal Task List
WMD	Weapons of Mass Destruction

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I. INTRODUCTION

A. COLLABORATIVE RADIOLOGICAL RESPONSE PLANNING

Effective and efficient preparedness efforts require inclusion and participation of multiple disciplines across various levels of private and public entities. According to Department of Homeland Security (DHS) guidance, "preparedness is the foundation of a successful national incident management system involving all levels of government and other non-governmental organizations "*as necessary.*"[1] It is difficult to measure the extent to which multiple disciplines are engaged and participate in radiological/nuclear planning efforts, as state and local determinations of what agencies/organizations are deemed *necessary* is quite subjective.

While some may view this generalized statement by DHS beneficial, as states and localities under "home rule" are free to include disciplines as they deem *necessary*, it may also lead organizations to give insufficient attention to external relationships. This lack of coordination and cooperation may be attributed to unclear federal policies and procedures that have been interpreted differently by state and local organizations.

Radiological events necessitate a broad range of flexible response capabilities as the threat is ever changing, dynamic and complex. Multi-disciplinary capabilities that may be utilized in responding to a radiological event are often not addressed as many agencies plan within silos, failing to address relevant partners governmental and non-governmental as well as private entities. This can be problematic, as according to the National Response Framework (NRF), United States disaster management follows the principle of federalism for emergency management, or bottom to top approach.[2] Local authorities have primary responsibility for initial and sustained emergency response, disaster management, recovery and mitigating long-term health and environmental

[1] United States Government Accountability Office (2010). *Combating Nuclear Terrorism: Actions Needed To Better Prepare To Recover From Possible Attacks Using Radiological Materials* (GAO-10-204). Retrieved from U.S. Government Printing Office, http://www.gao.gov/assets/310/301288.pdf.

[2] Francis X. McCarthy and Jared T. Brown, *Congressional Primer on Major Disasters and Emergencies*, Congressional Research Service, Washington, D.C.; "Who is in Charge?," 5, retrieved from Federation of American Scientists, http://www.fas.org/sgp/crs/homesec/R41981.pdf.

consequences. Therefore, the responsibility for multiagency multidisciplinary coordination and collaboration should sit with local authorities.

Because of the complex nature of emergencies and the potential scope of their consequences, preparedness and response arrangements, for their management should involve multiple organizations and entities in various jurisdictions.[3] Formal agreements among agencies may serve as a baseline for measuring inter-agency coordination and information sharing.[4] In 2004, The Council of State and Territorial Epidemiologists distributed questionnaires to individuals within state health departments to evaluate planning and preparedness for a radiological/chemical event.[5] Overall, respondents reported a lack of planning and preparedness for a radiological/chemical event; 48–67% of the respondents had not established Memoranda of Agreement (MOA) with agencies such as the Federal Bureau of Investigation (FBI), water regulators, food regulators, agricultural agencies, hazardous waste regulators, local environmental health agencies, American Red Cross, military, National Guard, mental health departments, or academic institutions.[6]

The apparent lack of agreements prompted further study by the United States Government Accountability Office (GAO), which examined coordination between DHS and Health and Human Services (HHS) for the development of their Chemical, Biological, Radiological, Nuclear (CBRN) risk assessments. The GAO report identified a lack of DHS interagency agreements or written procedures for development of terrorism risk assessments and material threat assessments.[7] The GAO further noted in the study that in the 2006 Risk Assessment report, DHS did not have inter-agency development or

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[3] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

[4] *A National Assessment of The Status Of Planning For Public Health Preparedness For Chemical and Radiological Contaminating Terrorism* (2004, April). Retrieved from http://www.cste.org/dnn/LinkClick.aspx?fileticket=vtcs94oAGYE=&tabid=175&mid=716

[5] Ibid.

[6] Ibid.

[7] United States Government Accountability Office (2011). *DHS and HHS Can Further Strengthen Coordination For Chemical, Biological, Radiological, and Nuclear Risk Assessments* (GAO-11-606). Retrieved from http://www.gao.gov/assets/320/319831.pdf

review of the risk assessment; nor did it have interagency working groups or other structures to regularly request and receive partner input.[8]

Limited or lack of multi-disciplinary collaboration in radiological response planning is a significant gap at the federal, state and local government level. Collaboration and information sharing form a necessary foundation for dealing with both natural and manmade disasters, as these events require shared authority, dispersion of responsibilities, and allocation of mutual resources. This thesis recommends the application of a Capabilities Based Planning (CBP) model to the current radiological response planning strategy to enhance collaboration among agencies and organizations.

The thesis first provides an overview of the current radiological planning strategy, identifying the need for enhanced collaboration. Second, it presents an overview of the variables impacting collaborative radiological response planning. Third, it provides an overview of CBP concepts and methodology. Finally, it offers recommendations for enhancing collaboration by means of implementation of the CBP model to the current government radiological response planning strategy.

B. METHODOLOGY

The primary research method utilized in the development of this thesis was program evaluation, by means of qualitative research methods. The purpose of the study was to examine the current United States government strategy for radiological response planning; and to what extent multiple disciplines and agencies are included in radiological response planning. The exploratory study aimed to identify strengths and shortfalls of the current strategy and examine recommendations for improvement.

The primary method of qualitative research utilized was documentary analysis.[9] Documentary analysis provided the opportunity to analyze critical documents. Data collection was conducted utilizing university and government wide libraries, to include various databases, such as the Homeland Security Digital Library, Lexis-Nexis, BOSUN, EBSCO Host and Springer Link. Sampling was purposeful in selecting information rich

[8] Ibid.

[9] Merriam, Sharan B. *Qualitative Research: A Guide to Design and Implementation.* San Francisco, CA: Jossey- Bass, 2009.

documents that meet the needs of the study and specifically related to the stated research question. The data sample included secondary sources, comprising written materials and official documents such as minutes from meetings, planning papers, journals, reports, newsletters, files and statistics as well as books.[10] Resources were collated, interpreted, criticized and synthesized.[11]

Data were included from different informational sources (data triangulation), as a means of testing the consistency of the data across different sources and reducing bias.[12] For example, documents were gathered from all levels of government as well as private sector and non-governmental organizations to ensure various vantage points were considered. Additionally, the sampling of documents included those stemming from the original implementation of radiological response planning to current date. The samples encompassed the historical account of radiological preparedness, a review of the implementation of such strategy, its mutations, as well as the outcome and recommendations for alterations to the current strategy as it relates to multi- agency collaboration.

The primary method of data analysis utilized in the development of this thesis was coding, whereby labels were systemically assigned to segments of data so that sections with similar content could be connected across data.[13] The type of coding utilized was thematic coding. Thematic coding required a detailed review of the text to identify and build themes and ideas about the data.[14] The data analysis was conducted in a series of steps.

The first step was to canvass a variety of potential sources and develop a broad overview of the elements relating to the research question and what means there were to

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[10] Thomas, Gail Fann. "Research Methods: Qualitative Data Analysis." Graduate School of Business & Public Policy, Naval Postgraduate School

[11] Bardach, Eugene. *A Practical Guide for Policy Analysis.* 3rd. Washington, DC: CQ Press, 2009.

[12] Merriam, Sharan B. *Qualitative Research: A Guide to Design and Implementation.* San Francisco, CA: Jossey-Bass, 2009.

[13] Braun, V. and Clarke, V., "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology*, 3 (2006): 77–101.

[14] Thomas, Gail Fann. "Research Methods: Qualitative Data Analysis." Graduate School of Business & Public Policy, Naval Postgraduate School.

learn about them.[15] The second step was to manually generate initial codes by utilizing colored tabs, highlighting text, and writing codes in the margins to identify important points, contradictions and inconsistencies, common themes, comparisons and contrasts with other data, etc. In the third step, codes were reviewed to identify major themes or patterns.[16] The fourth step was to conduct a review of the themes. The final step of the data analysis included defining and naming themes, whereby themes with related patterns were combined and catalogued into sub-themes.[17] As part of the fourth and fifth step, a thematic map was created to provide an overall conception of the data patterns and the relationship among the themes.

[15] Bardach, Eugene. *A Practical Guide for Policy Analysis.* 3rd edition. Washington, DC: CQ Press, 2009.

