

Blast from the Past: Examining Historical Army Approaches to the Nuclear Threat While Designing a Path for the Future

A Monograph

by

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Abstract

Blast from the Past: Examining historical Army approaches to the nuclear threat while designing a path for the future, by Major Michael S. Schumacher, 51 pages.

As the American military returns its emphasis to great power competition, the Army must adjust its training, education, and posture to the pacing threat. The 2018 *Nuclear Posture Review* identifies the growing disparity in worldwide atomic weapon advances and the approach other nations, particularly Russia and China, take with low-yield battlefield nuclear weapons (LYBNWs). America's potential adversaries could exploit the Army's approach to low-yield nuclear weapons on the future battlefield. Creating a formation able to operate on an atomic battlefield is paramount to deterrence and achieving political objectives.

This monograph examines the lessons learned from the Army's previous nuclear approaches during the Pentomic Division era in the late 1950s and on the integrated battlefield for AirLand Battle in the late 1970s through the mid-1990s. Proper focus on training increases readiness and projects credible deterrence to a nuclear threat. To prepare American ground forces for the reemergence of an atomic battlefield, the Army can extract lessons from historical nuclear approaches, provide nuclear training and education to tactical formations, and leverage existing competencies within interservice and government organizations.

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Abbreviations

ADP	Army Doctrine Publication
ASI	Additional skill identifier
CBRN	Chemical, Biological, Radiological, and Nuclear
CGSC	Command and General Staff College
CNI	Conventional Nuclear Integration
DNWS	Defense Nuclear Weapons School
DTRA	Defense Threat Reduction Agency
FM	Field Manual
ICBM	Intercontinental Ballistic Missile
JP	Joint Publication
LYBNW	Low-yield battlefield nuclear weapon
NEAT	Nuclear Employment Augmentation Teams
NPS	Nuclear Posture Statement
USANCA	US Army Nuclear and Countering Weapons of Mass Destruction Agency

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Introduction

Great power competition exposes a capability gap in the United States Army's tactical and operational nuclear readiness. The Army must prepare for low-yield battlefield nuclear weapons (LYBNW) in the operational environment (OE) should deterrence fail. After the Korean War, the Army responded to the nuclear threat through organizational changes, training, and education. The Pentomic Division era transitioned the US Army into an atomic force, ready to employ nuclear weapons to penetrate the adversary's defense or halt an overwhelming offensive.¹ The Army exposed some soldiers to nuclear blasts through live-fire exercises. Training exercises aimed to develop capabilities for maneuver through radiation fall-out.² Leaders taught formations to employ technical devices to detect and gain the initiative. The intent of the Pentomic Division's design facilitated a flexible and mobile response. Planners prepared all operations with a nuclear contingency option. Operational plans postured units to maintain tempo in a contaminated environment while they maneuvered to the objective. Schools educated officers on nuclear considerations during professional military education (PME) and trained soldiers to appropriately employ their respective equipment.³ The Army must reexamine these historical approaches to training and educate the force in anticipation of an atomic OE to effectively conduct large-scale combat operations (LSCO).

In 1961, the US Army abandoned the Pentomic Division as a failure.⁴ Command and control (C2) and logistics support in the Pentomic Division failed to provide adequate situational

¹ John H. Cushman, "The Pentomic Infantry Division in Combat," *Military Review* 37, no. 10 (January 1958): 24, accessed August 28, 2020, <http://jstor.com/stable/2601286>.

² A.J. Bacevich, *The Pentomic Era: The US Army Between Korea and Vietnam* (Washington DC: National Defense University Press, 1986), 110.

³ Boyd L. Dastrup, *The US Army Command and General Staff College: A Centennial History* (Manhattan, KS: Sunflower University Press, 1982), 95.

⁴ Robert T. II. Davis, *The Challenge of Adaptation: The US Army in the Aftermath of Conflict 1953-2000*, Occasional Paper 27, March 2018 (Fort Leavenworth, KS: Combat Studies Institute Press, 2018) 31, accessed August 28, 2020, <https://cgsc.contentdm.oclc.org/digital/collection/p16040coll3/id/164/rec/4>.

awareness and operational reach at the Division level.⁵ During the Vietnam War, the Army shifted its operational focus from the atomic battlefield to “flexible response.” The training prioritized counterinsurgency warfare and thus, nuclear proficiency waned. Military leaders evaluated the environment following the withdrawal of forces from Vietnam. Reforms emerging after the war led to the adaptation of AirLand doctrine.⁶ The Army continued developing nuclear artillery at the tactical level and focused on the Soviet threat in Europe. LYBNWs, such as the Davy Crocket and Honest John Battery (BTRY), provided tactical commanders a response to the Soviet manpower advantage. Nuclear proliferation treaties by political leaders in the mid-1980s and early 1990s eliminated these options.⁷ The American military began to rely solely on the nuclear triad of nuclear submarines, air-delivered atomic munitions, and silo-based missiles.⁸ The US Army decommissioned low-yield options. It also eliminated widespread nuclear training and education at each echelon.

The Army shifted nuclear competency to Functional Area 52 (FA 52) and the US Army Nuclear and Countering Weapons of Mass Destruction Agency (USANCA).⁹ Operational and tactical level formations receive inadequate nuclear training and education to navigate a nuclear environment. Unit commanders rely on knowledge from nuclear specialists within the formation. In armed conflict, nuclear employment augmentation teams (NEAT), attach to the respective staff to aid the commander in decision-making and nuclear awareness.¹⁰ Similar to Vietnam, the last

⁵ Bacevich, *The Pentomic Era*, 134.

⁶ William G. Hanne, “The Integrated Battlefield,” *Military Review* 62, no. 6 (June 1982): 35, accessed November 30, 2020, <https://cgsc.contentdm.oclc.org/digital/collection/p124201coll1/id/307/rec/6>.

⁷ Richard Hart Sinnreich, “Recovering the Army’s Nuclear Battlefield Proficiency,” *Association of the United States Army (AUSA)*, February 12, 2015, accessed February 3, 2021, <https://www.ausa.org/articles/recovering-army%E2%80%99s-nuclear-battlefield-proficiency>.

⁸ Davis, *The Challenge of Adaptation*, 53.

⁹ US Department of Defense, Joint Staff, Joint Publication (JP) 3-72, *Joint Nuclear Operations* (Washington, DC: Government Publishing Office, 2020), V-1.

¹⁰ US Department of the Army, Army Regulation (AR), 10-16, *US Army Nuclear and Countering Weapons of Mass Destruction Agency* (Washington, DC: Government Publishing Office, 2019), 2-1.

twenty years of low-intensity conflict atrophied the Army's ability to maneuver in large formations. The last thirty years have eliminated the land force's ability to plan, maneuver, and contemplate the existence of an atomic battlefield. The appearance of a nuclear threat stimulates the cognitive landscape of the Army. Conversely, adversaries continue to develop the means to harness the potential a low-yield battlefield nuclear weapon presents.¹¹ Figure 1 illustrates the acquisition of nuclear delivery systems for respective nations since 2010. While this does not compare total systems in respective military arsenals, it demonstrates the emphasis America's competitors place on nuclear capabilities.

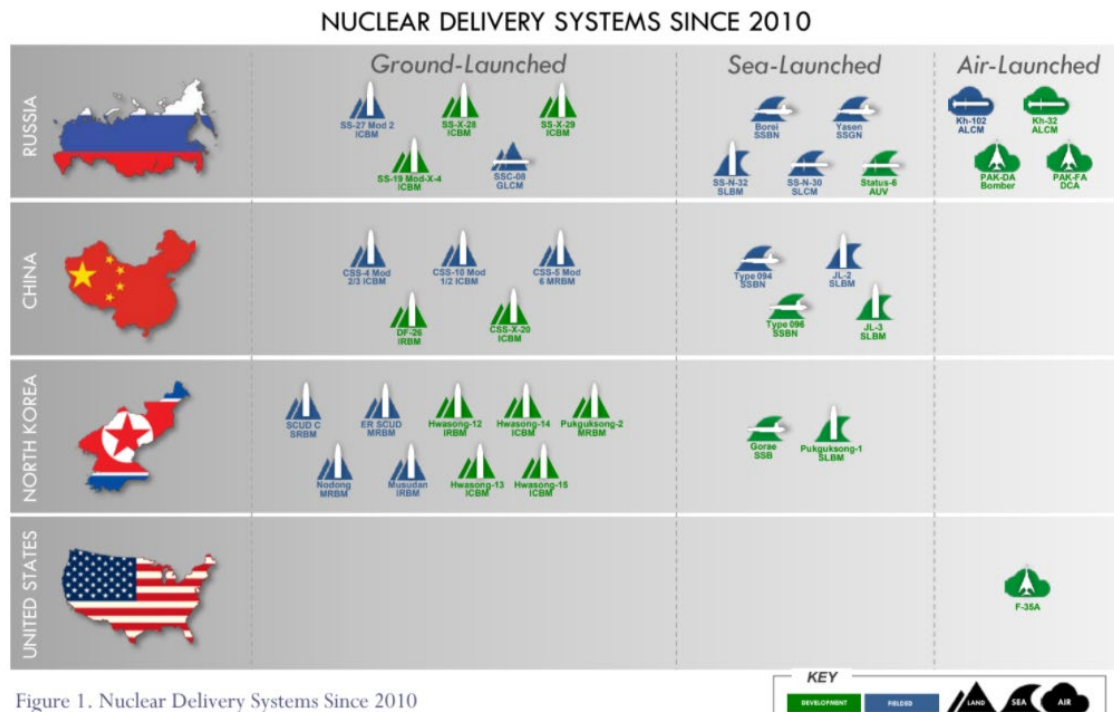


Figure 1. Nuclear Delivery Systems Since 2010
 Data provided by the DoD

A low-yield battlefield nuclear weapon is a nuclear weapon with a yield less than fifteen kilotons. They create tactical or operational effects against military targets, primarily ground

¹¹ Office of the Secretary of Defense, *Nuclear Posture Review* (2018), 7.

forces, within a specified theater. The use of such weapons has strategic implications through tactical results. The aim of those employing these weapons is to limit collateral damage to avoid justifying disproportional response.¹² Delivery methods could be, but not limited to, cruise missiles, artillery shells, or gravity bombs. The Army fielded LYBNWs such as the Davy Crocket artillery round, the Little Boy gravity bomb, and the Genie rocket.¹³ The current American nuclear arsenal includes variable yield weapons such as the B-61 gravity bomb and the air-launched cruise missile.¹⁴ The W 76-2 submarine-launched intercontinental ballistic missile is the newest low-yield option for the joint force. The Russian, Chinese, Indian, Pakistani, Israeli, and North Korean nuclear arsenals contain low-yield battlefield nuclear weapons at their disposal.¹⁵

Adversaries possess the capability to employ LYBNW to decimate formations with a single munition. The rapid loss of combat power will cripple the joint force's ability to maintain operational tempo and erode the American peoples' resolve. Three of the named adversaries (China, Russia, and North Korea) in the *National Security Strategy (NSS)* possess the ability to employ nuclear weapons.¹⁶ Growing tension between nuclear-capable counties further intensifies the likelihood of nuclear weapon use in armed conflict. In great power competition, armed conflict may result in nuclear weapons exchange to offset technological or numerical superiority.¹⁷ The US Army can extract lessons learned from previous eras where their focus aimed at nuclear proficiency.

