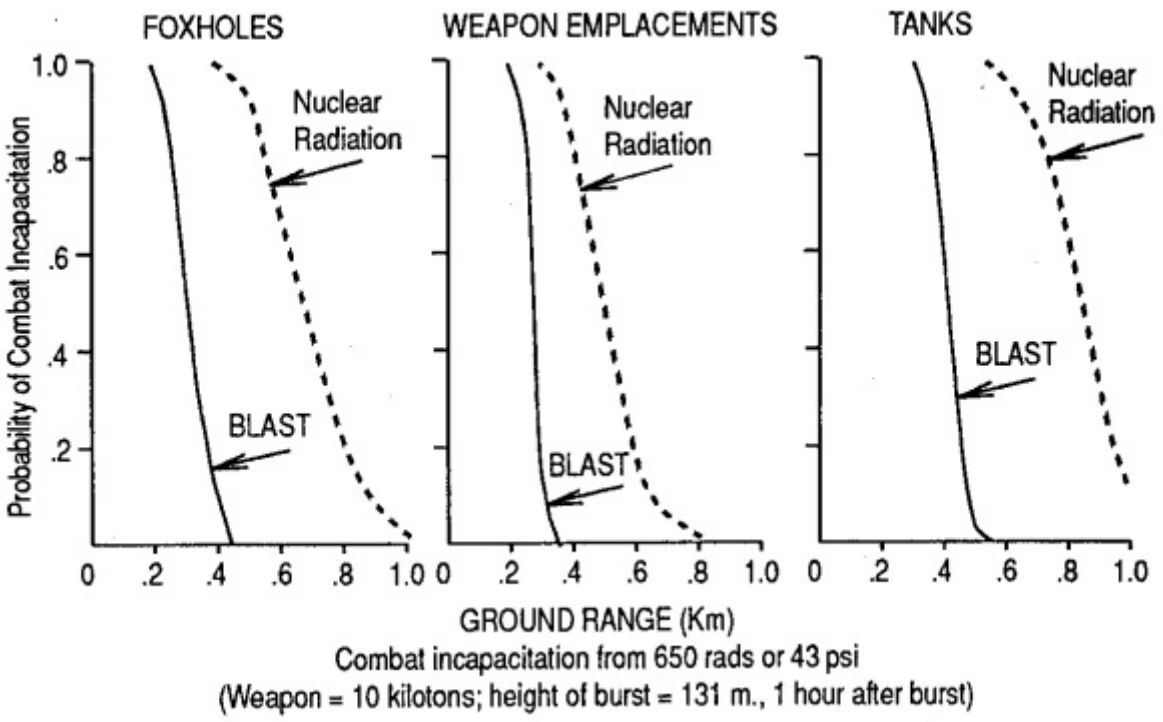
THE DELIBERATE EMPLOYMENT OF UNITED STATES NUCLEAR WEAPONS: ESCALATION TRIGGERS ON THE KOREAN PENINSULA



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DARYL G. PRESS

JANUARY 11 2022

I. INTRODUCTION

In this essay, Daryl Press analyses scenarios of US use of nuclear weapons on the Korean

Peninsula. He argues that the most likely route to US nuclear employment is linked to the DPRK's own use of weapons of mass destruction (WMD), which includes use of nuclear, chemical, and biological weapons.

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The views expressed in this report do not necessarily reflect the official policy or position of the Nautilus Institute. Readers should note that Nautilus seeks a diversity of views and opinions on significant topics in order to identify common ground.

Banner image: Vulnerability of North Korean Forces, Evaluation of Vulnerability of North Korean Divisions to Tactical Nuclear Weapons, vol 1, report to US Defense Nuclear Agency, DNA 4570F-1, March 1978, in Pacific Powderkeg, p. 67, **here**

II. NAPSNET SPECIAL REPORT BY DARYL G. PRESS

THE DELIBERATE EMPLOYMENT OF UNITED STATES NUCLEAR WEAPONS: ESCALATION TRIGGERS ON THE KOREAN PENINSULA

JANUARY 10 2022

Summary

This paper focuses on the conditions under which the United States might use nuclear weapons in the context of war on the Korean peninsula. It identifies circumstances that might trigger such a decision, the purposes of US nuclear use, and the plausible targets of US nuclear strikes. Attention is focused on the roles that nuclear weapons may continue to play in US military operations and geopolitical strategy despite US steps to reduce their saliency since the end of the Cold War. This paper argues that because the United States (and its allies) have a strong preference against using nuclear weapons, it would only consider doing so if (1) the mission being performed via the nuclear strike was of critical importance, (2) the mission could not be accomplished with sufficient certainty or speed with non-nuclear weapons, and (3) the use of nuclear munitions significantly increases the probability of mission success. This paper identifies a range of circumstances that could arise during a war on the Korean Peninsula that might satisfy all three of these criteria, and it identifies the pathways that are most likely to trigger US nuclear employment. Examining these conditions can help US allies and other partners identify and resolve disagreements about nuclear employment, enhance deterrence against regional adversaries, and shed light on the logic driving important decisions about US nuclear force structure and modernization.

1. Introduction

What are the conditions under which the United States, presumably in consultation with the Republic of Korea (ROK), might use nuclear weapons in the context of war on the peninsula? What might trigger such a decision, and what might be the purposes of US nuclear use? What are the plausible targets?

