



Remembering the Past,
Preparing for the Future



EMERGENCY MANAGEMENT

symposium

| 2024

BE READY: LEAD, COMMUNICATE, AND PREPARE!

ATLANTA, GEORGIA
MAY 7 - 9



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Defense Nuclear Facilities Safety Board

Outline of Remarks

- A Brief History of Safety Management in DOE
 - Creation of the Defense Nuclear Facilities Safety Board
- The Board's Past Perspectives on Emergency Preparedness
- Current Perspectives

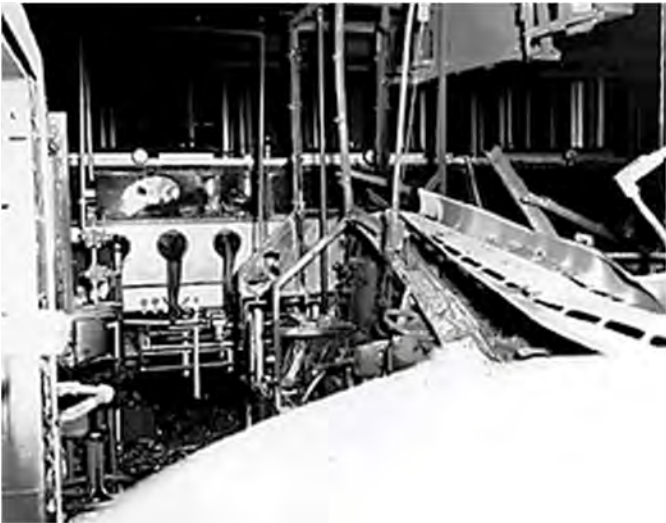
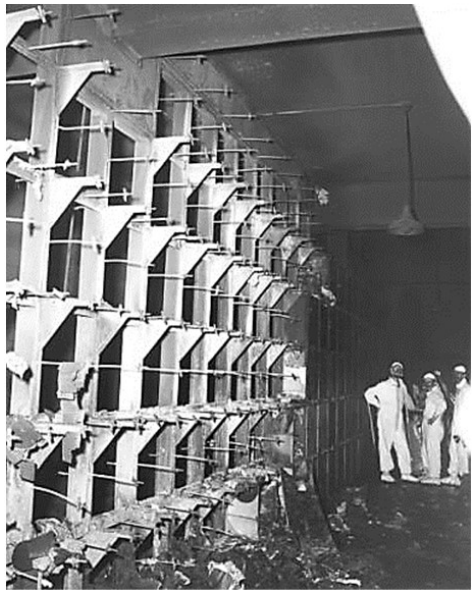
Post-WWII Atomic Energy Commission

- AEC responsible for defense-related and civilian nuclear activities.
- Atomic Energy Act of 1954 established licensing process for civilian nuclear industry.
- AEC developed safety standards for licensing.
 - Open to public for comment.

Post-WWII Atomic Energy Commission

- Defense complex separately developed standards.
 - Slow to develop.
 - No public notice or involvement.
- In meantime, contractors grew accustomed to their own practices.

Rocky Flats - Plutonium Fires



1957



1969

1970s – A Growing Divide

- 1974: Congress splits AEC into NRC and ERDA.
 - ERDA retained dual mission of operator and regulator.
- 1977: Congress reforms ERDA into DOE.
- New external regulations – Resource Conservation and Recovery Act (1976), Comprehensive Environmental Response, Compensation, and Liability Act (1980)
 - Cold War pressures meant slow DOE adoption.
 - Federal Facility Compliance Act of 1992 would improve enforcement.

Hanford – Single-Shell Tanks


- 149 single-walled tanks built from 1943 to 1964.
- Per a 1986 GAO study, these tanks leaked approximately 500,000 gallons of high-level radioactive waste.



Single-shell tank (left) and waste in a tank (right) at Hanford.

Source: Department of Energy. | GAO-21-73

1979 – Three Mile Island Accident

- Impetus for change at NRC and commercial industry.
- March 1981: Safety Assessment of DOE Nuclear Reactors.
 - “Crawford Committee Report” . 

A. FINDINGS AND RECOMMENDATIONS

Based on the assessments conducted, the Committee findings can be summarized as follows.

1. No evidence was found that any of the DOE-owned reactors are being operated in an unsafe manner or that any of these reactors should be shut down.
2. A number of significant deficiencies exist in DOE's reactor safety management activities, as revealed by the Committee's on-site reviews and by the findings of the Committee's Support Team in assessments of site and Headquarters documents.
3. There is a need to strengthen substantially the technical and managerial capabilities of DOE Headquarters and field organizations which have reactor safety responsibilities.
4. Many of the "TMI Lessons Learned" have not been adequately addressed or applied in DOE reactor programs.