[16] Thomas, Gail Fann. "Research Methods: Qualitative Data Analysis." Graduate School of Business & Public Policy, Naval Postgraduate School.

[17] Braun and Clarke, "Using Thematic Analysis in Psychology," 77–101.

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II. HISTORY OF UNITED STATES RADIOLOGICAL PLANNING

A. FEDERAL PLANNING EFFORTS

The United States Environmental Protection Agency (EPA) has had radiological responsibilities since 1970.[18] The General Services Administration expanded the EPA role in 1975 and assigned roles to other various federal agencies.[19] At this time, the Nuclear Regulatory Commission (NRC) was primarily responsible for emergency planning and preparedness as it pertained to radiological/nuclear events. The Three Mile Island Nuclear Power Plant accident of March 1979, lead to key changes in radiological response planning as crucial lessons about safety and crisis management were learned from the accident. Additionally, significant problems in the response of federal agencies were also identified as an opportunity for improvement. In July of 1979, President Carter established the Federal Emergency Management Agency (FEMA) by Executive Order. FEMA assumed the NRC role of coordinating emergency planning and preparedness activities outside the boundaries of NRC facilities.[20]

In June of 1980, the Nuclear Regulatory Commission Authorization, Public Law 96-295, Section 304, required that the President prepare and publish a "National Contingency Plan." This "National Contingency Plan" was subsequently renamed in 1996 as the United States Federal Radiological Emergency Response Plan (FRERP).[21] The objective of the plan was to establish an organized and integrated capability for timely, coordinated response by Federal agencies to peacetime radiological emergencies. A broad range of federal agencies participated in the plan, with clearly stated responsibilities and/or capabilities.

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[18] U.S. Environmental Protection Agency, "Radiation Protection." Last modified May 22, 2012. http://www.epa.gov/radiation/rert/history.html.

[19] Ibid.

[20] Ibid.

[21] Nuclear Regulatory Commission, "Federal Radiological Emergency Response Plan." Last modified May 07, 1996. Accessed October 1, 2013. http://www.fas.org/nuk/guide/usa/doctrine/national/frerp.htm.

In 2008, the United States Federal Radiological Emergency Response Plan was replaced by the National Response Framework. The National Response Framework was developed, in an effort to establish a single, comprehensive approach to domestic incident management. The replacement of the FRERP with the NRF was a fundamental shift in the national planning approach as it shifted from the specific to the general.

III. FEDERAL PLANNING STRATEGY

A. PRESIDENTIAL POLICY DIRECTIVE 8

Presidential Policy Directive (PPD) 8 was signed on March 30, 2011, and replaced Homeland Security Presidential Directive (HSPD)-8 (National Preparedness), and HSPD- 8 Annex 1 (National Planning) (except for paragraph 44 of HSPD-8 Annex I).[22] PPD-8 aimed at strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the United States. PPD-8 states "Our national preparedness is the shared responsibility of all levels of government, the private and nonprofit sectors, and individual citizens."[23] Furthermore, this directive sought to "galvanize action by the Government" and facilitate "an integrated, all-of-Nation, capabilities-based approach to preparedness."[24] The directive called for a series of integrated National Planning Frameworks (NPF) to be built upon scalable, flexible, and adaptable coordinating structures to align key roles and responsibilities to deliver necessary capabilities.[25] Key principles of PPD 8 include:

- Employ an all-of-nation/whole community approach, integrating efforts across federal, state, local, tribal and territorial governments and with private sector, community, non-governmental, and individual partners
- Use a risk-based approach to support preparedness
- Build core capabilities to confront any challenge
- Integrate efforts across Prevention, Protection, Mitigation, Response, and Recovery
- Assess performance outcomes to measure and track progress

The aforementioned key principles are woven into the NPF and provide a foundation for planning efforts aimed to enhance capabilities.

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[22] Obama, Barack. United States. The White House. *Presidential Policy Directive*. Washington, DC, 2011. http://www.dhs.gov/xlibrary/assets/presidential-policy-directive-8-national-preparedness.pdf.

[23] Ibid.

[24] Ibid.

[25] U.S. Department of Homeland Security (2013). *Overview of the National Planning Frameworks*. Retrieved from , http://www.fema.gov/library/viewRecord.do?id=7361

1. National Planning Frameworks

PPD-8 directed that one framework be developed for each of the five mission areas: Prevention, Protection, Mitigation, Response and Recovery. To date, the Federal Government and its partners have released four (4) of five (5) proposed National Planning Frameworks (NPF).[26] Each NPF documents the roles and responsibilities of the whole community in all aspects of preparedness; however, the roles and responsibilities are more general than specific and serve only as a guide for planners to use in local strategic planning efforts. The intent of the NPF was to provide a macro level outline of how the nation coordinates, shares information and collaborates to ensure a more secure and resilient nation.

The frameworks follow a whole community approach to preparedness, recognizing that everyone can contribute to, and benefit from national preparedness efforts. The term "whole community" is all-inclusive, as it incorporates individuals and families (to include special populations and those with functional needs), businesses, community and faith-based groups, nonprofit organizations and all levels of government.[27] Under the NPF, core capabilities are scalable, flexible, and adaptable. Therefore, the capabilities may be executed as needed to address a diverse range of threats and hazards. Flexibility within the NPF supports communities in organizing their efforts to address a variety of risks based on their unique needs, capabilities, demographics, governing structures and non-traditional partners.[28]

2. National Preparedness Guidelines

Federal, state, local, tribal, and territorial governments, in cooperation with private and non-profit sectors, each have unique roles in supporting the preparedness framework established by the National Preparedness Guidelines (NPG).[29] According to the NPG, all levels of government should integrate into their preparedness and response

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[26] Ibid.

[27] Ibid.

[28] Ibid.

[29] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

plans, the capacity of community, faith-based, and other nongovernmental organizations.[30] This guidance is aligned with the whole community approach. As depicted in Figure 1, this integration includes engaging such organizations in the planning process, providing necessary training and credentialing of their personnel, providing necessary resource support for involvement in joint response, and incorporating the organizations in training and exercises.[31]

The National Preparedness System (NPS) provides opportunities for all levels of government, the private sector, nongovernmental organizations, and individual citizens to work together to achieve priorities and capabilities. However, while the NPS provides opportunities and makes recommendations, it does not mandate collaborative efforts, as it functions merely as guidance.

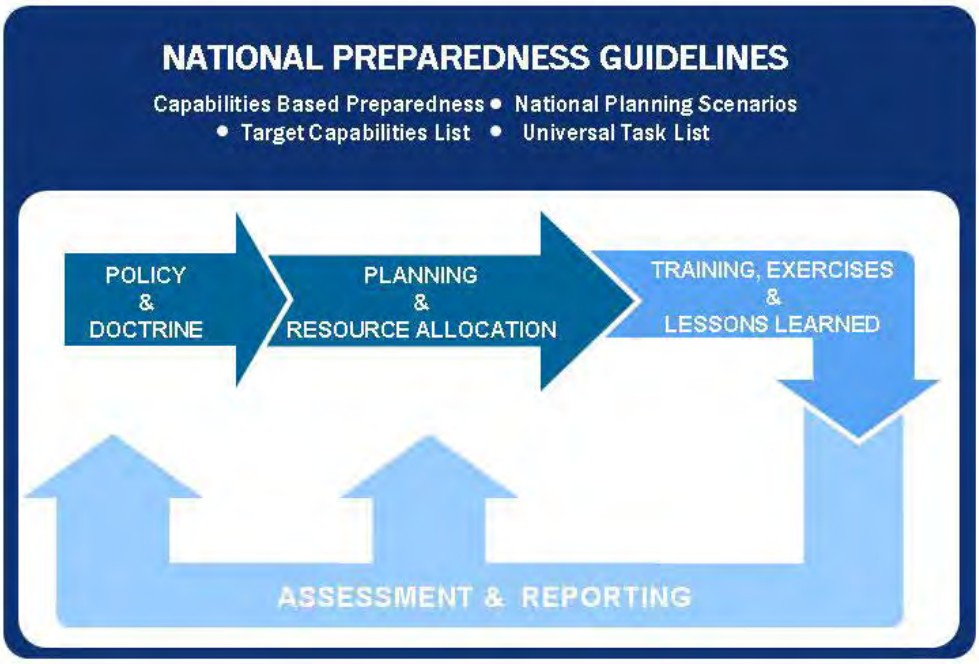

Figure 1. National Preparedness System[32]

[30] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

[31] Ibid.

