

The seal of the Defense Nuclear Facilities Safety Board is a circular emblem. It features a central shield with a bald eagle with wings spread, perched atop a shield. The shield is flanked by two olive branches and a bundle of arrows. The shield is set against a background of a blue and white globe. The entire emblem is encircled by a purple ring with the text "DEFENSE NUCLEAR FACILITIES SAFETY BOARD" in white. Above the ring, the words "UNITED STATES OF AMERICA" are written in a semi-circle.

**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

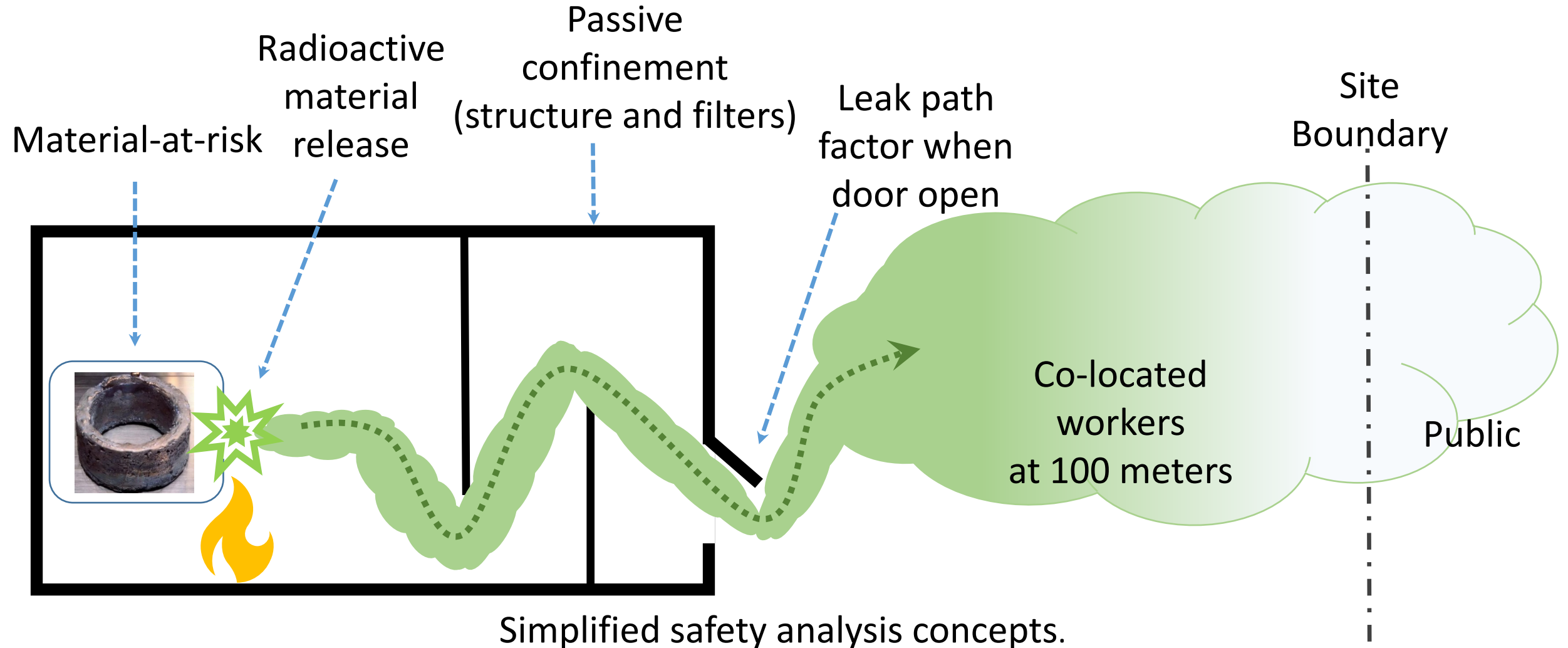
**Public Hearing on Los Alamos National Laboratory**

***Session 2: National Security Missions and Nuclear Safety  
Posture***

**Santa Fe, New Mexico  
November 16, 2022**



# Exhibit 10



Simplified safety analysis concepts.



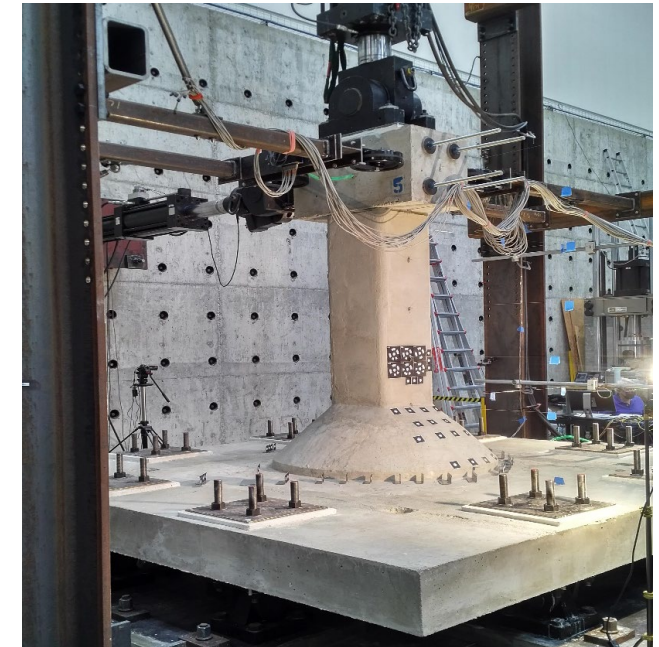
# Exhibit 11



Electrical equipment before (left) and after adding bracing (right) to resist Performance Category 3 earthquakes.



# Exhibit 12



Workers reinforcing structural members. Testing column capitals.

**2005**

Recommendation 2009-2  
*LANL Plutonium Facility Seismic Safety*

**2010**

Board public hearing on  
PF-4 safety posture

**2015**

Technical Report 44  
*LANL Plutonium Facility Leak  
Path Factor Methodology  
&*

**2020**

Board letter on PF-4 safety posture

Recommendation 2004-2  
*Active Confinement Systems*

History of seismic safety at PF-4.