¹² Adam Lowther, School of Advanced Military Studies, email message to author, December 19, 2020.

¹³ Sinnreich, "Recovering the Army's Nuclear Battlefield Proficiency."

¹⁴ Office of the Secretary of Defense, *Nuclear Posture Review* (2018), 48.

¹⁵ "Who will go nuclear next?" and "Briefing: Nuclear proliferation," *The Economist* (January 30, 2021) 9, 16-18.

¹⁶ The White House, *National Security Strategy* (2017), 26, accessed September 10, 2020, <https://www.hsdl.org/?view&did=806478>.

¹⁷ Office of the Secretary of Defense, *Nuclear Posture Review* (2018), 8.

The Pentomic Division organized tactical forces to address an emerging threat. It altered how units fought and trained nuclear proficiency at all levels. Formal *PME* educated officers on nuclear planning considerations to achieve military success in a large theater of operations. AirLand Battle doctrine addressed the changing environment as well. The Army instituted the concept of the integrated battlefield to ensure all plans included nuclear contingencies. Commanders and staff prepared to employ nuclear fires, and maneuver on the atomic battlefield. Both approaches provide lessons learned for the Army to apply in preparation for the next conflict. The 2018 *National Defense Strategy* directs the joint force to prepare for a return to strategic competition against revisionist powers.¹⁸ It tasks the military to prepare for war while specifying the nuclear weapons threat adversaries pose. To achieve this end, the Army must increase the force's nuclear proficiency by extracting lessons learned from historical approaches, providing nuclear education and training to tactical formations, and leveraging existing competencies within interservice and governmental organizations.

Research Methodology

Grounded theory guided the research. This method implements a qualitative approach to data collection.¹⁹ Relevant historical doctrine, publications, standard practices, trends, and interviews with industry subject matter experts were collected. Ft. Leavenworth's CARL research center and database, and Ft. Sill's library provided access to records and historical program of instruction (*POI*). Military Review archives provides surplus information on the Pentomic Division and the integrated battlefield concept during AirLand Battle. The monograph analyzed concepts into historical application, training and educating methods, and future application based

¹⁸ US Department of Defense, Office of the Secretary of Defense, *National Defense Strategy* (Washington, DC: Government Publishing Office, 2018): 2, accessed December 16, 2020, <https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>.

¹⁹ Cathy Urquhart, *Grounded Theory for Qualitative Research: A Practical Guide* (Thousand Oaks, CA: SAGE Publications Ltd, 2013), 35.

on current practices relating to the threat.²⁰ This monograph examines how the Army approached training and professional military education (PME) historically and how the joint force is currently training. Through this process, the relationship between theories, practice, and gaps are identified.²¹ A theory is developed from the information received and analyzed. This leads to a series of recommendations for greater preparedness of the nuclear battlefield.

How did the Army train and educate forces to operate on an atomic battlefield? The Army primarily prepared for an atomic threat during two periods. The first iteration led to the creation of the Pentomic Division, following the Korean War, and leading into the Vietnam War. AirLand Battle doctrine and the integrated battle approach, following Vietnam through the Gulf War, brackets the second response to the atomic threat. Examining these two periods provides insights into how the Army can re-integrate nuclear proficiency into the future force to enable the joint commander.

The Pentomic Division's Atomic Approach

The nuclear age, following World War II, triggered a shift in the traditional paradigm of armed conflict. The US demonstrated the devastating power a single nuclear weapon provides. Following the Korean War, President Dwight D. Eisenhower shifted the national defense policy and implemented progressive budget cuts.²² The “New Look” defense budget of 1955 reduced the Army budget allocation. Political leaders anticipated that ground forces would assume smaller roles with advent of the atomic weapon.²³ The Department of Defense (DoD) prioritized and reallocated resources to maintain national security objectives. Services rivaled for relevance, and

²⁰ Urquhart, *Grounded Theory for Qualitative Research: A Practical Guide*, 30.

²¹ Ibid., 51.

²² Bacevich, *The Pentomic Era*, 11.

²³ Sebastien Roblin, “The Mind-Blowing Way America Planned to Fight a Nuclear War Against Russia,” *The National Interest*, February 25, 2017, accessed September 29, 2020, <https://nationalinterest.org/blog/the-mind-blowing-way-america-planned-fight-nuclear-war-19576>.

tensions grew as they lobbied for funding. The Army sought a path to justify funding and transitioned its force in an evolving OE. The solution: The Pentomic Division.

Named for the shift to five primary subordinate maneuver units, the Pentomic Division changed the organization of the infantry division and altered the strategic focus of the Army.²⁴ Concurrently, the Army dedicated resources to develop radars, missiles, and air defense platforms.²⁵ Missile development increased the effects of artillery formations. The Army amplified the tactical level firepower with nuclear artillery. These atomic artillery formations provided direct support to the Pentomic Division as organic assets. Division commanders held release authority of atomic artillery as their staff planned nuclear targets. Maneuver units trained to exploit a position of relative advantage a nuclear blast presented.²⁶ During this period, the Army conducted atomic training exercises, reformed officer education, and provided material solutions for the new form of warfare. While the Pentomic Division period lasted only four years, the lessons learned are critical to consider when designing an approach to train and educate the Army in the twenty-first century.

²⁴ Roblin, “The Mind-Blowing Way America Planned to Fight a Nuclear War Against Russia.”

²⁵ Bacevich, *The Pentomic Era*, 74.

²⁶ Davis, *The Challenge of Adaptation*, 27.

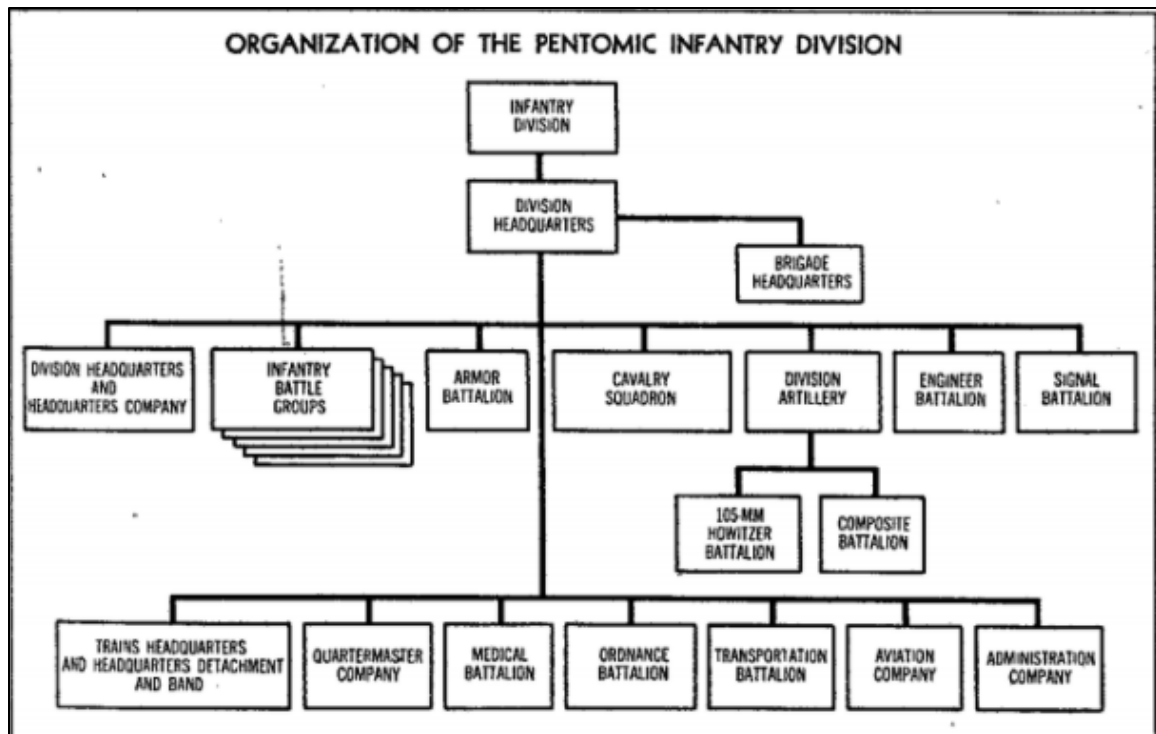


Figure 2. Pentomic Division Task Organization. Cushman, “The Pentomic Infantry Division in Combat,” *Military Review* 37, no. 10 (January 1958): 21.

