AN "ALL THINGS NUCLEAR" APPROACH TO REDUCING GLOBAL NUCLEAR DANGER

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Abstract

Most nuclear policy and national security experts of national prominence appear to agree that the danger to global security from nuclear threats is growing. Indicators of this growing threat include the resumption of state-level proliferation of nuclear weapons, stalled arms control efforts, burgeoning global demand for nuclear power, stressed and often ineffective international mechanisms, and the prominence of nuclear terrorism concerns among international leaders and security experts. To improve this global nuclear security environment the United States must reestablish its leadership by reengaging in *all* nuclear arenas. But first, it must develop a coherent national strategy that integrates policies, programs, and technologies that affect "all things nuclear" into a cohesive framework that understands and coordinates the relationships between the four major nuclear domains: (1) nuclear weapons, (2) nuclear energy and radiation sources, (3) nuclear nonproliferation, and (4) nuclear counterterrorism. Only by coordinating and integrating across these traditionally stove-piped domains can the U.S. effectively address the nuclear dangers that arise from the combination of all four domains. This paper describes the need for an "All Things Nuclear" approach within the U.S. government, presents ideas for how such an approach could be structured and implemented at the functional-level, and anticipates some of the benefits and challenges associated with it.

Introduction

Despite the best efforts of dedicated individuals and organizations, it is widely perceived by national security and nuclear policy experts that the threat to global security from the malicious use of nuclear technology is growing. But this threat arises from many different nuclear domains that are the purview of many different organizations and entities within the U.S. government. These domains include nuclear weapons, nuclear energy and radiation sources, nuclear nonproliferation, and nuclear counterterrorism. The fragmented and stove-piped approach the U.S. government uses to address nuclear issues is leading to policies and programs that may advance U.S. goals in one domain, but inadvertently conflict with and detract from U.S. goals in another domain. An example of such an issue was the effort in the early years of the George W. Bush Administration to fund development of a Robust Nuclear Earth Penetrator—which while possibly a positive development for the nuclear weapons domain, had a strikingly negative impact on U.S. nuclear nonproliferation efforts.

Consideration, analysis, and coordination of the impacts of policies and programs across *all* nuclear domains will be critical to the success of efforts to reduce global nuclear danger. This

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point was articulated by Rolf Mowatt-Larssen, Director of the U.S. Department of Energy's Office of Intelligence and Counterintelligence, in a 2008 interview: "we must make a strategic shift from our traditional views of terrorism, proliferation, nuclear weapons, and nuclear energy as being separate entities and instead view them as parts of a single framework of all things nuclear."[2]

This concept of "All Things Nuclear" (ATN) can be made an organizing principle for U.S. government efforts on nuclear issues. Using conceptual models of how the various nuclear domains link together within the ATN environment may lead to better cross-domain coordination, more robust trade-off analyses between competing national priorities on nuclear issues, more informed decisionmaking, and better overall results in U.S. government efforts to reduce global danger from nuclear threats. Without a common unifying theme like ATN, national efforts may remain stove-piped and relatively ineffective at addressing the indicators and warning-signs of the growing nuclear danger.

Indicators of the Growing Nuclear Danger

A variety of signs indicate that the danger for malicious use of nuclear technologies is growing. Without intentional and active measures to address *all* of these factors in a coordinated manner, efforts to address the global nuclear danger may fall short.

Proliferation

Since their invention in 1945, a new state has acquired nuclear weapons approximately every five to seven years.[3] Except for one notable 20-year period, this upward trend has remained remarkably steady and consistent, as seen in Figure 1.

