



DOE Accident Prevention and Investigation Program Update

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DOE Accident Prevention and Investigation Program Update



Thank you Environmental Radiation Assistance Directory Committee Members

- ERAD and Accident Investigation Common Purpose
- Lessons Learned (LL) - Review Events to Improve DOE Mission operational and safety performance
- Integrated Safety Management (ISM) – Reinforce the core functions and guiding principles
- High Reliability Organization (HRO) – Promote the values and concepts of a Learning Organization
- Prevention – Identify and Analyze causal factors to address organizational, systemic, and human performance continuous improvement



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ERAD and AI Common Points

- Identify and designate Program Point of Contact
- Improve communications between DOE Organizations at Headquarters and in the Field, and Federal and Contractors
- Provide feedback on methods and techniques for program improvement
- Determine with the help of subject matter experts significant issues and provide information and corrective actions to prevent recurrence

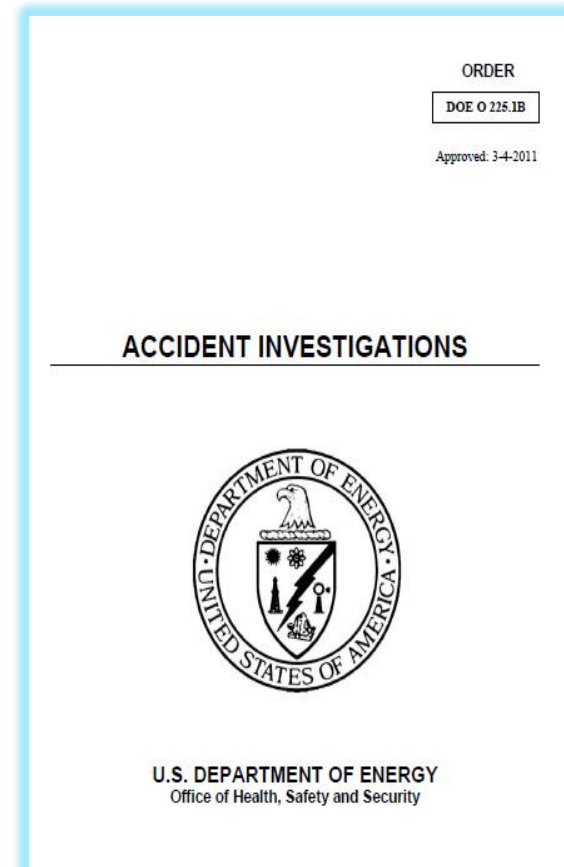


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DOE Order for Accident Investigations

- DOE Order 225.1B, dated March 4, 2011, states the requirements for accident investigation (AI)
- Appointment of AI Boards now the responsibility of the heads of program elements (NA-1, EM-1, SC-1, etc.)
- The DOE Power Marketing Administrations are EXEMPT from the DOE Order. But, all have similar internal AI Directives, and attend the DOE AI training course.
- Only one set of criteria for triggering AI's (Type A and B merged into one – Federally Led Investigation).





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DOE O 225.1B, Accident Investigations The Accident Investigation Criteria

Human Effects

- Any fatality from Injury or exposure.
- Hospitalization more than five calendar days.
- Any single accident resulting in three or more employees having lost-workday cases.
- Motor Vehicle Accidents while on official Government business, if the consequences result in meeting any of the criteria above.



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DOE O 225.1B, Accident Investigations The Accident Investigation Criteria

Radiation

- Radiation exposure exceeding by a factor of 2 or more 10 CFR Part 835.202 external dose limits.
- Radiation exposure exceeding 1 rem effective dose for embryo/fetus of a declared pregnant worker, a minor, or a member of the public.
- Confirmed monitoring result indicating an intake of radioactive material by an employee equivalent to two or more times the annual limit on intake (ALI).
- Confirmed monitoring result indicating an intake of radioactive material to a declared pregnant worker; a minor; or a member of the public equivalent to 20% or more of an ALI.