The Army initially perceived the nuclear age as an existential threat to the utility of ground forces. Army leadership resisted the thought of any strategy which included the use of nuclear weapons on the ‘modern’ battlefield. The Air Force and Navy controlled vital nuclear weapons to assure national security interests. The Army felt the urgency to remain relevant while preparing to fight on an atomic battlefield. In response, the Army developed advanced air defense platforms, invested in missile technology improvements, and formed a nuclear arsenal.²⁷ These lines of effort would provide the Army a justification for budget allocations.²⁸ The Army would then attempt to synchronize new equipment, tactics, and training to enable operational success.

Deputy Chief of Staff for Army research and development, Lieutenant General James Gavin, aimed to “dissolve the existing organization down to the size of units commanders are not

²⁷ Davis, *The Challenge of Adaptation*, 82.

²⁸ *Ibid.*, 85.

afraid of losing to one blast.”²⁹ Therefore, the Pentomic Division model created smaller subordinate formations to reduce footprint on the battlefield. Concentrated massed formations presented the enemy with lucrative targets to identify and engage with nuclear artillery. The Pentomic Division’s organization consisted of five subordinate organizations called battle groups as opposed to the traditional three brigades. The number of soldiers dropped from 17,000 men to 13,700 men in the light infantry divisions.³⁰ In 1957, three airborne divisions converted to this organization; the remaining infantry divisions changed the following year.³¹ No armor divisions reorganized in this construct, though they received nuclear artillery capability. The doctrine shifted the focus of maneuver to flexibility and mobility. To facilitate these principles, the division received more mobile platforms, including helicopters, and increased firepower capability, such as the Honest John atomic artillery batteries.³² Added firepower provided division commanders the options of employing low-yield battlefield nuclear weapons in their area of operations. Nuclear artillery platforms could range from ten to twenty-two miles.³³



Figure 3. Honest John- Nuclear Rocket Artillery. “Honest John,” US Army Aviation and Missile Life Cycle Management Command, accessed December 5, 2020, <https://history.redstone.army.mil/miss-honestjohn.html>.

²⁹ Davis, *The Challenge of Adaptation*, 105.

³⁰ Ibid., 24.

³¹ Roblin, “The Mind-Blowing Way America Planned to Fight a Nuclear War Against Russia.”

³² Davis, *The Challenge of Adaptation*, 94.

³³ Ibid.

Key tenants of fighting the Pentomic Division were flexibility and mobility. The Army planned to punch a hole in Soviet defenses with nuclear weapons at the tactical or operational level and mass an exploitation force to penetrate deep behind enemy lines. Echelons would disperse in depth and width for survivability and then concentrate on the attack to penetrate.³⁴ However, inadequate radios hindered the ability to communicate over the longer distances incurred by the dispersed battle groups. Battle groups did not have fire direction centers in the battle group operations center.³⁵ The sensor-shooter chain routed directly through division artillery (DIVARTY) or the division's operations center in order to prosecute fires. This severely hindered response times and the ability to mass effects at critical junctures. The Pentomic Division's design relied on fires to provide the commander with firepower overmatch. Centralizing fires at higher echelons without proper routing mechanisms degraded the effectiveness of having dispersed subordinate units.

To operate as intended, the Army trained soldiers for the atomic environment and educated officers on tactical considerations. Some critical training exercises during this period included Desert Rock series and Sagebrush. Desert Rock VI occurred in 1955 at Yucca Flats, Nevada, to demonstrate the ability to maneuver an armored formation as an exploitation force for an atomic blast. 3,000 soldiers prepositioned two miles from the 30-kiloton blast.³⁶ Once the initial blast subsided, the formation maneuvered within 900 meters from ground-zero until the radiation levels reached dangerous concentration. The exercise delayed execution for ideal weather conditions. Soldiers had days of vehicle preparations and staging before execution. Even in a fabricated environment, it demonstrated the difficulties of maneuver on an atomic battlefield. Geography in Europe provides fewer options for avenues of approach. Uncontrollable frictions in

³⁴ Davis, *The Challenge of Adaptation*, 68.

³⁵ Paul C. Jussel, "Intimidating the World: The United States Atomic Army, 1956-1960," (PhD diss., The Ohio State University, 2004), 208, accessed October 20, 2020, https://etd.ohiolink.edu/apexprod/rws_olink/t/1501/10?clear=10&p10_accession_num=osu1085083063.

³⁶ Bacevich, *The Pentomic Era*, 110.

battle, such as weather fluctuations and debris from the atomic blast, would inevitably complicate brigade maneuvers during combat operations.³⁷

Operation Sagebrush trained and validated sky cavalry (SKYCAV) formations in reconnaissance, mobility, and blocking enemy offensives.³⁸ The Army designed the SKYCAV as the corps' reconnaissance force of 2,000 soldiers to operate up to thirty miles beyond the forward line of troops (FLOT).³⁹ Organic division recon operated ten miles beyond the FLOT, providing early warning and identifying enemy disposition.⁴⁰ Since the Pentomic Division relied on dispersion, the risk of enemy penetration rose. SKYCAV filled the gaps in terrain and avenues of advance by identifying and delaying enemy penetration. The exercise trained the unit to integrate light and armored platforms, electronic warfare capabilities, and aviation assets.⁴¹ The SKYCAV capability increased the ground-to-air integration and complemented the dispersed battle groups' downside.

The Army reformed education at the Command and General Staff College (CGSC) and the Army War College during the Pentomic era. In 1957, CGSC transitioned from teaching solely conventional warfare to including nuclear warfare.⁴² The college underwent several reforms as a result of the 1949 Eddy Boards.⁴³ CGSC reduced class sizes, shifted to a generalized curriculum rather than a specialized focus by branch, and emphasized atomic warfare. In 1955, CGSC *POI* consisted of 88 of a possible 1081 hours dedicated to nuclear topics. In 1957, it rose to 387 hours,

³⁷ Bacevich, *The Pentomic Era*, 112.

³⁸ Stewart L. McKenney, "SKYCAV Operations During Exercise Sagebrush," *Military Review* 36, no. 3 (June 1956): 11, accessed November 30, 2020, <https://cgsc.contentdm.oclc.org/digital/collection/p124201coll1/id/744/rec/12>.

³⁹ Davis, *The Challenge of Adaptation*, 14

⁴⁰ McKenney, "SKYCAV Operations During Exercise Sagebrush," 17.

⁴¹ *Ibid.*, 14.

⁴² Dastrup, *The US Army Command and General Staff College*, 90.

⁴³ *Ibid.*, 93

and by 1960 it topped 600 hours of general and limited nuclear employment.⁴⁴ Officers conducted exercises to focus on Soviet nuclear and conventional threats. They learned the capabilities and considerations to employ nuclear weapons in response to overwhelming Russian or Chinese forces. Meanwhile, the school designed scenarios to develop leader judgment instead of merely memorizing principles.⁴⁵ CGSC strove to create competent military problem solvers capable of analyzing a situation and recognizing the operational environment's changing dynamics to provide novel solutions.

CGSC's changes increased the nuclear awareness of the entire officer corps. All students developed an understanding of the emerging OE through scenario-driven exercises that engaged the application of nuclear contingencies. Planning exercises put majors through iterations of contingency mitigation for all warfighting functions. Planners learned the second and third-order effects of a nuclear blast. Wargames demonstrated the necessity to disperse units and develop branch plans to exploit and overcome nuclear blasts effects. Officers intuitively established mitigation techniques to address radiation exposure; clearance of debris due to blocked avenues of approach; electromagnetic effects to electronics; and decontamination of personnel and equipment.

Nuclear training and education spread throughout the enlisted ranks as well. The Army trained soldiers on active and passive nuclear protection measures. Specific training allowed soldiers to operate radiation detection kits, implement protection measures for nuclear blasts, and identify the required medical care based on radiation level.⁴⁶ The addition of nuclear artillery increased the demand for training on nuclear handling, transportation, and targeting. The Fires Center of Excellence provided requisite training in these categories. These efforts required

⁴⁴ Dastrup, *The US Army Command and General Staff College*, 102.

⁴⁵ *Ibid.*, 101.

⁴⁶ Theodore C. Mataxis and Seymour L. Goldberg, *Nuclear Tactics, Weapons, and Firepower in the Pentomic Division, Battle Group, and Company* (Harrisburg, PA: The Military Service Publishing Company, 1958), 83.

additional allocation of time, money, and instructors. However, soldiers in tactical formations could effectively employ chemical, biological, radiological, and nuclear (CBRN) equipment with increased emphasis. Calculating radiation levels at the company level facilitated rapid detection.⁴⁷ Low-level leaders could determine the urgency of care soldiers needed or if they could stay in the fight. This reduced the dependency on external assets accompanying formations to make those rapid determinations.⁴⁸ This aspect facilitated the dispersion of units from higher echelon support structures and saved time in medical evacuations.

Military leaders labeled the Pentomic Division a failure and abolished the organized structure in 1960.⁴⁹ The operational approach turned the land forces into a cumbersome deterrent tool that could not execute tactically as designed. It could not accomplish conventional maneuver effectively due to overreliance on nuclear firepower. The Pentomic Division lacked adequate logistical support and failed to anticipate the complexity added by increasing subordinate units. Designed to provide a flexible and mobile response, the increased number of subordinate units overloaded the Division's ability to manage the battlespace.⁵⁰ This effect exacerbated the logistic shortcomings inherent to the battle groups.

The Pentomic organization consolidated sustainment units at the division level resulting in a reduction of operational reach and flexibility. Battle groups required dedicated logistic support to adequately service their subordinate units and maintain tempo in a contested environment. Since the bulk of sustainers remained centralized under the division command, battle groups found themselves requiring additional internal logistical capacity. Commanders thus reduced the manpower in combat formations internally to bolster their sustainment units.⁵¹ The

⁴⁷ Bacevich, *The Pentomic Era*, 114.

⁴⁸ Mataxis and Goldberg, *Nuclear Tactics*, 78.

⁴⁹ Davis, *The Challenge of Adaptation*, 28.

⁵⁰ Bacevich, *The Pentomic Era*, 134.

