

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

**ORDER**

DOE O 225.1

SUBJECT: ACCIDENT INVESTIGATIONS

Approved: 09-29-95  
Review Date: 09-29-97  
Chg 2: 4-26-96  
Chg 1: 10-26-95

1. OBJECTIVE. To prescribe requirements for conducting investigations of certain accidents occurring at Department of Energy (DOE) operations and sites; to improve the environment, safety and health for DOE, contractors, and the public; and to prevent the recurrence of such accidents.
2. CANCELLATION.
  - a. DOE 5484.1, ENVIRONMENTAL PROTECTION, SAFETY, AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, of 10-17-90, Paragraphs 1 through 5, 6a (1) through (10), both 6f (1) through (8) and the second misnumbered 6f, and Chapters I and II.
  - b. Cancellation of the above Order paragraphs does not, by itself, modify or otherwise affect any contractual obligation to comply with such an Order. Canceled Orders which are incorporated by reference in a contract shall remain in effect until the contract is modified to delete the reference to the requirements in the canceled Orders.
3. APPLICABILITY.
  - a. DOE Elements. Except for the exclusions in paragraph 3c, below, this Order applies to all DOE Elements.
  - b. Contractors.
    - (1) Except for exclusions in paragraph 3c, below, the Contractor Requirements Document (CRD), Attachment 1, sets forth the requirements to be applied to the universe of contractors awarded contracts for the operation, management, maintenance, construction, demolition or remediation of a DOE-owned or -leased facility.
    - (2) Contract compliance with the CRD will be required to the extent set forth in the contract. Contractors shall continue to comply with the requirements of the paragraphs of the Order identified in paragraph 2, above, that are canceled by this Order until their contracts are modified to delete the reference to the requirement of those canceled Order paragraphs.
  - c. Exclusions. Activities conducted under the authority of the Director, Naval Nuclear Propulsion Program, as described in Public Law 98-525.

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DISTRIBUTION:

All Departmental Element:

INITIATED BY:

Office of Environment, Safety & Health

4. REQUIREMENTS.

- a. Categorization. DOE Field Elements shall ensure the reporting of all accidents and categorize them as soon as possible, in accordance with the algorithm in Attachment 2, to determine if a Type A or Type B investigation is required.
- b. Conducting the Investigation. Accidents categorized as either a Type A or Type B shall be investigated as follows.

(1) Appoint the Accident Investigation Board.

- (a) The Appointing Official (see paragraph 5, Responsibilities) within 3 calendar days of the accident, shall formally appoint DOE employees to a DOE Accident Investigation Board. The Board shall consist of an Accident Investigation Board Chairperson and three to six Members, at least one of whom shall be a DOE Accident Investigator.
- (b) The Board appointment shall be in writing and shall include the scope of the investigation, individuals being appointed special provisions of the investigation, and a specified completion date for the final report. The scope of the investigation shall include gathering facts, analyzing causes, developing conclusions, and developing judgments of need pertaining to DOE and contractor organizations and management systems that could have or should have prevented the accident. The scope shall include all levels of the organization up to and beyond the level of the Appointing Official.
- (c) The DOE Accident Investigation Board Chairperson shall:
  - 1 Be a DOE senior manager with demonstrated managerial competence, preferably a member of the Senior Executive Service;
  - 2 Manage the investigation process and represent DOE in all matters regarding the accident investigation;
  - 3 Be knowledgeable of DOE accident investigation techniques and experienced in conducting accident investigations through participation in at least one Type A or Type B investigation;
  - 3 Notify DOE, Federal, State, or local investigative or law enforcement agencies of suspected unlawful activity identified during the accident investigation; and
  - 4 Coordinate Board activities with all organizations having an interest in the accident.