# Exhibit 13



Device Assembly Facility,  
Nevada.  
~47,000 people within 50  
miles.  
~7 miles to site boundary.



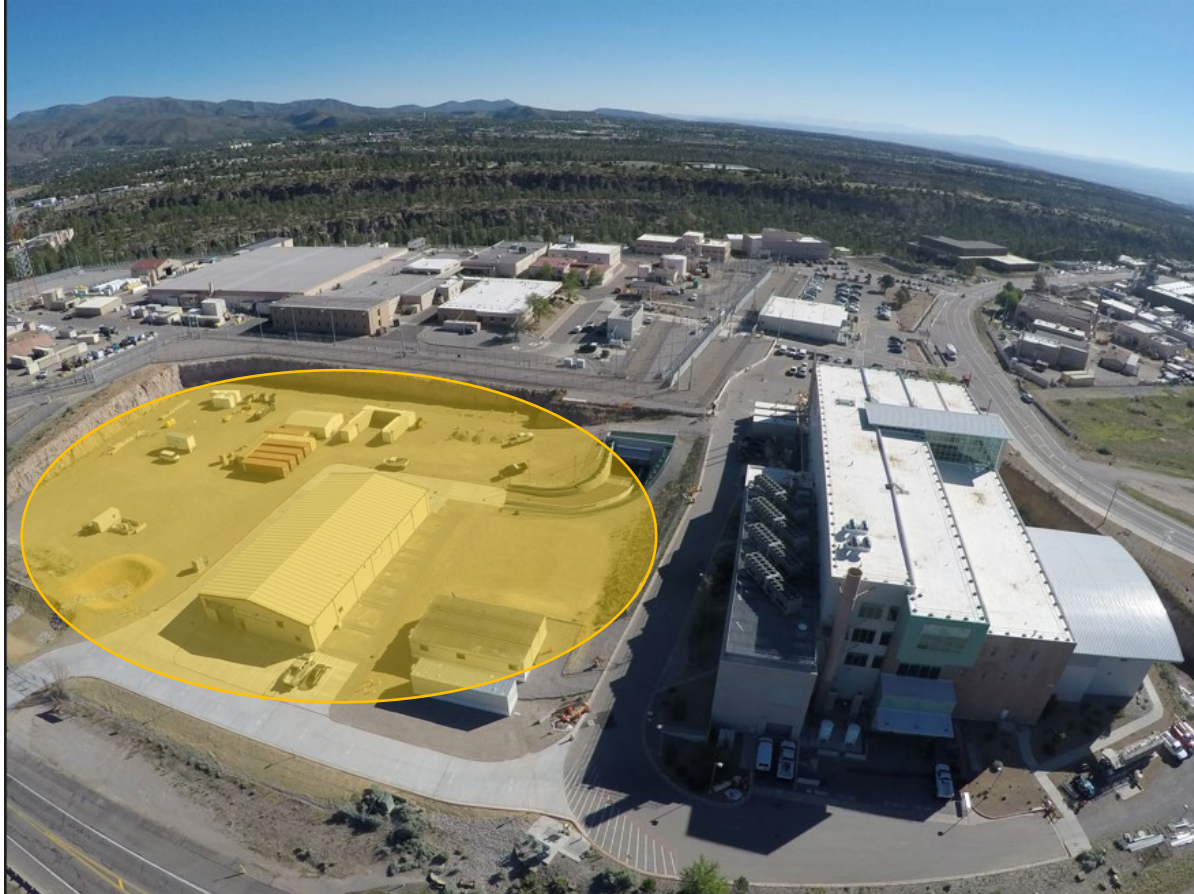
Plutonium Facility, LANL.  
~190,000 people within 40 miles.  
~990,000 within 60 miles.  
~0.6 miles to site boundary.



Savannah River Plutonium  
Processing Facility.  
~690,000 people within 50 miles.  
~6 miles to site boundary.



# Exhibit 14



Aerial view of PF-4 with area previously proposed for modules highlighted (PF-4 in the rear).

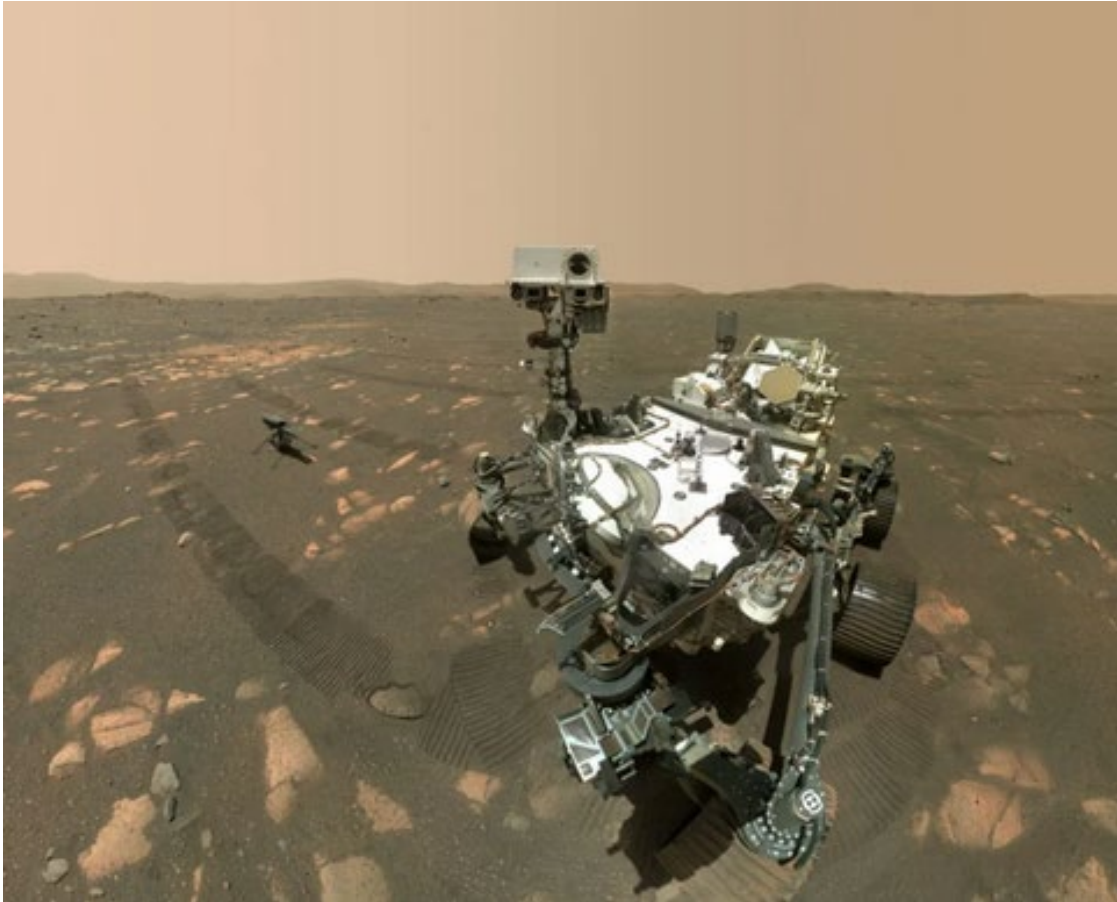
“We could move the higher-risk things out and therefore make the overall risk of the facility, whether or not we upgraded other systems, much lower; so that the attractiveness of that is that we have the potential to perhaps efficiently and effectively come up with a strategy to **move higher-risk activities into more modern facilities** and therefore change the overall risk profile of PF-4, which would then **drive what upgrades to PF-4 we might ultimately choose to do.**”  
(emphasis added)

