ABSTRACT

The premise of the article is to discuss how Interdependent Contamination Mitigation (ICM) principles will be applied to Large Scale Combat through the objectives of “Real Time Understanding”, “Inherent Survivability”, and “Negate Effects”. The goal is to inform on the identification and development of DOTMLPF-P solutions that enable future force requirements to evolve and match the future threat. The article visualizes and describes ICM principles and how they apply to MDO where CBRN mitigation concepts will be crucial to winning against a CBRN capable adversary in LSCO.

APPLYING INTERDEPENDENT CONTAMINATION MITIGATION TO LARGE SCALE GROUND COMBAT

In the past, when the term Contamination Mitigation was used it generally referred to CBRN Defense activities. Contamination Mitigation is defined as the planning and actions taken to prepare for, respond to, and recover from contamination associated with all chemical, biological, radiological, and nuclear (CBRN) threats and hazards in order to continue military operations (JP 3-11).

- *The actual or threatened employment of WMD or CBRN weapons can affect friendly forces by causing them to prepare for or conduct CBRN defense activities, contamination mitigation, and, if directed, CBRN response operations. (JP3-11)*
- *As part of execution, contamination mitigation enables joint forces to sustain operations in a contaminated environment without prolonged interruption of operational tempo. It also enables the quick restoration of essential capabilities or combat power required to accomplish the current mission and achieve operational objectives. (JP3-11)*[i]

Across several venues the same question seemed to be prevalent: How can academia, industry, and capability developers combine efforts to provide an interdependent solution to realize Contamination Mitigation across warfighting functions? The frequency of this question went well beyond the CBRN regiment and was also being asked during events facilitated by other Center's of Excellence. This led to the creation of a relevant problem statement for the Army: The current Army Contamination Mitigation problem: How must the Army develop contamination mitigation capability to negate the effects of CBRN threats without reduction of combat power or unnecessary expenditure of time and readiness?[ii]

In July 2019, MAJ Lucas Hoffman authored a whiter paper titled "Interdependent Contamination Mitigation" (ICM) to inform future Army concepts and capabilities development efforts, serving as the conceptual basis for identifying and developing solutions across the doctrine, organizations, training, materiel, leadership and education, personnel, facilities, and

policy (DOTMLPF-P) in support of future force requirements. The premise behind the new idea is based on the objectives of gaining “Real Time Understanding”, “Inherent Survivability”, and “Negate Hazard Effects” when addressing direct and indirect effects of CBRN threats as envisioned in Multi Domain Operations (MDO) and large scale combat operations (LSCO). The new approach is aimed at developing a cultural shift in the mindset of operations in a CBRN environment. The goal is to develop capabilities that allow warfighters to react faster, operate more freely, use less resources, and achieve dispersed autonomy (Figure 1 – ICM in a Complex Environment). Success in this venture will provide a level of overmatch in CBRN responsiveness that will allow the U.S. Army to **exploit** the enemy’s use of WMDs, obtaining positions of relative advantage, while negating the hazardous effects to the operational environment. This article dissects the principles of ICM by visualizing and describing a multi domain environment where mitigation concepts will be crucial to winning against a CBRN capable adversary in LSCO[iii].

Real Time Understanding is focused towards an integrated framework that enables commanders to comprehend the contaminated environment as early as possible to aid with risk based decisions that protect the force and allow freedom of action[iv]. Information needs to be rapidly digested and simplified to allow Commanders’ to make decisions on the ground to known threats. In an uncertain environment, exploiting opportunities and being capable of taking the initiative in CBRN conditions will be key to gaining the tactical advantage. The ability to understand the CBRN environment through early warning technology and real time predictive models would allow maneuver elements to gain the advantage when traversing through potentially contaminated areas. Real time understanding of CBRN hazards at the lowest level will allow mission command to flourish as platoon level leadership needs to be able to exercise disciplined initiative and take prudent risk in an environment where long range communication with higher headquarters may be unavailable or compromised. Understanding the effects of degradation and weathering in the CBRN environment could open windows of opportunity and

potentially make the difference when determining the deployment of mitigation resources, upgrading protective posture, traversing over partially contaminated routes, or altering convoy routes when navigating in the brigade close area.