⁵¹ *Ibid.*, 134.

shift inevitably led to a decrease in combat power. Doctrinally, battle groups dispersed three to five miles apart. Therefore, a loss in combat power significantly increased vulnerability to the entire division.⁵² The risk of enemy penetration became a key vulnerability to the formation. Furthermore, the larger footprint made it easier for enemy forces to infiltrate and target key command and supply nodes.

The Pentomic Division failed as an organizational entity but paved the way for the Army's response to the nuclear threat. Formal PME transformed the mindset of planners to anticipate and integrate the effects of nuclear weapons. Training provided soldiers proficiency on nuclear tactical tasks. They learned to employ nuclear radiation equipment to provide early warning and decontaminate radiological effects. Tactical units focused on exercising mission command and challenged leaders to take initiative in the absence of orders. Formations conducted tasks in mission-oriented protected posture (MOPP) gear to gain proficiency through repetition in a contaminated environment. Unfortunately, the Army lost these nuclear competencies as the conventional forces transitioned to a counterinsurgency fight in Vietnam. Following that conflict, the military found itself revisiting old nuclear proficiencies. Doctrine defined the military approach as AirLand Battle and designed a new method to fight on the integrated battlefield.

AirLand Battle and the Integrated Battlefield

In 1961, the Army organization shifted from the Pentomic Division to the Reorganization Objectives, Army Divisions (ROAD) construct. Strategy shifted from singular nuclear focus to greater "flexible response."⁵³ Nuclear *POI* reduced from 600 hours at the peak in 1960 to sixteen hours by 1966 as the military focused on the Vietnam War and counterinsurgency.⁵⁴ Soldiers, commanders, and officers focused training on the current enemy threats. Immediately following

⁵² Bacevich, *The Pentomic Era*, 115.

⁵³ Dastrup, *The US Army Command and General Staff College*, 108.

⁵⁴ *Ibid.*, 110.

the end of the war, the Army prioritized rebuilding the force to existential threats. The Army's formal education pendulum returned to primarily planning against the Soviets and their prevailing nuclear threat. The emergence of AirLand Battle doctrine reframed the Army's mindset. The Army viewed their nuclear capability as a means to counter the Soviet conventional threat in Europe. Returning atomic aptitude once again offset a reduction of personnel and defense budget cuts.⁵⁵ The Army trained soldiers to conduct target analysis and inculcated procedures for responding to CBRN effects on the battlefield.⁵⁶ However, unlike the Pentomic era, the Army's implementation of nuclear training shifted to a defensive mindset, only advocating use to prevent NATO destruction.⁵⁷

By the early 1980s, the Army developed the AirLand doctrine, which defined an integrated battlefield to provide both conventional and nuclear options to the commander.⁵⁸ The integrated battlefield concept paralleled practices of the Army's 1950s approach. Officers aimed to remain flexible and adaptable in an intense environment that presented ambiguity and demanded professional judgment in rapid succession.⁵⁹ The Army educated officers to determine the optimal means to employ nuclear weapons, anticipate enemy atomic use, and defend against the possibility of a nuclear attack. During the AirLand Battle era, the Army focused on integrating nuclear weapons, providing nuclear protection training, and educating planners on considerations inherent to the nuclear battlefield.

The Army turned its emphasis away from counterinsurgency to obtaining nuclear parity with the Soviets following the withdrawal of forces in Vietnam. As the Army absorbed budget cuts and manpower reduction, leaders espoused the narrative of nuclear response to reassure allies

⁵⁵ Davis, *The Challenge of Adaptation*, 46.

⁵⁶ Dastrup, *The US Army Command and General Staff College*, 114.

⁵⁷ Ibid., 124.

⁵⁸ Hanne, "The Integrated Battlefield," 35.

⁵⁹ Dastrup, *The US Army Command and General Staff College*, 125.

and increase deterrence. The Army acknowledged the Air Force and Navy as the American strategic deterrence main efforts.⁶⁰ Instead, they focused on the integrating low-yield battlefield nuclear weapons held at the tactical level. The nuclear capability required the Army to focus resources on Soldier's training for nuclear weapons handling, inspection programs, and employment considerations.

The Army's nuclear familiarization and proficiency waned during the Vietnam era. Education and training at all echelons post-Vietnam focused on filling the gap in nuclear-related tasks. Fire support teams (FIST) in maneuver formations learned about the minimum safe distance to employ nuclear weapons.⁶¹ FISTs developed nuclear fire plans in conjunction with the conventional operational fire plan. Training included the fire plans to employ the nuclear artillery at dedicated phase lines and disseminate control measures internal to the brigade combat team (BCT) and adjacent units. Multiple echelons of approval required foresight in the targeting cycle and knowledge at all levels of command. Figure 4 illustrates the timeline and approval sequence of twenty-five hours from planning to executing an atomic strike in 1976.⁶²

⁶⁰ Davis, *The Challenge of Adaptation*, 54.

⁶¹ Robert H. Kimball, "Calling for Shell Nuclear," *Field Artillery Journal* 52, no. 1 (January-February 1984): 26, accessed January 6, 2021, https://sill-www.army.mil/fires-bulletin-archive/archives/1984/JAN_FEB_1984/JAN_FEB_1984_FULL_EDITION.pdf.

⁶² US Department of the Army, FM 100-5, *Operations* (Washington, DC: Government Publishing Office, 1976), 10-9.

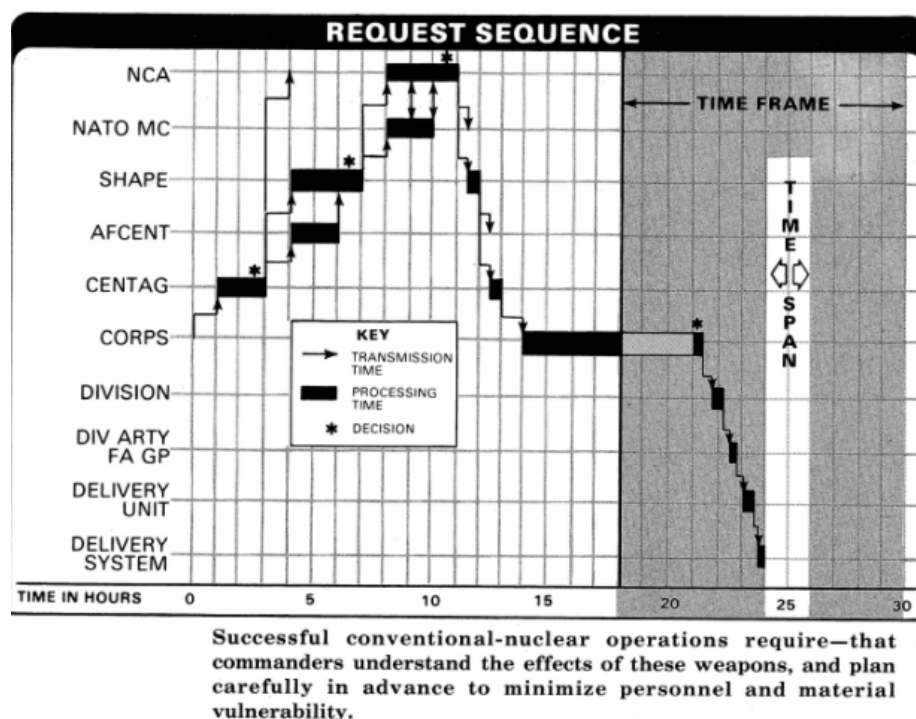


Figure 4. Planned Nuclear Fires Request Sequence. US Department of the Army, FM 100-5, *Operations* (Washington, DC: Government Publishing Office, 1976), 10-9.

The Army established the Nuclear and Chemical Target Analysis Training in August 1979 to assist in the proficiency of employment and ability in the fire support cells.⁶³ The training lasted four weeks at Ft. Sill, Oklahoma. The nuclear fire plans synchronized with maneuver efforts as they identified and calculated a blast's effects.⁶⁴ Engineer units prioritized routes in planning to clear debris based on the scheme of maneuver. The engineers also dedicated resources to protect C2 nodes, logistic stockpiles, and combat forces. Once the fires plan gained approval from the national control authority, firing batteries were prepared to execute accordingly.

Field artillery formations trained soldiers on handing, transporting, and unpackaging nuclear artillery rounds to support the planned fires. Fire direction officers (FDOs) in the

⁶³ Cockle, "Joint Nuclear Operations and Targeting Course," 19.

⁶⁴ Kimball, "Calling for Shell Nuclear," 26.

battalion and battery formations held ‘special weapons officer’ dual role..⁶⁵ They trained on fire mission processing for nuclear and conventional artillery rounds. Dedicated personnel in the battalion provided security to nuclear artillery stockpiles while other soldiers trained on the transportation and assembly of rounds to fire. Figure 5 illustrates how personnel and equipment appropriated to guard and transport the nuclear rounds drew these resources away from other missions and tasks..⁶⁶

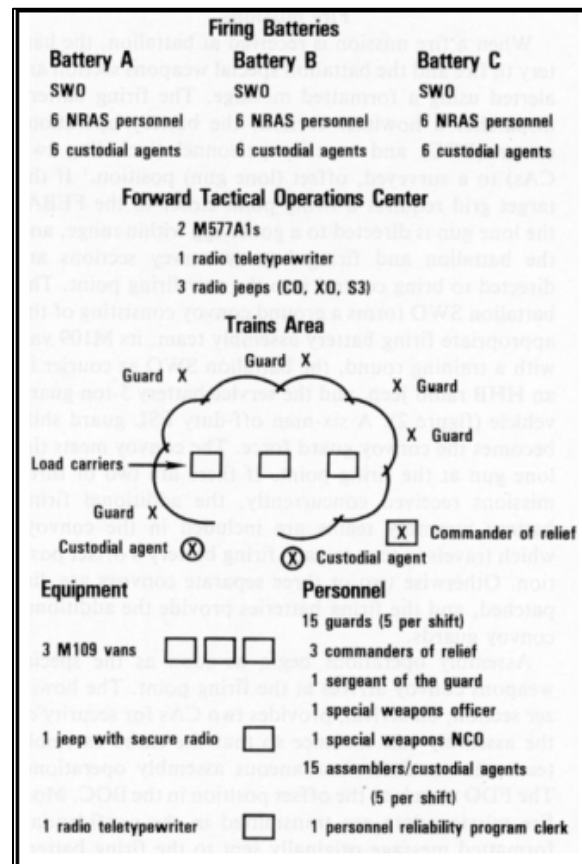


Figure 5. Nuclear Artillery Distribution Plan. Robert B. Rosenkranz, “The “Nuclear ARTEP in USAREUR- An Idea Whose Time has Come.” *Field Artillery Journal* 47, no. 4 (July-August 1979): 17.