[32] Ibid.

B. TARGET CAPABILITIES LIST

The Department of Homeland Security (DHS) Target Capabilities List (TCL) defines thirty-seven specific capabilities that all levels of government should possess in order to respond effectively to incidents. Capabilities may be defined as "combinations of resources that provide the means to achieve a measurable outcome resulting from performance of one or more critical tasks, under specified conditions and performance standards."[33] Aligned with the central objective of Capabilities-Based Planning, the TCL provides target levels of capabilities that federal, state, local, and tribal entities must achieve to perform critical tasks for homeland security missions.[34] The TCL serves as a resource for planners as it includes objectives, tasks, and measures for evaluation. Implementation at the state and local levels, however, is not fully embraced, and at times may be partially, if at all, integrated into planning efforts.

According to the Department of Homeland Security, the TCL was intended to define capabilities in an effort to cope with diverse homeland security scenarios and to delineate conditions and measures of performance.[35] Conditions may include weather or the number of casualties, among many other environmental variables that affect task performance.[36] More specifically, measures and performance criteria describe a standard for how well a task must be performed and on the basis for varying levels of acceptable task performance. For example, to assess a jurisdiction's ability to perform radiological response tasks, planners may utilize numerous TCL to include performance criteria outlined in the Prevent Mission Area: Chemical, Biological, Radiological, Nuclear, and Explosives (CBRNE) Detection, Respond Mission: Weapons of Mass Destruction (WMD) and Hazardous Materials Response and Decontamination Target Capabilities.

In addition to serving as a resource for measuring, assessing and evaluating performance, the TCL may also be considered a tool for expanding regional

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[33] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

[34] United States. Department of Homeland Security. *Target Capabilities List: A Companion to the National Preparedness Guidelines*. 2007.

[35] Ibid.

[36] Ibid.

collaboration. Expanded Regional Collaboration is identified as the first priority in the National Preparedness Guidelines (NPG).[37] Large-scale events may require a shared response across jurisdictions, levels of government, and the public/private sectors depending on the scale of the event.[38] Planners would be well-advised to organize an expanded region to facilitate the strengthening of relationships among participants, and regional preparedness planning and operations support, as well as joint implementation of a capabilities-based approach.[39]

National Preparedness Guidelines also recommend the establishment of multi-jurisdictional and multi-disciplinary working groups consisting of representatives from various entities located within multiple jurisdictions.[40] A collaborative approach may take form in three steps. First, a working group would first determine how best to achieve the capabilities. Second, a decision would determine where the capabilities should be built and maintained. Finally, priorities would be established to manage the use of limited resources.

Within the TCL, Prevent Mission Area: CBRNE Detection, the theme of collaboration is also prominent. Training, communication, close coordination with key partners (including intelligence, law enforcement, public safety, public health, international partners, public and private sector awareness of CBRNE threats) are all recognized as critical enablers for the CBRNE Detection capability.[41] Similarly, the Respond Mission: Weapons of Mass Destruction (WMD) and Hazardous Materials Response and Decontamination Target Capability also require significant collaboration in addition to enhanced information sharing efforts to successfully perform radiological response tasks.

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[37] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007, 10

[38] Ibid.

[39] Ibid.

[40] Ibid.

[41] United States. Department of Homeland Security. *Target Capabilities List: A Companion to the National Preparedness Guidelines*. 2007.

It may be important to note here, in 2011, the National Preparedness Goal (NPG) was released with a list of thirty-one new "Core Capabilities"[42] that targets for each capability remain either preliminary or incomplete in the National Preparedness Goal of 2011 (to include those which are relevant to radiological and nuclear emergency planning), which has not been revised to date. A crosswalk document released by FEMA attempts to link the thirty-seven Target Capabilities with the thirty-one Core Capabilities, but is "not meant as official FEMA doctrine."[43]

C. SCENARIO PLANNING

Scenario planning can be quite helpful in nuclear/radiological disaster planning as such events are difficult to predict, and therefore speculating upon the variety of possible scenarios may assist in preparing for the most likely or plausible events. Scenario building can be complex and subtle as they rely primarily on insight rather than formal analysis.[44] Scenario planning is challenging as planners need enough scenarios to cover the important possible contingencies, yet few enough to be manageable.[45] Additionally, considerable attention should be given to convincing management to do what seems best with a given scenario. A common view of the situation is supported by implementation of the Incident Command Structure and National Response Framework (as mentioned in the previous section). The intent of scenario planning is not to formalize the strategy per se, but to improve the decisions that are made both in building strategy and execution of actions in a real event.

1. National Planning Scenarios

According to the National Preparedness Guidelines, the National Planning Scenarios as well as the Target Capabilities List are both Capabilities-Based

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[42] Federal Emergency Management Agency, "Core Capabilities." Last modified 2011. Accessed October 5, 2013. http://www.fema.gov/core-capabilities.

[43] Ibid.

[44] Mintzberg, Henry, Bruce Ahlstrand, and Joseph Lampel. *Strategy Safari: A Guided Tour Through The Wilds of Strategic Management*. New York: Free Press, 1998.

[45] Ibid.

Preparedness tools.[46] The 2002 National Strategy for Homeland Security placed particular emphasis on preparing for catastrophic threats with "the greatest risk of mass casualties, massive property loss, and immense social disruption."[47] The 2007 National Planning Scenarios (fifteen in total), illustrates the potential scope, magnitude, and complexity of a range of high consequence events, to include terrorist attacks, major disasters, and other emergencies.[48] The National Planning Scenarios were developed with the premise that if a jurisdiction plans for a "major event," the same jurisdiction will be more adept to respond to a wide scale of emergencies. The National Planning Scenarios may be used by all levels of government as a reference to explore the potential consequences of major events and to evaluate and improve their capabilities to perform their assigned missions and tasks.[49] In planning for a "major event," jurisdictions are naturally challenged with their own unique resource needs and planning constraints, and are encouraged to identify means to address specific gaps.

[46] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

[47] Ibid.

[48] Ibid.

[49] Ibid.

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IV. FACTORS IMPACTING RADIOLOGICAL PLANNING COLLABORATION

A. COMPREHENSIVE PLANNING

The effectiveness of a plan may be measured by the extent to which it is comprehensive and comprehensible. This is especially true for terrorist incidents, as there is often ingenuity in panning as well as adaptability, relying on surprise to overcome security measures. Therefore, agencies involved in radiological planning would be well advised to implement a method based on capabilities which is more flexible, comprehensive, and comprehendible in its approach to contingency planning.[50] The process of contingency planning and resource allocation poses one of the greatest challenges because of the severity and diversity of the threats and the required timeliness of defensive operations and security responses. A capabilities-based planning method would support a comprehensive and comprehensible plan by producing a series of options for decision-makers that is directly related to radiological response capabilities and linked to specific and necessary resources.

B. MULTIDISCIPLINARY PARTICIPATION

Aligned with the whole-community approach, preparedness should be introduced as the responsibility of every level of government, every department, and every agency consistent with its authorities. However, often times departments and agencies who may have an integral role in radiological response are left out of the planning process. Threat identification and risk assessment may be utilized in identifying partners within and across jurisdictional and geographic borders. Preparedness activities, however, must be coordinated to ensure identification and fulfillment of roles and responsibilities among partners. Such coordination may be organized under the Capabilities Based Framework, as it provides for private sector and nongovernmental organizations to be involved, as

[50] Goss, Thomas., Building a Contingency Menu: Using Capabilities-Based Planning for Homeland Defense and Homeland Security, Homeland Security Affairs, Volume I, Issue 1, 2005 http://www.hsaj.org/?fullarticle=1.1.5.

they are critical players in prevention, vulnerability reduction, and response and recovery strategies and actions.

Planners would be well advised to coordinate preparedness across the same multi-agency coordination entities as described in the National Incident Management System (NIMS).[51] This is the basis for implementing the National Preparedness Guidelines, particularly the national priority to Expand Regional Collaboration. A notable challenge for state and local planning efforts is that the federal model for multi-disciplinary involvement and participation has been somewhat unsuccessful because federal agencies often do not comply with their own recommendations.[52] Moreover, the Department of Homeland Security's attempt to involve state and local government officials, national associations, and other federal agencies involved in homeland security has been more characteristic of a consultative relationship rather than a partnering, collaborative relationship.