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DOE O 225.1B, Accident Investigations The Accident Investigation Criteria

Environmental

- Environmental release of a hazardous material from a DOE facility in an amount greater than five times the reportable quantities specified in 40 C.F.R. Part 302.
- Release of a hazardous material from a DOE facility that meets the criterion for classification as a Site Area or General Emergency in DOE Order 151.1C.
- Any offsite transportation incident involving hazardous materials that would require immediate notice pursuant to 40 C.F.R. Part 302.
- Facilities under 29 CFR Part 1910.119, an incident that resulted in, or could reasonably have resulted in, a catastrophic release of a highly hazardous chemical in the workplace.



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DOE O 225.1B, Accident Investigations The Accident Investigation Criteria

Property

- Estimated loss of or damage to DOE property equal to or greater than \$2.5 million or requiring estimated costs equal to or greater than \$2.5 million for cleaning, decontaminating, renovating, replacing, or rehabilitating property.
- Any unplanned nuclear criticality.



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DOE O 225.1B, Accident Investigations The Accident Investigation Criteria

Other

- Any accident or series of accidents for which an Accident Investigation Board (AIB) is deemed appropriate by the Secretary or Deputy Secretary.



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DOE O 225.1B, Accident Investigations

Section 5. RESPONSIBILITIES: c. Heads of Field Elements.

- (2) After incorporating this Order into contracts, ensure its implementation and identify, to the Head of the Headquarters Element and AU, a single point of contact to act as liaison to Headquarters on matters pertaining to the Accident Investigation Program.
- (3) Provide for the necessary on-site support to the AI Board, as requested by the Chairperson, to facilitate the timely and effective completion of the accident investigation.



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DOE O 225.1B, Accident Investigations

DOE O 225.1B, Contractor Requirements Document (CRD)

The contractor must support Federal investigations of accidents related to activities under their contract. The contractor must:

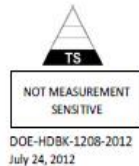
1. Establish and maintain a capability to respond to accidents, mitigate accident consequences, assist in collecting and preserving evidence, and assist during the conduct of the investigation. The assistance provided must include preserving and documenting the accident scene to the extent that it is under the control of the contractor.
2. Prepare, implement, and track to completion, approved corrective action plans that are identified for their action by the AIB.



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DOE Handbook approach incorporates HPI/ISM into the Accident Investigation and Operational Safety Analysis methods.

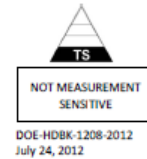


DOE HANDBOOK Accident Investigation and Prevention

Volume I: Accident Analysis
Techniques



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



DOE HANDBOOK Accident Investigation and Prevention

Volume II: Operational Safety
Review Techniques



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



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Volume I: (Federal Led) Accident Investigations

Volume I, discusses fundamental concepts of accident dynamics, accident prevention, and accident analysis. The focus is on improvement not placing blame. An understanding of the theoretical bases of safety management and accident analysis, and the practical application of the DOE Integrated Safety Management (ISM) framework, is presented.





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Organizational Causes of Accidents