1980s – Safety Concerns at DOE

- Several Government Accountability Office (GAO) reports on DOE facilities' safety in 1980s.
 - Requested by U.S. Senator John Glenn (D-Ohio).
 - 1987: U.S. Senators John Glenn and Sam Nunn (D-Georgia) held hearings.
- 1986: Chernobyl Explosion: Immediate concern that DOE's reactors were similarly vulnerable.
- Secretary of Energy John Herrington commissioned internal reviews and external safety studies.
- Followed by National Academy of Sciences and GAO reports on non-reactor defense nuclear facilities.

1988 – Creation of the DNFSB

- Five Board Members provide DOE expert technical advice and perform independent safety oversight.
- DOE remained both owner and regulator of defense nuclear facilities.
- Enabling legislation requires Secretary of Energy to respond formally to DNFSB Recommendations.



1990s – Early Days of DNFSB

- 1990 to 1993: 5 – 7 Recommendations per year.
 - Very short, often focused on very specific issues.
 - Were frequently followed with broader Recommendations.
- Recommendations 90-2, 91-1, 94-5, and 95-2 led to DOE establishing Integrated Safety Management (ISM).
 - Followed by Recommendations 98-1 and 04-1.


1990s – Early Days of DNFSB

- Interests included emergency preparedness and response.

0 The Board had recommended "that an action plan be developed for the measures to be taken to neutralize the conditions that may be signaled by alarms." Two types of measures are implied: actions to respond to unexpected degradation of a tank or its contents, and actions to be taken if an explosion were to occur. Your implementation plan stated that "the current contingency plans will be reviewed and revised if needed." We do not consider that this proposed implementation of the Board's recommendation is adequately responsive. It is recommended that a written action plan founded on demonstrated principles be prepared as soon as possible, that would respond to indications of onset of abnormal temperatures or other unusual conditions in a ferrocyanide-bearing tank, to counter any perceived growth in hazard. A separate emergency plan should be formulated and instituted, covering measures that would be taken in event of an explosion or other event leading to an airborne release of radioactive material from the tanks, and that would protect personnel both on and off the Hanford site. The Board believes that even though it is considered that the probability is small that such an event will occur, prudence dictates that steps be taken at this time to prepare the means to mitigate the unacceptable results that could ensue.

*Excerpt from DNFSB Recommendation 1990-7, Ferrocyanide Tank Safety
at the Hanford Site*

Origin of Modern Emergency Management Requirements

- Post-TMI: NUREG 0654/FEMA-REP-1, Rev. 1, Nov 1980.
 - DOE involved in development.
- DOE incorporated guidance into 5500 series of directives.
- August 1981 GAO report. 

--Is DOE providing adequate emergency preparedness guidance and assuring that DOE facilities are prepared to respond to nuclear accidents? The short answer is "No." DOE has provided limited guidance in this area. Overall, DOE does not know the status of the emergency preparedness programs at its facilities and needs to update their emergency preparedness to the post Three Mile Island state-of-the-art. GAO recommends actions to correct these, as well as several other, aspects of DOE's emergency preparedness program. (See pp. 14 to 27.)

1990s – DNFSB Interest

- Board’s staff observe emergency drills and exercises.
- Notable events:
 - 1997: Hanford PRF chemical explosion.
 - 2000: Cerro Grande wildfire at LANL.
- DNFSB Technical Report-21 (1999) is first complex-wide look at DOE emergency management.



Exhibit 3.
 Tank A-109 and
 Separated Lid.

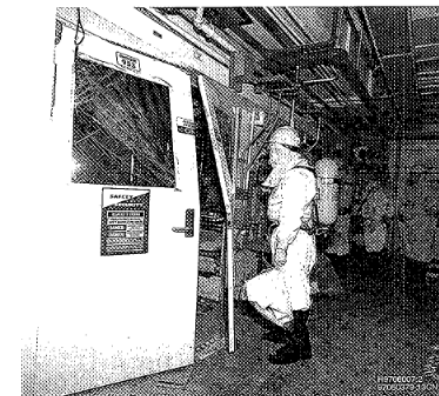


Exhibit 4.
 Damage to
 Interior Doors
 That Lead to
 Room 40
 of the Facility.

Accident Investigation Board Report on the May 14, 1997, Chemical Explosion at the Plutonium Reclamation Facility, Hanford Site, Richland, Washington

Prominent Disasters Get DNFSB's Attention

- Deepwater Horizon (2010).



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- **Fukushima Daiichi (2011).**



Prominent Disasters Get DNFSB's Attention

- Deepwater Horizon (2010).
- Fukushima Daiichi (2011).
- **Various "beyond design basis events".**



Meteor over Chelyabinsk, Russia, 2011.

2014

- February 2014: WIPP truck fire and underground radiological release accidents.