In this paper I focus on the *deliberate employment* of nuclear weapons by the United States, narrowing the scope in two important ways. First, by "employment" I mean the actual detonation of nuclear weapons, rather than the mere issuance of coercive threats. Second, the word "deliberate" focuses this analysis on instances in which US political leaders authorize the detonation of nuclear weapons, rather than instances that arise from unauthorized or accidental detonations.[1]

By defining the scope in this manner, I focus attention on the roles that nuclear weapons may continue to play in US military operations and geopolitical strategy despite US steps to reduce their saliency since the end of the Cold War. The dangers of unauthorized and accidental escalation have been analyzed by a large and important literature.[2] By comparison, there is relatively little unclassified discussion of the circumstances in which US leaders may choose to employ nuclear weapons. Examining the circumstances in which the United States might actually use nuclear weapons has significant potential benefits: for example, allowing allies and other partners to identify and resolve disagreements about nuclear employment, enhancing deterrence against regional adversaries, and shedding light—for the US analytic community and US Congress—on the logic driving important decisions about US nuclear force structure and modernization.

The analysis in this paper rests on one key assumption: that the United States and the ROK have a strong preference against using nuclear weapons.[3] Therefore, Washington would only consider using them during a war if three criteria were all met: (1) the mission being performed via the nuclear strike was of critical importance, (2) the mission could not be accomplished with sufficient certainty or speed with non-nuclear weapons, and (3) the use of nuclear munitions significantly increases the probability of mission success. If all three criteria are met, the United States would likely consider nuclear options.[4]

In the remainder of this paper, I identify a range of circumstances that could arise during a war on the Korean Peninsula that might satisfy all three of these criteria, and I identify the pathways that seem most likely—that is, are most likely to arise during a war, and most likely to cause US nuclear employment.

The rest of this paper is divided into four sections. Section I explains why war is still plausible on the Korean peninsula, Section II analyzes the military missions that might lead the United States to consider nuclear options, and Section III evaluates broader political objectives that could motivate US nuclear use. And Section IV, the conclusion, assesses the likelihood of the various pathways and draws attention to the greatest dangers that lie ahead.

2. The Continued Threat of War in Korea

A conflict on the Korean Peninsula could arise in many ways. From the US perspective, the canonical scenario is a deliberate invasion of the South by the Democratic People's Republic of Korea (DPRK)—either with the goal of conquering the entire Peninsula or seizing Seoul to cripple the ROK. Variants of that scenario are abundant. For example, the DPRK forces might seize a small part of ROK territory (for example, a few islands, or a sliver of land along the DMZ), either to extort the ROK or simply to demonstrate the DPRK regime's power or relevance. In any of these scenarios, if DPRK forces can seize their military objectives, Pyongyang's nuclear arsenal could be used to deter or restrain the response by US and ROK forces.

The canonical scenario cannot be completely ruled out. Although the DPRK's military capabilities have eroded dramatically over the past two decades (as discussed in more detail below), desperate leaders sometimes take reckless gambles. If the leaders in Pyongyang see their political power eroding, they may launch a desperate invasion toward Seoul as a final gamble. Because any major war on the Korean Peninsula entails grave consequences, even scenarios that appear relatively unlikely deserve scrutiny.[5]

Other pathways to war on the Korean Peninsula seem more likely. A political crisis (for example, stemming from sanctions imposed on Pyongyang to compel denuclearization or to punish the regime for hostile activities) could cause the DPRK to initiate a military coercion campaign. A coercive campaign could take many forms—such as shelling by DPRK artillery, attacks on ROK warships, assassinations of South Korean leaders, and many other possibilities. The DPRK has engaged in all these provocative behaviors in the past. Next time, if the ROK responds to a major provocation with unexpected intensity, the back-and-forth dynamic of punishment and counter-punishment could escalate beyond either side's initial goals. The key point is that a major conventional war could erupt from the type of political crisis that is common on the Korean Peninsula, whether either side wants a war or not.

Perhaps the most likely, understudied, and most dangerous cause of war on the Korean Peninsula stems from a partial collapse of the Kim regime in the DPRK.[6] A power struggle in Pyongyang that led to an extended period of contested leadership could unleash dynamics that would force the ROK to invade. A prolonged period of anarchy in Pyongyang could trigger: (1) a humanitarian disaster in the North; (2) major refugees flows into China and the ROK; (3) fears in Seoul that China might intervene militarily and seize substantial DPRK territory to secure its border and restore order; (4) concerns that the DPRK may lose control over its nuclear weapons and fissile material; and (5) worries that hardliners in the DPRK may reestablish control there, prolonging the peninsula's division for years to come.[7] In those circumstances, leaders in Seoul would face tremendous pressure—for strategic, humanitarian, and political reasons—to move north and reunify the Peninsula. Such an act, however, could rally elements of the DPRK military to defend the country, and might trigger deliberate—and rational—nuclear escalation by Pyongyang if they still control their arsenal.

There has been no outbreak of large-scale war on the Korean Peninsula for seven decades, so some observers downplay the dangers of conflict there. The widening gap between the economic might of the ROK and the DPRK, and signs of serious decay in the DPRK military, may provide additional confidence that war is unlikely. But even if deliberate invasion by Pyongyang is significantly less likely than in the past, other important pathways to war remain. And the DPRK's economic stagnation, military decline, and political isolation mean that the risks of war following a DPRK collapse remain serious—and perhaps are growing.

3. Military Rationale for US Nuclear Weapons Use

If war were to erupt on the Korean Peninsula through any of the pathways described above, circumstances could arise that would cause the United States to consider employing nuclear weapons. I divide these circumstances into two categories: those in which the United States employed nuclear weapons to solve a critical military problem (discussed below in this section), and those in which the United States used nuclear weapons for broader geopolitical reasons (discussed in the following section).

