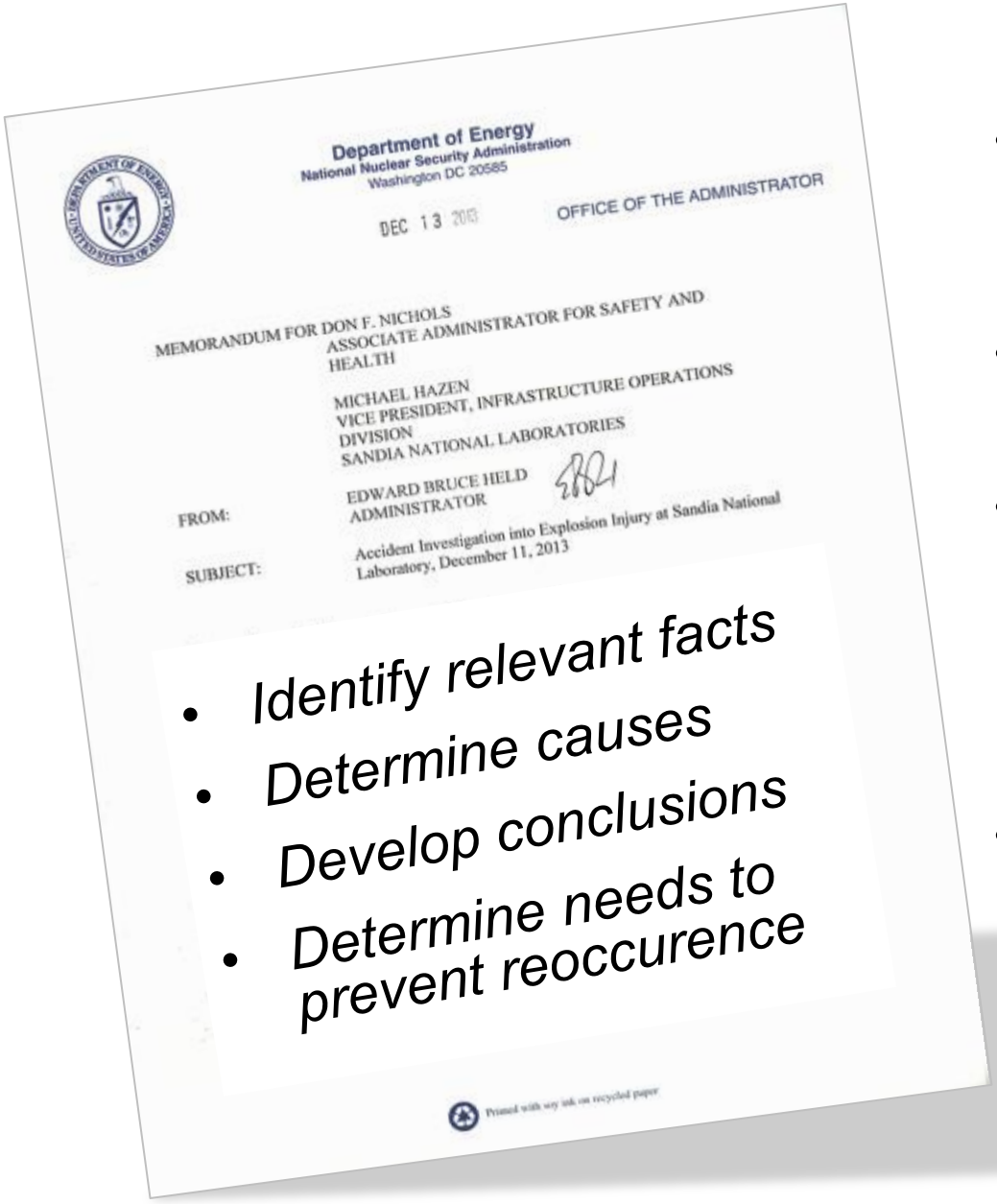
Accident Investigation Board (AIB)

for the Test Site 9920 Event

National Nuclear Security Administration

Sandia National Laboratories

SAND2014-2192 P



TEAM PRINCIPLES

- Maximize the investigation as a **learning experience**, not just for Sandia, but for the entire DOE Complex
- Find **solutions**, rather than blame while respecting individuals
- Review the event using the **principles** of Integrated Safety Management, **Safety Culture**, Human Performance Improvement and **Engineered Safety**
- Demonstrate a **Just Culture** by looking at the event as a result of a system of interoperable parts, not an individual failure, and find the underlying causes, not just ‘surface’ causes