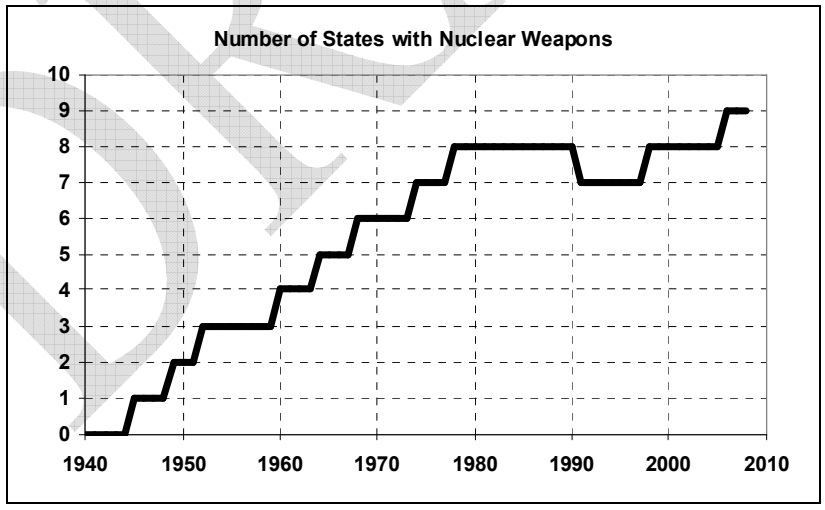

Figure 1: Number of states with nuclear weapons, 1940 – present

[2] David R. Sands, "Nuclear dangers rise with oil costs," *The Washington Times*, June 17, 2008.
[3] "Acquired" is a subjective term that can be interpreted many ways. For the purposes of this analysis, open-source information was used to determine a date of the first known nuclear test by individual nations, or, if a nation did not test, the approximate year that open-source information indicates the nation developed functional nuclear weapons.

The historical exception that occurred for a remarkable 20 year period during the 1980s and 1990s coincided with the height of the Cold War arms race and the eventual collapse of the Soviet Union. During this period the proliferation trend briefly halted and even reversed—with South Africa giving up its small nuclear arsenal along with apartheid in the early 1990s. Despite this brief respite, the upward trend appears to have resumed in the past decade, with Pakistan acquiring nuclear weapons in 1998 and North Korea in 2006. Speculation that other nations, particularly Iran, may be developing nuclear weapons would only confirm the continuation of this ominous trend into the 21st century.

Arms Control

Signed in May of 2002, the *Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions* (SORT, commonly known as the "Moscow Treaty"), is the most recent effort in bilateral U.S./Russia arms control. The treaty calls for sharp reductions in the strategic nuclear weapon stockpiles of both nations. However, several cogent criticisms have been leveled at the effectiveness of the treaty, including its lack of verification provisions, its limits only on operationally deployed weapons (not those held in reserve), its expiration on December 31, 2012 (the same day the treaty requires the reductions to occur by), its lack of restrictions on the numbers of delivery vehicles, and its focus solely on "strategic" weapons (not "tactical" weapons, which are quite numerous in the Russian stockpile). Credible or not, these criticisms lead some in the international community to believe that the U.S. and Russia are not serious about arms control when it is directed at them—diminishing U.S. influence on other nations' nuclear aspirations.

Another concern in the arms control arena is the expiration at the end of 2009 of the Strategic Arms Reduction Treaty (START). This treaty limits the numbers of strategic weapons systems—including delivery vehicles—for both Russia and the U.S., and provides for detailed verification measures. Renegotiation or extension of either START or SORT, or an entirely new bi- or multi-lateral treaty on arms control, may be possible under the administration of President Barack Obama, though Russian leaders have indicated that no such steps can be taken if U.S. efforts to implement a missile defense system in Europe continue.[4]

Nuclear Energy Expansion

More than 40 developing countries have approached the United Nations (UN) recently to signal interest in starting nuclear power programs, including Nigeria, Libya, Jordan, Yemen, and others.[5] While the global expansion of nuclear energy usage is not inherently a negative development—and may even be a positive one in light of U.S. goals on promoting clean energy production—it often leads to the proliferation of knowledge, technologies, and the availability of nuclear material that can also be used to develop a nuclear weapons capability. If nothing else, it provides new nations with the latent expertise to develop nuclear weapons in the future.

[4] Russian News and Information Agency, "Russia, U.S. may sign new START treaty in mid-2009", *NOVOSTI*, June 11, 2008.
[5] Joby Warrick, "Spread of Nuclear Capability is Feared," *The Washington Post*, May 12, 2008.

Of perhaps greater concern than simply the expanded utilization of nuclear technologies for energy production is the potential for proliferation of the capability to enrich and reprocesses nuclear materials. In the past four years, at least six countries have told the UN they may begin to conduct nuclear material enrichment or reprocessing activities: Namibia, South Africa, Argentina, Brazil, Canada, and Australia.[6] The knowledge and technologies associated with these activities can lead even more directly to a nuclear weapons capability. Overall, the burgeoning world-wide demand for nuclear energy is, under current policies and programs, leading to a dangerous spread of nuclear technologies, knowledge, and access to nuclear material.