To assess the *military* conditions that might cause the United States to consider nuclear options during a war in Korea, I return to the three criteria described above: (1) the mission is of critical importance, (2) it could not be accomplished with sufficient certainty or speed with non-nuclear

means, and (3) the use of nuclear munitions significantly increases the probability of success. Given those three criteria, what might trigger US nuclear employment?

Suppressing North Korean Artillery Attacking Seoul

The DPRK has deployed thousands of artillery pieces near the demilitarized zone (DMZ), some of which can reach the South Korean capital.[8] To make matters worse, they have built hundreds of hardened artillery sites (HARTS) near the border to protect their forces during a conflict. The HARTS come in many shapes and sizes: from simple sheds and bunkers that conceal the artillery in peacetime, to buried shelters, which would give DPRK artillery significant protection in between the shots they fire at the South.[9] The existence of hundreds of long-range artillery pieces in hardened positions constitutes a significant military threat to the ROK.

Many analysts worry that the DPRK will use its artillery against ROK cities during a crisis or war—and, in particular, they worry about Pyongyang firing its long-range artillery systems at Seoul. At the bottom of the escalation ladder, the DPRK could simply alert some of their longest-range guns and rockets during a crisis to trigger panic in Seoul and thereby coerce the ROK. More aggressively, they could fire a small number of shells at the cities and towns near the DMZ —or at Seoul itself—to try to force the ROK to back down. Finally, the DPRK could unleash a devastating barrage on Seoul in the midst of a full-scale war. During a major war, a large-scale DPRK artillery attack on Seoul could impede ROK and US reinforcements (by clogging roads as civilians flee the capital), force the Combined Forces Command (CFC) to devote scarce air and artillery assets to counter-battery missions and/or force the ROK to accept a cease fire on terms favorable to the North.[10]

Whatever their motivation, if the DPRK begins to shell Seoul, destroying those artillery pieces quickly would be a critical objective for the ROK and the United States. But because of the large number of targets, and the protection they receive from HARTS, some analysts believe that it would take many days to adequately suppress DPRK artillery. In fact, a recent RAND report suggested that the DPRK's artillery could not be effectively suppressed until CFC ground forces seized the DPRK artillery positions north of the DMZ, an operation that could take weeks.[11] Therefore, given the high priority that the ROK and US governments would place on protecting Seoul, they might consider employing low-yield US nuclear weapons to destroy the DPRK's long-range artillery if doing so would defend Seoul and cause little to no collateral damage in the South.[12]

Countering a Major DPRK Invasion

Regardless of how a war begins, once it is underway the DPRK might launch a conventional offensive into the ROK. The DPRK has a large army, most of which is deployed near the DMZ. Although the ROK's military is far better equipped and trained,[13] Seoul is located so close to the border that any rupture in the South's defensive lines would pose an immediate threat to the capital. Thus, the United States and the ROK may find themselves, during a war, with a critical need to rapidly destroy the "second echelon forces" of the DPRK army: those that are a few kilometers behind the front, positioned to provide reinforcements and supplies to frontline units.[14]

Attacking second-echelon targets does not necessarily require nuclear weapons. In fact, those targets would be a high priority for ROK and US conventional airpower. But the DPRK has a dense air defense system that, though outdated, would need to be suppressed before CFC aircraft could operate freely over DPRK territory. Furthermore, the DPRK is likely to conduct rocket attacks against ROK airfields, reducing the rate of CFC combat sorties. For these reasons, a small number of nuclear strikes against second-echelon forces could be seen as a regrettable – but necessary – step to blunt a DPRK offensive and thus ensure that the invasion is stopped well-north of the South Korean capital.

Destroying DPRK Nuclear Forces

If war erupts on the peninsula, there will be powerful incentives for the DPRK to employ weapons of mass destruction (WMD)—and in particular, to use its nuclear weapons. The likelihood of DPRK escalation, in turn, would put enormous pressure on the United States and the ROK to conduct so-called "counterforce" attacks on DPRK WMD sites preemptively (if possible), or in response to a DPRK WMD attack (if Pyongyang escalates first).[15] Although Washington and Seoul would greatly prefer to conduct such counterforce strikes without using US nuclear weapons, they may have no choice if the DPRK has already begun using its own WMD, and especially if the DPRK has begun using nuclear weapons. The arguments underpinning these claims are developed below.

There are at least three distinct logics that could drive the DPRK to begin employing chemical, biological, and/or nuclear weapons during a major war on the Peninsula. I describe each in turn because they have different implications for the underlying logic that might cause the United States to consider employing nuclear weapons, as well as the timing and potential targets of such strikes.

Offensive coercion. DPRK strategists might believe (like the leading airpower strategists of World War II) that they can defeat their enemies in war by destroying their will to resist—and that the simplest route to crushing adversary morale is inflicting massive damage on their adversaries' societies. Under a strategy of "offensive coercion," the DPRK would use chemical, (non-contagious) biological, and/or nuclear strikes not for their military effect *per se*, but to convince the ROK and the United States that surrender or accommodation is necessary to prevent unthinkable civilian losses. Offensive coercion using WMD sounds far-fetched but burning down cities to coerce enemy governments to surrender was the policy of every major combatant during the second world war—including the United Kingdom and the United States. Given this history, and the DPRK government's record of using gruesome levels of brutality to achieve its political objectives, it is hard to dismiss this potential DPRK strategy.

