

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



May 7, 2019

The Honorable Jim Cooper
Chairman
Subcommittee on Strategic Forces
U.S. House of Representatives
1536 Longworth House Office Building
Washington, DC 20515-6035

Dear Congressman Cooper:

I am honored to provide responses to the three questions for the record which you requested in your April 18, 2019 correspondence to me. I understand that my responses will be included in the published part of the record of hearing: "Fiscal Year 2020 Priorities for Atomic Energy Defense, Nonproliferation, Safety, and Environmental Management."

Since your correspondence and the three enclosed questions were addressed directly and specifically to me and not to the Defense Nuclear Facilities Safety Board as a whole, I have provided my responses only from my perspective. The answers may not reflect the views of my fellow Board Members or the collective view of the Board.

Yours truly,

A handwritten signature in black ink that reads "Bruce Hamilton". The signature is written in a cursive style.

Bruce Hamilton
Chairman

Enclosure

QFR submitted by Chairman Cooper

7) Mr. Hamilton, in your testimony you noted that the four waste drums at the Idaho Advanced Retrieval Project which exploded were a “near miss,” and that there was “some degree of luck that nobody was there to get hurt.” Yet you were the one Board Member to vote against the Board's recommendation, which simply requested additional information from the Department. Why? Further, you note that there is uncertainty around what is in the last 10% of drums left for processing. What gives you confidence that this—or something worse—will not occur again, particularly given the uncertainty around the material in the remaining drums and poor record keeping at Rocky Flats, where the drums originated?

On April 11, 2018, four waste drums at the Idaho National Laboratory underwent over-pressurization, ejecting their lids and spreading radiological waste inside the Advance Retrieval Project (ARP-V) structure. The event occurred at night when the facility was unoccupied and no workers were present; a near-miss, but nevertheless an event to be taken seriously. The Department of Energy subsequently determined that waste in the drums generated methane gas, causing the event, and additional controls were placed in effect to address the underlying cause. It is my view that the additional controls, coupled with the fact that over 90% (the more precise figure is 97%) of the targeted waste had already been process without a similar incident, demonstrates adequate protection of the public health and safety.

On March 4, 2019, the Board approved sending correspondence to the Secretary of Energy (subsequently transmitted on March 12, 2019) opining that DOE does not have effective controls to prevent or mitigate such deflagrations, a position on which I disagree. More to the point, the correspondence invoked the statutory authority of the Atomic Energy Act (as Amended), 42 U.S.C. § 2286b(d). It required that DOE provide a briefing with analysis or supporting data to address six detailed questions related to this event as well as to grammatical concerns pertaining to the complex-wide environmental cleanup. I did not concur with the majority who voted to approve this correspondence.

In my dissent, I noted the following:

“42 U.S.C. § 2286b(d) authorizes the Board to, “... establish reporting requirements for the Secretary of Energy....” The Board should generally practice a narrow interpretation of its statutory authority to require reports. This authority should be used with discretion, such as when information has been difficult to obtain through informal staff-to-staff interaction or when periodic recurring reports on program status are warranted. 42 U.S.C. § 2286b(d) authority should not be used as a mechanism to convey either an explicit or an implied suggestion for the Secretary to carry out an activity. In this case, that appears to be the message.

“Likewise, 42 U.S.C. § 2286b(d) should not be used as a surrogate for a formal Recommendation. In the event the issues identified in the Staff Issue Report, either individually or in their totality, challenge the “ ... adequate protection of the public health and safety ... ,” the statutorily appropriate path would be to recommend action to the

Secretary of Energy. In this case, there is no indication that this threshold has been reached.”

In other words, I believed the Board already had sufficient information to evaluate the risk associated with this event as well as the broader complex-wide related question. Further, I evaluated that risk as not rising to the threshold of challenging the adequate protection of the public health and safety. Even so, I did not vote against a subsequent motion made before the Board to hold a public hearing in May 2019 on safety management of waste storage and procession in the defense nuclear facilities complex.