*James McConnell*

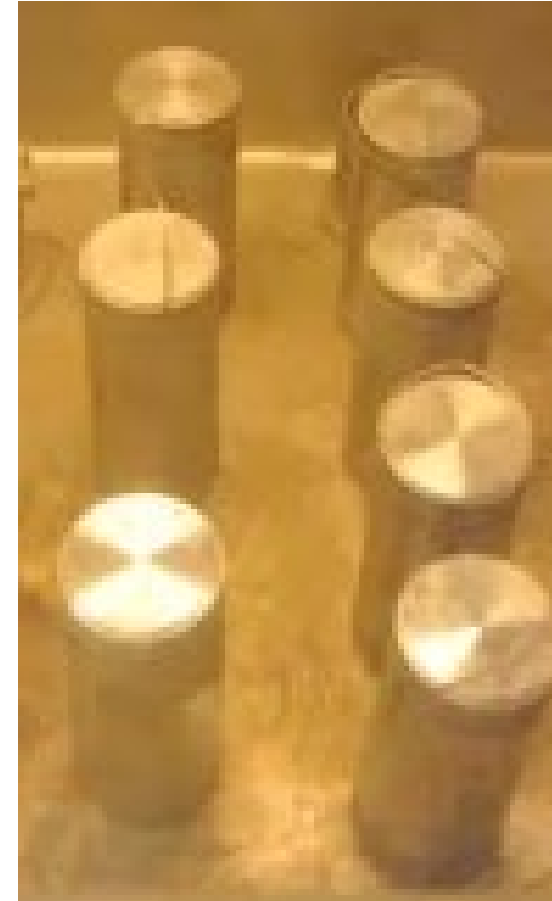
*DNFSB Public Hearing on June 7, 2017*



# Exhibit 15



Perseverance rover powered by plutonium-238 heat-sources produced at PF-4.



Fuel storage outer containers.



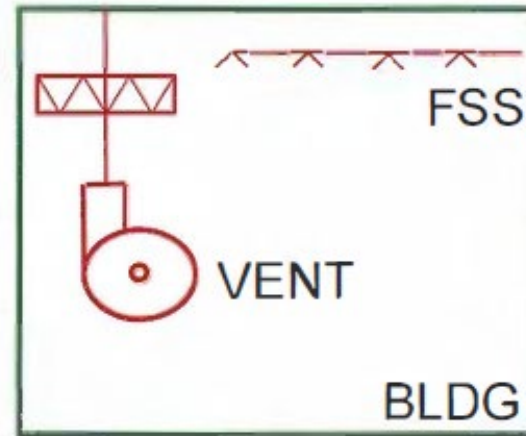
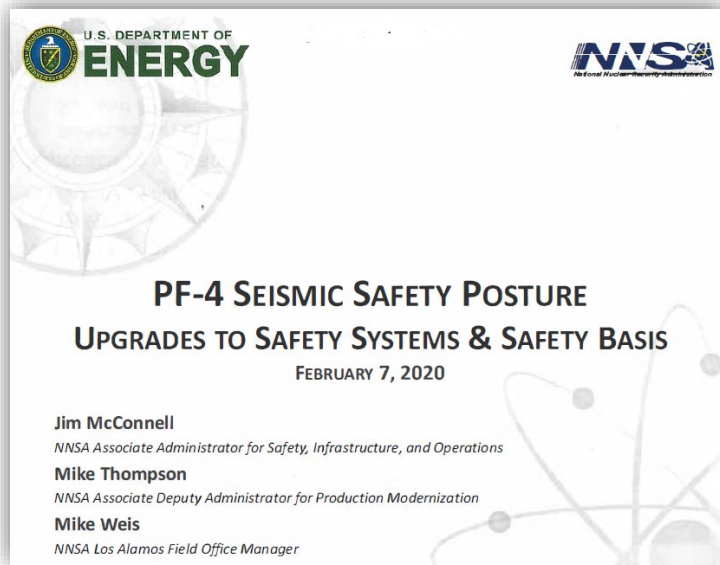
# Exhibit 16

## Current Safety Class Control Strategy

- SC/PC-3 Building Structure and Doors confine aerosolized Pu inside PF-4
- Passive confinement provides a ~15% Leak Path Factor via modeling/analysis

