

The New **DOE O 225.1B,**
Accident Investigations/ *Accident*
Prevention

“What Happens to One of Us, Happens to All of Us”

Charles Lewis - Office of Corporate Safety Programs

May 5, 2011





DOE O 225.1B, Accident Investigations

A New Order for Accident Investigations

DOE Order 225.1B governing the rules and regulations of accident investigation has been approved as revised March 4, 2011.

This presentation is an overview of how the Order has changed the process and will prompt a quiet revolution in the culture of DOE accident investigation.

Facility Representatives are a very important part of the AI process and change in culture.

Why did we need to change?

The Order had not been revised in 13 years.

But let's review and look first at what history has to tell us.

But DOE has a good safety record...

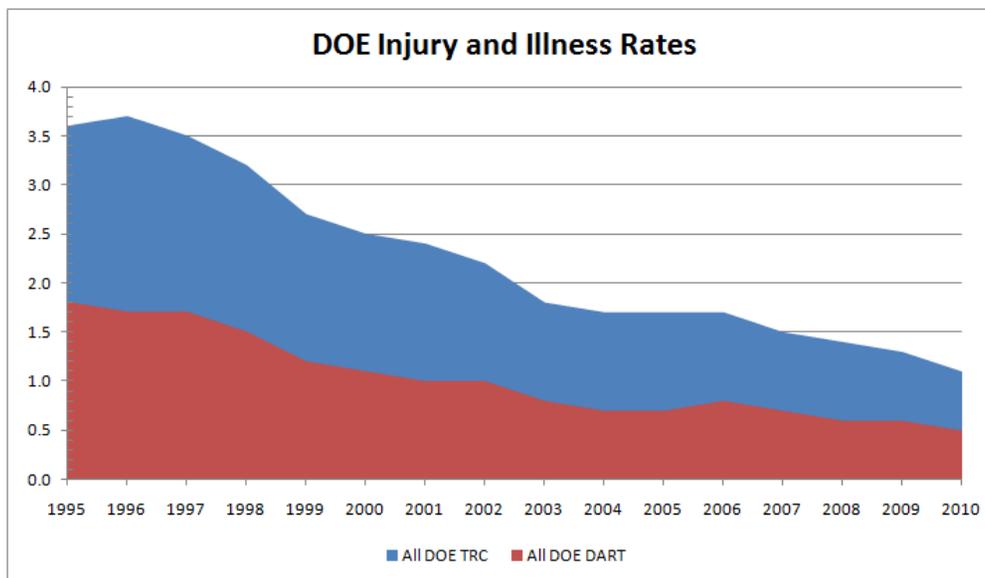


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Even operations with statistically good safety performance can—and do—experience major accidents.

“Notwithstanding the tragic loss of life in the Gulf of Mexico, we achieved an exemplary statistical safety record.”

– *Transocean Ltd., explaining large executive cash bonuses despite the Deepwater Horizon accident*