Nuclear Terrorism

Included most prominently in the national discussion over the growing nuclear danger is the possibility of nuclear terrorism. It is unanimously agreed that the detonation of a nuclear device in a major U.S. city would be devastating to the nation. The likelihood of such an event is debated, though many scholars, analysts, and commissions of national prominence argue that such an attack is increasingly likely, particularly if the U.S. does not aggressively move to secure stockpiles of nuclear material around the world.[7,8]

Furthermore, the links between nuclear terrorism and U.S. nuclear weapons policy in the form of nuclear deterrence are poorly understood. The nuclear deterrence model long relied upon to bring stability to global security is widely seen as ineffective against these non-state actors.[9]

Stressed International Mechanisms

International mechanisms and controls for developing international stability and decreasing nuclear danger—particularly those associated with arms control and the nuclear nonproliferation regime—are stressed and, arguably, becoming ineffective. In remarks to the United Nations (UN) Conference on Disarmament in 2006, UN Secretary-General Kofi Annan highlighted one stark example of this when he said, "a crisis [was] facing the Non-Proliferation Treaty (NPT) – a twin crisis, of compliance and of confidence. Today, the contract between the nuclear weapon States and the rest of the international community, which was the basis of the NPT, had been called into question…. Since the negotiation of the Comprehensive Test-Ban Treaty nine years ago, the Conference had been barren of achievement."[10]

Diminished U.S. Influence on International Nuclear Matters

A final concern regarding the increasing global nuclear danger is the diminished ability of the U.S. to influence international nuclear matters. For a variety of reasons, the U.S. has lost its

[6] Ibid.
[7] The Congressional Commission on the Strategic Posture of the United States, *Interim Report*, December 15, 2008.
[8] Matthew Bunn, "Securing the Bomb 2008," *Belfer Center for Science and International Affairs, Harvard University*, November 2008.
[9] Graham Allison, "Nuclear Deterrence in the Age of Nuclear Terrorism," *Technology Review*, Vol. 111, Issue 6, November 2008, 68–73.
[10] The United Nations Office at Geneva, "Secretary-General Kofi Annan Urges Conference on Disarmament to Break Impasses in its Work," Press Release, June 21, 2006.

position of international leadership on most nuclear issues. For instance, its ability to influence the nuclear energy programs of other nations is severely curtailed by its lack of attention to its own domestic nuclear energy industry, which has been stagnant for more than 30 years. Also, the U.S. appears to lack the confidence of the international community on nonproliferation matters (as Kofi Annan alluded to in the quote above) because of perceptions that it is not complying with its Nuclear Nonproliferation Treaty (NPT) obligations. Whether this lack of compliance is real or only perceived does not really matter—the lack of confidence in U.S. intentions and leadership reduces the effectiveness of U.S. actions.

A New Approach

To deal with the large, cross-cutting problem of global nuclear danger, the U.S. government requires a new approach. Simply dealing with individual problems within the individual stove-piped nuclear domains will likely fall short. Kofi Annan pointed out a similar flaw at the international level in his remarks to the UN Conference on Disarmament: "the world risks becoming mired in a sterile stand-off between those who care most about disarmament and those who care most about proliferation."[11] A holistic and comprehensive approach must be taken to solve such a wide-ranging and complex problem.

To improve the global nuclear environment, the U.S. must reestablish its global leadership in nuclear matters by reengaging in *all* nuclear arenas. The U.S. remains the dominant force in international politics and can guide, convince, and cajole other nations into policies and practices that help reduce nuclear dangers worldwide if it is perceived as a credible leader on nuclear issues.