⁶⁵ Robert B. Rosenkranz, “The “Nuclear ARTEP in USAREUR- An Idea Whose Time has Come.” *Field Artillery Journal* 47, no. 4 (July-August 1979): 17, accessed November 30, 2020, https://sill-www.army.mil/fires-bulletin-archive/archives/1979/JUL_AUG_1979/JUL_AUG_1979_FULL_EDITION.pdf.

⁶⁶ Ibid., 17.

The growth of nuclear artillery inadvertently created a resource drain. Tactical formations dedicated time and personnel to focus on nuclear handling inspections in field artillery units. Nuclear surety inspections (NSI) and technical validation inspections (TVI) became a requirement to validate proficiency at the user levels. These inspections evolved into a more practical and demanding nuclear army training and evaluation program (ARTEP). The nuclear ARTEP consumed two days and 240 rounds per battalion to execute. The nuclear ARTEP validated the nuclear sensor-to-shooter link.⁶⁷ Tasks included: security, transportation, assembly, fire mission processing at brigade (BDE), battalion (BN), or battery (BTRY) levels; air re-supply; emergency destruction; nuclear round repackaging; nuclear accident procedures; nuclear custody and accountability; and confirmation of the nuclear release authentication system procedures.⁶⁸

As nuclear delivery proficiency grew, so did the requirement to train soldiers on protection tasks. Doctrine and training guided commanders in their training plans to ensure formations mitigated the risks of a nuclear weapons strike. CBRN protection measures were second nature in every training gate and developed in combat training centers (CTCs) and annual training requirements. Doctrine instructed commanders to conduct nuclear training that included:⁶⁹

- *Mitigation techniques against nuclear effects.*
- *Radiation monitoring.*
- *Decontamination techniques.*
- *Operations exploiting nuclear use.*
- *Recovering and regrouping after attack.*
- *Handling mass casualties*
- *Having to use degraded resources to accomplish the mission.*
- *Nominating nuclear targets.*

⁶⁷ Rosenkranz, "The "Nuclear ARTEP in USAREUR," 17.

⁶⁸ Ibid., 18

⁶⁹ US Department of the Army, FM 100-30, *Nuclear Operations* (Washington, DC: Government Publishing Office, 1996), 1-5.

Soldiers trained on identifying radiation levels and interpreting the risk it posed to exposed personnel. Radiac devices received routine maintenance to ensure proper function. Meanwhile, device employment became a part of every field training exercise as a muscle movement repetition. Other repetitions occurred in combat service and support (CSS) units. Mass casualties (MASCAL) in a nuclear strike may require evacuation of an entire battalion of personnel. CSS leaders dedicated vehicles for MASCAL procedures and established efficient load plans to ensure rapid response if required. Higher echelons prepared to receive high casualty numbers and facilitate subsequent reconstitution. Medical facilities and personnel trained on reception and care of exposed individuals.⁷⁰ The unit surgeon provided recommendations to the commander on proper triage criteria and medical support. The staff maintained systems of record and transmitted data to track the chain of custody of soldiers. Soldiers trained on examining equipment for damage and determined if the electro-magnetic pulse (EMP) blast affected electronic capabilities. Proper planning considered all these elements across every warfighting function. Although specialty skill sets focused on the tactical tasks, planners required a broader spectrum of nuclear considerations to build redundancy and mitigate risk.

The doctrine evolution from the 1976 FM 100-5 to the 1986 version demonstrated a shift into how the Army expected to employ nuclear weapons. The message to planners remained constant. While the US Army “re-learned” nuclear warfare in the integrated battlefield, Army planners focused on the most significant threat facing ground forces, nuclear weapons.⁷¹ Operational planners anticipated when and where atomic weapons would appear on the battlefield and how to mitigate accordingly. AirLand Battle doctrine focused planners on anticipating nuclear use, establishing appropriate protection measures, and ensuring redundancy in the sustainment plan to retain the operation’s tempo.

⁷⁰ US Army, FM 100-30, 4-4.

⁷¹ Robert A. Doughty, *The Evolution of US Army Tactical Doctrine, 1946-1976* (Fort Leavenworth, KS: Combat Studies Institute Press, 1979), 40.

The Pentomic era viewed a nuclear battlefield as a certainty. Following Vietnam, the Army transitioned to viewing nuclear use during specific phases without specifying the transitions.⁷² The 1986 doctrine stressed the importance of anticipating nuclear weapons throughout the offense and defense. Soviet doctrine indicated they would use nuclear weapons to punch holes through the defense and exploit with mass numbers of troops.⁷³ The doctrine instructed the Army to retain the conventional fight at the first echelon and employ low-yield nuclear weapons at the second echelon of enemy forces to either disrupt their tempo, or, on the offensive to regain lost terrain.⁷⁴

The command level that initiated the nuclear strike held the responsibility to alert joint force elements on the time, location, and yield of the weapon.⁷⁵ Planners anticipated the effects of the blast and how it affected the scheme of maneuver for exploitation. The intelligence war-fighting function (WFF) identified the enemy's courses of action and anticipated avenues of approach to assist the targeting process. Meanwhile, planners allocated engineer assets to clear any necessary routes from tree fall-out. Weather and terrain in the target area affected the expected radiation fall-out. Key infrastructure, civilian collateral damage, and friendly scheme of maneuver all informed the timing and approval process.⁷⁶ The persistent threat of a nuclear attack necessitated the dispersion of forces throughout the doctrine evolution.

Operational plans included redundancy in command and logistic nodes, protection from a nuclear blast, and resources to respond to radiation effects. Command nodes, logistic stockpiles, and fire cells occupied multiple locations per echelon. The redundancy mitigated the risk if an

⁷² Doughty, *The Evolution of US Army Tactical Doctrine*, 42.

⁷³ US Department of the Army, FM 100-5, *Operations* (Washington, DC: Government Publishing Office, 1986), 85.

⁷⁴ US Army, FM 100-5 (1976), 10-8.

⁷⁵ Ibid.

⁷⁶ US Army, FM 100-5 (1986), 78.

atomic blast destroyed a vital function.⁷⁷ Engineer units would dig in based on priority and time allocated. Most of the time, the engineers would dig in three positions for an entity, intending to only use one. The logic was to overload the enemy's decision cycle and targeting process. However, the trade-off resulted in fewer dug in locations to place command or logistic nodes. Planners also identified favorable terrain to place nodes and analyzed the ability to communicate with dispersed formations.

Logistic units planned for redundant means to supply the formation, identified decontamination sites, and incorporated medical planning.⁷⁸ The sustainment network maintained the maneuver principles of dispersion, concealment, and redundancy when creating the support plan. They planned decontamination, anticipating the effect on water sources from radiation fall-out. Decontamination of vehicles and equipment required massive amounts of water. Thus, a reserve of water storage vehicles and logistic containers became a necessary planning factor. Medical plans consisted of both evacuation and reconstitution. The combination of protection and sustainment capabilities enabled the ground commander to transition from offense and defense. A weakness or gap in either of these areas diminished the readiness of the unit and eliminated options.

The US Army focused their efforts during AirLand Battle to operating on the integrated battlefield. It provided robust tactical training to soldiers at all echelons to identify and mitigate the effects of nuclear weapons. This gave the Army a requisite knowledge to operate on an atomic battlefield and achieve military objectives. Planners learned the capabilities and limitations of nuclear weapons. Delivery units trained and validated handling, transportation, and delivery procedures. Commanders dedicated training windows to teach soldiers how to employ detection and mitigation devices. This capability integrated into every training exercise. During

⁷⁷ US Army, FM 100-5 (1986), 85.

⁷⁸ Ibid., 87.

the AirLand Battle era, the Army focused on employing nuclear weapons, developing nuclear protection training, and educating planners on considerations inherent to the nuclear battlefield. As the Army shifted focus to the Global War on Terror in 2001, it replicated the pattern set during the Vietnam War. It cast nuclear proficiency and knowledge to the side as the education and training focused on urban operations and counterinsurgency warfare. CBRN proficiency atrophied over twenty years of low-intensity conflict. Gaps began to emerge as the military addressed great power competition with the 2017 *National Security Strategy*.

Unified Land Operations' Approach to Nuclear Warfare

The 2018 *Nuclear Posture Review (NPR)* indicates a rising nuclear threat from adversarial countries. The United States reduced military forces and focus on nuclear advancement following the Cold War. Meanwhile, Russia, China, and various other countries have dedicated resources to advance their nuclear capabilities. The current American nuclear stockpile is 15% of the amount of nuclear weapons possessed when the Cold War ended.⁷⁹ Following the 2010 New START treaty, the US stockpile dropped to 1,550 operationally deployed strategic nuclear weapons while its adversaries continue to retain a larger stockpile of strategic and tactical nuclear weapons.⁸⁰ The US must retain a flexible, credible, and reliable nuclear capability to deter potential adversaries from employing nuclear weapons. Readiness in nuclear proficiency provides the Commander-in-Chief options in conflict. The priorities in the 2018 *NPR* require the military to deter adversaries, assure allies, and achieve objectives should deterrence fail.⁸¹

The 2018 *Nuclear Posture Review* cites enemies' perception that limited nuclear use is a viable option given the American response gap.⁸² Russia's belief is that the variety of LYBNW it

⁷⁹ Office of the Secretary of Defense, *Nuclear Posture Review* (2018), I.