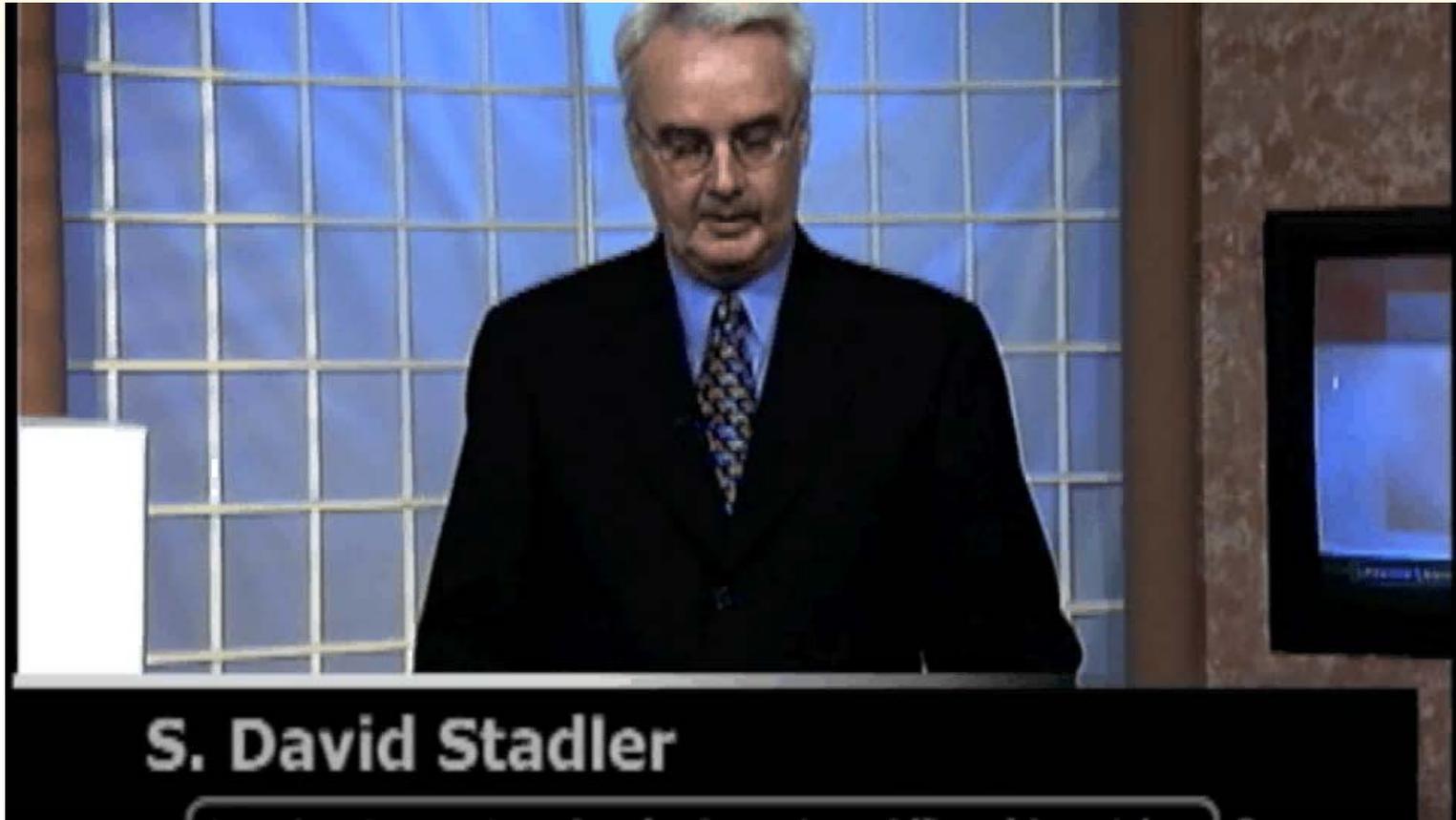
History

Significant events many people will recall

- Three Mile Island
- Space Shuttle Challenger
- Chernobyl Nuclear Accident
- Exxon Valdez
- Texas City Refinery Explosion
- British Petroleum Oil Spill in Gulf of Mexico

Low probability events with high-risk consequences involving human interface with complex machines .

Taken together with our own significant safety events...



The CO₂ fatality and multiple injuries at Idaho National Laboratory



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Release of CO₂ at the Test Reactor Area, INEEL, July 28, 1998

Event Summary

- De-energizing of electrical circuit breakers at Test Reactor Area, INEEL.
- Fire suppression system unexpectedly activated without sounding an evacuation alarm as prescribed by NFPA and OSHA.
- CO₂ is lethal at fire suppression levels; as a result, it causes impairment, unconsciousness, and death within minutes.
- Worker escape impeded by obstacles, low visibility, disorienting effects of CO₂, breathing apparatuses not available.

One fatality, several life-threatening injuries, risks to rescuers.



The K-33 Welder Fatality at the K-25 Site...