WMD warfighting. A second logic that could lead the DPRK to employ WMD envisions Pyongyang escalating for military purposes (rather than to coerce). Neither the DPRK's military, nor its economy, appears strong enough to support a long war; therefore, any battlefield successes will need to occur quickly.[16] The DPRK's best chance to create quick breakthroughs—by opening holes in the ROK's stout defensive lines—is to employ large quantities of chemicals to kill or panic ROK forces, or several nuclear weapons to destroy CFC forces at key points along the front.[17] The "WMD warfighting" logic may arise for the North in defensive scenarios too. For example, in a partial collapse scenario, if the ROK moves north, Pyongyang may use nuclear weapons against CFC ground forces and airbases to blunt a ROK/US "intervention."

Defensive coercion. The relative weakness of the DPRK's conventional forces (compared with those of the CFC) suggests that Pyongyang would very likely lose any major conventional war against the ROK/US alliance. If a war began, therefore, leaders in Pyongyang would quickly face life-and-death incentives to force its adversaries to accept a ceasefire. Nuclear weapons (much more-so than chemical or biological weapons) are the ideal tool for that purpose: to inflict pain on the ROK and the United States until the allies agree to halt operations.[18]

These three rationales for DPRK escalation explain why the ROK and the United States will very likely try to destroy the DPRK's WMD capabilities in the earliest stages of any conventional war on the Peninsula.[19] Leaders in Seoul and Washington will strongly prefer to conduct their "counterforce" attacks with non-nuclear weapons, but three facts will keep US nuclear options on the table: (1) the DPRK's nuclear sites alone (that is, ignoring for the moment the biological and chemical weapons targets in the DPRK) appear to present several dozen targets,[20] some of which (because of their construction) will be hard to destroy; (2) to be successful, a counterforce strike will

seek to destroy nearly every one of the designated targets—a 75 percent success rate would be a failure if the surviving facilities contain nuclear-tipped missiles that are subsequently launched at the DPRK's enemies; and (3) all the targets must be destroyed nearly simultaneously, to prevent early strikes from providing warning that will allow some weapons to disperse or be launched. CFC and USSTRATCOM planners may conclude that employing a mix of conventional- and nuclear-strikes maximizes the odds of disarming the DPRK's nuclear forces, thereby preventing (or highly mitigating) the impending DPRK use of nuclear weapons.

To be clear, fears of DPRK escalation (or actual DPRK escalation, once it occurs) will place great pressure on the United States and the ROK to conduct counterforce strikes, but those strikes will not necessarily employ US nuclear weapons. In fact, Seoul and Washington would greatly prefer to conduct conventional-only counterforce attacks. But the further that the DPRK moves up the escalation ladder, the more it will appear necessary to employ US nuclear strikes to rapidly eliminate the remaining DPRK nuclear weapons.[21]

4. Geopolitical Rationales for US Nuclear Employment

The first set of escalatory mechanisms described above focused on military necessity. They linked US nuclear employment decisions to calculations about (1) the importance of specific military targets (for example, DPRK artillery, second echelon forces, and nuclear sites); (2) assessments about the adequacy of nonnuclear options against those targets; and (3) the level of additional effectiveness that nuclear munitions would provide. The United States, however, might also decide to use nuclear weapons for reasons that are more "geopolitical" than "military." For example, US leaders may feel compelled to use nuclear weapons if the DPRK employs WMD—especially if the attack produces mass-casualties—even if the military consequences of the DPRK's WMD attack are minor. A US nuclear response may be seen as necessary to bolster the credibility of the American nuclear deterrent—which is critical for deterring future nuclear attacks—for assuring allies around the world, and for preventing proliferation. Whether or not US nuclear hesitancy would actually reduce US credibility, and whether or not a US nuclear response would strengthen the US deterrent, fears about US credibility would weigh heavily on US leaders and cause them to consider employing nuclear weapons.

The DPRK actions that could lead to US "geopolitical" escalation are numerous. Any DPRK use of WMD that produced mass-casualties—among military or civilian personnel—could lead the United States to consider a nuclear response. For example, if large-scale use of chemicals gruesomely killed thousands of ROK and US troops along the DMZ, or if DPRK biological weapons killed large numbers of civilians in the South, the United States might consider a nuclear response. More broadly, *any* North Korean use of *nuclear* weapons—to achieve any of the goals listed in the previous section (for example, warfighting, coercion) —could trigger a US nuclear response. Even a nuclear detonation (during a war) over the East Sea / Sea of Japan that killed no one would create pressure on the United States to respond with nuclear weapons (to deter additional DPRK employment and to bolster the credibility of the US deterrent more broadly). In short, any use of WMD by the DPRK would raise some amount of escalatory pressure on the United States, which would vary in intensity depending on the circumstances, including the number of fatalities the DPRK WMD caused, the nature of those fatalities (civilian vs. military), and the DPRK's choice of weapons (DPRK nuclear employment would create greater escalatory pressures than chemicals).[22]

The targets of US nuclear retaliation in such a scenario might fall into three broad categories. First, the United States could conduct a very limited nuclear strike against those DPRK military units that executed the offending WMD attacks, especially if they were located in a relatively isolated location. Second, the United States could launch a symbolic retaliatory strike against other DPRK military target(s): for example, one or more remote airfields, or some remote leadership sites. The third

option for US nuclear retaliation is a large-scale conventional strike with some nuclear elements to disarm the DPRK's remaining nuclear capabilities. The logic of the third option would be powerful, especially in the aftermath of a terrible WMD attack: American leaders may conclude that the DPRK's WMD escalation requires a US nuclear response, but that if the United States is going nuclear, it needs to disarm the most potent DPRK retaliatory forces. In other words, DPRK WMD use would place pressure on the United States to take *some* retaliatory steps in response, but once that decision is made, the pressure to disarm and prevent subsequent DPRK retaliation will be powerful.