The involvement of multiple levels of government as well as other agencies and organizations has not been initiated in the planning stages. Requests for involvement from the federal level has occurred much later in the process and relied on reaction in the form of requirements for rapid comment on a draft product. As a result there is often push-back, confusion about intent and requirements, as well as an inherent lack of understanding of radiological response, roles, and responsibilities.

Contrary to the federal approach, state and local planners would be well advised to generate a partnership in developing a strategic approach to radiological response. Ideally, all strategic partners should be identified and their needs should be clearly represented in a collaborative decision-making process. Diversifying and expanding the partners involved in radiological response may also be favorable to stakeholders as it may reduce the funding burden. However, this may not be completed without associated challenges.

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[51] United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

[52] State of Washington Department of Health, Disaster in Japan Incident Response- March 2011 to May 2011, Event After Action Report/ Improvement Plan, July 29, 2011, 47.

For example, due to federal funding mechanisms, individual entity budgeting and funding requirements, as well as liability and resource depletion concerns, entities may resist building formal partnerships for response to a major event, particularly if they consider a major event unlikely. More specifically, mutual aid agreements often dictate reimbursement and liability assignments. Unfortunately, despite the well-known catastrophic impact a radiological event can have, such events are often perceived as too low in probability to warrant dedicated resource allocations, planning time and partnership building.

C. FEDERAL GUIDANCE

Coordination of recovery planning for radiological-nuclear incidents requires federal guidance to provide states and localities with a framework for developing their own recovery strategies.[53] The lack of effective guidance or the mere existence of such guidance is of noticeable concern. In 2010, the Government Accountability Office (GAO) conducted an extensive review of existing federal guidance to include federal law, presidential directives, and other executive guidance.[54] An interview was conducted with officials from DHS, Department of Energy (DOE), Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), Nuclear Regulatory Commission (NRC), DOE and EPA national laboratories.[55] Additionally, the GAO conducted a survey of emergency management officials in cities, states and federal offices.[56] The review resulted in a significant finding, that FEMA has not completed planning to help cities and states recover from Radiological Dispersion Devices (RDD) or Improvised Nuclear Device (IND) incidents.[57]

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[53] United States Government Accountability Office (2009). *Combating Nuclear Terrorism: Preliminary Observations On Preparedness To Recover From Possible Attacks Using Radiological Or Nuclear Materials* (GAO-09-996T). Retrieved from U.S. Government Printing Office, http://www.gao.gov/assets/130/123278.pdf

[54] United States Government Accountability Office (2010). *Combating Nuclear Terrorism: Actions Needed To Better Prepare To Recover From Possible Attacks Using Radiological Materials* (GAO-10-204). Retrieved from U.S. Government Printing Office, http://www.gao.gov/assets/310/301288.pdf

[55] Ibid.

[56] Ibid.

[57] Ibid.

Within the aforementioned GAO report, it was stated that "a senior FEMA planning official told the GAO that because FEMA is already aware that its planning system does not fully recognize the involvement of state and local governments, the agency is developing regional support plans."[58] However, such support plans have not come to fruition. Despite the federal government's own requirements to test and exercise plans, the GAO determined that federal agencies have conducted few exercises to test radiological recovery plans.[59] Exercising radiological response is an opportunity to not only test plans, but also provide an opportunity to identify agencies that may have a role or responsibility in collaborative planning to strengthen radiological capabilities.

Federal guidance is essential in limiting confusion among state and local emergency management officials regarding federal agency responsibilities to provide assistance. Confusion can certainly hinder timely recovery from radiological incidents. Moreover, this issue has led to an apparent deficiency in health- related organizations understanding of their roles in radiological planning and response.

For example, in a roundtable conducted by the Center for Disease Control and Prevention (CDC) and the National Center for Environmental Health in 2010, discussions were facilitated with multiple Emergency Medical Services (EMS) and public health agency representatives.[60] The result was a determination that many of the participants did not understand what roles they would have in managing and recovering from a radiological event.[61] Aside from not understanding individual roles and responsibilities in a radiological event, some participants had no idea that their departments would even be involved."[62] The roundtable highlighted the fact that collaboration is critical to response in a radiological emergency, as local resources alone, would not be adequate.

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[58] Ibid.

[59] United States Government Accountability Office (2010). *Combating Nuclear Terrorism: Actions Needed To Better Prepare To Recover From Possible Attacks Using Radiological Materials* (GAO-10-204). Retrieved from U.S. Government Printing Office, http://www.gao.gov/assets/310/301288.pdf.

[60] Center for Disease Control and Prevention, National Center for Environmental Health (2010). *Record Of The Roundtable Meeting On Partnering With EMS For Radiological/Nuclear Emergency Preparedness* http://www.bt.cdc.gov/radiation/pdf /CDC%20EMS%20Radiation%20Roundtable%20Report%20508.pdf.

[61] Ibid.

[62] Ibid.

The recommendation was made that additional policies and guidance should be developed to address the scope of potential events ranging from local and regional to statewide.[63]

With a lack of guidance from the federal overarching entities, state and local divisions are creating their own planning documents resulting in an inconsistency across disciplines, as coordination and collaboration is limited or nonexistent. For example, the Department of Defense (DoD) developed a CBRNE consequence management plan. However, it has not been integrated with other federal government plans.[64]

Existing general strategy guidance, such as the National Planning Frameworks (NPF), provide roles and responsibilities for the whole community. However, it serves only as a generic guide for local planners, who must be empowered to implement the concepts of such guidance in local plans and strategies. While the NPF makes many recommendations regarding the whole community approach, the guidance is very general and often states that partners should include multilevel government, community and faith based organizations. Specific guidance on how to do so remains inadequate and lacks clarity. This may be due to the lack of partnerships of federal planning and policy authorities with those at local levels.

According to a study conducted by the GAO, local response disciplines prefer the federal government to consult with them in the initial formulation of a recovery strategy through inclusion in working and focus groups.[65] The report notes that emergency management officials at both the state and local levels are in need of more intelligence information on RDD and IND threats, as sharing information with law enforcement agencies is necessary for appropriate planning for RDD or IND incidents.[66]

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[63] Ibid.

[64] United States Government Accountability Office (2009). *Preliminary observations on defense chemical, biological, nuclear, and high-yield explosives consequence management plans and preparedness* (GAO-09-927T). Retrieved from U.S. Government Printing Office, http://www.hsdl.org/?view&did=34851.

[65] United States Government Accountability Office (2009). *Combating Nuclear Terrorism: Preliminary Observations on Preparedness to Recover from Possible Attacks Using Radiological or Nuclear Materials* (GAO-09-996T). Retrieved from U.S. Government Printing Office, http://www.gao.gov/assets/130/123278.pdf.

[66] Ibid.

D. INFORMATION SHARING

The Department of Homeland Security defines information sharing as "the ability to exchange intelligence, information, data, or knowledge among local, state, tribal, territorial, and Federal governments, private sector entities, or international partners as appropriate."[67] The Intelligence and Information Sharing capability is critical to radiological response planning, and involves

> …the effective implementation of the intelligence cycle and information integration process … by the whole community (to include local, state, tribal, territorial, and Federal intelligence entities, the private sector, the public, and international partners, as appropriate), … to develop situational awareness on the actor(s), method(s), means, weapon(s), or target(s) related to an imminent terrorist threat within the United States.[68]

Information sharing is a key element in collaborative planning for radiological response, mitigation, resilience and recovery. As such, there have been several improvements in federal policy. For example, Section 1016 of the Intelligence Reform and Terrorism Prevention Act of 2004 (Public Law 108–458) supports United States counterterrorism activities. Executive Order 13388 issued in 2005, further strengthened the sharing of terrorism information to protect Americans.[69]

Additionally, the WMD Intelligence and Information Sharing Act of 2011 (H.R. 2764) directed the Department of Homeland Security (DHS), through the Office of Intelligence and Analysis (OIA), "to undertake various activities to combat the threat of weapons of mass destruction and to share related reports with federal, state, local, and tribal authorities as well as other stakeholders."[70] Despite these improvements in federal policy, literature examining the operational strategy for ensuring effective information-sharing through collaborative methods is sparse. Moreover, there is a paucity of research on cross-sector capabilities to seamlessly collect, blend, analyze, disseminate, and use

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[67] United States. Department of Homeland Security. *National Prevention Framework*. Washington, DC, 2013.

