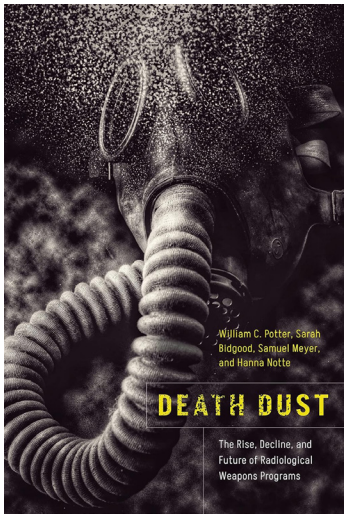

Book Review

Death Dust:
The Rise, Decline, and Future of Radiological Weapons Programs

William C. Potter, Sarah Bidgood, Samuel Meyer, and Hannah Notte,
Stanford University Press, 2023

Reviewed by: Maj. Parker Stevens

The United States (US) Army has made major efforts to address Weapon of Mass Destruction (WMD) use, with investments towards upgrading capabilities for responding to Chemical, Biological, Nuclear, and Radiological (CBRN) threats, chemical use featuring prominently in exercises, and releasing new strategies for operating in nuclear and biological weapon-affected battlefields. What about the letter 'N' in CBRN? Despite worries over what terrorists could do with a Radiological Weapon (RW), states have not employed them on the battlefield—why? In *Death Dust: The Rise, Decline, and Future of Radiological Weapons Programs*, authors William C. Potter, Sarah Bidgood, Samuel Meyer, and Hannah Notte address these questions by walking through the historic state RW programs, discussing how they started, why they stopped, and what this portends for the future.

The paradox the authors examine is, with the supposed ease of making RWs, why have states with actual industrial bases not employed them? They highlight other questions that follow: Are they a thing of the past? Is the focus on use by terror groups misplaced? Are new tools like updated arms control instruments needed to limit future dangers? The authors address these questions with a comparative case study analysis of known state programs, using a common matrix of questions informed by a general model of military technological innovation. The authors define RWs as weapons designed to disperse radioactive material in the absence of a nuclear detonation, excluding nuclear weapons with enhanced payloads, they did not include nonstate actor attempts.

The body of *Death Dust* consists of the country case studies, emphasizing the main factors in starting and stopping the RW programs. Of these, the US and Soviet programs get the most coverage as they made the greatest progress and are used as the archetypes of contrasting approaches to military innovation. Starting shortly after World War II, the US program embodied a "bottom up" approach, with individual scientists and military personnel advocating for RW development. This devoted but narrow base of support only kept the program running until the late 1950s. Results of early weapons tests were promising, but RWs never enjoyed the broad, cross-service support of nuclear weapons and did not seem to justify their cost, especially with the absence of intelligence on a similar Soviet threat.

Meanwhile, the Soviet Union began developing RWs shortly after starting their nuclear program, a decision largely driven by intelligence on US RW efforts. The Soviet Union used a "top down" approach, with the senior military leadership pushing for rapid weaponization and live weapons reaching testing by the mid-1950s. The Soviets continued their program for longer than the US, but ultimately interest faded for similar reasons. Even with very different decision-making approaches, in both cases bureaucratic reasons won over technical factors. Testing showed there certainly were significant problems in employing RWs such as radiation affecting the delivery system, or managing munitions that decayed away in storage, but the real deciding factor was the greater pull of nuclear advocates.

The coverage of "minor" programs varies widely by available evidence. Postwar Britain only conducted academic studies throughout the 1950s, constrained by lack of funds. Never developing a deep bench of advocates, even this modest effort was cut for more focus on the nuclear program. Evidence on the Egyptian program is limited but points to concerns over Israel's rumored nuclear developments and the desire for prestige as a "nuclear" power. It did not pass the exploratory phase, encountering severe difficulties producing radiological material and developing a suitable delivery system. The final program covered is Iraq. Alongside the more publicized WMD programs, the country managed to test live RWs by the late 1980s. Strong senior leader interest came from a search for advantages as the Iran-Iraq War dragged on and the lack of international reaction to chemical weapon use; however, their interest faded as costs increased and chemical weapons proved their value. The chapter about Iraq also highlights the difficulty that United Nations inspectors, prepared for other WMD programs, had in collecting evidence of RW development. Overall, the minor program chapters illustrate how top-down decision-making and associated lack of feedback can allow scientifically dubious schemes to survive and thrive.

The book concludes with a review of factors seen across case studies, the outlook for future RW development, and what may change with the war in Ukraine. The authors observe that while there are common traits among the known programs, there are no universal factors that explain why they began or ended. Most were conducted in great secrecy, so previous efforts rarely informed later decisions.

The outlook for the future is murky. RWs have severe technical limitations, but as arms control instruments tend to focus on more common WMDs they may offer a way around such measures. While the authors identify no actual wartime use of RWs, they point out that RWs are back in the news with Russia accusing Ukraine of developing them before the current invasion. The authors identify the specific Russian allegations as spurious at best and showing a surprising lack of technical merit, but this elevated profile may reinvigorate interest as an option for nations who would have difficulty acquiring nuclear weapons.

Overall, the approach of using common questions presented in an overarching innovation framework provides a well-organized decision-making study of novel weapons development programs, but those expecting a more technical treatise may be disappointed. There is no dedicated background discussion on how RWs function, and what factors into potential military effectiveness is only brought up as a detail in the vignettes. This makes sense with how technical facts usually took a backseat to bureaucratic imperatives in program decisions, but providing some background on the technical details and the very real problems in employing RWs could have helped better define where these diverged. Finally, the conclusion thoroughly discusses situational factors likely to affect future RW development but may have benefited from also examining changing technical factors such as increasing proliferation of radioactive material for medicinal, industrial, and power applications.

I would recommend *Death Dust* for readers specifically studying RWs as it provides a consolidated background resource in an area where discussion is focused on nonstate actors. I would also recommend it to those looking at state WMD pathways who may be interested in learning about how internal dynamics can interact with external threats and scientific reality. Those involved with conducting inspections may find some interesting vignettes on being prepared for the unexpected. While this book was published in the midst of Russia's invasion of Ukraine, just as with nuclear proliferation it remains to be seen if the concerns raised over loopholes in the international nonproliferation regime will prove prescient. ■

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Notes

1. Todd South, “Fighting ‘Dirty’- The Army’s Plan to Survive, and Win, a Doomsday War,” *Defense News*, October 16, 2024. https://www.defensenews.com/land/2024/10/16/fighting-dirty-the-armys-plan-to-survive-and-win-a-doomsday-war/.

2. Mary Beth D. Nikitin, “’Dirty Bombs’: Background in Brief,” (Congressional Research Service, 2011): R41891, https://www.congress.gov/crs_external_products/R/PDF/R41891/R41891.4.pdf.

3. William Potter, Sarah Bidgood, Samuel Meyer and Hanna Notte, *Death Dust: The Rise, Decline, and Future of Radiological Weapons Programs*, (Stanford University Press, 2023).