What seems far less likely in any of these scenarios is a US retaliatory strike aimed at DPRK cities or at the DPRK's senior leadership bunkers located in urban areas. A counter-city retaliatory strike would be deeply unattractive to American leaders. It would create a humanitarian catastrophe that would tarnish the United States and the administration responsible for decades to come (if not immediately). It would be viewed by many experts in the United States and abroad as violating international law. And perhaps worst of all, a US nuclear attack on DPRK cities would likely leave the DPRK capable of retaliating with surviving nuclear forces against the cities of America's allies in the region (and soon, given ongoing advances in development of intercontinental ballistic missiles, the American homeland as well). Unless the North Koreans have been so careless as to create a nuclear command and control system that is vulnerable to leadership decapitation, a US nuclear attack on DPRK cities would invite devastating retaliation while doing nothing to prevent it.

In sum, DPRK use of WMD during a war on the peninsula would raise the risks of US nuclear response. The more people killed by use of a DPRK WMD, and/or the decision by Pyongyang to use *nuclear* weapons, the more the escalatory pressure on the United States to use nuclear weapons would be exacerbated. The most salient choice for US leaders would be to launch a symbolic nuclear response against one or more DPRK military sites—and *hope* that the DPRK does not counter-escalate —or to launch a full-scale conventional- and nuclear disarming attack against Pyongyang's remaining nuclear forces.

5. Assessing the Potential Triggers for US Nuclear Employment

The main purpose of this paper is to identify plausible pathways to US nuclear employment during a war on the Korean Peninsula. Nevertheless, it is important to differentiate between those pathways that sound more likely than they are, and those that are more dangerous than they seem. I highlight a few examples of each below.

Suppressing North Korean Artillery — Reconsidered

It is possible that the United States may use nuclear weapons to suppress DPRK shelling of Seoul, but the case for doing so is much weaker than it initially appears. The DPRK fields thousands of artillery pieces, but only a few hundred can reach the South Korean capital. An excellent recent RAND report estimated that North Korea's long-range guns and rocket launchers could kill about 3,500 people in Seoul in one hour (and injure 10 times as many) – a terrible human toll, but an estimate that is one or two orders of magnitude smaller than most public estimates.[23]

Furthermore, the RAND analysis did not incorporate the impact of CFC counterbattery fire. In fact, the ROK recently deployed more than one hundred new multiple launch rocket system (MLRS) launchers, which have the capability to deliver precision-guided rockets against the DPRK's artillery positions. New modeling suggests that the CFC's growing counterbattery capabilities are greatly reducing the threat posed by DPRK artillery. Across the range of plausible scenarios, the DPRK's long-range guns and rocket launchers would be suppressed (or destroyed) before they could fully execute the barrage modelled by RAND—and thus that the civilian losses in Seoul would be lower than the RAND analysis suggests.[24] The bottom line: because the CFC's conventional options for

suppressing the DPRK's long-range artillery are growing significantly, there is a much weaker case for using nuclear weapons to do so.[25]

Second Echelon Forces—Reconsidered

It does not seem likely that the United States will need nuclear weapons to blunt a DPRK *conventional* offensive against the South. The DPRK military suffers from multiple, reinforcing weaknesses: obsolete equipment, poor maintenance, limited training and exercises, and questionable morale (from poor food, mistreatment, and bad health). In fact, saying that DPRK equipment is old severely understates the problem that the KPA faces: their weapons are old versions of obsolete designs, which are poorly maintained. DPRK ground forces do some training, but the company- and battalion-level exercises which are essential for troops who will be required to assault heavily defended positions virtually ceased several years ago. And even before the current food shortages and Covid-19 crisis hit the DPRK, the health and conditions of their soldiers were appalling.[26] Conducting offensive operations against prepared defenses requires great skill, coordination, and morale. If the KPA can pull off a well-executed attack despite all their compounding weaknesses, it would be one of the most remarkable feats of arms in history.[27]

Of course, a DPRK invasion that incorporated the widespread use of WMD (i.e., the "WMD warfighting" strategy described above) *could* lead to collapse of CFC defenses.[28] But that problem is discussed below, along with the other ways that first-use of WMD by the DPRK could trigger US nuclear response.

The Likely Routes to Nuclear War

Of the pathways described in this paper, the most likely routes to US nuclear employment are linked to the DPRK's first use of WMD. Two pathways in particular pose grave risks and deserve increased scrutiny.

First, because of the DPRK's profound military weakness, if conventional war erupts through any mechanism (e.g., a crisis along the DMZ that spins out of control; the partial collapse of the DPRK regime and subsequent intervention by the ROK) the government in Pyongyang may logically conclude that they must use WMD—and probably nuclear weapons. Any reasonable hope they harbor for conventional military success would depend on large-scale WMD use to weaken CFC defenses. Any effort to coerce the ROK with artillery attacks would quickly face a sobering reality in the form of withering CFC counterbattery fire. And if the CFC initiated offensive air- and ground-operations toward Pyongyang, the DPRK leadership would be compelled to rapidly coerce an end to fighting. WMD, and in particular, nuclear weapons, provide their best hope. For the reasons described above—military and "geopolitical"—the United States would face pressure to respond with nuclear weapons.