However, before the U.S. can begin to reassert its influence on international nuclear matters, it must first develop a coherent national strategy to addressing "all things nuclear". This strategy would integrate policies, programs, and technologies that affect "all things nuclear" into a cohesive framework that understands and coordinates the relationships between the four major nuclear domains:

1. Nuclear weapons
2. Nuclear energy and radiation sources
3. Nuclear nonproliferation
4. Nuclear counterterrorism

Only by coordinating and integrating across these traditionally stove-piped domains can the U.S. effectively address the nuclear dangers that arise from the combination of all four domains. The first, and simplest, step to actively coordinating ATN issues is to instill an "all things nuclear" mindset in policymakers, analysts, practitioners, and people at all levels of U.S. government and industry involved in nuclear issues. This mindset will encourage them to consider how a particular policy, program, or technology under their control within their particular domain could affect policies, programs, and technologies in the other nuclear domains of the ATN environment. A simple model of the ATN environment can be used to communicate this idea,

[11] Charles B. Curtis, *Reducing the Global Nuclear Danger: International Cooperation – the Indispensable Security Imperative*, Nuclear Threat Initiative, November 2007, 4.

and help those unfamiliar with other domains to consider broader implications. A proposal for such a model is show in Figure 2 below.

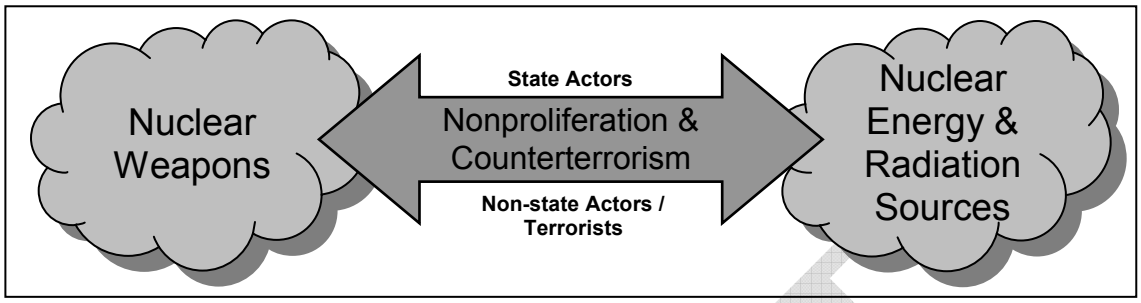

Figure 2: A simple model for conceptualizing the All Things Nuclear environment

This highest-level model of the ATN environment depicts the primary manner in which the distinct domains within ATN are linked. The model places the nuclear nonproliferation and nuclear counterterrorism domains as the nexus between the nuclear weapons and nuclear energy and radiation sources domains. Usage of this model could be as simple as considering, as many have advocated, how the size and capabilities of the U.S. nuclear weapons stockpile affects and impacts U.S. goals in nuclear nonproliferation, which in turn affects and impacts U.S. priorities for promoting nuclear energy usage worldwide. Similarly but working in the other direction, promotion of nuclear energy in third world countries could lead to nuclear counterterrorism concerns and issues with propagating nuclear technologies and knowledge to new states, and therefore could affect U.S. nuclear weapons posture and plans.

The model shown in Figure 2 is proposed for communicating the overall concept of All Things Nuclear to the broadest possible audience. But it is likely too low-fidelity for it to be used as a detailed analysis tool. Figure 3 attempts to take a step further in this direction. The model in Figure 3 shows the four nuclear domains as parts of a larger circle that represents the ATN environment.