[68] Ibid.

[69] Federal Register. "Executive Order 13388 - Further Strengthening the Sharing of Terrorism Information to Protect Americans." *National Archives and Records Administration* 70, no. 207 (October 2005): 1–5.

[70] Ibid.

information regarding threats, vulnerabilities, and consequences in support of radiological preparedness.

Existing literature supports the premise that each new piece of intelligence enhances the identification, definition and scope of the threat environment, information necessary for discerning what associated capabilities must be developed to prevent, disrupt and recover from a threat event. Additionally, actionable intelligence can initiate the execution of pre-planned response capabilities already identified and enabled.[71]

The intelligence and warning mission area covers activities to detect terrorist threats and disseminate terrorist-threat information. The category includes intelligence collection, risk analysis, and threat-vulnerability integration activities for preventing terrorist attacks. It also includes information sharing activities among federal, state and local governments, relevant private sector entities (particularly custodians of critical infrastructure), and the public at large. The major requirements addressed in the intelligence and warning mission area include: 1) unifying and enhancing intelligence and analytical capabilities to ensure officials have the information they need to prevent attacks and 2) implementing the Homeland Security Advisory System and other information sharing and warning mechanisms to follow federal, state, local and private authorities to take action to prevent attacks and protect potential targets.[72]

With accurate, timely, and relevant intelligence, responding partners can respond with precision and speed. U.S. intelligence must learn more about American institutions as partners while seeking to educate the American people about intelligence.[73] U.S. intelligence needs cohesive leadership plus a centralized and locally networked domestic structure in order to work with the American public. It would not be advisable to ignore the need for intelligence at home, create ad hoc and unsupervised entities, rely exclusively on the externally focused Central Intelligence Agency (CIA), or substitute

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[71] Davis, Paul K., Analytic Architecture for Capabilities-Based Planning, Mission Systems Analysis, and Transformation. Santa Monica, CA: RAND Corporation Publication MR 1513, 2002.

[72] United States Government Accountability Office (2005). Agency Plans, Implementation, and Challenges Regarding the National Strategy for Homeland Security (GAO-05-33). Retrieved from U.S. Government Printing Office, http://www.gao.gov/cgi-bin/getrpt?GAO-05-33.

[73] Sims, Jennifer E., and Burton Gerber. *Transforming U.S. Intelligence*. Washington, D.C.: Georgetown University Press, 2005.

law enforcement for intelligence. U.S. intelligence and other American institutions need each other to defend the homeland through a strategic partnership, one that matches America's potential with foreign intelligence collection opportunities at home and abroad. A call should be made for greater responsiveness and warning from U.S. intelligence to the homeland.

The U.S. private sector can help guide U.S. intelligence into unfamiliar areas and new ways of doing business. This kind of collaboration makes sense for many reasons, to include the growing number and complexity of topics that must be covered. A challenge to this rests with U.S. intelligence, under informed executive leadership and constructive legislative oversight, to understand private-sector partners and construct the right interdependent links.[74]

Planners would be well advised to ensure that communication plans, procedures and processes clearly state how, when and what information will be exchanged between partners and communicated to stakeholders.[75] Additionally, a process should be established for responding to conflicting decisions, misinformation and rumors as they can present significant challenges to the protection of the public's health and safety. Planners should identify and maintain a list of stakeholders and partners who will receive emergency risk communication products in advance of mass distribution to ensure message continuity and accuracy.[76] A communications strategy should ensure that timely and accurate information as well as clear and understandable advice is made available to stakeholders early in the response and routinely repeated and updated before, during and after a radiological event.[77]

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[74] Ibid.

[75] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

[76] Covello, V.T. "Developing an Emergency Risk Communication (ERC)/Joint Information Center (JIC) Plan for a Radiological Emergency." Office of Nuclear Security and Incident Response (February 2011): 1–172, https://www.hsdl.org/?view&did=4482

[77] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

V. CAPABILITIES-BASED PLANNING OVERVIEW

A. COMPONENTS AND PROCESS

The Capabilities-Based Preparedness (CBP) process is rooted in multi-disciplinary, cross-governmental, and regional collaboration. The CBP approach may assist in determining measurable radiological response targets, assessment of current preparedness capabilities as well as identifying and addressing areas of improvement with respect to planning, training and exercising for radiological events.[78] Additionally, a new model for cross-sector collaborative planning, in combination with the capabilities-based approach, can serve as a framework for management and organization of limited resources.[79] Under such framework, disciplines would be encouraged to expand and diversify their preparedness missions, as well as optimize output.

Capabilities-based planning may be defined as "planning, under uncertainty, to provide capabilities suitable for a wide range of modern-day challenges and circumstances, while working within an economic framework."[80] While the concept of capabilities-based planning is rarely discussed in public policy literature, the concept should be looked at more closely for application in radiological response planning, as such capabilities deal with a great measure of uncertainty and surprise.[81]

Previous methods of radiological response planning have primarily focused on the traditional threat-based approach.[82] While suggestions for implementation of a capabilities-based planning strategy have been proposed in the past, it is only recently

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[78] United States. Department of Homeland Security. *National Preparedness Guidelines*, Washington, DC, 2007.

[79] Fitzsimmons, M (2007). Whither capabilities-based planning?. *Joint Force Quarterly*, *44*, 101–105. Retrieved from https://www.hsdl.org/?view&did=711647.

[80] Davis, Paul K., Analytic Architecture for Capabilities-Based Planning, Mission Systems Analysis, and Transformation. Santa Monica, CA: RAND Corporation Publication MR 1513, 2002.

[81] (2002). *Alternative Futures Approach to Nuclear Deterrence Planning: Capabilities Based Planning for the New Triad*. Retrieved from Systems Planning and Analysis, Incorporated : https://www.hsdl.org/?view&did=441412.

[82] Committee on Naval Analytical Capabilities and Improving Capabilities-Based Planning. "Naval Analytical Capabilities: Improving Capabilities-Based Planning." *National Research Council of the National Academies* (National Academies Press), 2005: 1–102 http://proxy.buffalostate.edu:2055/lib/buffalostate/docDetail.action.

that consideration has been given to recommendations for revising current policy.[83] For example, the United States Quadrennial Defense Review has moved from a threat-based, country-specific approach to a non-country-specific continuum of capabilities.[84] This transformation has changed the basic United States force planning philosophy to a capabilities-based planning approach. However, despite such advancements, new planning methodologies still need to be fully developed.

The development of such planning methodologies is quite challenging as there is a difference between national interests and local interests. The national interest focuses on high impact threats and hazards, while the local interest takes a stochastic approach, focusing on high probability threats and hazards. Risk factors, such as threat, vulnerability, and consequence can be managed to a certain degree; however, the higher the impact an event may have the greater the uncertainty regarding the probability of such an event. The direct correlation between impact and uncertainty poses a significant challenge to homeland security planning, given the differences in national and local interests. As federal guidance is often focused on high impact threat, when states and localities attempt to adopt or implement such planning, there are significant challenges as such planning does not specifically address high probability events.

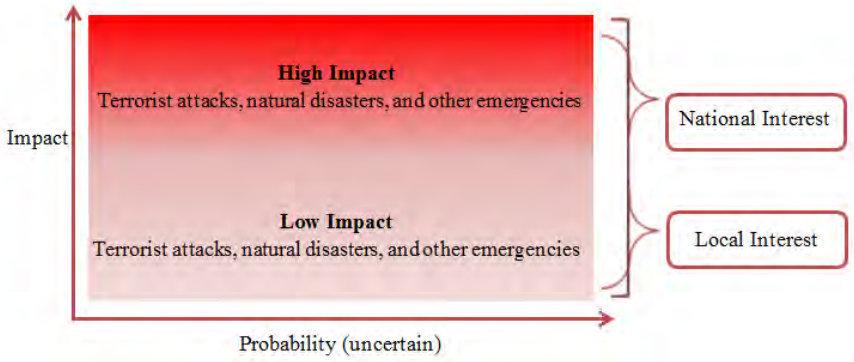

Figure 2. Risk-Based All-Hazards Approach[85]

[83] Davis, Paul K., Analytic Architecture for Capabilities-Based Planning, Mission Systems Analysis, and Transformation. Santa Monica, CA: RAND Corporation Publication MR 1513, 2002

[84] Kahan, Jerome H., Tindal, Zavadil, Stephen W., The New U.S. Strategic Framework and Capabilities-based Planning: Application to Strategic Force Planning, June 2003

[85] United States. Department of Homeland Security. *National Preparedness Goal*. Washington, DC, 2006.