The second dangerous pathway to US nuclear employment extends this logic backwards a half-step. Because CFC military planners expect the DPRK to use WMD first during any war on the Peninsula,[29] CFC plans very likely call for large-scale conventional attacks on the DPRK's WMD, command and control, and leadership targets from the first moments of any conventional war.[30] And if the CFC's disarming strikes are not completely effective, leaders in Pyongyang—desperate to halt attacks on their regime survival weapons—*will need to escalate*. Depending on the targets the DPRK hits (civilian vs. military), the weapons they employ (nuclear vs. chemical), and the casualties they cause (many vs. few), Pyongyang's use of WMD could trigger a US nuclear response. Stated differently, US and ROK fears of DPRK WMD—and the possibility of nuclear escalation—could easily become a self-fulfilling prophecy.

But before one condemns US and ROK planners for causing the escalation they seek to avoid, keep in mind that they're probably correct: the DPRK very likely will use nuclear weapons if there is a major war on the Peninsula—whether or not the CFC targets Pyongyang's nuclear facilities. The core problem is that the DPRK military will likely be overmatched in any war on the Peninsula, and so the leaders in Pyongyang will need to find some way to rapidly create a stalemate—a ceasefire-i--place. DPRK Chairman Kim Jong Un and the Kim family cannot afford to let the CFC inflict a decisive victory on the DPRK; they know what happened to Saddam Hussein in Iraq and to Muamar Qadaffi in Libya. The grim truth is that once their army starts to lose, coercion via nuclear escalation is their best option. Which—of course—is the surest path to US nuclear employment.

III. ENDNOTES

[1] Unauthorized nuclear employment refers to a circumstance in which military personnel (or others entrusted with the weapons) use them without valid authorization. In peacetime those dangers are minimized by a combination of material barriers (such as locks) and the procedures that govern the handling of the weapons. Some of those protections, however, may be weakened during a nuclear crisis to increase the readiness and survivability of the nuclear forces. Accidental detonations (as opposed to unauthorized use) refer to instances in which nuclear weapons are detonated without any actor deliberately choosing to release them—for example, the result of a crashed aircraft carrying nuclear weapons, or a fire at a storage site. Modern US nuclear weapons are designed to minimize the probability of accidental detonation, but other countries' designs may not be well-protected from this risk, and the possibility of accidental detonations cannot be fully ruled out for any country's arsenal.

[2] For example, see Bruce G. Blair, *The Logic of Accidental Nuclear War,* Brookings, 1993; and Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons*, Princeton, 1993.

[3] In fact, the Biden Administration is reportedly considering adopting a "sole use" policy for US nuclear weapons, which (if enacted) would limit the role of US nuclear forces to deterring or responding to adversary nuclear employment. See for example, Paul Sonne and John Hudson, "Biden administration considers adjusting rationale for US nuclear arsenal," *Washington Post*, November 2, 2021, https://www.washingtonpost.com/national-security/biden-nuclear-weap-ns-strategy/2021/11/02/19686832-3be2-11ec-a67c-d7c2182dac83_story.html

[4] As will become clearer later in this paper, these three criteria (e.g., the importance of the mission, and the need for nuclear munitions to accomplish it) do not necessarily refer to a mission with *military* importance. Some of the most important potential triggers for US nuclear employment, as described in detail below, are rooted in the perceived *geopolitical* importance of US nuclear retaliation after various adversary actions (also described below).

[5] Furthermore, as Paul Davis and Bruce Bennett point out, geopolitical events that seem implausible do happen—and given the stakes involved, planners and analysts should at least consider the possibility of a reckless invasion by the DPRK. Paul K. Davis and Bruce W. Bennett, "Nuclear Use Cases for Contemplating Crisis and Conflict in East Asia."

[6] Bruce W. Bennett, *Preparing for the possibility of a North Korean collapse* (Santa Monica; RAND, 2013); Bae, Joonbum, and Andrew Natsios. "Preventing a Post-Collapse Crisis in North Korea." *Foreign Affairs* (2018).

[7] On military missions associated with these problems see Bruce W. Bennett and Jennifer Lind. "The Collapse of North Korea: Military Missions and Requirements." International Security 36, no. 2

(2011): 84–119.

[8] Among the best unclassified analyses of the risk that DPRK artillery poses to ROK cities are D. Sean Barnett et al, “North Korean Conventional Artillery: A Means To Retaliate, Coerce, Deter, or Terrorize Populations,” RAND Corporation, 2020; Gian Gentile et al, “Four Problems on the Korean Peninsula: North Korea’s Expanding Nuclear Capabilities Drive a Complex Set of Problems,” RAND Corporation, 2019; and Roger Cavazos, “Mind the Gap Between Rhetoric and Reality,” NAPSNet Special Reports, June 26, 2012.

[9] The DPRK has also apparently built some number of extensive underground facilities near the DMZ (“subterranean complex battle positions”), which would allow their forces to fight from within heavily protected fortifications. See “North Korean Tactics,” ATP 7-100.2, Department of the Army, July 2020, chapter 4, pp. 37-41. It is unlikely, however, that the DPRK’s long-range artillery can fire from within these structures. The concussive effects of firing very large caliber guns inside structures would likely incapacitate DPRK artillerymen, and the backblast from large rocket launchers would be extremely dangerous in a confined space. I thank Joseph Bermudez for helpful discussions on these points.