- (d) DOE Accident Investigation Board Members shall be DOE employee subject matter experts in areas related to the accident. At least one Member shall be a DOE Accident Investigator with knowledge of the DOE accident investigation techniques and experienced in conducting investigations through participation in at least one Type A or Type B investigation.
- (e) The DOE, Accident Investigation Board Chairperson and Members shall:
  - 1 Report only to the Appointing Official during the investigation;
  - 2 Be independent of the direct line management chain responsible for day-to-day operation or oversight of the facility, area or the activity involving the accident; and
  - 3 Not include both a supervisor and his or her subordinate.
- (2) Investigate the Accident.
  - (a) The Board shall be responsible for conducting a thorough investigation of all individuals, organizations management systems, and facilities having a stake in or potential impact on the accident.
  - (b) The Board shall determine the facts of the accident by examining the accident scene, examining DOE and contractor documentation, interviewing witnesses and performing engineering analyses. The Board shall also examine policies, standards, and requirements that are applicable to the accident being investigated as well as management and safety systems at Headquarters and Field Offices that could have contributed to or prevented the accident.
  - (c) The Board shall be supported by advisors and consultants and shall analyze the facts and identify causal factors (including root causes) and judgments of need for
  - (d) The Board shall have sufficient skills and knowledge, either through Board members or advisors and consultants, to evaluate: the effectiveness of management systems, as defined by the Guiding Principles of Safety Management; the adequacy of policy and policy implementation; and the execution of line management, as they relate to the accident.
  - (e) Prior to completion of the investigation the Board shall conduct an internal review of the investigation process to ensure that:
    - 1 All of the facts, standards, and requirements relating to the accident have been identified, a thorough analysis of them has been conducted and causal factors have been determined; and

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- 2 Judgments of need for corrective actions have been stated, and can be supported by the facts, for development of corrective actions.

(3) Reporting Investigation Results.

- (a) The Board shall report investigation results without determining individual fault or proposing punitive measures. The report shall contain judgments of need for corrective actions based upon objective analysis of the facts, root and contributing causes, and DOE or contractor management systems that could have prevented the accident.
  - (b) The Board shall offer the facts section of the draft investigation report to the affected DOE and contractor line management for review for factual accuracy prior to completion of the report.
  - (c) Prior to completion of the investigation, the Board shall:
    - 1 Conduct a review of the report to ensure its technical accuracy, completeness, and internal consistency; and
    - 2 Ensure that it also includes an analysis of management control and safety systems that may have contributed to the accident.
  - (d) The Board Chairperson and Board Members shall sign and date the final investigation report and, if appropriate, include a minority report section should any Member wish to offer an opinion different from that of the Board.
  - (e) The Board shall then submit the final investigation report to the Appointing Official for acceptance within the time frame established by the Appointing Official. The Appointing Official shall signify in writing in the front of the report that the report and findings are accepted and the investigative phase of the accident is completed.
- c. Investigation Closeout. The Appointing Official shall close Type A and Type B investigations after ensuring the following.
- (1) DOE and contractor line organizations affected by the investigation have had an opportunity to conduct a factual accuracy review of the draft report and present comments to the Board.

- (2) A statement signed by the Appointing Official is included in the final report accepting the investigation report and the Board's findings, thus concluding the onsite part of the investigation.
- (3) The Board Chairperson and the senior manager of the site have conducted a formal briefing of Headquarters and field line management on the outcome of the investigation.
- (4) The final report is transmitted to senior managers of organizations identified in the judgments of need in the report with a request for their organizations to prepare corrective action plans.
- (5) Lessons learned from the accident investigation are disseminated DOE-wide.
- (6) Action plans are completed, and corrective actions are implemented to satisfy the judgments of need identified in the final investigation report.

5. RESPONSIBILITIES.

a. Assistant Secretary for Environment, Safety and Health (EH-1).