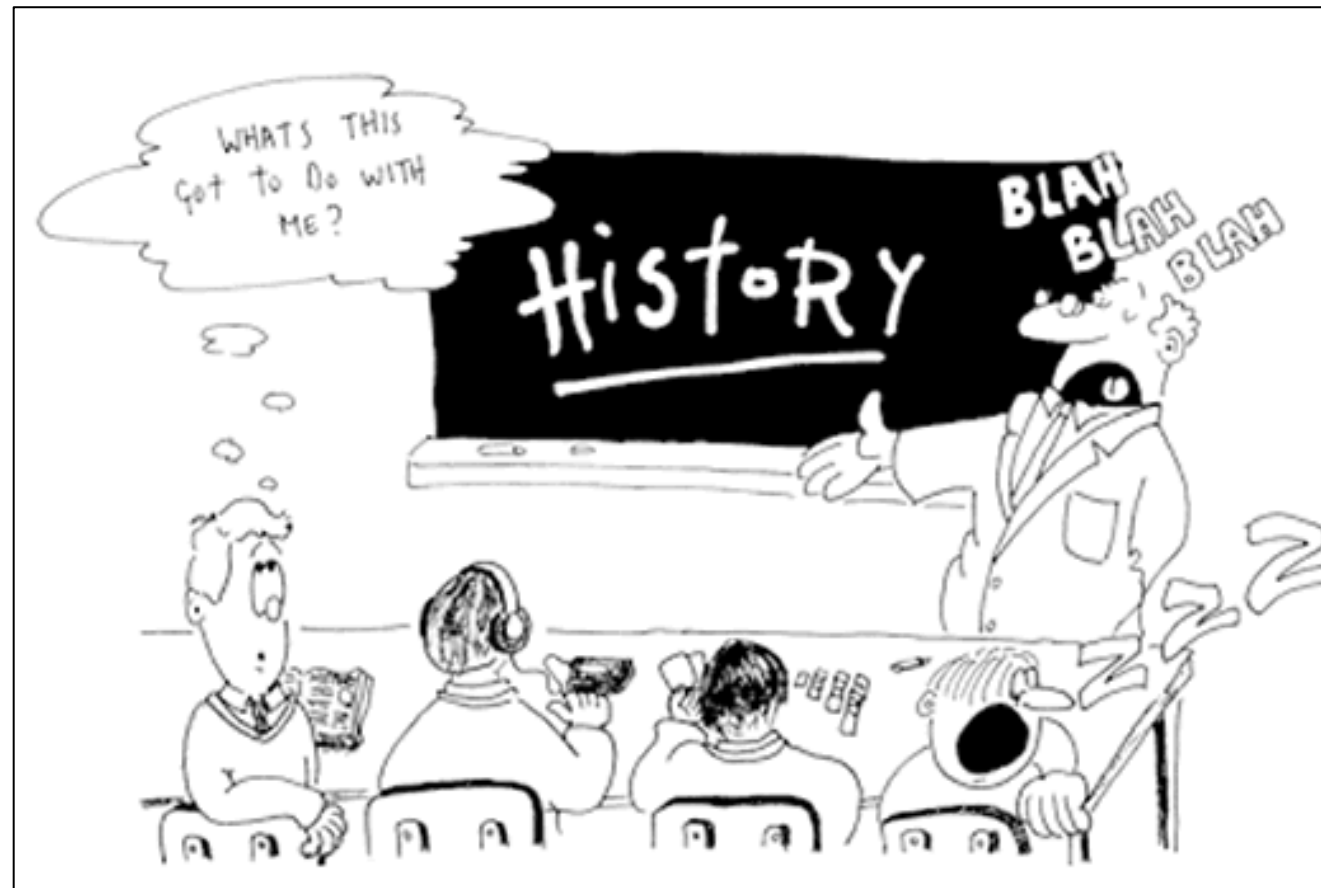


- Board Recommendation 2014-1 recommended DOE:
 - Update DOE emergency management directive (Order 151.1C).
 - Address severe events, emergency response infrastructure, drill and exercise criteria, and issue identification and resolution.

The Past Decade

- Recommendation 2015-1, *Emergency Preparedness and Response at the Pantex Plant.*
- Recommendation 2019-2, *Safety of the Savannah River Tritium Facilities.*
- Emergency response continues to be tested:
 - INL ARP-V drum over-pressurization events (2018).
 - Hanford PUREX tunnel collapse (2017).
 - Y-12 Building 9212 uranium briquette fires.
 - Wildland fires and natural phenomena (across the complex).

Learning Lessons from History



Where is attention needed today?

1. Training and drills for a rapidly changing workforce.
2. Radiation survey and contamination control during emergency response.
3. Communication, communication, communication!

Suggestions

- History and lessons learned should be integrated with training and drills.
- Benchmarking and cross-training activities should be expanded and resourced.
- The realities of today's highly mobile workforce require new approaches to cultivating and maintaining emergency readiness.



Closing