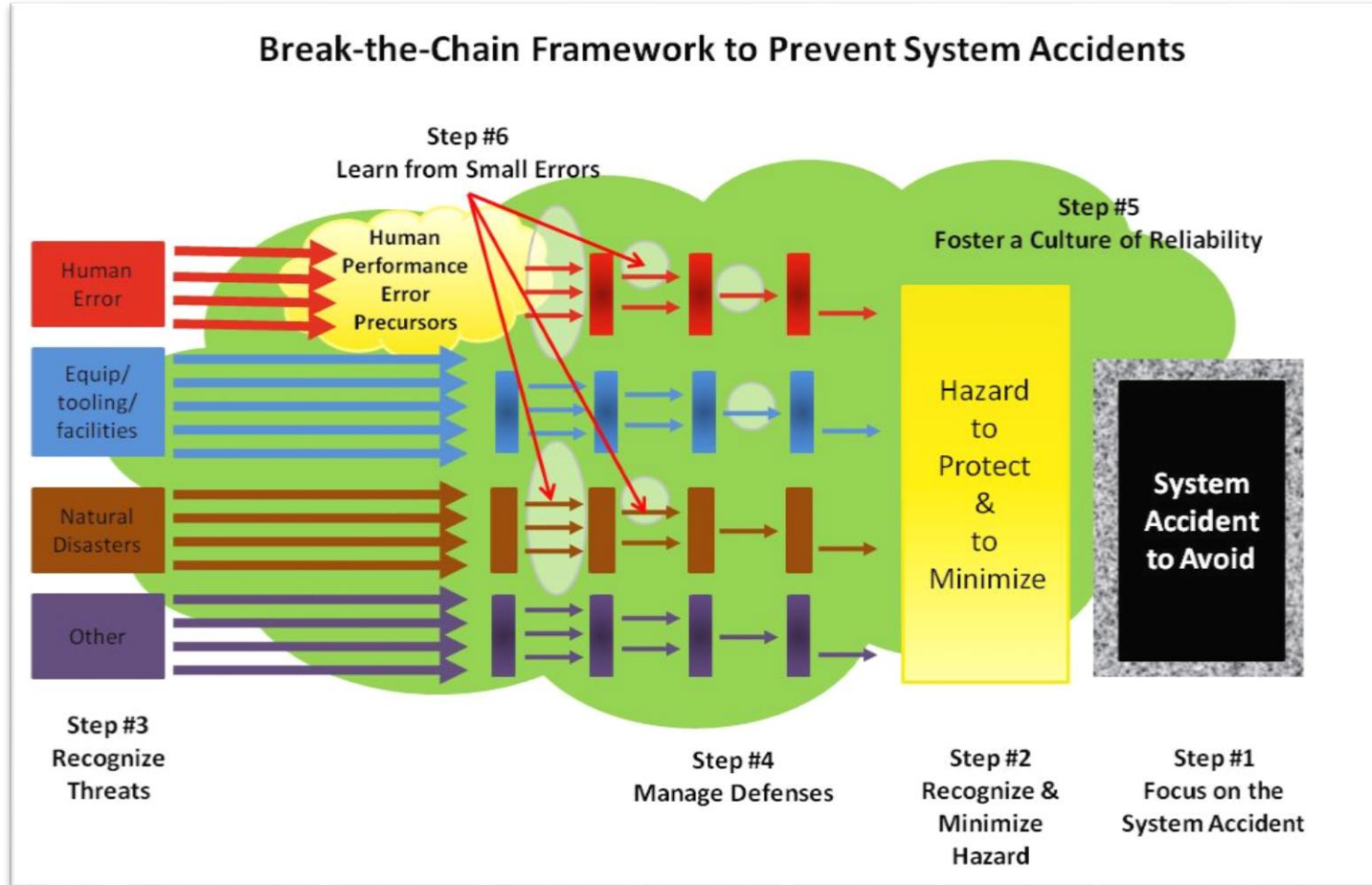




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Accident Prevention – Concepts