Real time understanding based technology would enhance the military's ability to conduct ICM through CBRN Intelligence, Reconnaissance, and Surveillance (ISR) assets. Space, cyberspace or aerial reconnaissance providing overhead imagery of contaminated terrain would allow maneuver elements to understand areas of friction along the battlefield. Mounted CBRN reconnaissance would be able to shape the environment by surveying the enemy's CBRN obstacle belt to identify seams in the enemy defense that have been degraded through weathering or failed application. The understanding of the enemy CBRN application across the battlefield through the lens of ISR assets would allow commanders to upgrade protective posture when preparing to conduct a frontal attack, flanking weak points along a potentially contaminated area, or penetrating the peripheral of a degraded CBRN obstacle. Failure to understand the complex environmental effects on CBRN can lead to risk adverse decisions, hesitation, and lost opportunities as seen in historical large scale combat vignettes.

Military history provides countless examples of how opportunities were lost due to lack of real time understanding in an uncertain environment. Specific examples from World War II, such as the "Falaise Pocket", reinforce the difficulties of decision making when operating against an adaptive and thinking enemy. When an unplanned opportunity arose to encircle and destroy the German Seventh Army; General Bradley had to worry about fratricide to friendly forces, debated a wide or narrow encirclement, and was burdened by the unknown size and intentions of German forces. Despite having ULTRA to unencrypt German communications, the understanding of the battlefield became more nebulous as Allied forces moved east. The delayed decision-making took an opportunity away from Allied forces to close the "Falaise Pocket" and significantly destroy the German's Seventh Army[v]. Seventy five years later the environment has become even more complex due to technology advancements in space, cyber,

and electronic warfare. Multi domain threats accompanied with the employment of CBRN will significantly challenge decision making. In addition, the “fog of war” may potentially cause un-necessary threat based decisions or multiple dilemmas that create missed opportunities. To prevent any reduction in tempo when operating in a CBRN environment, ground forces must have the tools to provide real time understanding to apply ICM risk based decision making. Decision making without real time understanding of the CBRN threat will delay initiative, waste resources, and hinder operational tempo.

Inherent survivability is the ability of a unit or equipment to operate in a CBRN environment without degradation of combat power. Individual protective equipment, prophylaxis, and unmanned systems all serve as means to increasing desired survivability. Having the advantage in these areas allows friendly forces to operate in contaminated conditions where the enemy is unable to survive[vi]. Employing ICM to operate in these environments can be crucial in securing a major intersection, staging deception operations, or advancing artillery assets forward to set conditions for forces maneuvering towards the deep area. Having survivability prevents maneuver forces from losing tempo when exposed to hazardous conditions; while concurrently providing opportunities to surprise the enemy by maneuvering to a contaminated areas that may exploit a vulnerability.

Continued advancements in survivability equipment will allow units to operate unimpeded in a CBRN environment. This includes vehicle platforms that are capable of operating in a contaminated area to ergonomic protective equipment that provides minimal to no physiological disturbance to Soldier activities. Having a dominant level of inherent survivability, may be enough to prevent enemy forces from expending resources to employ CBRN on the battlefield.

Negating the effects includes a set of actions which remove a CBRN hazards ability to further degrade combat power. This encompasses the removal of a hazard or the medical treatment for a contaminated individual[vii]. Thorough decontamination procedures place the force at risk as it generates a dense footprint, possibly increase primary route contamination, and