Welding/Cutting Fatality at the K-33 Building, K-25 Site, February 13, 1997

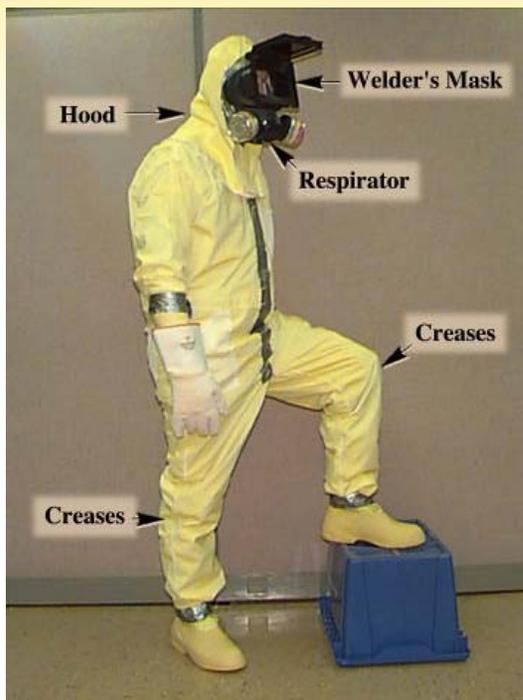
Event Summary

- Task: welding to remove six converters for shipping to other sites.
- “Routine maintenance” required no Job Hazards Analysis.
- Working in constricted space under poor conditions, on a ladder, alone.
- Welder wore multiple layers of non flame-retardant clothing, head, hand and foot gear, a personal air monitor, and a full-face respirator with an attached welding mask and radiological protective equipment.
- Spark ignited anti-contamination coveralls and was undetected.
- Flames spread until beyond worker’s ability to extinguish.

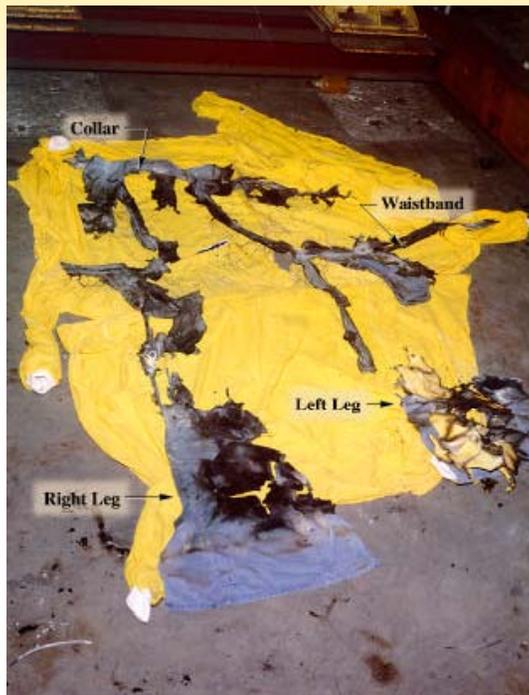
By the time a co-worker responded and extinguished the fire with a dry chemical fire extinguisher, flames had totally engulfed the welder’s body. He suffered third degree burns over 95 percent of his body and died the next day at a burn center.



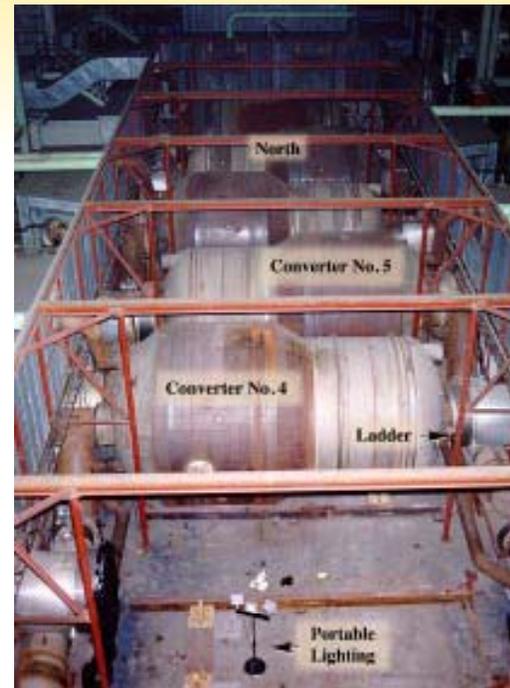
Welding/Cutting Fatality at the K-33 Building, K-25 Site, February 13, 1997