## Future Safety Class Control Strategy

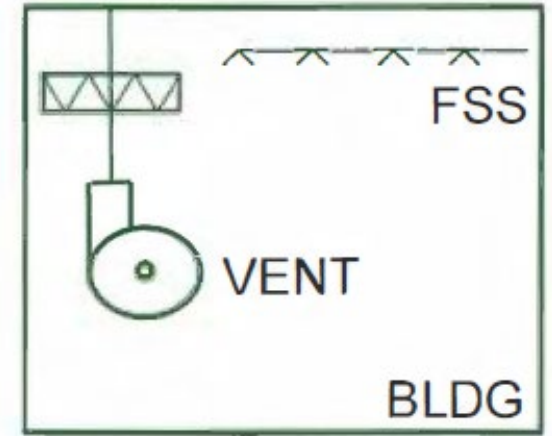
- SC/PC-3 Fire Suppression System prevents an incipient post-seismic fire from developing into a large fire
- SC/PC-3 Conf. Ventilation directs Pu aerosol thru Safety Class HEPA filters



3009-94 DSA: ~24 rem

### Color Key

- SC/PC-3
- Not yet SC/PC-3



3009-2014 DSA: <1 rem

Excerpt from NNSA's briefing in response to the Board's letter dated November 15, 2020. This was NNSA's previous strategy and has since changed.





# Exhibit 17



Ventilation ducting.



Carts and tanks.



Large toolboxes.

Potential obstacles to worker evacuation following a bounding earthquake.



# Exhibit 18

“The safety class fire protection system will suppress post-seismic fires such that the calculated total effective dose equivalent to the MEI will be reduced to approximately seven rem”

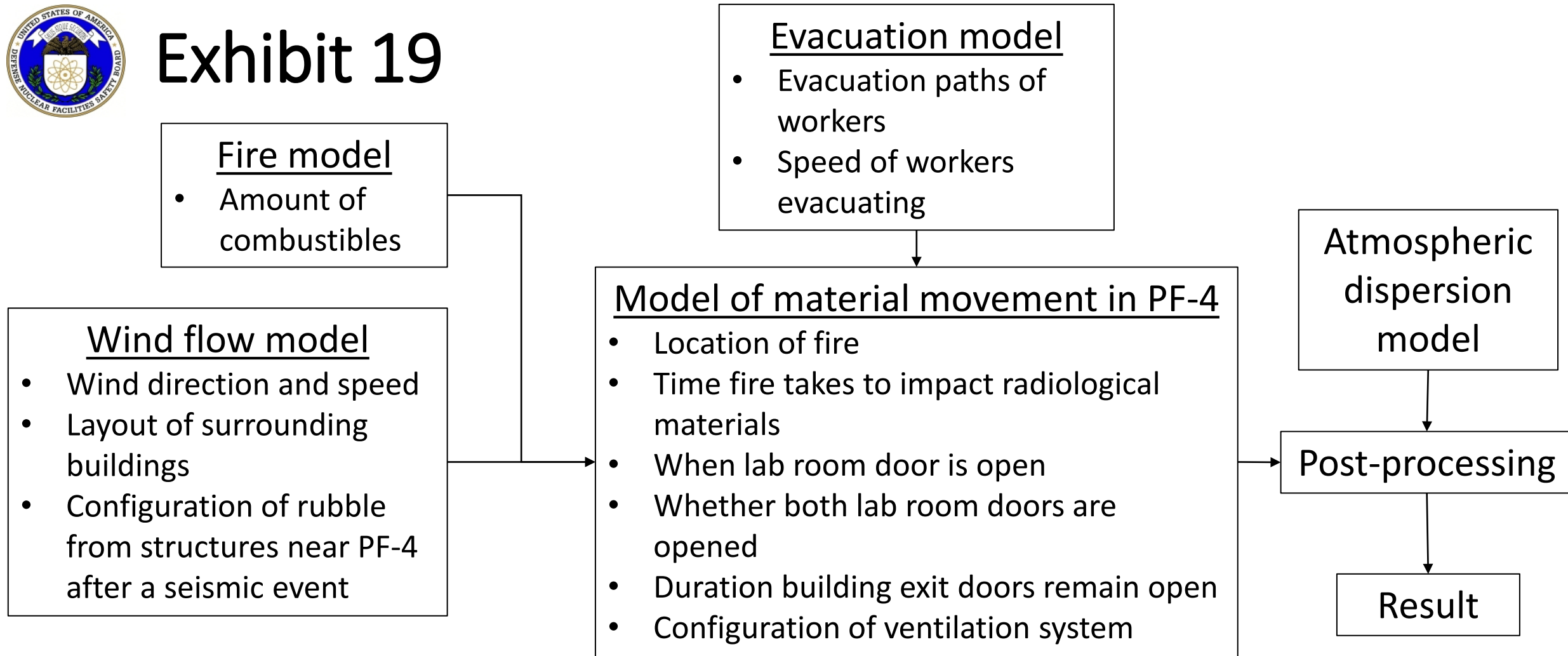
*NNSA’s response to the Board dated March 15, 2022.*



Sprinkler head on the ceiling of PF-4.



# Exhibit 19



Models and key assumptions used for the leak path factor analysis.



# Exhibit 20



## Project Execution Plan

**Update of Accident Analysis Calculations and the  
TA-55 DSA and TSR to Meet DOE-STD-3009-2014  
PLAN-TA55-525-R5**

Key Milestones	Date
Hazard Analysis Complete	11/18/2022
Accident Analysis MAR Evaluation Complete	12/8/2022
Leak Path Factor Calculation Report Complete	2/14/2023
Key Safety Basis Chapters Complete	2/28/2023
Submittal of 3009-2014 Safety Basis to NNSA for Approval	5/25/2023

Safety basis development plan updated in July 2022.



# Exhibit 21

50 USC §2538a. Plutonium pit production capacity

(a) Requirement

Consistent with the requirements of the Secretary of Defense, the Secretary of Energy shall ensure that the nuclear security enterprise—

- (1) during 2021, begins production of qualification plutonium pits;
  - (2) during 2024, produces not less than 10 war reserve plutonium pits;
  - (3) during 2025, produces not less than 20 war reserve plutonium pits;
  - (4) during 2026, produces not less than 30 war reserve plutonium pits;
- and
- (5) **during 2030, produces not less than 80 war reserve plutonium pits.**

Existing pit production requirements.