In my view, DOE has in fact put in place the additional controls needed to ensure the adequate protection of the public health and safety. That adequate protection persists is further informed by the fact that most of the targeted waste was already processed event-free even without those controls. There will always be a chance that another event of this or of a different nature may occur, particularly given the uncertainty around the material in the remaining drums and the poor record keeping at Rocky Flats, where the drums originated. That said, confidence that something won't occur is not the standard specified in the Atomic Energy Act (as Amended). Rather, the standard to which I am obliged is that of adequate protection of the public health and safety.

In the spirit of your question, I offer the following additional thoughts on just what I consider “adequate protection” means.

The Atomic Energy Act (as amended), at 42 U.S.C. § 2286a(a), states that, “The mission of the Board shall be to provide independent analysis, advice, and recommendations to the Secretary of Energy ... in providing adequate protection of public health and safety at ... defense nuclear facilities.” The AEA does not further define the term “adequate protection,” and the legislative history of the Board [Congressional Record vol. 134, House Conference Report No. 100-989, Sept. 28, 1988] at p. 488 explains why:

“Adequate protection” is the level of safety required of commercially licensed nuclear facilities. ... The conferees believe that it is appropriate to require the same general level of safety from DOE nuclear facilities as is required of commercial facilities. The conferees recognize that specific standards recommended by the Board for achieving adequate protection may not necessarily be the same as those applied to commercial facilities, to the extent that DOE and commercial facilities are significantly different.

As applied to commercial facilities, the standard of adequate protection means “reasonable assurance that the health and safety of the public will not be endangered by the operation of the facility. ... Absolute certainty or perfect safety is not required. What constitutes “reasonable assurance of adequate protection” is subject to change as the state of the nuclear safety art advances. The Board will be responsible for weighing such factors as technical feasibility, the risk of accidents, the record of past performance, the need for further improvement in nuclear safety, and other considerations. The conferees believe that such factors should be balanced by the Board when the adequate protection standard is applied.

This Report also quotes, at p. 489, from a case heard by the U.S. Court of Appeals for the District of Columbia, *Union of Concerned Scientists v. NRC*, 824 F.2d 108, 118 (D.C. Cir. 1987) which states:

NRC need ensure only an acceptable or adequate level of protection to public health and safety; the NRC need not demand that nuclear power plants present no risk of harm

The level of adequate protection need not, and almost certainly will not, be the level of "zero risk." This court long has held that the adequate-protection standard permits the acceptance of some level of risk.

Additionally, the Committee on Armed Services Report to accompany S. 1085, the *Nuclear Protections and Safety Act of 1987*, Report 100-232 at p. 20 states:

It is important that the Board be supplied with a sense of priority, and be focused on significant risks and consequences to public health and safety. ... The Committee intentionally declines to go beyond establishing an adequate protection standard as a matter of policy and legislative intent, and renders no judgment as to the appropriateness of requiring "comparability" with particular commercial standards imposed by NRC.

From this background, there emanate several key elements in understanding "adequate protection" as it applies to defense nuclear facilities. First, the "adequate protection" criterion does allow for risk. Lawmakers understood that there would always be some risk present in the nuclear enterprise and that absolute certainty or perfect safety is an unobtainable standard. Second, what constitutes "adequate protection" will change with time, as the technology and our knowledge base change. Third, Congress established the Board (just as it did the Nuclear Regulatory Commission) using an informed and experienced group of nuclear field experts *for the very purpose* of weighing their differing views on what constitutes "adequate protection" in order to come to a balanced conclusion. In the final analysis, Congress declined to provide an objective definition of "adequate protection," instead deferring to the collective and subjective wisdom of the Board.

Every human endeavor involves risk. The only way to ensure no risk in an endeavor is to do nothing. But even the absence of such action brings with it risk. Not having a nuclear arsenal would guarantee zero risk to the public from that program, but what would be the national security risk to our republic without nuclear weapons in a world where others have them? Certainly not zero.