Similarly Outfitted Welder



Remnants of Welder's Burned Coveralls



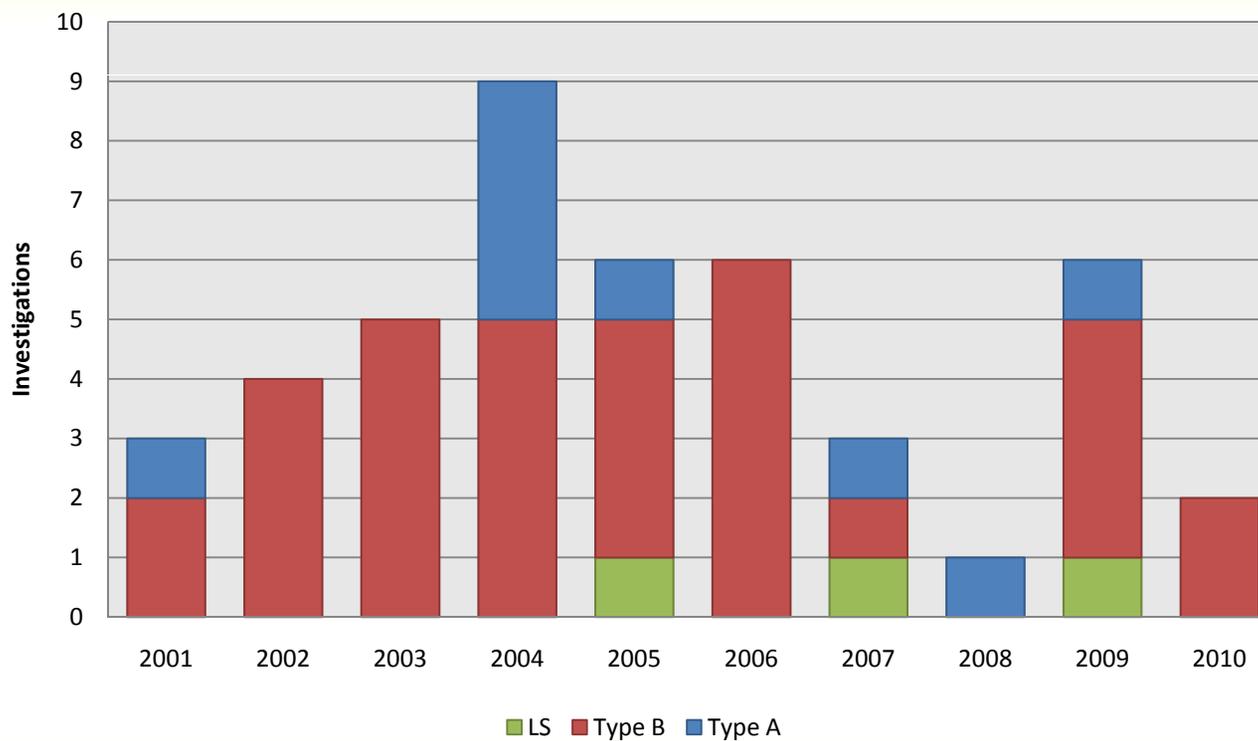
Area of work in Cell 7



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Type A and B Events Are Down

Accident Investigations (Fiscal Year)





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A change in the way we do business was warranted





What We Have Learned

- We know that humans (all humans) make mistakes and mistakes are a factor in accident causation.
- We believe that HROs-highly reliable organizations-create safer places to work.
- We know that the worker is not always to blame.
- We know that a culture of blame does not create a learning organization.