## Fiscal Year 2022 Stockpile Stewardship and Management Plan

Report to Congress  
March 2022

- Produce 30 pits per year at the Plutonium Facility at LANL during 2026
- Repurpose the Mixed Oxide Fuel Fabrication Facility at the Savannah River Site as part of the Savannah River Plutonium Processing Facility to produce **50 pits per year as close to 2030 as possible**



# Exhibit 22

**“Document which portions of the input were used to update the analysis and which portions were not, including the associated rationale. NA-LA is not endorsing the Board input in total or in part, but does want to make sure Triad considers the Board’s perspective. Please provide this information to NA-LA no later than December 11, 2020.”**  
**(emphasis added)**

NA-LA contract direction to Triad.



Department of Energy  
National Nuclear Security Administration  
Los Alamos Field Office  
Los Alamos, New Mexico 87544



FEB 03 2020

Ms. Andrea N. Martinez  
Prime Contracts Office Manager  
Prime Contract Management Office  
Los Alamos National Laboratory  
Triad National Security, LLC  
P.O. Box 1663, MS-C331  
Los Alamos, NM 87545

Dear Ms. Martinez:

References:

1. Contract Number 89233218CNA000001, Triad National Security, LLC, and the Department of Energy, National Nuclear Security Administration
2. Contract Clause H 43, Performance Direction

Subject: Transmittal of Defense Nuclear Facilities Safety Board Chairman letters to the Secretary of Energy regarding the Plutonium Facility

This correspondence formally transmits for your consideration letters from Defense Nuclear Facilities Safety Board (DNFSB) Chairman Hamilton to the Department of Energy (DOE) Secretary Perry discussing weaknesses in the Plutonium Facility structure, equipment, and Documented Safety Analysis (DSA). This includes the DNFSB Technical Report (DNFSB/TECH-44) pertaining to the Leak Path Factor (LPF) methodology as it applies to the analysis supporting the DSA update to DOE Standard 3009-2014.

The Los Alamos Field Office (NA-LA) directs Triad National Security, LLC (Triad) to consider the information contained within the enclosed letters and technical report during the planned safety basis update, including the LPF analysis. Document which portions of the input were used to update the analysis and which portions were not, including the associated rationale. NA-LA is not endorsing the Board input in total or in part, but does want to make sure Triad considers the Board’s perspective. Please provide this information to NA-LA no later than December 11, 2020.

It is the position of the National Nuclear Security Administration that this direction is within the scope of the contract. If you have any questions regarding this direction, you may contact the

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**DEFENSE NUCLEAR FACILITIES SAFETY BOARD**

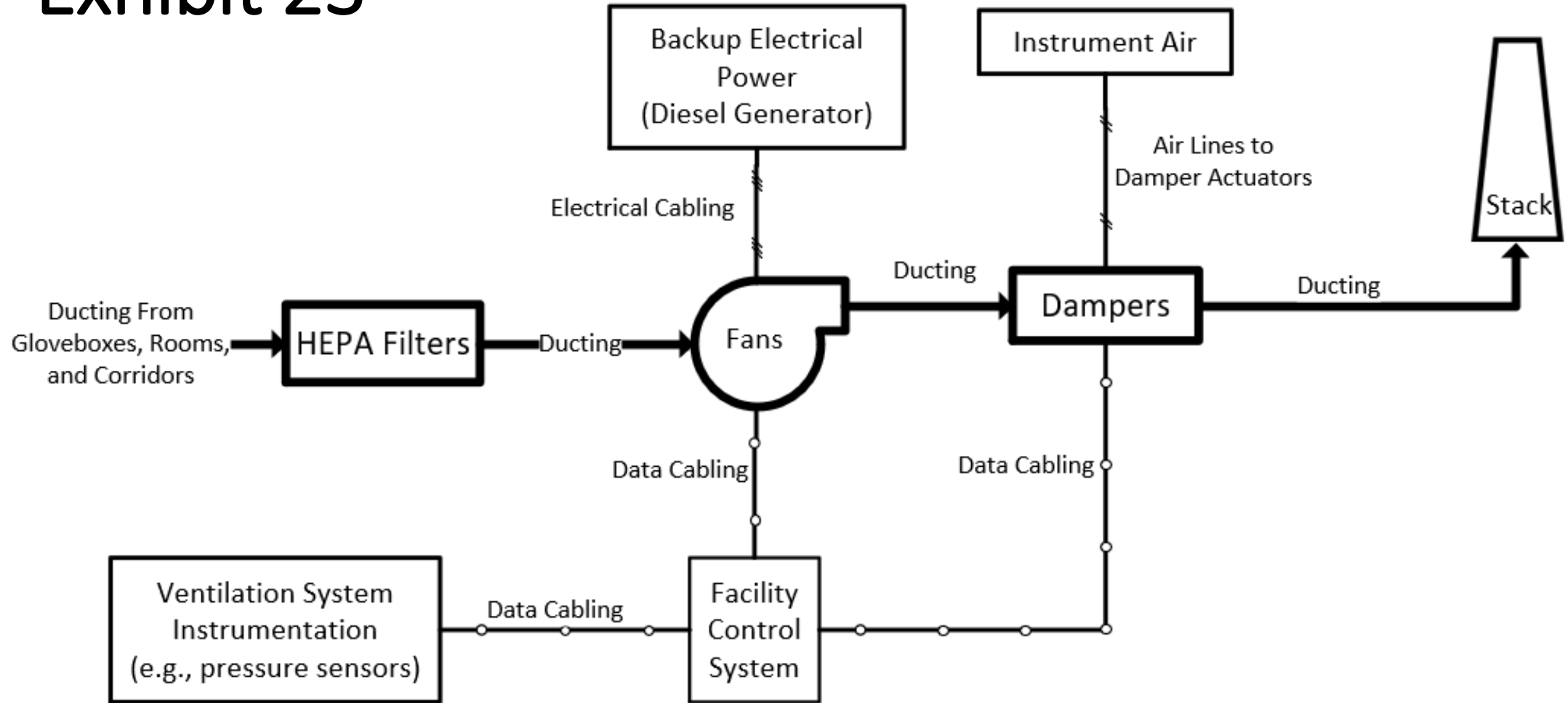
**Public Hearing on Los Alamos National Laboratory**

***Session 3:  
Improving Safety Systems,  
Safety Management Programs, and Oversight***

**Santa Fe, New Mexico  
November 16, 2022**



# Exhibit 23



Simplified depiction of equipment for an active confinement ventilation system.