If we decision-makers accept the premise that we need a weapons program, even if it does bring with it some risk to public health and safety, then the next question we must answer is, "How much risk do we accept?" We aspire to use all of our scientific and mathematical tools of analysis and statistics to find an objective answer, but an objective answer always remains elusive, beyond our grasp. That means we must eventually be subjective, accepting that each human being has a different risk profile, and that every American places a different value on the importance, or even existence, of our nuclear weapons program.

We also know that there will always be a chorus of critics insisting that if the regulator, or in our case independent overseer, simply prevents engagement in risky behavior then no one will be harmed. We know that should something go wrong, we will receive blame. That creates concern on our part which can, and frequently does, lead to a regulatory mindset that too often results in our coming down on the side of less and less risk, with little concern for cost, both in dollars and in the effectiveness of the nuclear deterrent.

Congress long ago came to the conclusion that there is no easy answer to the question, “Is it safe enough?” That’s why Congress, in its wisdom, established a five-Member Board: to provide a balance in competing views on an issue which addresses relative values, and is therefore as much a political question as it is a technical one. While all Board Members should have in common a technical background in the field, Congress expects that each Member will bring to the table his or her independent views in order to balance competing risk profiles. Coming to a conclusion on what is “safe enough” starts out as an objective analytical exercise, but in the end it includes the subjective balancing of the “gut feel” of the individuals on the Board. This is as it should be, for if adequate protection could be defined in strictly objective terms, Congress would have long ago done so and would have dispensed with the Board in favor of a single Administrator.

I support a strong national defense; one of the plainly Constitutional functions of our Republic’s government. A key component of our defense is a strong, safe, secure and reliable nuclear weapons arsenal. I have also sworn an oath to our Constitution to abide faithfully by and execute the laws of the land. In my role on the Board, the specific statutory language at play is to ensure the Secretary of Energy is informed when the public is not adequately protected from activities and accidents within the DOE’s weapons complex. I take that obligation most seriously. At the same time, I am sensitive to the reality that safety can be used as an excuse to constrain operations. I also know that humans, when given the power to regulate, or in the Board’s case to advise, tend in the direction of more rather than less.

The Department of Energy’s safety posture today is both excellent and in continuous improvement. I am convinced that the leadership and the workforce in DOE, both federal and contracted, actively embrace safety. I know from personal dialog and observations of their words and actions that the DOE political appointees and senior executives with whom I have had the most frequent contact hold nuclear safety sacrosanct and that they consider it their ultimate professional responsibility. I am completely confident that they not only believe that safety is vital to their operations, but that they have internalized and fully accepted that obligation. This is not a politically partisan characteristic. I have observed the same passion for safety in both the Obama and Trump Administrations. I consider that the nuclear weapons complex today, including both active and legacy activities, is one of the safest industrial undertakings in our modern world. But compared to what?

We are surrounded by risk. According to the Bureau of Labor Statistics, in 2017 there were 5,147 fatal work injuries, 887 from falls alone, and 123 from exposure to harmful substances in U.S. industry. Amtrak accidents killed 1 in 2018, 3 in 2017, and 8 in 2015. A 2016 train derailment of 14 cars just 2 miles from the Capital at Rhode Island & 9th dumped toxic Sodium Hydroxide, ethanol and other substances into the city, another near-miss with no fatalities. A

2013 explosion at an ammonium nitrate fertilizer plant in West, TX killed 15. The BP oil disaster in the Gulf of Mexico, Deepwater Horizon, killed 11 in 2010. A 2008 explosion in a sugar refinery killed 13. A 2005 Texas City refinery explosion killed 15. While not occurring in the United States, the two recent crashes of American-manufactured Boeing 737MAX aircraft killed 189 in Indonesia and 157 in Ethiopia. Last year's Camp Fire in the Sierra Nevada foothills razed 14,000 homes and killed 85 people. Credit for this tragedy can be directly attributed to risks incurred by not implementing wildfire-prevention projects because they were contrary to environmental regulations. And of course, most horribly, auto fatalities on U.S. highways killed 37,133 in 2017, which is a typical annual number. These are the tragic outcomes of real risks in America today.