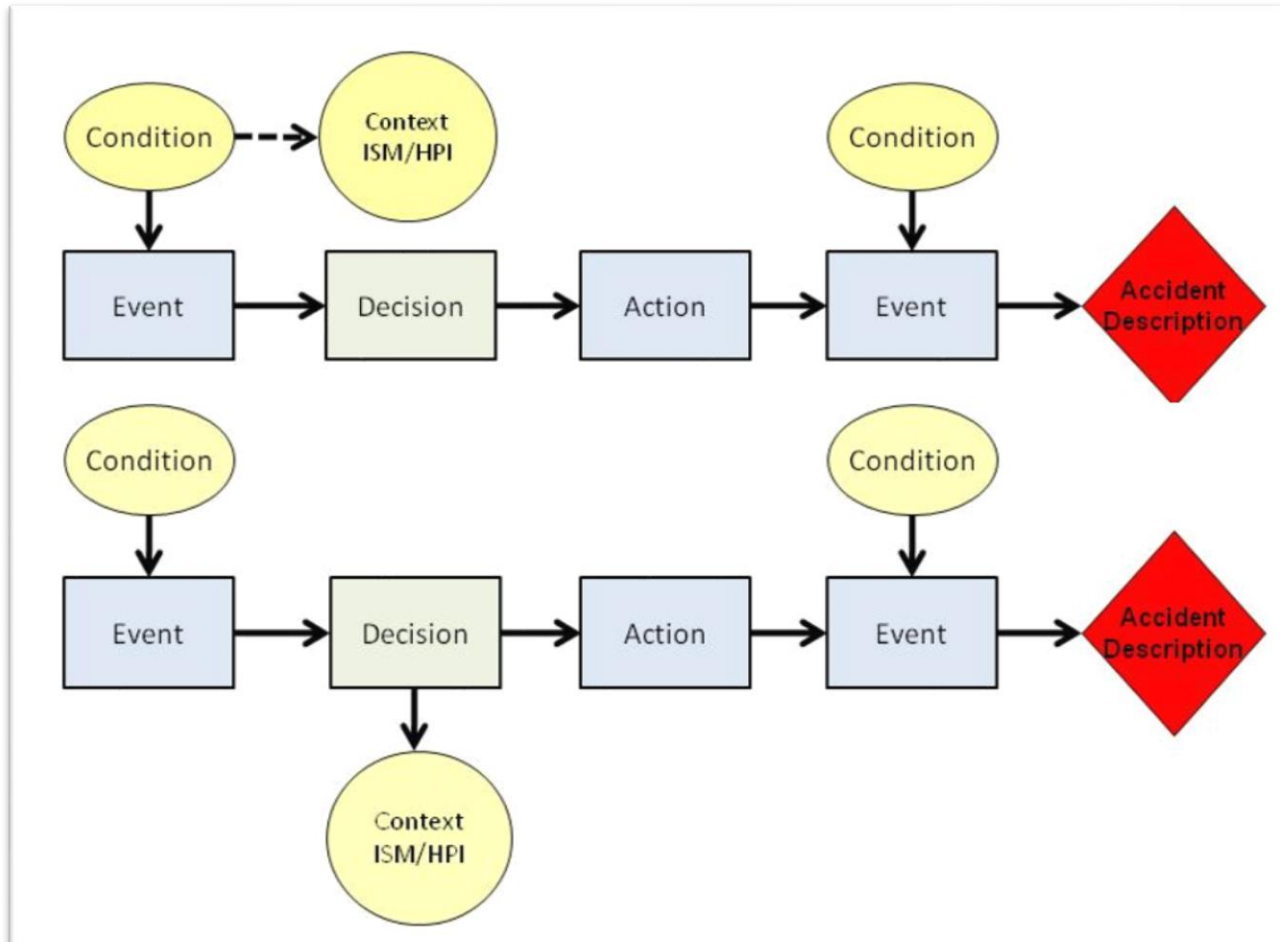




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Conditions and Decisions - Context of Human Performance, and Safety Management Systems Flowcharting





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Barrier Analysis

Hazard: 13.2 kV Electrical Cable		Target: Acting Pipefitter		
What were the barriers?	How did each barrier perform?	Why did the barrier fail?	How did the barrier affect the accident?	Context: HPI/ISM
Engineering drawings	Drawings were incomplete and did not identify electrical cable at sump location	Engineering drawings and construction specifications were not procured Drawings used were preliminary No as-built drawings were used to identify location of utility lines	Existence of electrical cable unknown	<p>HPI:</p> <ul style="list-style-type: none"> • HN #5 – inaccurate mental picture • HN #6– inaccurate risk perception • IC#2 – limited perspective <p>ISM:</p> <ul style="list-style-type: none"> • GP #3 & 5 – Hazard identification
Indoor excavation permit	Indoor excavation permit was not obtained	Pipefitters and utility specialist were unaware of indoor excavation permit requirements	Opportunity to identify existence of cable missed	<p>ISM:</p> <ul style="list-style-type: none"> • CF##1 – Define scope of work • CF#2 – Analyze hazards • CF#3 – Control hazards