AIB CORE TEAM

Don Nichols
Co-Chair

Michael Hazen
Co-Chair

Carol Adkins
AIB Team Lead

Philip Heermann
TAT Lead

AIB TEAM

Ralph Fevig
Noel Duran
Caren Wenner
Tim Wallace
Mike Lopez
Mike Zamorski
Jef Franchere
Marce Armendariz

SUPPORT TEAM

Bess Campbell-Domme
Pam Maestas
Stephanie Holinka
Robin Johnson

LESSONS LEARNED FROM THE AIB REVIEW

① **Maximized learning opportunities** - Used a joint review format led by senior Federal and Laboratories personnel.

② **Inclusion of management in learning process** - Allowed senior managers to attend end-of-day meetings.

③ **Conclusions with solid technical basis** - Used a Technical Advisory Team.

④ **Inclusion of staff in learning process** - Involved staff in the discovery process and conducted a small engineering review with the project team and an operations review with test personnel.

⑤ **Increased buy-in and personalization** - Discussed the results of the review in small group settings with the personnel directly involved.

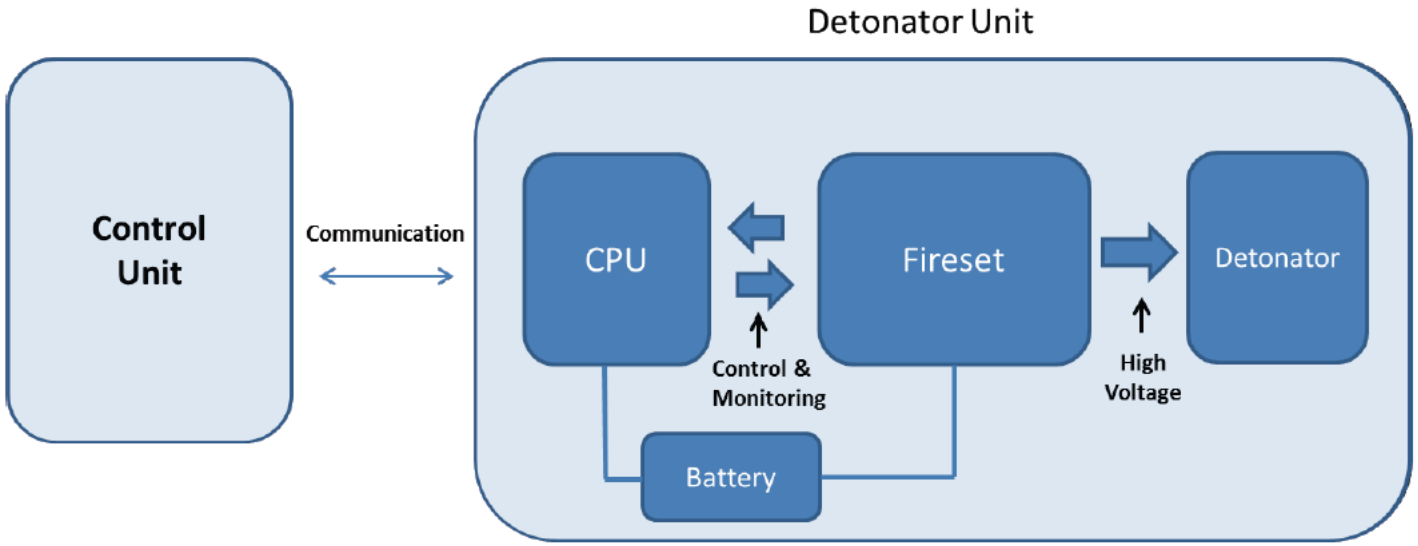
EVENT SUMMARY

During an explosives test at Site 9920, an individual received an injury to their left hand when the detonator in the test unit fired during troubleshooting.