Comparisons across industries are imperfect and metrics are elusive. While they don't directly cross-compare to threats to the adequate protection of the public from defense nuclear facilities, they subjectively help to inform my determination of relative risk. In the entire history of the DOE/AEC/Manhattan Project activities spanning over 75 years, there have been six fatalities which were unambiguously attributed to radiation exposures or traumas from accidental criticalities. The most recent of these occurred over a half-century ago. That is an exception record of safety.

Granted, I am only considering clear-cut acute fatalities, not other health effects from environmental challenges and low-level exposures that could possibly contribute to premature deaths. Doing so would quickly overwhelm us with subjective data and would embroil us in controversies such as the scientifically dubious linear no-threshold hypothesis. That notwithstanding, the orders of magnitude comparisons in non-acute health challenges are similar. The fact of the matter is that, for all of the fear and misunderstanding in the public domain, America's nuclear weapons complex has always been extremely safe when placed in the context of other hazards in our modern world, and today it is even safer than ever.

Please do not misunderstand me. The stellar nuclear safety record of the Department of Energy must never be taken for granted. Continual vigilance is the price paid for that record, and the Board's mission in that vigilance is as important as it ever has been. The superlative staff supporting the Board, the seriousness which I have observed that my fellow Board Members take their jobs, and my personal dedication, are indicative of that vigilance, even as in final decisions we come to differing conclusions on the threshold of adequate protection of the public health and safety.

QFR submitted by Congressman Garamendi

10) Given the cancellation of the MOX facility and the plan to repurpose the facility, what role do you envision for the Defense Nuclear Facilities Safety Board throughout design, construction, and operation? What is the plan and timeline for DNFSB oversight?

The Atomic Energy Act obliges the Board to review the design of the repurposed MOX facility before construction begins and to recommend to the Secretary of Energy any modifications of the design that the Board considers necessary to ensure adequate protection of public health and safety. During construction, I expect the Board will periodically review and monitor construction and will provide further recommendations and/or advice. During startup and operations, I anticipate that the Board will continue to monitor the facility and make any necessary recommendations and/or advice. No plan is yet in place for each of these steps because the facility construction authorization, funding and timeline are just in development. I predict that oversight will begin at some point between the Department's establishment of Critical Decision 2 (Approve Performance Baseline) and Critical Decision 3 (Approve Start of Construction or Execution).

QFR submitted by Congresswoman Horn

11) Mr. Hamilton, in your testimony before the Committee you stated that the Board's work during the ramp up of activity in the nuclear complex will make your job easier due to newer facilities coming on line to replace older Manhattan Project-era ones.

1. Please detail the specific facilities, including planned facility start dates, that are coming online that you believe will make the Board's work easier. 2. Is there not an increased Board workload from doing both safety oversight of current facilities, and ensuring future facilities are designed, built, and operated in a safe manner? 3. Further, with regard to DOE's Environmental Management work, how does the Board plan to do safety oversight as new facilities at Savannah River and Hanford come online? 4. How do you plan to incorporate all this additional work while reducing the planned number of Full-Time Equivalents (FTEs) from your FY2019 request of 117 to 100 FTEs for FY20?