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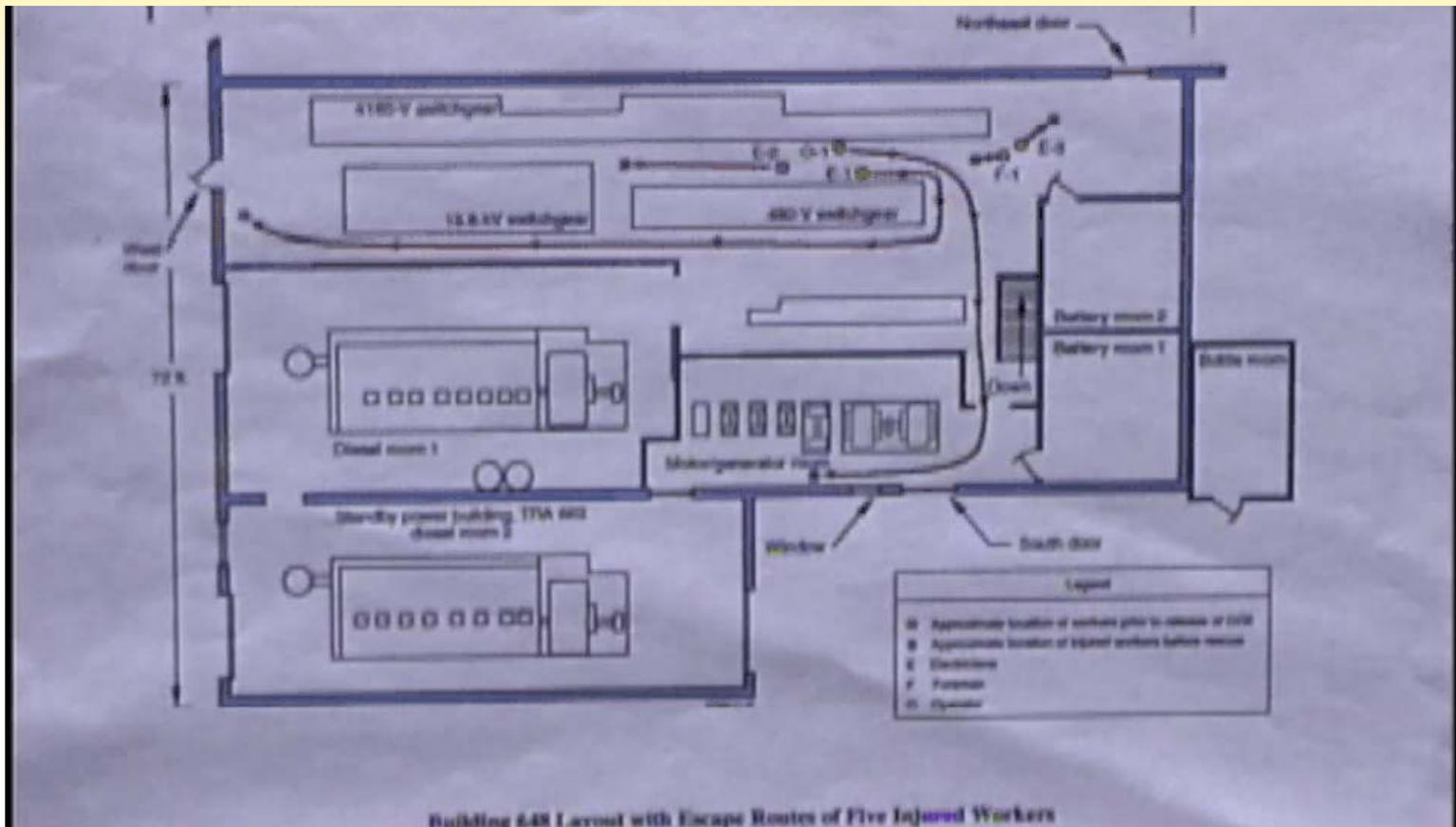
**We knew it was time for the AI Order to reflect this new thinking.
Then we wanted to ask the questions...**

How can accident investigations widen the lens through which we see?

- Who else can we bring into the mix?
- Who are the eyes and ears of our business?
- Who is the one who gets the call when things go bump in the middle of the night?



Meet Do E. Facrep



CO₂ Fatality and Multiple Injuries-INEEL



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The basic spirit and intent of Order 225.1B have not changed and continue to be guided by:

Establishing and implementing a Department-wide, state-of-the-art, structured approach to conducting accident investigations

Assisting line management in meeting responsibilities to:

- Prevent the recurrence of accidents.
- Improve environmental protection and the safety and health of DOE employees, contractors, and the public.
- Decrease the number and severity of accidents.



How does the new Order support the new thinking?

- The new Order represents a move away from only a compliance-based culture to a learning-based culture.
- The new Order is a recognition that requirements are written for a bigger idea that may not apply to a risk associated with an individual task.
- The new Order is an acknowledgment that we need to be looking at the attributes of an accident in a way that considers what has not been considered.





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Accident Investigation is Accident Prevention

The DOE Accident Investigation course, delivered in a classroom setting, turns into a course in “accident prevention.” Participants report a new way of “seeing” accident precursors.





After an accident, one of the Facility Rep's many roles may be to secure the accident scene.



Process Steps

Determination

- Head of HQ Element determines if an Accident Investigation Board is to be appointed and documents rationale.
- No longer Type A and Type B federal investigation.
- Criteria (Appendix A), Knowledge to be gained, Other relevant factors considered
- HSS Chief reviews and concurs/non-concurs with rationale

The new Order changes the Determination Criteria. Some would debate if they are more strict or less strict.

Some would say HQ Elements are not sufficiently independent.

Some changes are intended to drive a more timely and formal decision-making process.



Determination criteria are triggers.

Human Effects—no significant changes

- Any fatality from injury or exposure
- Hospitalization >5 calendar days (Serious Injury)
- More than 3 employees having lost work days (Single event)

Radiological Exposure—significant discussions on Timeliness and Multiplier Factors

- Greater than 2 times 10 CFR 835.202 Occupational Dose Limits
- Embryo/fetus, Minor, or Public >1rem effective dose
- Uptake >2 times Annual Limit on Intake
- >20% ALI to pregnant worker, Minor, or Public



Determination Criteria

**Environmental Effects—basically the same, judgment required.
Addition of Site Area and General Emergencies.**

- Release of hazardous material >5 times the reportable quantity in 40 CFR 302
- Release of hazardous material resulting in Site Area or General Emergency per DOE O 151.1C
- Off-site transportation event requiring notification per 40 CFR 302
- Catastrophic release per 29 CFR 1910.119



Determination Criteria

Property

- >\$2.5 Million in property damage
- Estimated within 72 hours of the accident
 - Facility Information Management System





But don't get trapped into thinking it's an easy formula.