HN – Human Nature

IC – Individual Capabilities

GP – Guiding Principles of ISM

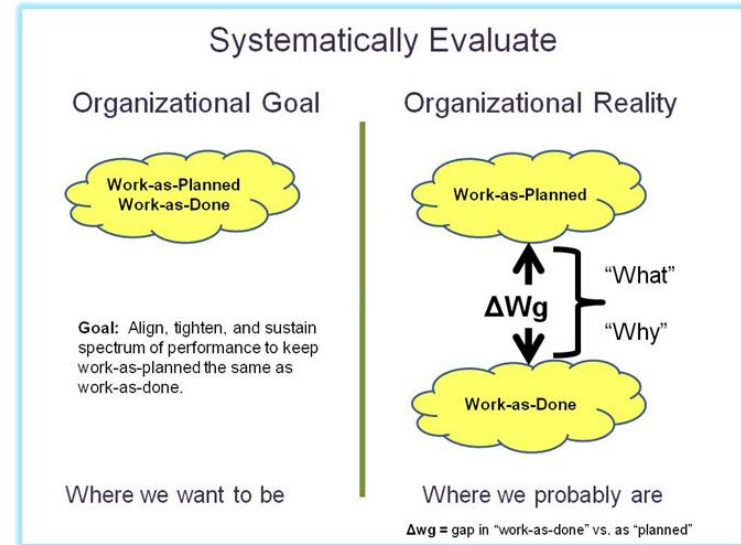
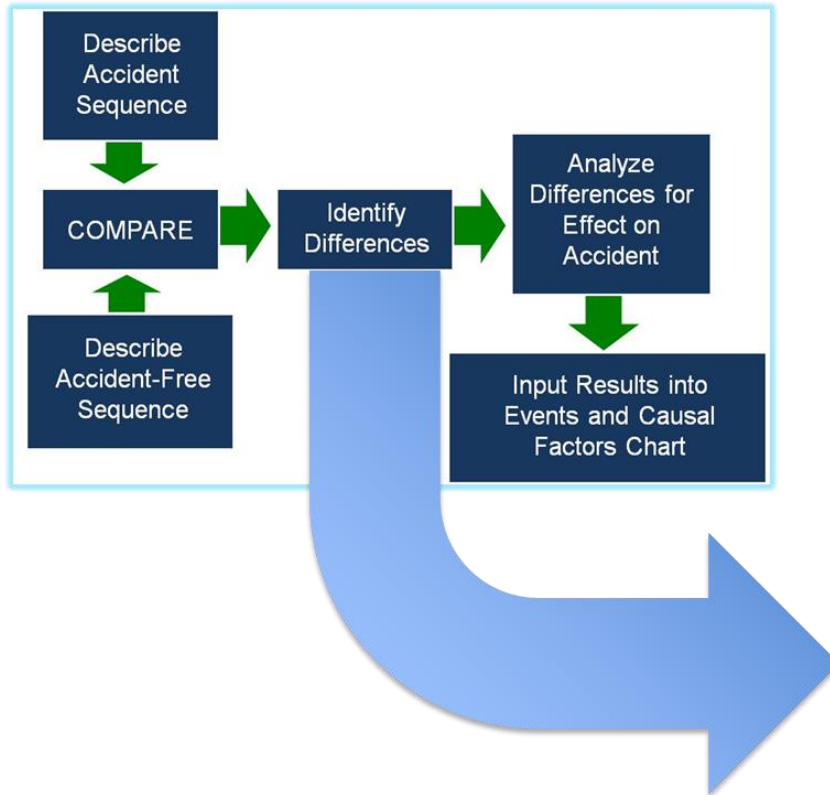
CF - Core Functions of ISM



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Change Analysis





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Volume II: (Contractor Led) Operational Safety Review (OSR)

- Volume II of the Accident and Operational Safety Analysis Handbook builds upon the concepts, philosophy, processes, and techniques presented in Volume I.
- Volume II is not intended to be a standalone volume, but supplements Volume I, with the key differences in the EXPANED analysis techniques for a Contractor Led - Operational Safety Review (OSR) in order to prevent accidents.
- Volume II has been structured using the same logical sequence for organizing a (Contractor) OSR team as for a(DOE) Federal Accident Investigation presented in Volume I.