At the local level, with the priority often being on high probability events, it is essential to enable officials to make informed choices that best strengthen capabilities. The Capabilities-Based Preparedness Process as depicted in Figure 3, emphasizes the integration of collaboration throughout several necessary steps to identify, achieve, and sustain target levels of a capability. The steps in Figure 3 may be integrated to better plan for radiological preparedness. The eight (8) steps must be followed in sequence as the processes and tools are combined to firstly identify and prioritize measurable preparedness targets in assessing current capabilities, and secondly to allocate available resources with emphasis on the most urgently needed capabilities based on risk.[86]

Figure 3. Capabilities-Based Preparedness Process[87]

[86] Ibid.

[87] Ibid.

The following section details the Capabilities-Based Preparedness Process as a framework for implementing the Capabilities Based Planning model for radiological planning. The model sets requirements and measures through a scenario-analysis process. The radiological response planning scenario is ideal in this process as it is specific and long-term. Utilization of the Capabilities Based Planning model allows for decision makers to select options, and make final determinations through multiple levels of analysis and decision-making.[88] Additionally, the model provides the opportunity for planners to consider a set of options to meet operations needs and/or outcomes. Capability Based Planning addresses risk management through direct intelligence regarding potential catastrophic events, analyzing capabilities across uncertain circumstances and risk characteristics, and then forming investment choices about how to achieve key objectives.[89]

[88] Ibid.

[89] United States. Department of Homeland Security. *National Mitigation Framework*. Washington, DC, 2013.

VI. IMPLEMENTATION OF A CAPABILITIES-BASED PLANNING MODEL

A. APPLICATION OF CBP IN RADIOLOGICAL PLANNING

The Capabilities Based Planning (CBP) model provides a conceptual framework for planning under the uncertainty of a radiological event, by emphasizing capability flexibility, robustness, and ability to adapt.[90] The implementation of such a model may allow for localities to better understand not only the threat and potential impact of a radiological event, but also to examine radiological response capability needs, assessment of radiological response options, as well as the ability to make choices based on multiple factors including risk, resources and economic limitations.[91]

A capabilities-based approach to contingency planning is inherently flexible and has the additional advantage of facilitating the planning process by ease of comprehension and explanation. The capabilities-based approach to planning can be adapted and adopted in part or in total by any organization involved in radiological preparedness. All levels within an organization can use the same planning process to formalize the passing of threat assessments, operational plans, and resourcing decisions up and down organizational leadership.

The eight (8) steps in CBP include convening a working group, determining capability targets, assessing current capability levels, identifying, analyzing and choosing options, updating plans and strategies, as well as conducting assessment and reporting. Such steps may be further defined to examine how they may be executed within the realm of radiological emergency response and planning at the local level.

Diversification of participants within a working group is essential, as responsibility for radiological response capabilities can be assigned to specific agencies and organizations that may further sub- divide, and designate responsibilities and tasks to specific divisions, teams and resources. This would allow planners at all levels to share a common language for addressing radiological threats as well as developing a

[90] Ibid.

[91] Ibid.

comprehensive response plan that then could be tested in multidisciplinary exercises. Agencies would evaluate existing resources, capabilities and missions to identify what their roles and responsibilities would potentially be when responding to a radiological event. A workgroup may serve to facilitate problem solving, improve access to resources, and foster coordination and information sharing.[92] A workgroup would also serve to generate an understanding of the overall emergency management structure, the roles and responsibilities of their individual organizations and their relation to other organizations and jurisdictions within the management structure.[93]

Collaboration will be enhanced with the implementation of a coordinating structure, which ensures ongoing communication and coordination among federal, state, local, tribal, nonprofit and private sector organizations. Coordinating structures such as the example in Figure 4 are in accordance with the whole community approach. The structure brings together those entities involved in conducting activities and operations, to address the requirements of the radiological response mission, and to serve in both a readiness and operational roles.[94] Additionally, the coordinating structure would support the Prevention, Protection, Mitigation, Response, and Recovery mission areas outlined in the National Preparedness Goal.[95]

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[92] Ibid.

[93] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

[94] United States. Department of Homeland Security. *National Mitigation Framework*. Washington, DC, 2013.

[95] United States. Department of Homeland Security. *National Preparedness Goal*. Washington, DC, 2006.

Figure 4. Example of Coordinating Structure[96]

Once a locality has established a working group, the participants would work with their emergency manager and state emergency management office in determining the jurisdiction's risk-based target level for radiological emergency response. The workgroup may use the Department of Homeland Security Target Capabilities List (TCL), such as those outlined in section II B, and National Preparedness Guidelines as a tool/guide.[97] Planners would be encouraged to balance the risk-based target level with both available resources and those that can be realistically acquired through regional collaboration.

With the risk-based target level identified, the workgroup would assess current capability levels. The working group would be charged with coordinating a detailed comparison of current capabilities with the risk-based target capability identified in the previous step. The outcome of such a comparison should assist in identifying areas for

[96] United States. Department of Homeland Security. *National Mitigation Framework.* Washington, DC, 2013, 23

[97] United States. Department of Homeland Security. *Target Capabilities List: A Companion to the National Preparedness Guidelines*. 2007.

improvement, or gaps.[98] The working group should also consider regional multi-agency coordination (i.e., mutual aid, acquisition through contracting, and resources from nongovernmental and private sector partners) as a resource for enhancing capabilities.

Following the assessment of the current capability levels, methods must then be identified and analyzed to address the areas for improvement. Specific needs will require a combination of resources. The workgroup may utilize the TCL as a guide to apply analytical processes to select alternative combinations of resources or solution sets for each area of improvement.[99] Senior decision makers will also consider strategic concerns and implications to include potential costs as well as the forecasted impact on planning.

A jurisdiction specific radiological response plan should be developed, as well as updated and revised with the participating agency roles and responsibilities, in addition to the identified strategies chosen. As many guidelines change with time, the workgroup should ensure that the plan is aligned with the National Preparedness Guidelines and is compliant with National Incident Management System (NIMS).[100] As a living document, the plan should be reviewed and exercised annually.

Resources identified as necessary and outstanding will require decision-makers to review budgets and funding requests. Identifying current or potential sources of funding will be necessary to determine feasibility of acquiring certain resources and prioritizing acquisitions. With an effective and regionally coordinated preparedness portfolio, jurisdictions will need to work closely with partnering counties as well as states to satisfy prioritized resources.

To deliver an effective emergency management and public health response, it is necessary to make, maintain and exercise adequate plans and arrangements in advance of

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98 United States. Department of Homeland Security. *National Mitigation Framework.* Washington, DC, 2013. Or can be accessed at https://s3-us-gov-west-1.amazonaws.com/dam-production/uploads/20130726-1914-25045-9956/final_national_mitigation_framework_20130501.pdf.

99 United States. Department of Homeland Security. *National Mitigation Framework*. Washington, DC, 2013. Or can be accessed at https://s3-us-gov-west-1.amazonaws.com/dam-production/uploads/20130726-1914-25045-9956/final_national_mitigation_framework_20130501.pdf.