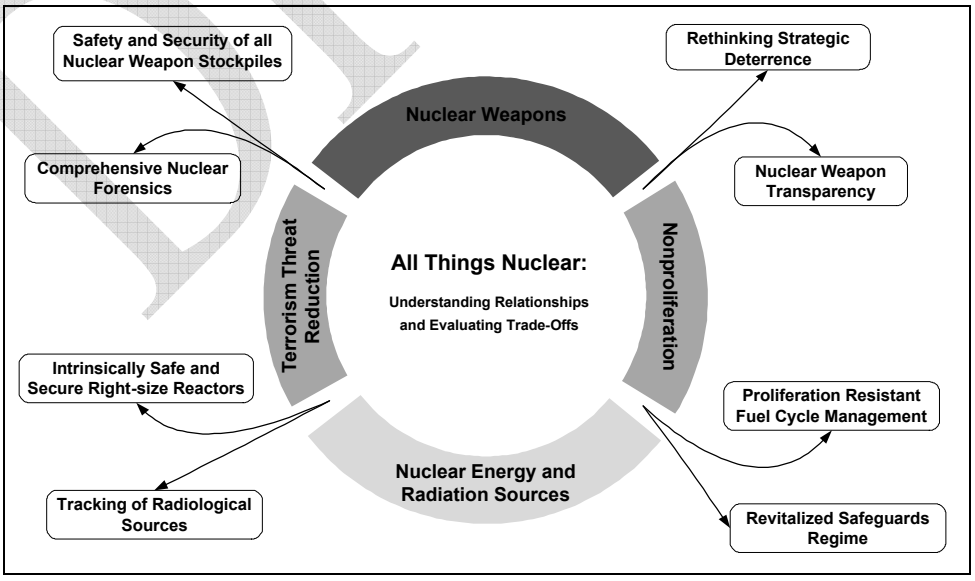

Figure 3: Programs, policies, and technologies focused on the intersections of the ATN model

Importantly, this model shows with greater clarity the intersections between the four domains. These intersections are important because the problem of reducing global nuclear danger across the broad ATN environment is—at its core—a systems analysis problem. And like most systems analysis problems, there is a great deal of value to be gained from examining and focusing on the intersections and interdependencies within the ATN system.

As part of the national strategy for addressing global nuclear danger, it is proposed that programs, policies, and technologies be specifically targeted at the intersection points of the ATN model. Existing programs and policies should be examined explicitly for how they address their relationships to programs and policies in nuclear domains adjacent to theirs in the model. Of greatest benefit, however, would be new programs and policies specifically designed and implemented to address these intersection points. Several such potential programs are shown on the model in Figure 3. For instance, at the intersection of the nonproliferation and nuclear energy/radiation sources domains, programs/policies/technologies are needed that enable the broader use of nuclear technologies for peaceful energy production purposes that also provide enhanced safeguards against the proliferation of nuclear weapons knowledge and technologies. At the intersection of the nuclear weapons and nonproliferation domains, new policies are needed that reexamine U.S. strategic deterrence posture within the context of its effects on U.S. priorities regarding nonproliferation.

Finally, a third model of the ATN environment—more detailed and more actionable than the previous two—is presented in Figure 4. This model is intended to depict a comprehensive decision-support framework for making policy decisions across ATN issues. It supports the analysis of ATN issues across three dimensions: (1) potential program and policy options, (2) domestic and international actors, and (3) U.S. goals and priorities.

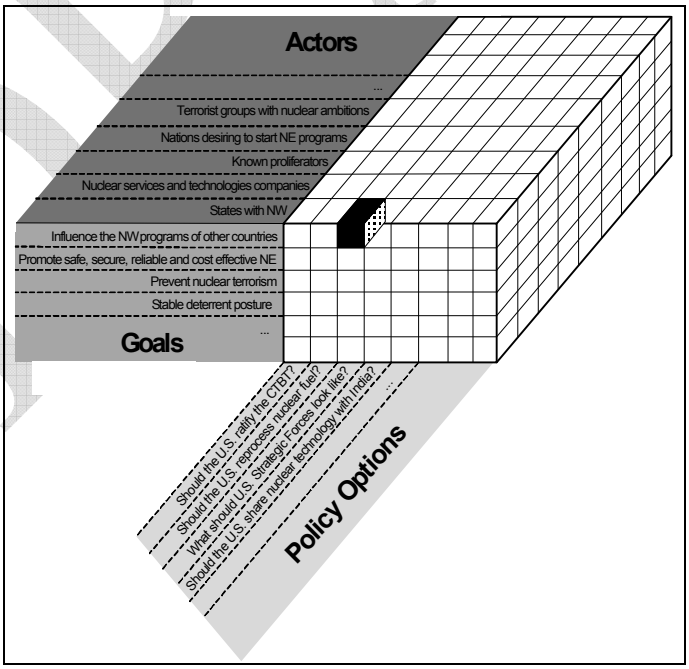

Figure 4: Model for creating a comprehensive decision-support framework for considering ATN policy options

Using this framework, policy analysts and decisionmakers can examine the trade-offs of potential policy choices on U.S. goals within all four nuclear domains, understand how policy options should be geared to specific actors (including foreign nations, non-governmental organizations, terrorist groups, etc.), and understand how policy choices are interdependent upon each other. This three dimensional matrix can be made as detailed or as high-level as necessary to achieve a comprehensive understanding of the ATN environment. It can be used as an up-front and on-going tool for selecting a set of policies within all four nuclear domains that provide the maximum benefit to U.S. interests.