# Exhibit 24

**RECOMMENDATION 2020-1 TO THE SECRETARY OF ENERGY**  
*Nuclear Safety Requirements*  
**Pursuant to 42 USC § 2286a(b)(5)**  
**Atomic Energy Act of 1954, As Amended**

**Dated: May 18, 2021**

**Introduction.** The Department of Energy's (DOE) defense nuclear facilities and associated infrastructure are aging, but DOE will need to continue to use many of the facilities and much of the infrastructure for the foreseeable future. Safety systems and features that were designed into buildings or installed during construction are also aging. At the same time, DOE is proposing, designing, and building new defense nuclear facilities to support its continued mission. DOE needs to maintain a robust safety posture and strong regulatory framework to ensure that both its aging facilities and infrastructure and its new facilities provide adequate protection of public health and safety. DOE will need clear requirements and guidance for its staff to follow and enforce.



Ventilation system fan planned for replacement.



# Exhibit 25



Ruptured waste drums at Idaho National Laboratory.

## POTENTIAL ENERGETIC CHEMICAL REACTION EVENTS INVOLVING TRANSURANIC WASTE AT LOS ALAMOS NATIONAL LABORATORY

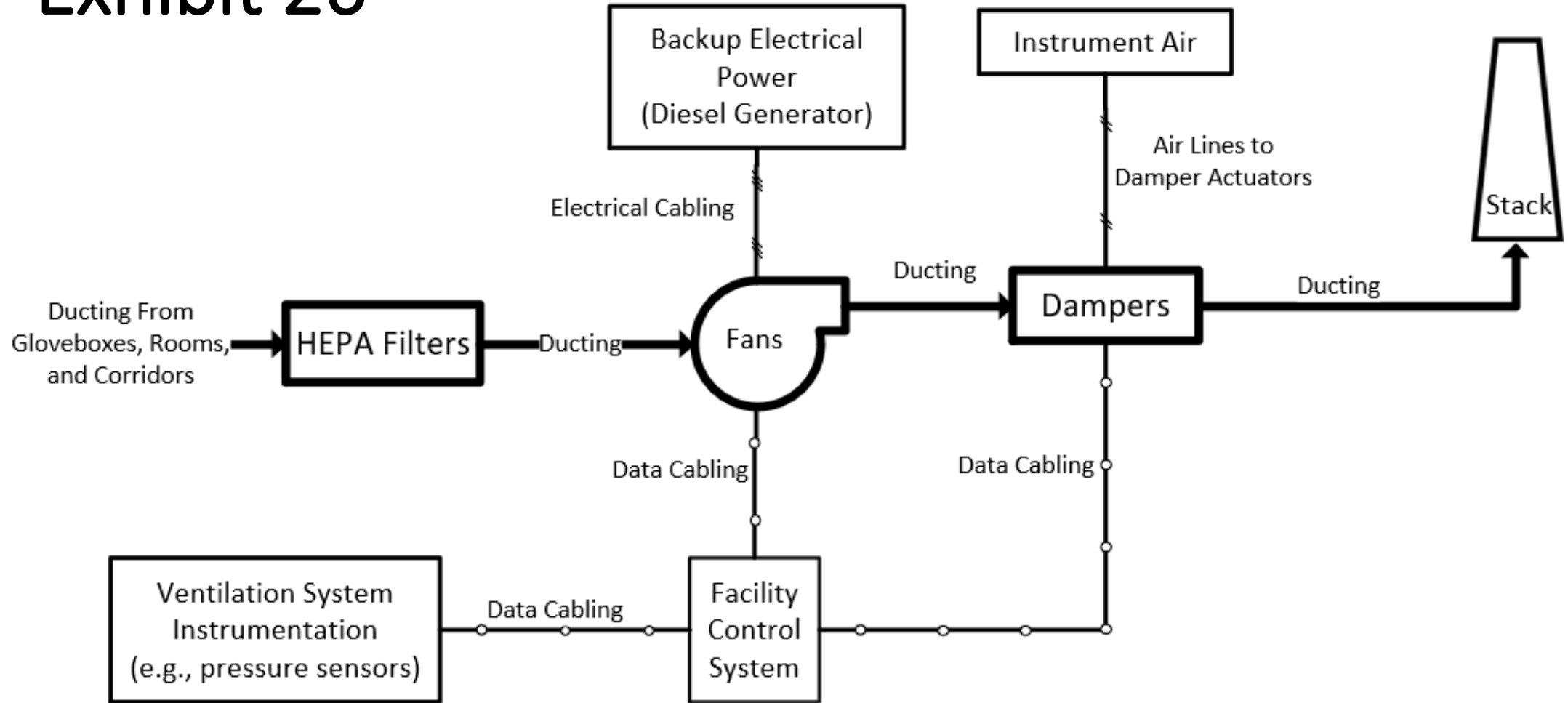
Defense Nuclear Facilities Safety Board  
Technical Report



September 2020



# Exhibit 26



Simplified depiction of equipment for an active confinement ventilation system.



# Exhibit 27



Components of the Facility Control System.