⁸⁰ *Ibid.*, 1.

⁸¹ *Ibid.*, VII.

⁸² *Ibid.*, 53.

possesses “provide(s) a coercive advantage in crisis and at lower levels of conflict.”⁸³ The 2018 *NPR* directs the military to retain and modernize the existing nuclear triad while it develops and implements its low-yield options.⁸⁴ As the nuclear options expand for the United States and its adversaries, the Army’s role is to prepare to operate in any environment, including a nuclear battlefield.

The uncertainty of future conflicts presents dilemmas while designing a way-ahead. Will low-yield battlefield nuclear weapons be employed in future combat? What is the probability that the US conducts large-scale combat operations against a nuclear-capable adversary? The Army cannot afford to hedge its bets against these two uncertainties. Considerations for the Army includes knowing how to employ nuclear weapons; surviving a nuclear blast; protecting personnel and equipment; and maneuvering in a potentially contaminated environment.

The nuclear triad includes nuclear ballistic missile submarines (SSBNs), armed with submarine-launched ballistic missiles (SLBMs), land-based inter-continental ballistic missiles (ICBMs), and strategic bombers armed with gravity bombs and air-launched cruise missiles (ALCMs).⁸⁵ The triad’s robust nature ensures the US military’s inventory functions as a survivable, responsive option, layered with redundancies. While the Minutemen ICBM remains postured in underground silos, the triad’s remaining elements provide what former Secretary of Defense James Mattis dubbed “strategically predictable but operationally unpredictable.”⁸⁶ These elements function as parts of a whole system designed to provide the joint force commander (JFC) the capability to deter an enemy. The Army must understand nuclear capabilities and effects in order to operate within the environment. A ground force prepared to operate on an

⁸³ Office of the Secretary of Defense, *Nuclear Posture Review* (2018), XII.

⁸⁴ *Ibid.*, 55.

⁸⁵ Office of the Secretary of Defense, *Nuclear Posture Review*, 42.

⁸⁶ US Department of Defense, *National Defense Strategy* (Washington, DC: Government Publishing Office, 2018), 5.

atomic battlefield signals a credible threat to our adversaries and reduces the perception that an opportunity exists for our adversaries to employ LYBNWs.

In 2017, the US Army published an updated FM 3-0, *Operations*. The doctrine brought to the forefront the return to great power competition in the form of large-scale combat operations. The doctrine describes LSCO against a peer adversary in an intense, lethal, and complex environment.⁸⁷ In this environment, the likelihood of using weapons of mass destruction (WMD) increases.⁸⁸ Nuclear weapons presents a grave concern for the JFC. Nuclear weapons on the battlefield may disrupt tempo and culminate offensive forces before achieving objectives. Such a pause gives the initiative to the enemy to exploit the conditions created by a LYBNW. Preparing for the contingency of a nuclear weapon in LSCO is essential to prevailing over a peer threat. The Army uses unit rotations through the CTCs or Mission Command Training Program (MCTP) to validate unit readiness against a live, simulated, or constructive opponent.

The National Training Center (NTC) identified a trend in units' inability to demonstrate proper protection procedures and a lack of readiness relating to CBRN tasks. Published in September of 2020, the report states that 0/10 forward support companies (FSCs) assigned to the brigade engineer battalion (BEB) have adequately prepared to conduct CBRN operations.⁸⁹ It states that less than 10% of companies arrive prepared to employ CBRN equipment or procedures. These units come to fight with incomplete joint service lightweight integrated suit technology (JSLIST) protective equipment.⁹⁰ A lack of proficiency at the tactical level reduces the options for commanders and the joint force. Detection and protection tasks are simple

⁸⁷ US Department of the Army, Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Publishing Office, 2017), 1-2.

⁸⁸ US Army, FM 3-0, 1-3.

⁸⁹ National Training Center, *The Army University Joint Lessons Learned Information System* (2020), September 14, 2020, accessed December 2, 2020, <https://www.jllis.mil/apps/?do=lessons:lesson.view&doit=view&disp=lms&lmsid=224605>.

⁹⁰ Ibid.

compared to operations in a nuclear environment that require radiation considerations, decontamination, and medical care. The Army has published training and evaluation outline (T&EO) tasks that support brigade-level procedures in the event of an offensive or defensive nuclear attack.⁹¹ It is not an individual unit failure but rather a lack of emphasis throughout the Army profession that has led to this deficiency.

The number of chemical soldiers at each command echelon may be inadequate during LSCO. Divisions have a dedicated CBRN section of ten CBRN officers and non-commissioned officers (NCOs), while corps HQs have twelve.⁹² These staff sections are responsible for protection planning and providing the requisite knowledge to the commander. Brigades and battalions each have two CBRN personnel, a chemical officer and an NCO. Companies only have one CBRN NCO, an E-5 74D, in the headquarters and headquarters company (HHC). The soldiers within the formation typically do not conduct CBRN training or education once they finish the gas chamber during basic training. Additional CBRN training for soldiers caters mainly to the 74D military occupational specialty code (MOS), CBRN NCOs. Most current schools restrict the training to specific MOSs. These schools are not accessible to soldiers at their home station. The Army plans to rescind the M5 ASI, nuclear medicine course, on October of 2022 (Table 1). The other nuclear training opportunities are sparse, and awareness almost nonexistent.

⁹¹ Army Training Network, “Prepare for Nuclear Attack at Brigade Level,” Task No. 03-BDE-0066, <https://atn.army.mil/ATNPortalUI/task/#> (accessed October 30, 2020).

⁹² “XVIII Airborne Corps HHC, and “3rd Infantry Division HHC,” FMS Web, <https://fmsweb.fms.army.mil/protected/struct/3LevelChart.asp?Update=DRAWCHART&UIC=WAQJFF&OPCON=WAUKFF&DOCST=A&FY=2022&exp=false> (accessed December 8, 2020).

Table 1. Army skill identifiers (ASIs) relating to nuclear training.

ASI	Description	MOS Restriction	Location	Note
F6	Nuclear BC-RV Sensor suite repair	94F		Implemented 10/2015
5H	Nuclear Target Analyst		Kirkland AFB	DNWS
L1	CBRN Reconnaissance and surveillance	74D; skill level 40	Ft. Leonard Wood	
L2	RTCH maintainer (Pending)			
L3	Technical Escorting	74D and 89D only	Redstone Arsenal	Implemented 04/2008
L4	Biological Integrated Detection System (BIDS)	74D	Ft. Leonard Wood	
L5	M93 CBRN Recon system Fox			Implemented 10/2009
L6	CBRN Recon for BCT (Stryker)			
M5	Nuclear Medicine	68P, SPC-SSG		Rescinded 10/2022

Source: DA PAM 611-21 Table 12-2, Milsuite. Accessed Dec 8, 2020, <https://Milsuite.mil/book/docs/Doc-155143>.

The Army no longer retains low-yield battlefield nuclear weapons in their arsenal. Ground forces rely on the nuclear triad in the Air Force and Navy. While potential American adversaries are building a stockpile of LYBNW, the US military relies on large-yield nuclear weapons with higher blast radii and the inability to provide a lower collateral damage radius. Therefore, employment considerations take a backseat in Army training and education. Current doctrine and the 2018 *NPR* directs the Army, as members of the joint community, to prepare for operations in a nuclear environment. One ASI referenced in Table 1 is 5H, Nuclear Target Analyst. The training provides education on nuclear target analysis and nomination, integration of nuclear and conventional fires, and training to planners on nuclear operations concepts.⁹³ The school associated with the ASI is the Defense Nuclear Weapons School (DNWS), located at Kirtland Air Force Base (AFB).

⁹³ James A. Cockle, "Joint Nuclear Operations and Targeting Course," *NBC Report* 2, no. 2 (Spring-Summer 1998): 19, accessed November 11, 2020, <https://www.hsdl.org/?view&did=438428>.

DNWS provides an opportunity for the joint force to educate and train its members in nuclear awareness and proficiency. DNWS provides 36 courses and 24 partnerships through residence courses, Mobile Training Teams (MTTs) and online learning courses.⁹⁴ DNWS is a part of the Defense Threat Reduction Agency (DTRA), also located at Kirtland AFB. This agency provide training on the DoD's only radiological training sites.⁹⁵ While the site and facilities reside at Kirtland AFB, the US Army Nuclear and Countering Weapons of Mass Destruction Agency provides some of the instructors.

USANCA is the lead DoD proponent for nuclear expertise to the Army by providing nuclear employment augmentation teams, developing Army CWMD policy, and synchronizing force protection programs.⁹⁶ The NEAT provides nuclear expertise in planning and targeting as they deploy, on order, to support CCDR or JFC.⁹⁷ They assist in advising the command on nuclear effects, accomplish theater objectives, and in-depth analysis on potential mitigation options.⁹⁸ When needed, the NEAT reaches to USSTRATCOM for nuclear targeting modeling and DTRA for nuclear effects estimates. This allows the commander to synchronize operations across multiple warfighting functions.⁹⁹ The capability provided by the NEAT is a centralized means of distributing expertise when necessary. Internal to the army's personnel is the functional area (FA) 52, nuclear and counterproliferation officer. USANCA is the lead proponent for training and educating FA 52 officers.¹⁰⁰

⁹⁴ Defense Threat Reduction Agency, "Radiological & Nuclear Training Course Catalog," *Defense Nuclear Weapons School* (2021): 2, accessed September 29, 2020, https://www.dtra.mil/Portals/61/FY_2021_Course_Catalog.pdf.

⁹⁵ DTRA, FY21 Course Catalog, 8.

⁹⁶ US Army, AR 10-16, 2-1.

⁹⁷ Joint Staff, JP 3-72 (2020), V-1.

⁹⁸ Ibid., Appendix A-1.

⁹⁹ Ibid., V-1.

¹⁰⁰ US Department of the Army, AR 5-22, *The Army Force Modernization Proponent System* (Washington, DC: Government Printing Office: 2015), 5, Table 2.