requires extensive resources to protect. Negating the effects of contamination applies to all warfighting functions. It is imperative to develop fast and resource efficient decontamination options to maintain forward momentum in LSCO. The enemy cannot be given the opportunity to gain fire superiority or any tactical advantage. During the initial phases of conflict it is imperative that US forces maintain prodigious rates of lethal fires on enemy forces; while concentrating all desired lethal and non-lethal effects on the target to support ground forces that are securing and seizing objectives. Disruption in fires assets being able to suppress, neutralize, or destroy due to contamination can slow operational tempo and risk mission failure. Neutralizing the effects of a CBRN strike on an airfield will be vital to maintaining air superiority and resupply. Employing ICM options to the lowest level that allow friendly forces to rapidly move, disperse to evade enemy targeting, and re-assemble to mass direct and indirect fires on the objective will be decisive in conducting MDO in a CBRN environment. Main Supply Routes will require immediate clearance of CBRN hazards to allow rapid maneuver and operational reach. Maneuver elements conducting battles and engagements within the close area may be at risk of culmination if separated from critical support area elements due to a contaminated route. Predicting and understanding these types of future LSCO scenarios are crucial to CBRN planners as history has shown us that future adversary's will take every opportunity possible to limit our ability to mass fires, deny command and control, and disrupt operational reach.

During the Korean War, after the success of the Inchon landing, US forces advanced rapidly towards the Yalu River. Despite threats from Chinese to intervene, forces continued to advance at a tempo that over-extended resources. The pursuit towards the Yalu River led to battlefield engagements with the Chinese. Enemy forces were able to encircle, isolate, and destroy the over-extended US forces. Roadblocks and destroyed bridges prevented withdrawal, leading to the destruction of units such as TF Faith[viii]. Applying the historical vignette to a Complex CBRN Environment (CCE) can lead a planner to implementing ICM that prevents the enemy from potentially using CBRN to isolate forces. Continued development of DOTMLPF-P

requirements that supports inherent survivability and negation of contamination effects used on supply routes, lethal fires assets, maneuver units, and command and control nodes will be crucial in LSCO as units maneuver towards the deep area and extend further away from support nodes located within SPODs and APODs.

The concept of ICM will impact how planners frame MDO within a CBRN environment. History has shown how difficult decision making in an uncertain environment can be; while also providing a glimpse of how future adversaries may utilize CBRN to counter the American Way of War. Technology to enable real time understanding of the CBRN environment will develop proactive risk based decision making that allows forces the advantage in a compacted timeframe. Inherent survivability will enable our forces to operate and maintain advantage in hazardous environments and prevent forces from being deterred from fighting in unfavorable conditions. Negating the effects of contamination will ensure maneuver, tempo, and massing of fires will not be disrupted. Applying ICM principles to DOTMLPF-P development will close CBRN related gaps across the Joint services. ICM will aid in reducing uncertainty on the battlefield and enable commanders on the ground to make decisions that place their unit in a position of advantage, while minimizing the effects of a CBRN threat. The application of ICM will evolve how CBRN practices are integrated within the warfighting functions and enable joint forces to assess, protect, and mitigate the CBRN threat within MDO.

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[i] Joint Publication 3-11, *Operations in Chemical, Biological, Radiological, and Nuclear Environments*, 29 October 2018. Pg. GL6, ix, x, xii

[ii] Hoffman, Lucas, *Interdependent Contamination Mitigation White Paper*, Army Maneuver Support Center of Excellence, Fort Leonard Wood, 24 July 2019. Pg.5

[iii] Hoffman, Lucas, *Interdependent Contamination Mitigation White Paper*, Pg. 5, 8

[iv] Hoffman, Lucas, *Interdependent Contamination Mitigation White Paper*, Pg. 11

[v] Blumenson, *Battle of the Generals*, pg. 188-192, 197, 199, 202, 204-207, 230, 239, 227-228, 240, 242

[vi] Hoffman, Lucas, *Interdependent Contamination Mitigation White* Paper, Pg. 13

[vii] Hoffman, Lucas, *Interdependent Contamination Mitigation White Paper*, Pg. 14

[viii] Reilly, Bob. "Defeat from Victory: Korea 1950*". M312 Reading A, Module III: Transition to the Offense.* Command General Staff College. Pg 6-8, 13-14, 18-25