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Volume II: Operational Safety Review (OSR)

- The Operational Safety Review (OSR) is based on the premise that major accidents or incidents are not caused by individual errors, but are set up by the organizational environment the employee works in.
- It is not necessary to wait until a catastrophic accident for Contractors to use the investigation and analysis process defined in this handbook because the underlying organizational issues are at work all the time and can be preemptively identified through review of precursor incidents.
- Lesser consequential or information-rich events or negative trend indicators investigated using the OSR process can identify key organizational factors that if not identified and corrected, could lead to a more catastrophic event.



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DOE Webpage on DOE Accident Prevention and Investigation Program

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DOE ACCIDENT PREVENTION AND INVESTIGATION PROGRAM

- Environment
- Worker Health & Safety
 - Energy Employees Occupational Illness Compensation Program Pamphlet
 - Federal Technical Capability Program (FTCP)
 - Accident Investigation Reports
 - Nuclear Safety
 - Facility Safety
 - Security
 - Classification
 - Databases
 - Dashboards
 - DOE Technical Standards Program

The Department of Energy (DOE) Accident Prevention and Investigation Program serves as a key DOE corporate safety resource for promoting accident PREVENTION through exchange of lessons learned and information for improvement of our integrated safety management system. The techniques and tools utilized in the investigation of "accidents" can be valuable in looking at leading indicators associated with our safety program, to determine the embedded precursors to accidents, and prevent them from occurring. The information obtained through application of these techniques and tools serve as benchmarks for others to utilize in evaluating their safety management systems.

The AI program provides ongoing corporate program support resources for DOE line programs. We depend on each DOE site to assure adequate numbers of: accident investigators; analysts; technical experts and, readiness teams who are prepared to rapidly respond to investigate accidents.

The Corporate Safety Programs maintains the Accident Investigation and Prevention Handbook (DOE-HDBK-1208-2012) as part of a continuing effort to enhance quality and achieve program goals and objectives. The Handbook describes the process and principal activities for conducting accident investigations, in accordance with DOE Order 225.1B, Accident Investigations. DOE Order 225.1B establishes requirements and responsibilities for Headquarters, heads of field elements, Accident Investigation Boards, and DOE contractors, who must collectively implement the Accident Investigation Program. Additionally, HSS has developed: SAF-230 - 40 hour Accident Investigator, and the online SAF-230DE Accident Investigation Orientation, training courses. For more information see the link to training below.

We encourage you to participate in AI training programs, volunteer to serve on an AI Board, study our reports, and utilize AI information and tools to improve your safety management system performance at your facility. We believe you will find the materials and tools on our web

FOR ADDITIONAL INFORMATION CONTACT:

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[301-903-0444](tel:301-903-0444)

ACCIDENT INVESTIGATION PROGRAM DOCUMENTS

[Federally Led Accident Investigation Reports](#)

[Accident Investigation Reports - Type B](#)



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We need more people to participate as AI Board Members and Subject Matter Experts!

- Consider enrolling in an up-coming DOE AI Course thru CHRIS for Federal staff, or the National Training Center (NTC) LMS for contractors.





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Links, Websites, Resources

- For more information:
 - DOE Order 225.1B, *Accident Investigations*:
<https://www.directives.doe.gov/directives-documents/200-series/0225.1-BOrder-b>
 - Accident Prevention and Investigation Program:
<http://energy.gov/ehss/worker-health-safety-policy-guidance-reports/doe-accident-prevention-and-investigation-program>
 - Accident Investigation Reports:
<http://energy.gov/ehss/listings/federally-led-accident-investigation-reports>
 - DOE Handbook (DOE-HDBK-1208-2012) Accident Investigation and Prevention, Volumes 1 and 2:
<http://energy.gov/ehss/downloads/doe-hdbk-1208-2012>



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Questions?



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