USANCA has courses for executive leaders through DTRA..¹⁰¹ The intended audiences are future and current decision-makers and commanders. Current classes listed are under development and will be provided to units to increase nuclear awareness and capability at all levels.

- The Conventional Nuclear Integration (CNI) course provides education to executive leaders. The course is a one-hour *POI* tailorable to the theater of interest. The course educates upper echelon leaders, combatant commanders and staffs, to grow their awareness of nuclear weapon effects and capabilities.
- The CNI Orientation Course is a four to six hours course offered to Majors and above. The course educates on US nuclear policy, adversary concerns, and impacts of nuclear effects on the battlefield.
- Nuclear Policy Course provides a broad education in the following subject matters: US nuclear policy development, the evolution of policy deterrence theory, application of nuclear weapons, factors including policy, foreign nation considerations, and proliferation concerns.
- Basic Intermediate Radiological Nuclear Training (B/IRNT) is a two to five-day residence training. Mobile training teams (MTTs) are available upon request. The course provides ‘radiological and nuclear force protection’ and ‘hazard recognition and identification.’ Education models can also provide up to two hours of radiological fundamentals, two hours of exposure guidance and biological effects of radiation, and a one-hour overview of radiation detection equipment.

Currently, the Army retains CBRN soldiers throughout tactical echelons but does not train individuals outside of the CBRN MOS in nuclear protection and mitigation tasks. Officers

¹⁰¹ James M. Ragland, DTRA, email message to author, October 28, 2020.

do not receive training as part of the *POI* during formal PME. NEAT provides a capability to commanders if a nuclear threat exists. However, planners in all WFFs require a baseline understanding on the effects low-yield battlefield nuclear weapons have on their plans. Should deterrence fail and our adversaries employ LYBNW, the Army cannot risk being unprepared to respond to the emerging threat. To secure national security objectives, the Army can examine the lessons learned from previous historical approaches, provide nuclear training at the tactical level to enable operational success, and integrate efforts with interagency organizations that specialize in nuclear considerations.

Findings

The US Army designed the Pentomic Division as a solution to the first emergence of the nuclear weapon. The Army trained to employ and exploit the opportunity nuclear weapons presented in the tactical level of war. The Pentomic Division era developed capabilities, training, and education primarily internal to the Army and, consequently, overwhelmed the C2 system. As the Army developed solutions for an atomic battlefield, it lost its ability to provide a flexible response in conflicts of limited aims. Unintended consequences such as overwhelmed C2 and inadequate logistics degraded the effectiveness of the battle groups.

The Pentomic Division changed the organization of divisions to address the new threat. The Army primarily trained soldiers at the tactical level in nuclear protection tasks. Training events such as the Desert Rock series and SAGEBRUSH provided the opportunity to build proficiency in the new construct. PME educated officers to understand and plan for nuclear contingencies during scenarios. However, the singular focus towards nuclear tasks cost training and education in other vital Army functions. When America committed conventional forces to Vietnam, the Army realized how single-focused the organization had become. A change in political objectives focused the Army on counterinsurgency training and education. Therefore, the

nuclear proficiency built during the Pentomic Division era degraded through the 1960s and 1970s.

When political leaders committed conventional forces to Vietnam, they were unprepared for counterinsurgency due to the intense focus on the Soviet atomic threat. During the Vietnam War, most of the nuclear education and training ended. The Army needed to design a new solution post-Vietnam and thus defined the integrated battlefield concept through AirLand Battle doctrine. American commanders had chemical and nuclear weapons as options integrated with the traditional conventional weapon array.¹⁰² Soldiers relearned tactical nuclear tasks such as radiation detection, protection to mitigate from the blast, and medical care at the unit level. PME re-introduced nuclear considerations to officers and planners. Formations trained for the atomic battlefield and built proficiency in simulated contaminated environments. Other organizations developed and integrated with the Army to assist units and planners prepare for an atomic threat.

The Department of Defense created agencies such as DTRA and USANCA to fill the role as subject matter experts that could assist commanders with knowledge on the atomic threat. These agencies assist in the operational planning of nuclear considerations should the OE require nuclear proficiency. However, planners, nuclear-proficient soldiers, and atomic artillery remained at the tactical level. The DoD retains nuclear specialty agencies to provide expertise, guidance, and the ability to deploy NEAT to the joint force. Since the Army does not currently field nuclear weapons, the forcing function to educate on nuclear considerations is gone. The Army must turn to the lessons learned from the Pentomic Division era and the integrated battlefield to chart a course ahead.

The Army currently uses the leader development model to focus the development of knowledge and skills to its soldiers. The model demonstrates how providing education, training,

¹⁰² Donn A. Starry, "Extending the Battlefield," *Military Review* 61, no. 3 (March 1981): 34, accessed February 10, 2020, <https://cgsc.contentdm.oclc.org/digital/collection/p124201coll1/id/334/rec/5>.

and experience to a Soldier through the three domains creates a solid foundation for intuition and judgment.¹⁰³ The three domains are institutional, operational, and self-development. There is a balance of training, education, and experience associated with providing tacit and explicit knowledge in each domain. The model is shown in Figure 6.

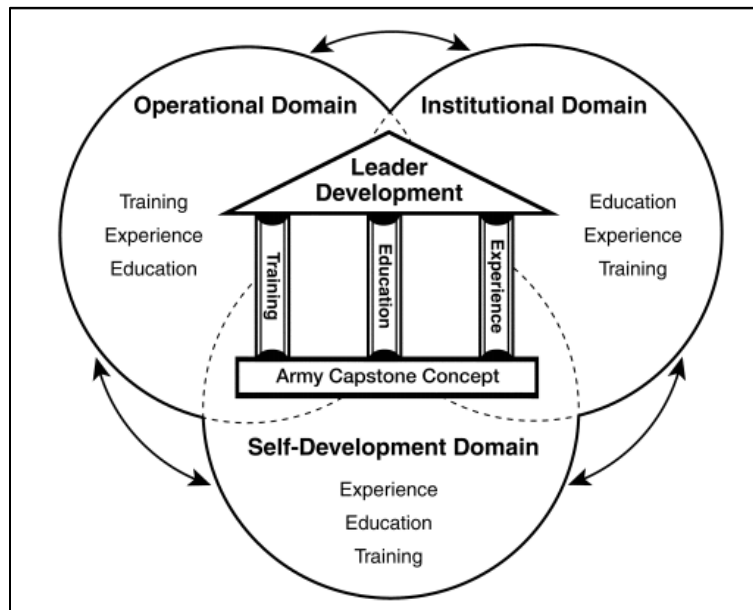


Figure 6. The Army Leader Development Model. US Department of the Army, DA PAM 350-58, *Army Leader Development Program* (Washington, DC: Government Publishing Office, 2013), 2.

Throughout the Pentomic Division era, the Army heavily relied on institutional training and experience to prepare troops to make decisions on an atomic battlefield. Soldiers attended specific training to increase knowledge on radiation detection and mitigation, decontamination, medical response, and recognizing the effects of a nuclear blast. Training events, such as the Desert Rock series, exposed some troops to nuclear blasts. During these exercises, soldiers donned MOPP protection and outfitted vehicles to maneuver in a contaminated environment. Officers focused on recognizing nuclear effects and mitigation during PME. Scenario exercises tested their ability to blend operational art in the atomic battlefield to C2 and sustain dispersed

¹⁰³ US Department of the Army, Department of the Army Pamphlet 350-58, *Army Leader Development Program* (Washington, DC: Government Publishing Office, 2013), 2.

formations. Most importantly, soldiers at all echelons felt that a nuclear exchange was inevitable and prepared accordingly.

During the integrated battlefield era, the Army trended away from institutional education towards the operational domain. The Army trained to employ low-yield nuclear weapons and survive in the face of a Soviet nuclear threat. Select individuals received education and training in the institutional domain that they would leverage the operational training for the unit's benefit. Self-development on nuclear knowledge was unit and mentor dependent. However, all soldiers trained in MOPP levels, units deployed detection devices, and operational plans focused on conventional and nuclear threats. Fires cells planned nuclear employment and held battle drills on attaining nuclear approval. The Army conducted rigorous inspections on nuclear proficiency standards. Overall, the Army approached the nuclear threat with a balanced solution and obtained proficiency to provide the nation with a credible nuclear deterrent.

Today, the Army uses the institutional domain for specific nuclear specialists and outsources the nuclear proficiency to supporting agencies. To synchronize this merger in a future conflict, the Army needs to recognize the opportunities in the institutional and operational domains to build the skillsets that soldiers may need to navigate for uncertain future threats. CTCs and MCTP present this opportunity to the Army. These entities have identified a CBRN proficiency gap in tactical units. Formations fail to bring and demonstrate the proper employment of nuclear equipment or conduct contingency planning. Current soldiers retain little experience and knowledge on CBRN protection tasks, nuclear contingency planning, or nuclear weapon employment considerations.

Recommendations

The Army needs to prioritize nuclear training and education to deter adversaries and build readiness in the formation. Potential adversaries perceive a nuclear proficiency gap and may exploit American weakness in future conflict scenarios. The Army has existing agencies,

USANCA and DTRA, and guidelines that aid commanders on nuclear awareness. Previously, the Army overcorrected its response to the nuclear threat, which sacrificed readiness in other areas. Therefore, leveraging the existing capabilities and growing proficiency at each echelon is vital to maintain a balanced, flexible force. Multiple lines of effort and lines of operation can provide an approach to the desired readiness level. The profession must increase formalized nuclear education in PME institutions, train to a baseline of knowledge for all soldiers, and evaluate readiness in existing culminating training exercises to increase the Army's nuclear proficiency.

The Army can complement formal PME education, at a minimal cost of resources, to increase nuclear education. Planners from all WFFs must consider the respective constraints and limitations LYBNWs have on the battlefield. The lessons learned from the Pentomic Division and the integrated battlefield approach provide insight into previous designs and what to consider. The Army increased training at the tactical level to provide capability during operational planning. Units trained to mitigate the threat and maneuver in contentious environments. Small unit leaders understood the priorities of work to increase survivability and employ devices to provide CBRN early warning.