[10] For an excellent analysis of the consequences of varying levels of North Korean artillery attack on the ROK, see Barnett et al, “North Korean Conventional Artillery…”, ibid.

[11] Michael Mazarr, et al., “The Korean Peninsula: Three Dangerous Scenarios,” *Perspective*, RAND Corporation, PE-262-A, 2018, pp. 12-13.

[12] Nuclear weapons that are detonated as “air bursts”—meaning at a high enough altitude to prevent the debris from the ground from mixing with the fireball—produce very little fallout, allowing nuclear strikes to occur without causing much collateral damage. For an analysis of the relationship between warhead yield, target hardness, height of detonation, and fallout, see Keir A. Lieber and Daryl G. Press, “The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence,” *International Security* 41, No. 4, (Spring 2017), pp. 28-32.

[13] James Hackett, “The Conventional Military Balance on the Korean Peninsula,” IISS, June 11, 2018; Kim Min-Seok, “The State of the North Korean Military,” in Chung Min Lee and Kathryn Botto, eds., *Korea Net Assessment 2020: Politicized Security and Unchanging Strategic Realities* (New York: Carnegie Endowment for International Peace, 2020); John Gordon IV et al, “Army Fires Capabilities for 2025 and Beyond,” RAND, 2019, pp. 27-28, 32.

[14] In the 1970s and 1980s, NATO planned to do exactly this to blunt a Warsaw Pact invasion of Western Europe. The United States and its allies envisioned using “theater nuclear weapons” against second-echelon Warsaw Pact forces, plus nuclear strikes on Warsaw Pact supply depots, rail yards, and bridges, to destroy the forward momentum of an offensive.

[15] A recent RAND analysis of future US artillery requirements simply states in passing that in the process of fighting a conventional war, US and ROK forces would conduct strikes aimed to “neutralize [DPRK] WMD capabilities” Gordon, “Army Fires,” p. 34-35. Gordon et al.’s view is entirely consistent with unclassified interviews I conducted with USFK and CFC war planners in 2013, who suggested that air strikes against DPRK WMD (including nuclear sites) was a major part of CFC military plans for war on the Peninsula. See Keir A. Lieber and Daryl G. Press, “Coercive Nuclear Campaigns in the Twenty-first Century: Understanding Adversary Incentives and Options for Nuclear Escalation,” Project on Advanced Systems and Concepts for Countering WMD (PASCC), Report Number 2013-001, US Naval Postgraduate School, 2013.

[16] Of the many ways in which the DPRK's economy appears ill-prepared to support a sustained conventional war against the South, perhaps the most critical is Pyongyang's shortfalls in stocks of petroleum products. See Peter Hayes and David von Hippel, "Sanctions on North Korean Oil Imports: Impacts and Efficacy," NAPSNet Special Reports, September 05, 2017.

[17] By detonating nuclear weapons as "airbursts" (that is, at sufficiently high altitude that the fireball does not mix with debris from the ground), the DPRK could destroy ROK military forces without creating fallout, which would impede a DPRK military advance.

[18] Facing conventional military defeat, DPRK leaders would face life-and-death incentives to use nuclear weapons to coerce the CFC to accept an immediate ceasefire. The potential targets for initial DPRK attacks in such a scenario are wide ranging: the first DPRK coercive move could be a nuclear demonstration over its own territory, a detonation over the sea, an attack on a military installation in the ROK, or even an attack on a small city. What distinguishes "defensive coercion" as an escalation strategy is not the target, *per se*, but the coercive intent. The purpose would be to use nuclear weapons in a manner that demonstrates that additional escalation is likely, and then to issue a clear threat: halt the offensive military operations immediately or suffer further nuclear attacks. On coercive nuclear escalation, see Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs*, November / December 2009; and Lieber and Press, "The Next Korean War," *Foreign Affairs*, April 1, 2013.

[19] By launching a major counterforce campaign, the CFC will inadvertently create another incentive for the DPRK to use WMD and in particular nuclear weapons to coerce the CFC to immediately halt their counterforce strikes. That said, if CFC planners expect that DPRK WMD escalation is very likely (for the three reasons described above), they may logically conclude they must degrade DPRK WMD capabilities as much as possible.

[20] Unclassified estimates of key DPRK sites vary substantially, but given inevitable target identification uncertainty, CFC / STRATCOM planners will presumably strike confirmed targets, likely targets, and maybe even possible targets as a way to ensure that their strikes damage as many actual critical WMD sites as possible.

[21] It is essential to remember that if DPRK nuclear escalation appears likely (e.g., because their conventional forces are collapsing, because their political leaders are issuing nuclear threats, and/or because certain forces or NC3 systems are alerted), a CFC disarming strike would not need to be completely successful to save millions of lives. A counterforce strike that destroyed seventy-five percent of intended targets might destroy all DPRK nuclear delivery systems (or create a mismatch between surviving delivery systems and surviving weapons). Furthermore, given the questionable reliability of DPRK missiles and warheads (and the possibility of successful missile defense), a few surviving DPRK weapons may not result in any successful retaliatory strikes. The overarching point is that faced with likely DPRK escalation, even imperfect counterforce options may be appealing and logical—and such strikes may require some number of nuclear weapons.

[22] It is difficult to place biological weapons on this continuum because they vary enormously in their consequences, from non-contagious and non-lethal pathogens to highly contagious lethal ones.

[23] Barnett et al, "North Korean Conventional Artillery."

[24] Nick Anderson and Daryl G. Press, "Lost Seoul? Modeling an Artillery Battle along the DMZ," manuscript 2021.