TECHNICAL ADVISORY TEAM (TAT)

Conducted scientific and engineering analysis and provided technical expertise

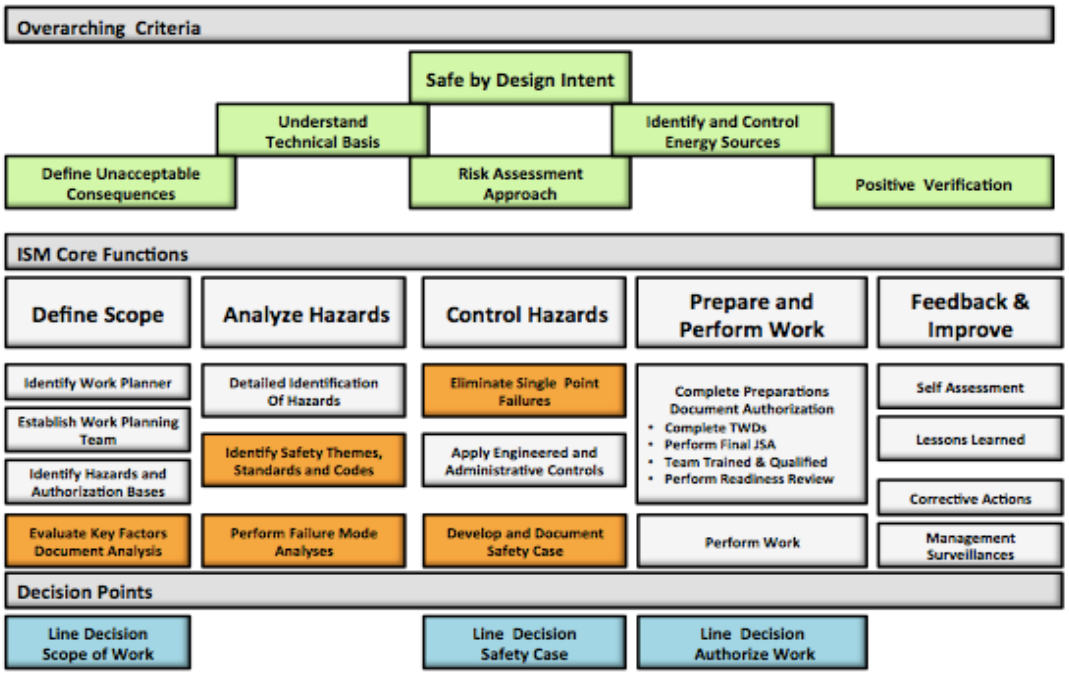
- Review and understand the design
- Determine potential failure paths



DIRECT CAUSE

The direct cause of this accident was a failure in the test device, from mechanical disturbance or electrostatic discharge, which caused an unexpected detonation.

Work Planning & Control/Engineered Safety Framework



CORE CAUSES

① Failure to effectively implement “safe by design” intent

② Insufficient WP&C of Test Operations

③ Lack of integration and understanding of the project

④ Differing safety culture maturity levels

1: FAILURE TO EFFECTIVELY IMPLEMENT “SAFE BY DESIGN” INTENT

Design group did not analyze the development and testing cycle of the device, make the device as safe as they could, and require it to be treated as unsafe while engineered safety protocols were being confirmed.

ENGINEERED SAFETY IN DESIGN

Fireset Design

- Recognized that safety of the system is inherent in the system design, not the design of individual components.
- Made safety recommendations to other component designers, such as the use of the shorting plug.
- Designed in safety features, such as the LED light.