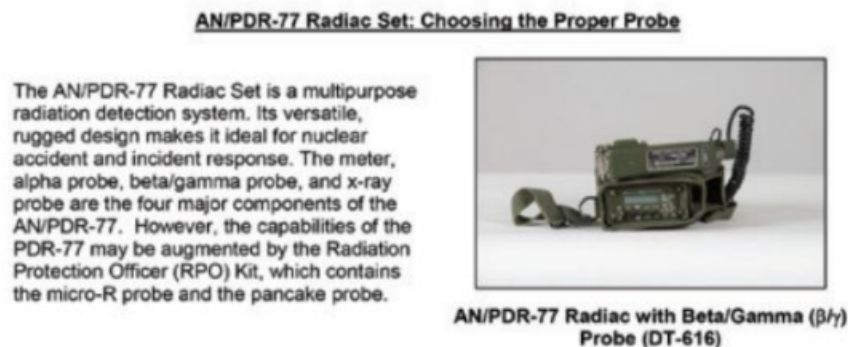


Figure 7. AN/PDR-77 Radiac Set. DTRA, FY21 Course Catalog, 68.

Creating shared understanding and growing awareness across lower ranks are crucial to spread survivability and protection tactical actions. COVID-19 increased DoD's capacity to conduct distanced, virtual learning. While hands-on learning may increase the training quality, the Army relies on quantity when providing base-line proficiency to soldiers in all formations.

Dedicating time to unit training calendars grows CBRN awareness and provides a foundation for future training. CBRN NCOs at the Company level reinforce the training and provide a secondary check to the commander that the unit executes procedures to standard. CBRN NCOs manage the readiness of the CBRN devices and support soldiers in CBRN task proficiency.

Officers and soldiers need to study the nuclear threat to anticipate and mitigate risks. Presenting a credible nuclear threat during CTCs or MCTP scenarios force tactical formations to train soldiers on nuclear proficiency. T&EOs exist to provide a guideline for leaders in training management. Evaluation at training gates provides the mechanism to incorporate CBRN protection tasks such as detection equipment employment, conducting tactical tasks in MOPP gear, and implementing survivability mitigation. These tasks can once again become second nature to soldiers through repetition and developing an appreciation for the growing nuclear threat in LSCO. Creating an Army able to operate on an atomic battlefield is paramount to deterrence and achieving political objectives. Knowing how to access the requisite knowledge from USANCA, understanding the Army's historical approaches, and training current soldiers in CBRN tactical tasks increase the force's readiness.

Conclusion

America's adversaries continuously seek parity and dominance through multiple domains and approaches. One opportunity they seek is through developing low-yield battlefield nuclear weapons. America's nuclear stockpile is less than at the end of the Cold War. Meanwhile, Russia, China, and other rogue states invest in nuclear weapon development and seek to exploit American policy gaps. The 2018 *Nuclear Posture Review* identifies the growing disparity in worldwide atomic advances and the approach other nations take with LYBNWs.¹⁰⁴ The DoD must validate American capabilities and present a credible deterrent to any party who seeks to undermine international peace and order.

¹⁰⁴ Office of the Secretary of Defense. *Nuclear Posture Review* (2018), V.

The Army plays a vital role in this effort. In the face of a growing threat, signaling nuclear readiness is vital for national security interests. The Army can deter adversaries, assure allies, and achieve political objectives should deterrence fail by redesigning an atomic battlefield approach. The Army has undergone two previous shifts in response to a nuclear threat. During the Pentomic Division era in the late 1950s, and through AirLand Battle in the 1970s through the 1990s on the integrated battlefield. Drawing lessons learned from these previous approaches assist decision-makers in anticipating necessary adjustments to the current ULO doctrine. Leaders must also be aware of established agencies that retain requisite knowledge to assist and educate the joint force. The Army can extract lessons learned from historical nuclear approaches, provide nuclear training and education to tactical formations, and leverage existing competencies within interservice and governmental organizations to increase the force's nuclear proficiency and signal a credible deterrent.

In 1957, the Army organized into the Pentomic Division. The organization consisted of five subordinate battle groups, which eliminated an intermediate level of command. It reduced the number of soldiers in the division but increased the capacity to achieve flexibility and mobility.¹⁰⁵ The Army also developed nuclear artillery, air defense platforms, and increased the number of aviation assets. Training and education shifted focus to complement the approach. Officers' PME drastically increased *POI* to educate planners on nuclear effects, mitigation measures, and methods to maneuver on the atomic battlefield..¹⁰⁶ Soldiers trained on survivability tasks, primarily on protection competencies. They learned how to employ radiation detectors, interpret exposure levels, and decontaminate individuals and equipment.

The Pentomic Divisions' organization and tactics created unintended gaps in the Army's capability. Highly dispersed battle groups presented an opportunity for the enemy to penetrate

¹⁰⁵ Bacevich, *The Pentomic Era*, 68.

¹⁰⁶ Dastrup, *The US Army CGSC*, 102.

and exploit. The Army responded with increased detection and firepower. SKYCAV provided a Corps HQ with a formation to conduct reconnaissance up to thirty miles beyond the forward line of troops. Its main functions included identifying enemy disposition, providing early warning for enemy offensive, and blocking exposed avenues of advance until the main body advanced.

Nuclear artillery integrated into the Pentomic Division and gave the commander a counter to the Soviet's multi-echeloned offensive.

The Pentomic Division's failure mainly consisted of inadequate logistic support, overwhelmed C2, and insufficient communications capabilities. Many sustainment enablers centralized at the division level. Therefore, battle groups bolstered the logistic formations with soldiers from the maneuver formations. The shift reduced combat power in an already depleted formation. Since the re-organization eliminated the regimental level, the division staff had five subordinate maneuver elements to control rather than three. Adding the sustainment, fires, and various support organizations, meant the division controlled up to sixteen subordinate units with no intermediary command levels.¹⁰⁷ This overwhelmed their ability to compartmentalize and timely respond to changes in the OE. The decentralized command structure did not account for enough communications equipment to support the dispersed formations. Dissemination and timely reporting suffered from a lack of material and equipment. The deployment of conventional forces into Vietnam exposed the Pentomic Division's shortcomings. It became a "deterrence force" incapable of providing "flexible response." The extreme over-commitment to the atomic battlefield reduced the Army's ability to respond to low-intensity conflict.

Following the end of Vietnam, the Army focused on the Soviet nuclear threat by adapting AirLand battle doctrine. Through AirLand battle, the Army envisioned an integrated battlefield where conventional and atomic weapons merged in combat. The Army once again focused training on employing nuclear weapons, preserving combat power, and planning mitigations. This

¹⁰⁷ Bacevich, *The Pentomic Era*, 134.

time, the Army selected specific personnel within the formation to receive nuclear-specific training. In the Pentomic Division, all officers and soldiers grew their nuclear proficiencies. The Army took a more deliberate approach in atomic training to provide a credible deterrent to the pacing threat and provide a flexible response to political objectives.

The Army trained soldiers in nuclear targeting, atomic artillery handling, and atomic effects analysis. Courses trained targeteers to employ atomic fires.¹⁰⁸ They learned the effects LYBNWs had on both the enemy and the terrain. Field artillery formations conducted training in nuclear artillery round storage, transportation, and handling. The Army conducted surety inspections on personnel, procedures, and mission execution.¹⁰⁹ Planners began to learn the considerations an atomic battlefield presented. Plans incorporated atomic protection measures, articulated engineer priorities, and specified logistic support. Mission command emphasis returned to the forefront as the Army re-learned to conduct dispersed operations.

Department of Defense established the Defense Nuclear Weapons School in 1947 and US Army Nuclear and Countering Weapons of Mass Destruction Agency in 1952 to centralize nuclear training and provide subject matter expertise to the joint force. The mission and function of each entity have changed through the years. Today, they both retain the ability to support the Army in educating and training personnel to operate on an atomic battlefield. USANCA trains FA52 officers and Nuclear Employment Augmentation Teams to support higher echelons of command.¹¹⁰ These capabilities plug a gap in knowledge in the face of a nuclear threat. The Army tactical forces can leverage the education and training opportunities they provide. Further development of their virtual training augments residual knowledge and increases proficiency throughout Army formations.

¹⁰⁸ Cockle, "Joint Nuclear Operations and Targeting Course," 19.

¹⁰⁹ Rosenkranz, "The Nuclear ARTEP in USAREUR," 16.

¹¹⁰ US Army, AR 10-16, 2-1.

Established in 1980, the Army created the National Training Center to train and validate the tactical proficiency of Brigade-level organizations..¹¹¹ Recently, their observations provide a scathing report on the tactical proficiency of units' CBRN tasks. Units either do not bring assigned equipment, or they were unable to display proper employment procedures..¹¹² Inadequate protection measures unnecessarily expose soldiers to various enemy threats. Dispersion, redundant command and logistic nodes, and understanding MOPP posture, all increase the units' survivability and functionality. Evaluating CBRN tasks during CTC rotations can be the forcing function the Army needs to ensure leaders incorporate nuclear proficiency throughout training qualification gates.

As the American military returns its emphasis on great power competition, it must adjust its training, education, and posture to the pacing threat. Russia and China are increasing their LYBNW arsenal while America adjusts from a military emphasis in counterinsurgency operations. This isn't the first instance the Army has had to shift training emphasis. Through revisiting previous transformations, the Army can design a novel solution to the evolving threat environment. MDO requires the Army to consider convergence of effects against the enemy. It would be wise to consider the enemy's convergence of effects on our forces. As the threat of an atomic battlefield looms in great power competition, the Army must create a credible deterrent to secure national security interests. To accomplish nuclear proficiency, the Army can revisit lessons learned from its historical approaches, provide nuclear training and education throughout the force, and leverage the existing competencies with government organizations.

¹¹¹ Davis, *The Challenge of Adaptation*, 56.

¹¹² National Training Center, *The Army University Joint Lessons Learned Information System*.

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