If thresholds have been triggered in any of these preceding determination criteria, a formal determination has to be made whether to conduct a Federal investigation.

- More than technical aspect is involved.

Goal is to make determination within 3 days.

- Evidence is perishable.

Must make decision despite incomplete and changing information.



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Program Responsibilities

Heads of Headquarters Elements

- Determine and appoint Accident Investigation Board
- Maintain trained, qualified personnel to serve on Accident Investigation Boards
- Review and distribute reports
- Request, approve and track corrective actions

Chief, Health, Safety and Security Officer

- Policies, procedures, standards and guides
- Reviews for quality all draft reports
- Provides assistance when requested
- When requested by Program Office, may become Appointing Official
- When directed by Secretary, becomes Appointing Official



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Program Responsibilities

Heads of Field Elements

- Ensure implementation of Contractor Requirements Document (CRD)
- Ensure necessary on-site support for accident investigations
- May result in extent of condition reviews for specific issues related to accidents



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Investigation Board Composition

Board Chairperson (DOE Federal)

Board Members (DOE Federal)

- One board member must be a DOE Accident Investigator.
- Board Chair and DOE Accident Investigator must be from different duty stations than the accident location.

Advisors (contractor or Federal)

Consultants (contractor or Federal)

Support staff – administrative coordinator

Don't recreate the wheel

(we've built it already)

Resources, References, Websites





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The Organization

The Office of Corporate Safety Analysis closes the loop on the operating experience, gathers the knowledge, builds the data bases, and rolls it into Lessons Learned for the benefit of the entire Complex.

- William H. Roege, Director, Office of Corporate Safety Analysis
- Charles (Chuck) Lewis, Director, Corporate Safety Programs
- David K. Pegram, Manager - Accident Prevention and Investigation with Dennis Vernon (CONT), William McQuiston (CONT), Susan Keffer, (CONT)
- W. Earl Carnes, Senior Program Manager for Human Performance and Highly Reliable Organizations, and liaison, Institute of Nuclear Power Operations (INPO)
- Stephen Domotor, Director, Office of Analysis Program Manager
- Eugenia Boyle, Occurrence Reporting & Operating Experience Program Manager

We are from HQ, we can help. Really!



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Links, Websites, Resources

For more information about DOE Complex events and Accident Investigations:

- The new DOE Order 225.1B, Accident Investigations, is at <https://www.directives.doe.gov/directives/current-directives/225.1-BOrder-b/view>
- Final Accident Investigation Reports from 1995 to present are available on the HSS/Corporate Safety Programs Website and E-Reference Tools <http://www.hss.doe.gov/CSA/CSP/AIP/index.html>
- AI information, including Lessons Learned, is disseminated via Operating Experience Summary (OES), OES Blog, and HSS Operating Experience Wiki.
 - Operating Experience Summary <http://www.hss.doe.gov/CSA/analysis/oesummary/index.html>
 - Operating Experience Summary Blog <http://oesummary.wordpress.com/>
 - Operating Experience Wiki <http://operatingexperience.doe-hss.wikispaces.net/home>



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A world of resources at DOE.gov; Safety and Health tab

DOE Standards

- Human Performance Handbook, Volume 1: Concepts and Principles
- Volume 2: Human Performance Tools for Individuals, Work Teams, and Management
- Coming in June 2011- DOE Technical Standard-Operational Safety and Accident Analysis

available on the Department of Energy Technical Standards Program Website at

<http://www.hss.energy.gov/nuclearsafety/ns/techstds/>



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It's difficult to imagine...



Dr. David Stadler, INEEL CO₂ Fatality and Multiple Injuries final accident investigation



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Take Action to become more engaged

- Remember, not everything that happens in Vegas should stay in Vegas.
- Put the odds in your favor by attending a DOE Accident Investigation course as soon as possible.
- Sign up through the National Training Center : next class starts August 15 in Albuquerque. Visit the NTC Website for information and registration.

And thanks for listening!





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Epilogue—Can you answer this question: Why do more accidents happen in June and July?

Type A and B Accidents by Month
April 1995 to March 2011