Enabling Functional-Level Coordination

Coupled with changing the mindset of practitioners in nuclear fields and using a series of progressively complex models to communicate and analyze ATN issues, a change in the U.S. government's fragmented approach to nuclear issues is also needed. But proposals to reorganize or consolidate federal agencies, vest authority in a single "czar", or place a new single-mission leader within the already cumbersome interagency process may—based on recent historical examples—fall short. Rather than a focus on top-level leadership positions and sweeping organizational changes, a focus on "all things nuclear" must be aimed at the functional level.

To that end, an "All Things Coordination Team" is proposed to facilitate working-level coordination and consistency in government programs and policies across all nuclear issues. This small team (approximately 20 people) would be composed of the "best and brightest" from nuclear fields across the federal government and nuclear industry. Team members would be selected on a staggered, rotational basis to enable fresh ideas but maintain some institutional knowledge. Importantly, members of the team would be given *full* access to *all* information on nuclear issues.

The team's principal responsibility would be cross-linking all relevant governmental efforts and bringing consistency to the ATN environment. The primary mechanism the team would utilize would be through the development and maintenance of a well-organized clearinghouse of ATN information that is made available to all pertinent government industry employees with nuclear responsibilities. This information clearinghouse function would be implemented primarily through the use of modern communication and collaboration tools such as social networking websites, wikis, blogs, subject matter expert identification and management databases, information databases with RSS feeds and XML-based content management controls, etc. More traditional communication and collaboration tools such as journals, workshops, conferences, and seminars would also be used. A recent example of successful implementation of modern communication and collaboration tools to produce better coordination of government policy and actions can be seen in the U.S. Intelligence Community's Intellipedia and A-Space programs.

In addition to acting as a clearinghouse for nuclear information, the team must also be given budgetary authority to assure the team has appropriate capacity to act on its mission within the government bureaucracy. Therefore, it is proposed that the team be provided with a significant budget—drawn from current agencies with nuclear missions. Importantly, the team would be mandated to spend its budget *through* other government agencies, but would have wide

discretion to select the cross-linking and coordinating activities it feels would most benefit the national and global nuclear environments.

Benefits and Challenges

The primary benefit of the proposed ATN approach is it would allow the U.S. government to conduct active risk management on the trade-offs between policy and program options within the broad and complex ATN environment. The interdependencies between U.S. actions on nuclear issues would be better understood, and more fully informed decisions can be made. Overall, the ATN approach is intended to select policies and programs that maximize benefits to U.S. interests while minimizing their negative impacts. A secondary benefit of the approach is that it would likely allow the U.S. to tailor its message and policies toward specific countries and specific goals, and provide for more consistent communication and collaboration with all stakeholder parties: external and internal, foreign and domestic.

The primary challenge that would present itself with an ATN approach would be overcoming government inertia to change. This can partially be surmounted with significant budgetary authority given to the ATN Coordination Team, but must be backed by active and vocal support from highest level officials in all affected agencies. Also, the dynamics of collaborative efforts (like the ATN Coordination Team's mission) are not well understood and can be difficult to control to effective ends.

Summary and Conclusions

The U.S. government's fragmented approach to addressing global nuclear danger is ineffective. A grand reorganization or consolidation of the disparate federal organizations working on nuclear issues, however, is unlikely to bring about the change necessary. Instead, the nation should take an "All Things Nuclear" approach to coordinating and addressing the widely varied nuclear issues that combine to increase nuclear danger. First, we should strive to establish an ATN mindset in all people who work on nuclear issues, particularly policy analysts and decisionmakers. A very simple model can be used to communicate both the ATN concept and the need to consider and address how new and existing policies affect *all* nuclear domains. More detailed models can be used to design policies that specifically address the intersection points between the nuclear domains in the larger ATN environment, and support fully-informed trade-offs and decisionmaking. Finally, the creation of an "All Things Nuclear Coordination Team" with the capacity, authority, and tools to enable functional-level coordination within the U.S. government's scattered nuclear agencies may help ensure consistency in nuclear policies, improve the quality of decisionmaking on nuclear issues, and lead to effective reductions in the global nuclear danger.