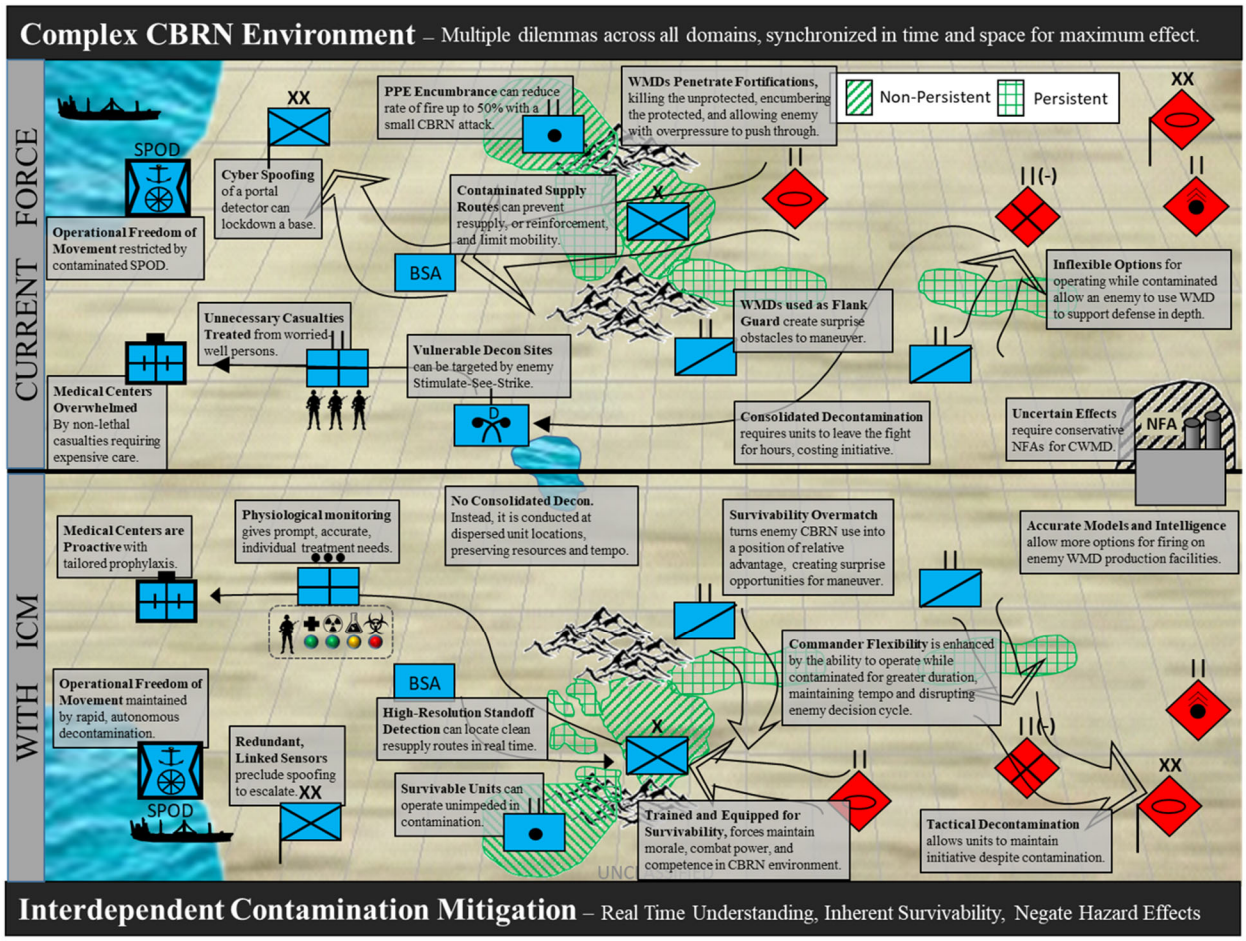

Figure 1 – Interdependent Contamination Mitigation