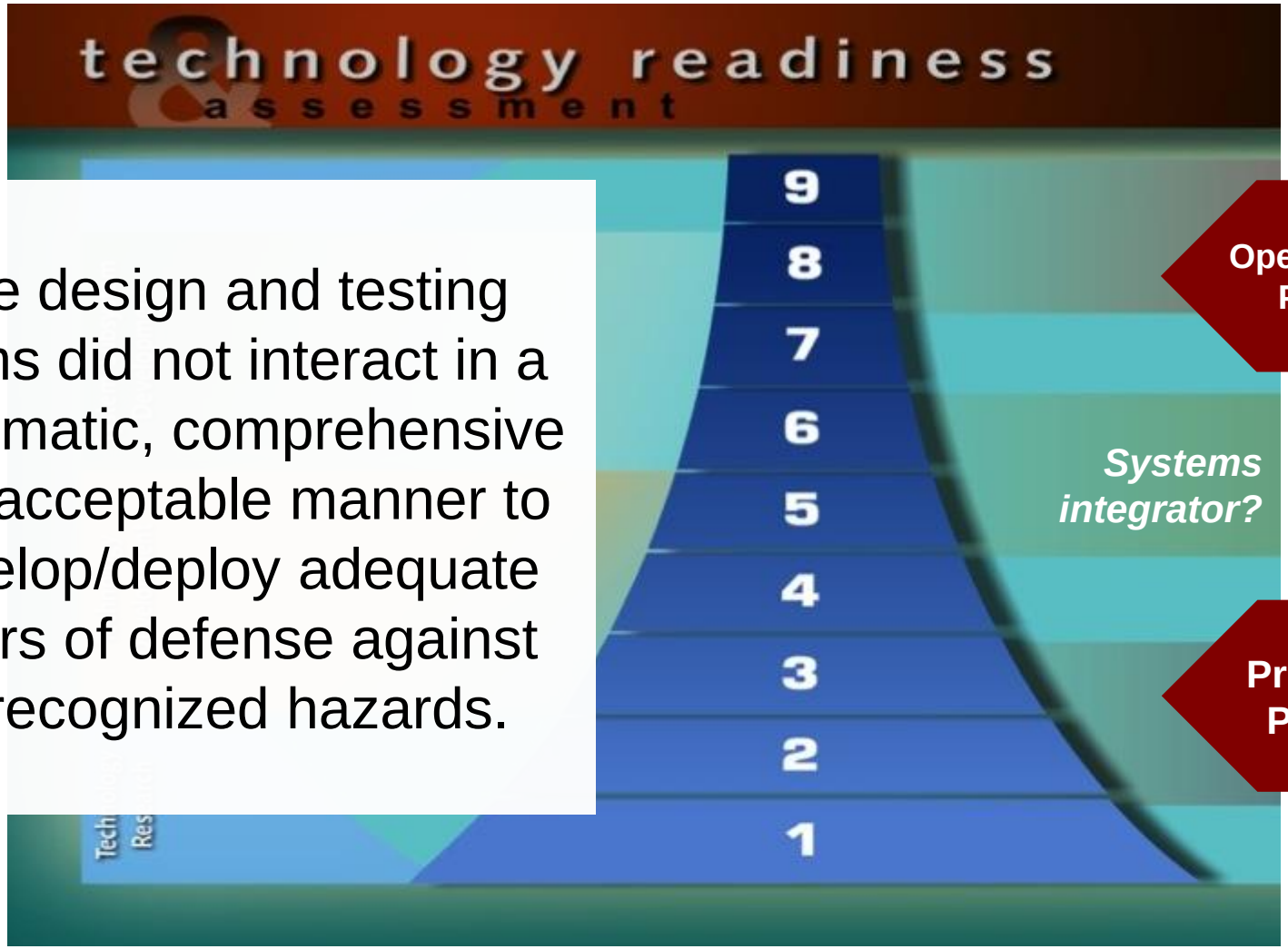
Explosive Assembly

- Applied engineered safety principles when installing the detonator into the test unit.
- Understood the technical basis by learning enough about the test unit to apply three controls to ensure energy would not reach the capacitor.
- Exhibited defense in depth by assuming the detonator would initiate anyway; used a blast shield to protect the worker.

2: INSUFFICIENT WP&C OF TEST OPERATIONS

The operations group accepted and then executed a job that their **existing hazards analysis** and operating procedures did not address, without analyzing the hazard, identifying controls & implementing controls.

3: LACK OF INTEGRATION AND UNDERSTANDING OF THE PROJECT



The design and testing teams did not interact in a systematic, comprehensive and acceptable manner to develop/deploy adequate layers of defense against unrecognized hazards.

4: DIFFERING SAFETY CULTURE MATURITY LEVELS

Sandia's diverse workforce has varying levels of safety practice maturity. Typical approaches to advancing the maturity of safety culture have not been sufficiently tailored to reach all individuals in the workforce, according to their individual needs.

People who think they "get it," but don't

People who don't realize they need it

SANDIA'S PATH FORWARD

- Develop and implement corrective actions to address shortcomings identified by the AIB
- Conduct extent of condition review activities
- Face-to-face discussions with the SNL president and all levels of management
- Engage the External Advisory Board – focus on safety culture and validate the implementation of Engineered Safety