100 United States. Department of Homeland Security. *National Preparedness Guidelines*. Washington, DC, 2007.

an emergency situation.[101] Radiological preparedness and response plans should be not only updated but also executed.[102]

Execution focuses on the following:

- Administering programs
- Conducting planning and coordination
- Purchasing equipment in accordance with documented needs and specified standards, as well as preparing and maintaining such equipment to be readily available as needed
- Developing and conducting training to fill capability gaps
- Developing and conducting exercises to demonstrate performance

The following example describes how execution applies to radiological training and exercises:

Capabilities-Based Preparedness for Radiological Training and Exercises

- Review relevant strategy and policy to identify priority Target Capabilities List (TCL) capabilities to be trained for and exercised against
- Develop a Multi-Year Training and Exercise Plan (MYTEP) for intended training and exercise activities
- Per the MYTEP, carry out planned training activities oriented toward augmenting priority TCL capabilities (i.e. Prevent Mission Area: CBRNE Detection and Respond Mission: WMD and Hazardous Materials Response and Decontamination)
- Conduct exercises that apply and evaluate the priority TCL capabilities developed through training
- Use a "building block cycle" of escalating exercise complexity (e.g. seminar, tabletop exercise, drill, full-scale exercise) to incrementally build priority TCL capability levels
- Evaluate capabilities tested in exercises using Homeland Security Exercise and Evaluation Program (HSSEP) Exercise Evaluation Guides (EEG) linked to each TCL capability
- Update MYTEP annually to reflect new priority capabilities and lessons learned from exercises

Figure 5. CBP for Radiological Training and Exercises[103]

[101] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

[102] United States. Department of Homeland Security. *National Mitigation Framework*. Washington, DC, 2013.

[103] Ibid.

Regular assessments are essential to providing a continuously validated baseline for radiological preparedness. The assessment process includes capability (as described previously), compliance, and performance assessments to determine preparedness of individual partners and levels of government. Performance and compliance assessments serve to validate levels of capability. Compliance assessments provide insight into conformance with requirements (i.e. NIMS). Performance assessments are conducted through exercise programs such as the example in Figure 5.

B. EFFECTIVE DECISION MAKING

The CBP approach to decision making can facilitate timely, effective and compatible decision making by response organizations at every level.[104] Decision making is at the very core of the emergency management cycle, and therefore should be addressed to ensure effectiveness for radiological events. According to the Nuclear Emergency Agency, decision making should be guided by the inclusion of several key strategic elements:[105]

- Examination of the depth of preparedness by conducting a threat and risk assessment that looks at all possible nuclear and radiological emergencies in terms of their origin, probability of occurrence and magnitude of impacts
- Anticipating when a decision will be necessary and identifying what information will be needed to support such decision
- Coordination of communications to ensure organized and timely decision making among key leaders
- Engagement and inclusion of stakeholders in development of protection strategies

Local planners would be well advised to implement the aforementioned considerations to enhance the efficiency and effectiveness of the emergency management cycle. As decision making occurs throughout the emergency management cycle,

[104] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

[105] Ibid.

stakeholder input may be appropriate to each of the following elements in the general planning process (see Figure 6).

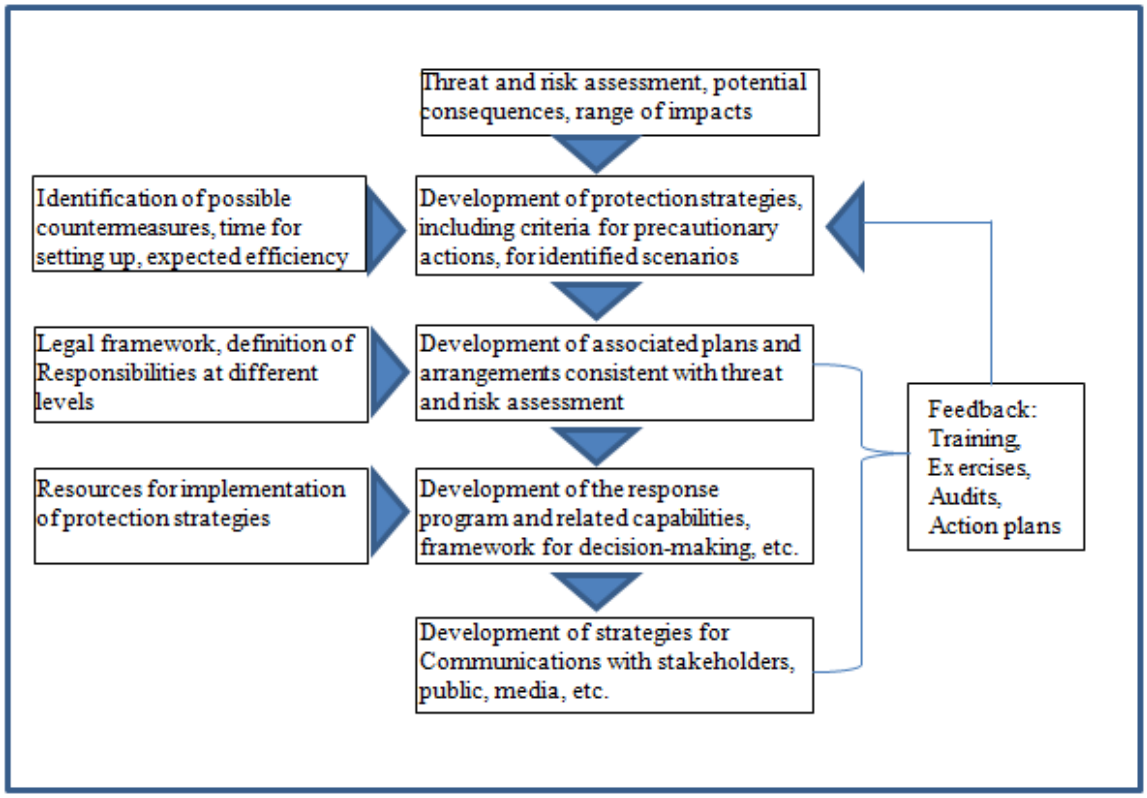

Figure 6. Planning Process[106]

A radiological event would enhance the complexity of decision making, as it would increase and expand the multiple layers of participants in the overall emergency management structure with various roles and authorities.[107] Therefore, the possible change in the relationship between such organizations or inclusion of different partners should be considered in pre-planning and exercising efforts. A whole community approach to the integration of multi-jurisdictional and multi-disciplinary partners may be integral to ensure coordination during an actual event. Key elements that may be adopted include: identification of how organizations at all levels will interact, where the decision-

106 "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

107 Ibid.

making authorities reside and if and how these will change depending on the type of event or its severity.[108] As with all planning efforts, such structure should be formally documented, exercised and supported by all participants and stakeholders.

C. FACTORS IMPACTING IMPLEMENTATION

Aside from the many benefits of a capabilities based planning approach, there are also associated challenges to its successful implementation.[109] Three (3) significant challenges for implementation include stakeholder buy-in, leader(s) support and involvement, as well as resource development and leveraging.[110]

1. Stakeholder Buy-In

One of the first requirements for successful implementation of Capabilities Based Planning (CBP) is collaborative stakeholder involvement. Stakeholder involvement is an important component in the development and optimization of protection strategies for emergency situations.[111] Additionally, education and training of stakeholders, with respect to planning arrangements, may also prove to be highly beneficial.[112]

Organizations and individuals that will be affected by the emergency situation and will be involved in or affected by its management may be considered stakeholders for planning purposes.[113] A special consideration should be made to include those not typically involved, such as non-governmental organizations, private sector and the public.[114] Planners would be well advised to include a broad range of stakeholders to

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108 Ibid.

109 Walker, Colonel Stephen K. *Capabilities-Based Planning — How it is Intended to Work and Challenges to its Successful Implementation.* USAWC Strategy Research Project, Carlisle, PA: U.S. Army War College, 2005, 1–37.

110 Ibid.

111 "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

112 Ibid.

113 Ibid.

114 Ibid.

facilitate effective emergency management in complex emergency situations.[115] A stakeholder's role and degree of involvement would depend on the type of stakeholder, and how he or she may be affected by an emergency situation, including possible preparedness and response roles.[116]

Stakeholders generally control the information, resources, and authority required to support CBP, and therefore, their requirements must be considered from the outset. To gain stakeholder buy-in, one must understand and address the criticisms and flaws of the CBP concept being presented. Issues may be mitigated by discussing how lessons learned from previous disasters may be incorporated as well as how comprehensive assessments, plans, systems and capabilities for preparedness at the state and local level may be included.