NOT MEASUREMENT  
SENSITIVE

DOE-STD-1195-2011  
April 2011

## DOE STANDARD

DESIGN OF SAFETY SIGNIFICANT  
SAFETY INSTRUMENTED SYSTEMS USED  
AT DOE NONREACTOR NUCLEAR  
FACILITIES



U.S. Department of Energy  
Washington, D.C. 20585

AREA SAFT

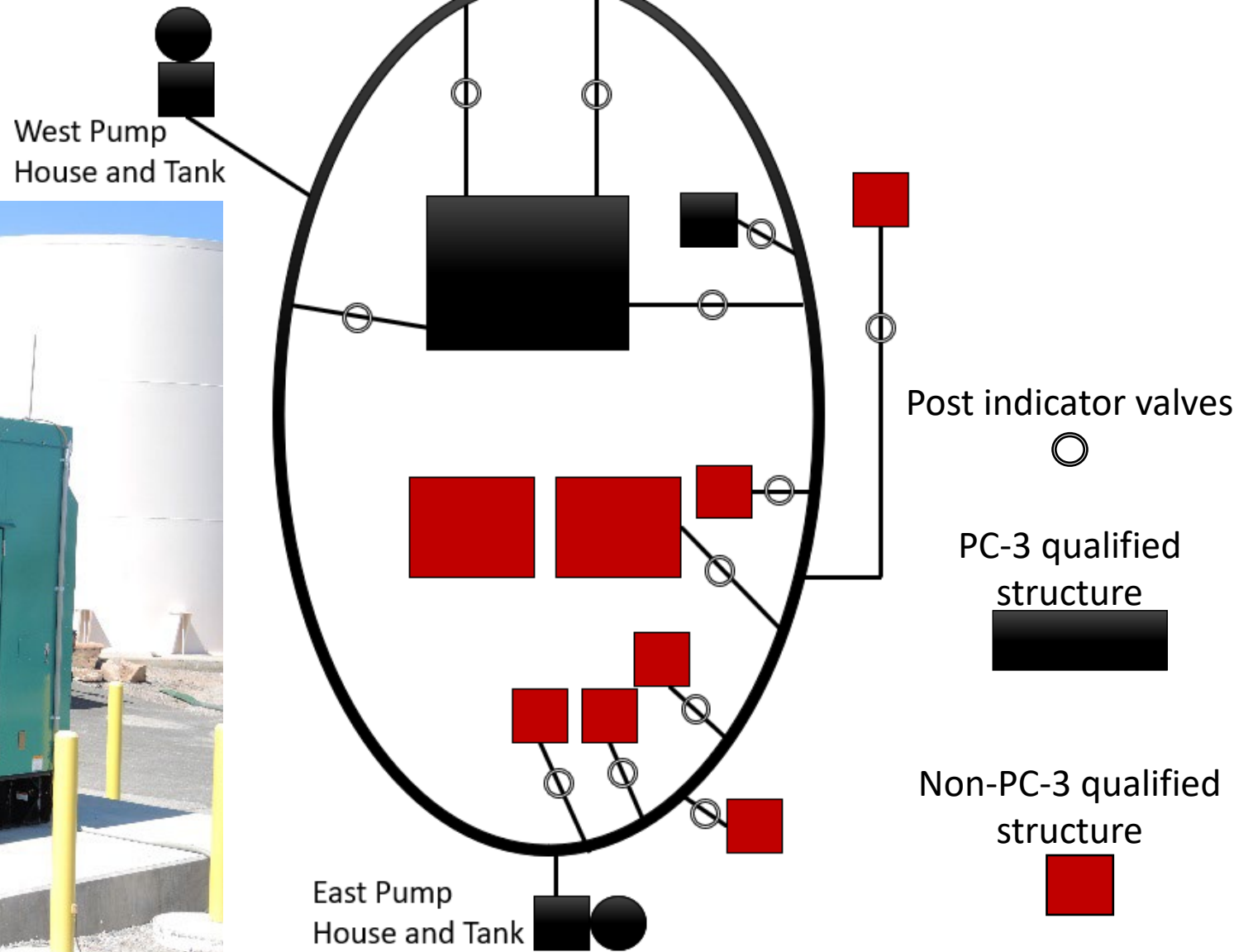
DISTRIBUTION STATEMENT. Approved for public release; distribution is unlimited.



# Exhibit 28



Generator for electrically-driven firewater pump.



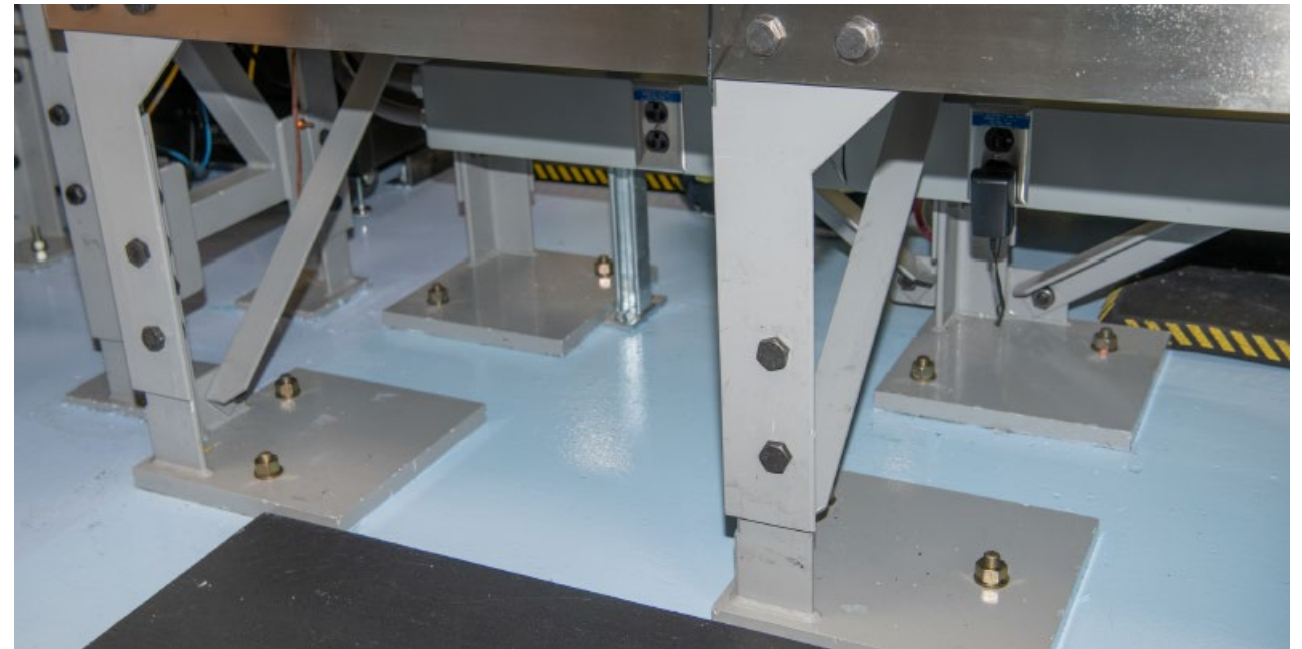
Firewater piping loop diagram.