[25]There's another reason to doubt that US nuclear weapons would be appropriate for the counter-

artillery mission. If the DPRK's largest guns and rocket launchers must move out of their fortifications to fire, then ROK artillery should be able to destroy them rapidly. (See Anderson and Press, "Lost Seoul.") But if the DPRK can fire their largest guns from inside fortified, deeply buried positions, then nuclear ground-bursts might be necessary to destroy those structures. Ground bursts, however, would create lethal fallout perilously close to Seoul. In other words, for nuclear weapons to help solve the problem of DPRK artillery, Pyongyang's HARTS must be just hard enough to be immune from CFC conventional munitions but just soft enough to be destroyed with nuclear air bursts (preventing fallout). That window exists theoretically, but it is narrow. On the causes of fallout and the key distinction between air- and ground-bursts, see Lieber and Press, "The New Era of Counterforce," pp. 28-32.

[26] Among the many reports of the decay of the DPRK military over the past decade, see Elizabeth Shim, "Malnutrition in North Korea military forcing parents to supply food," *UPI*, July 17, 2017, https://www.upi.com/Top_News/World-News/2017/07/17/Report-Malnutrition-in-North--orea-military-forcing-parents-to-supply-food/2941500311067/; Sofia Lotto Persio, "North Korea Has 1.2 Million Troops But Cannot Feed Them," Newsweek, August 24, 2017, https://www.newsweek.com/north-korea-cant-feed-all-its-12-million-soldiers-654732; Stephen Silver, "North Korea's Military: Too Sick and Too Hungry to Train?" *The National Interest* December 1, 2020, https://nationalinterest.org/blog/korea-watch/north-koreas-military-too-sick-and-to--hungry-train-173591; Gabriela Bernal, "The Worsening Plight of North Korean Soldiers," *The Diplomat* September 9, 2021, https://thediplomat.com/2021/09/the-worsening-plight-of-north-k-rean-soldiers/ For a summary of the state of DPRK weapons see Kim Min-Seok, "The State of the North Korean Military," Carnegie Endowment for International Peace, March 18, 2020, https://carnegieendowment.org/2020/03/18/state-of-north-korean-military-pub-81232 That report notes that most of North Korea's ground force weapon systems are either from the middle decades of the Cold War or are built based on those obsolete designs. To put this in context, the condition of the DPRK army seems comparable to the condition of the front-line, conscript infantry that Saddam Hussein deployed along the Kuwait-Saudi border in 1990. Whereas Iraq's well-armed and well-trained Republican Guard fought bravely (though ineffectively) against the US-led coalition, the front-line infantry—armed with obsolete weapons, lacking basic maintenance, denied training, and deprived of healthy food—collapsed immediately. A DPRK leader considering ordering a major offensive would need to confront the real possibility that his army might immediately collapse upon first contact.

[27] Some analysts worry that although the DPRK military may be in terrible condition overall, elements of their forces (for example, the missile forces) may have higher levels of training, maintenance, and morale. Even if true, the ability of the DPRK to execute a successful invasion of the South, triggering the United States to consider nuclear strikes on second echelon forces, depends on the preparedness of the DPRK military overall—not simply elements such as the missile forces.

[28] Even if the DPRK used WMD to cause a breakthrough in CFC lines, it is debatable whether nuclear strikes on second echelon forces would be an effective way to stall a DPRK offensive. Skeptics argue that tactical nuclear weapons would have too small a lethal radius to inflict sufficient damage on DPRK follow-on-forces or supply lines, given that they can disperse to reduce their vulnerability to attack. I would counter that the United States has a wide range of nuclear yields available for such a contingency (e.g., from the various configurations of B-61s, W-76s, and W-88s), and that an airburst attack (to avoid fallout) could create chaos and shortages in an DPRK army that would already be operating with minimal supplies. More analysis of this potentially important questions is merited. For an excellent analysis that takes the "skeptical" stance on nuclear strikes on second echelon forces, see Bryan Jack et. al., "Regional Rivalries and Nuclear Responses, Volume II,

The South Korean Case: A Nuclear Weapons Program Embedded in an Environment of Great Power Concerns," Defense Nuclear Agency, Washington, DC, 1978, available at https://nautilus.org/foia-document/regional-rivalries-and-nuclear-responses-voluume-ii-the-south-korean-ca-e-a-nuclear-weapons-program-embedded-in-an-environment-of-great-power-concerns/; and see the helpful discussion of this issue in Peter Hayes, "Nuclear Warfighting to Defeat a DPRK Attack: Unnecessary, Disproportionate, Incredible, and Self-Defeating", NAPSNet Special Reports, November 01, 2014, https://nautilus.org/napsnet/napsnet-special-reports/nuclear-warfightin--to-defeat-a-dprk-attack-unnecessary-disproportionate-incredible-and-self-defeating/

[29] The expectation, common among United States Forces Korea (USFK) planners, that the DPRK will use WMD early during a war on the Peninsula is based on (a) assessments that without such attacks, the DPRK would have little hope of battlefield success against strong CFC forces and (b) the repeated threats of the DPRK leadership to do exactly this.

[30] Unclassified interviews I conducted with USFK and CFC war planners a decade ago confirmed that, at least then, air and missile strikes on DPRK WMD sites were core elements of CFC conventional war plans. See Lieber and Press, "Coercive Nuclear Campaigns in the Twenty-first Century"; and Lieber and Press, "The Next Korean War."

IV. NAUTILUS INVITES YOUR RESPONSE

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