At Los Alamos National Laboratory: The Transuranic Waste Facility (TWF), operational as of October 2017, partially replaces waste storage on outdoor pads, leaving enduring missions in Waste Characterization, Reduction, and Repackaging Facility (WCRR) and Radioassay and Nondestructive Testing Facility (RANT); The Radiological Laboratory Utility Office Building (RLUOB, started chemical operations January 2014, started radiological operations August 2014, partially replaces Chemistry and Metallurgy Research Building (CMR), leaving some enduring missions to be relocated to Plutonium Facility; The Low-Level Liquid Waste Facility (LLLW), start operations November 2018, partially replaces The Radioactive Liquid Waste Treatment Facility (RLWTF), leaving the remaining mission to be relocated to another planned facility (Transuranic Liquid Waste Project); The Transuranic Liquid Waste Project (TLW), solicitation of bids for design and construction issued April 2019, to replace RLWTF functions not already transitioned to new LLLW Facility; Plutonium Modules, CD-0 approved in 2015 but the project was removed from the FY2019 Stockpile Stewardship Management Plan, if pursued, some activities from Plutonium Facility would be relocated to module(s).

At Pantex: The Material Staging Facility (MSF), planned to be Operational by 2040, or by 2030 if scope is reduced, would replace Zone 4 storage magazines for nuclear explosives and nuclear materials.

At The Savannah River Site: SRS Plutonium Processing Facility, retrofit of the unfinished MOX Fuel Fabrication Facility, planned to be operational at full capacity by 2030; The Salt Waste Processing Facility (SWPF), construction complete April 2016, currently undergoing testing and cold commissioning, start of operations projected by March 2020, based on the pilot projects Actinide Removal Process (ARP) and Modular Caustic Side Solvent Extraction (CSSX) Unit (MCU), which have operated for over 10 years.

At Y-12: The Uranium Processing Facility (UPF), construction started June 2016, partially replaces B9212, leaving enduring missions in B9215 and B9240-2E.

At Hanford: The Waste Treatment & Immobilization Plant (WTP) Pretreatment Facility, under design and under construction but activity was suspended 2012, start of construction July 2002;

The WTP Low-Activity Waste (LAW) Facility, construction complete June 2018; currently undergoing testing and cold commissioning, start of operations projected by 2023, WTP High-Level Waste (HLW) Facility, under design and construction; all activity suspended 2012, start of construction July 2002; WTP Analytical Laboratory Facility, under construction, start of construction July 2002; WTP Low-Activity Waste Pretreatment System (LAWPS), design work suspended.

At Idaho National Laboratory: The Integrated Waste Treatment Unit (IWTU), construction complete; currently undergoing testing and cold commissioning, start of operations projected by 2020.

I do not agree with some who correlate the steep budgetary increase for DOE with increased challenges to the adequate protection of the public. This includes the new facilities at Savannah River and Hanford. In fact, I believe it to be just the opposite ... an inverse correlation. Increased funding for the weapons complex and the legacy environmental management means more built-in safety, not less. The increase funding goes to correcting maintenance backlogs, tackling aging infrastructure, replacing Manhattan Project-era buildings with modern construction, and replacing equipment which is worn out and has dated technology with modern, safer components. Those things come at a cost, but they make the complex even safer than it already is. This counter-intuitive situation is further enhanced as rising operational intensity increases learning. As production increases, for example, the workforce learns what does and doesn't work, improves the processes, procedures, and techniques, and develops much higher skill competencies. Consequently, it's my view that higher levels of production will be even safer than the current situation, which is already profoundly safe.

Board and Board staff oversight of existing facilities and the statutory mission to review facility design and construction is managed through the annual technical staff work plan. The plan allows the work load to be leveled through a timing, prioritization and ranking process which can be modified by the Board from time-to-time throughout the year. While the Board is directed through statute to review design and construction, the level to which those reviews are conducted is left to the decision of the Board. The contemporary design and construction process is defined by modern and detailed codes and regulations, which means that the quality of the products are superior to the previous generation. As a result, I believe that the Board and Board staff reviews need not be as invasive as in the past. How much oversight is prudent will always be a subjective decision, but recent years indicate that the combined level of effort required to ensure adequate protection of the public health and safety for both existing and new defense nuclear facilities is well within the capacity of current agency size. Given that current staff (not including contract employees) consists of 88 full-time equivalents, a staff of 100 will be more than adequate to achieve the statutory mission.