# Exhibit 29



Seismically-deficient glovebox stand used for plutonium solutions.



New seismically-qualified glovebox stand for a weapons grade plutonium metal operation.



# Exhibit 30

## Changes in Estimated Completion Schedule for Safety System Upgrades

Safety System Upgrades	Benefit	2011 Baseline	2019 Update	2021 Update
Fire Suppression Seismic Upgrades	Ensures sprinklers are operable following a bounding seismic event	2013	2024	2026
Ventilation Equipment Replacements	Replaces aging components	2020	2025	2026
Remove Seismically Unqualified Buildings from Firewater Loop	Ensures water supply to PF-4 fire suppression system after a seismic event	2022	2026	2026



# Exhibit 31

“A visual ISI (in-service inspection) of engineering barriers done every three years without additional specific monitoring or inspections for legacy appurtenances **coupled with a run until failure mentality**, poses a significant contamination risk and a safety hazard to the workers. “ [**emphasis added**]

*NNSA’s Incident Review Report on the January 7, 2022, contamination event at PF-4*



Legacy sample port with degraded seals involved in event. Note the yellow tape and plastic were placed after the event.





# Exhibit 32

July 2019

October 2022

Outdoor transuranic waste container storage area.



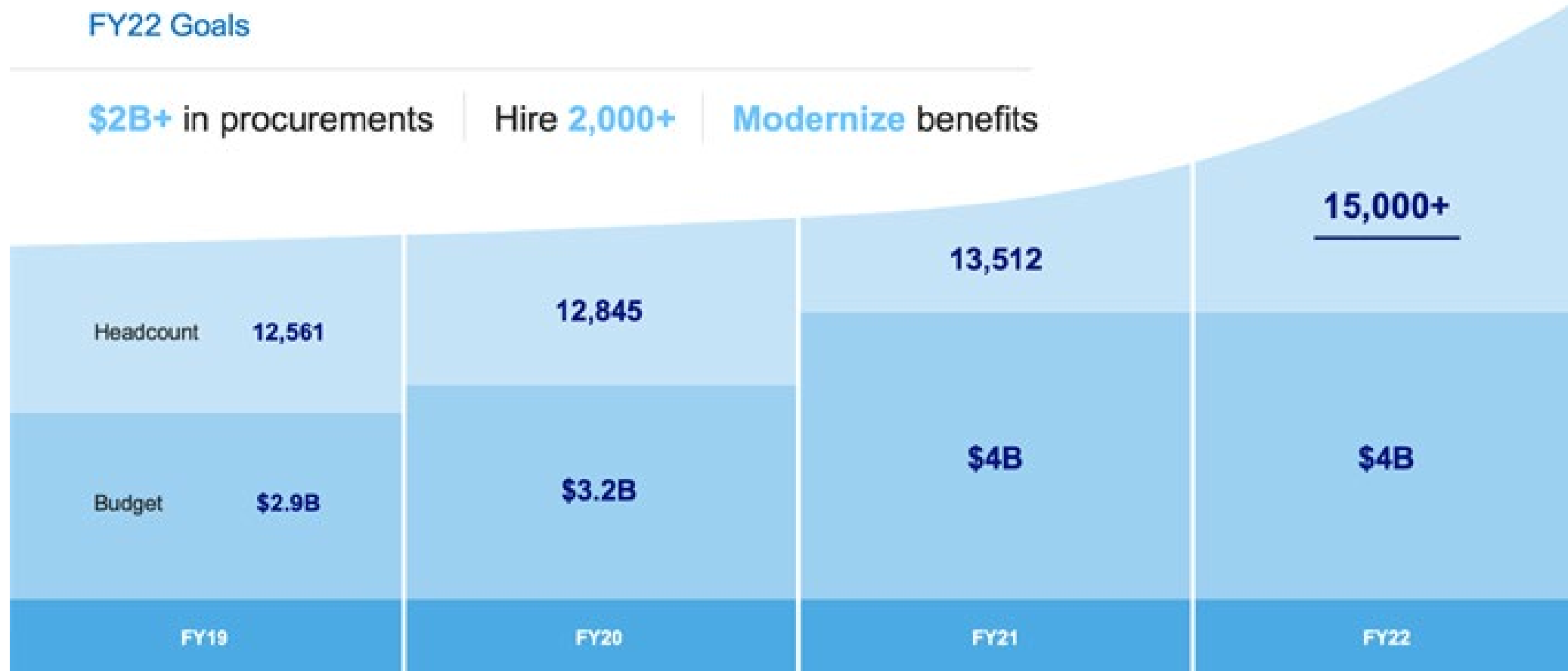
# Exhibit 33

## FY22 Goals

**\$2B+** in procurements

Hire **2,000+**

**Modernize** benefits



Triad's human capital environment.



# Exhibit 34



Triad's new training centers and program documentation.



# Exhibit 35

“It is the opinion of the assessment team that there is a subconscious expectation that the level of ConOps (Conduct of Operations) performance of M&O (management and operating) Contractors at NNSA nuclear facilities be on par with that of the Navy Nuclear and Commercial Nuclear Power programs. Most NNSA nuclear facilities, however, are not funded or staffed to allow for months of intense initial and continuing nuclear power training with a heavy emphasis on ConOps to ensure safe and sustainable operations.”

*NNSA’s Conduct of Operations assessment of LANL, March 2022*



Poor conduct of operations contributed to the PF-4 water bath overflow event on March 31, 2021.



# Exhibit 36



View of PF-4 at night.



Contaminated equipment wrapped for removal.



# Exhibit 37



NNSA's Los Alamos Field Office.