A significant challenge to securing stakeholder buy-in is leader anticipation that the entire nation would contribute to the response and recovery for a large-scale event within his/her community. Local political leaders often make the assumption that Federal and State partners will have the resources and ability to assist in the event of a disaster. This overreliance results in a lack of community planning for terrorist attack scenarios, as jurisdiction leaders believe such events are highly unlikely to occur. High impact threats and hazards may also be viewed as national in scope, necessitating a coordinated national approach. This "national response view" creates a detailed "one size fits all" national standard requirement for every jurisdiction.

Local decision-making should be done within a national context of building and maintaining capabilities necessary for prevention, response, and recovery from both large-scale and smaller all-hazards incidents. Stakeholders must be included in Capabilities Based Planning to ensure that their requirements and concerns are considered. Key stakeholders will eventually control the planning process, and it is therefore important that they feel they have ownership of it. It is also important to ensure that stakeholders have an understanding of each other's perspectives and an appreciation of the different, if not competing, requirements.

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[115] Ibid.

[116] Ibid.

Stakeholder incorporation into information flow is also critical to response. As in the Washington State Department of Health response to the 2011 Fukushima Nuclear Power Plan disaster, incorporation of key stakeholders such as Health and Human Services, regional partners, Department of Health, and tribal nations was integral to maintaining situational awareness and streamlining public information.[117] As mentioned in the Washington State Department of Health After Action Report, sharing information via conference calls strengthened coordination and enhanced efficiency. Additionally, it gave state health more information for decisions that needed to be made with regard to the response. Stakeholders may make better decisions and be more confident in such decision if they are included in many of the discussions. This may especially be true for the Capabilities Based Approach as it builds off of good partnerships, coordination and collaboration.

Following the crisis phase of a radiological event, little stakeholder interaction may occur due to the urgency of actions to prevent severe radiological harm. However, interaction with stakeholders would increase as other issues begin to be addressed and resolved. For many countermeasures that may be considered by the emergency manager (i.e., evacuation, sheltering indoors, iodine prophylaxis, sheltering or and/or feeding restrictions on livestock), stakeholders outside of the formal emergency management structure will play an important role. Often times, restrictions on agricultural production, transportation, or behavior modification cannot be imposed on stakeholders by response officials; therefore, stakeholder involvement in the development of such actions is integral to the acceptability of them.[118]

2. Leaders Support and Involvement

Leaders may share the concern that radiological response plans are too detailed and rigid. Rather than approving the execution and "sitting back and watching," leaders should be involved throughout the process of plan development, training and exercising.

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[117] Roberts, Shawn, and Al Conklin. "Disaster in Japan Incident Response." *Washington State Department of Health After Action Report/Improvement Plan* (2011).

[118] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." *Nuclear Emergency Agency* (2010): 1–69.

Involvement in plan development is important as plans and procedures help guide leaders through a response and help them understand the implications of each decision.[119] Facilitated workshops involving key stakeholders and leaders may be greatly beneficial in enhancing leadership input and understanding. The use of workshops may also provide a forum for stakeholders and leaders to discuss their concerns with planners and come to a common understanding of the process. Leadership involvement can extend past participation in meetings, and include observation of training and exercises.

Leadership involvement is integral for effective and efficient information sharing. As key decision makers, leaders must be apprised of their community's risk, possible radiological impacts of an incident, and what resources are needed for response. Education and open communication to partners and the public are essential to success of radiological preparedness. Timely information sharing is key to mitigating gaps in communication as well as leader disconnection from other agencies.[120] Another consideration for leader support and involvement is control for turnover. Constant involvement is important to ensure new leaders are properly apprised key information.

3. Resource Development and Leveraging

With an all hazard planning requirement, local jurisdictions may find it difficult to identify, secure and maintain resources for radiological response. Most jurisdictions do not have the resources to develop the knowledge base on radiation.[121] Partnerships with multiple disciplines and agencies, such as the Office of Radiation Protection, may enhance awareness with meeting and/or trainings. Building awareness of what resources are available is important, in addition to maintaining relationships with such partners and establishing Memoranda of Understanding/Agreement to formalize what is expected of each party.

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[119] Roberts, Shawn, and Al Conklin. "Disaster in Japan Incident Response." *Washington State Department of Health After Action Report/Improvement Plan* (2011).

[120] Roberts, Shawn, and Al Conklin. "Disaster in Japan Incident Response." *Washington State Department of Health After Action Report/Improvement Plan* (2011).

[121] Ibid.

An all hazard and all threats approach may best be met with a whole community approach. In many situations, emergency management and homeland security operations start at the local level and expand to include Federal, state, territorial, tribal, regional, and private sector assets as the affected jurisdiction requires additional resources and capabilities.[122] Plans must, therefore, integrate vertically to ensure a common operational focus, as well as horizontally to ensure that individual departments and agencies understand, accept, and is prepared to execute identified assignments.[123]

The Capabilities Based Planning model involves the process of matching threat capabilities and counter capabilities, which intentionally facilitates a decision-making judgment on resources versus risks. The building blocks of capabilities require a set amount of resources to mitigate the risk of the threat capability they are built to counter. Where no counter capabilities exist, mitigating long-term risks require investment and research strategies to develop what is required.

[122] U.S. Department of Homeland Security, "Developing and Maintaining Emergency Operations Plans." Last modified November 2010. Comprehensive Preparedness Guide (CPG) 101. Version 2.0: http://www.fema.gov/pdf/about/divisions/npd/CPG_101_V2.pdf.

[123] Ibid.

VII. CONCLUSION

A. CONCLUSION

Existing literature on radiological response planning indicates that emergency response efforts will continue to be disparate if a lack of effective coordination across governmental jurisdictions, communities, and the health and emergency response systems remains. It is difficult to assess whether the U.S. approach is adequate or if more needs to be done because the overall metrics for success have not been determined.[124] While the GAO has developed recommendations, there is a paucity of literature illustrating if, when and how actualization of such recommendations occurred.[125]

It remains however, that radiological events are unique hazards, requiring sufficient time, effort and resources. Preparedness for such events require sufficiently robust, flexible, understood and exercised plans to allow decision makers and supporting staff to use and synthesize the required knowledge and experience when in the mist of the response for each emergency situation.[126] To deliver an effective response, it is necessary to make, maintain and exercise adequate plans and arrangements in advance of an emergency situation.[127]

Planners are challenged by the unfortunate fact that radiological events often occur with no notice and require broad scenario planning to cover the many complex possibilities as a result of such an event. Agencies, organizations and relevant stakeholders are faced with increased demand that timely and effective actions be taken to mitigate consequences on populations, infrastructure and environment.

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[124] A. Mauroni, "Nuclear Terrorism: Are We Prepared?," *Homeland Security Affairs* 8, no. 9 (2012): 1–14. Retrieved from http://www.hsaj.org

[125] Ibid.

[126] "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." Nuclear Emergency Agency (2010): 1–69.

[127] Ibid.

B. RECOMMENDATIONS

Strategic planning cannot be approached with the common concept that a rigid and orderly implementation process exists that will effectively and efficiently address all challenges and barriers to successful radiological preparedness efforts. Radiological response planning requires formal comprehensive plans that incorporate a wide span of partners and is exercised and practiced on a regular basis. Local planners would be well advised to first address the jurisdictions risk to such a hazard and secondly evaluate the status of existing assets. It is understood that long-term culture, system, habit, and skill changes cannot be effectively addressed with force. To truly set forth change, individual agencies and organizations must first look at how they may build coordination and enhance information sharing between and among other partners.

Local Emergency Managers are well suited to spearhead the effort to enhance coordination and collaboration. Specific attention should be given to information sharing across multiple agencies/organizations as well as disciplines. The Capabilities Based Planning Model may be utilized by local planners as a framework to enhance planning and associated decisions made by all partners involved in local radiological planning efforts. Information sharing, stakeholder involvement and collaboration among many organizations should be addressed up front in the planning process in order to put all required operational arrangements in place, to facilitate appropriate and timely decisions, and to effectively manage resources.[128]

What remains to be found is the proper evaluation of radiological response planning, as its current state is factually uncertain. While well-defined strategies such as the capabilities-based planning model have not been thoroughly tested to date, the core elements of the model may be implemented by local emergency managers within his/her jurisdiction to build coordination and collaboration.

128 "Strategic Aspects of Nuclear and Radiological Emergency Management: Planning for Effective Decision Making Consequence Management and Transition to Recovery." Nuclear Emergency Agency (2010): 1–69.

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