- (1) Develops and maintains DOE accident investigation policies, procedures, standards, and guidelines, and oversees their implementation.
- (2) Serves as Appointing Official of Type A Accident Investigation Boards
- (3) Develops and disseminates uniform DOE accident investigation techniques and provides training to DOE Accident Investigation Board Chairpersons, Investigators, and readiness teams.
- (4) Maintains a list of prospective DOE Accident Investigation Board Chairpersons and Investigators.
- (5) Reviews Type A and Type B accident investigation reports and provides comments to the Appointing Official and Board Chairperson as appropriate.
- (6) Provides concurrence or comments on corrective action plans resulting from Type A and Type B investigations, and verifies completion of approved corrective actions and satisfaction of judgments of need.

b. Secretarial Officers.

- (1) Cooperate with the Board during the investigation.
- (2) Review draft Type A and Type B investigation reports for factual accuracy within the time frame allowed for the investigation.
- (3) Approve corrective action plans resulting from Type A and Type B investigations for satisfaction of judgments of need identified by the Board.

c. Heads of Field Elements.

- (1) Determine whether adequate protection can most effectively be achieved by continuing to operate under the terms of existing contracts requiring compliance with old Orders or by modifying the contract to incorporate the requirements of revised Orders. Field Elements are responsible for determining that implementation of new rule or Order requirements will provide adequate protection prior to requesting contract modification to drop old Order requirements from contracts,
- (2) After incorporating this Order into contracts, ensure its implementation and identify a single point of contact for that purpose.
- (3) Serve as Appointing Officials of Type B Accident Investigation Boards.
- (4) Ensure establishment of accident investigation readiness capability by trained contractors (see Attachment 1).
- (5) Provide cooperation and assistance to DOE Accident Investigation Boards.
- (6) Ensure that a sufficient number of DOE Accident Board Chairpersons and Investigators are available to implement this Order for both Type A and Type B accident investigations and, upon request, provide them to other DOE sites
- (7) Review draft Type A and Type B investigation reports for factual accuracy within the time frame allowed for the investigation.
- (8) Initiate actions to address applicable lessons learned from investigations conducted at other DOE sites.

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- (9) Ensure that corrective action plans are:
    - (a) Developed to address judgments of need identified by the Board;
    - (b) Approved by the Secretarial Officer;
    - (c) Concurred-on by the Assistant Secretary for Environment, Safety and Health; and
    - (d) Implemented and tracked to completion.
  - (10) Provide two copies of the final accident investigation report and corrective action plan to the Secretarial Officer, Operations Office, and Field Element, and four copies to the Assistant Secretary for Environment, Safety and Health.
6. CONTACT. Questions concerning this Order can be directed to the Office of Oversight, Office of Environment, Safety and Health, phone 301-903-3777.

BY ORDER OF THE SECRETARY OF ENERGY:



ARCHER L. DURHAM  
Assistant Secretary for  
Human Resources and Administration.

CONTRACTOR REQUIREMENTS DOCUMENT

ACCIDENT INVESTIGATIONS

Type A and Type B Accident Investigations

1. In the performance of this contract, contractors shall support Type A and Type B investigations of accidents at sites under their cognizance. Type A and Type B investigations are conducted by formally appointed DOE Accident Investigation Boards comprised of DOE employees, supplemented by advisors and consultants, and may take from 2 to 6 weeks to-complete.
2. Contractors shall establish, and maintain a readiness to respond to accidents, mitigate the consequences, assist in collecting and preserving evidence, and assist with the conduct of the investigation. This shall include preserving the accident scene to the extent that it is under the control of the contractor, documenting the accident scene through photography and other means, providing office space, and equipment for the Accident Investigation Board, meeting regularly with the Board for discussions of issues surrounding the accident, and providing general administrative assistance.
3. Contractors shall also prepare, implement, and track approved corrective action plans to completion that satisfy judgments of need identified by the Accident Investigation Board.



ACCIDENT INVESTIGATION CATEGORIZATION ALGORITHM

1. INTRODUCTION. Accidents shall be analyzed as soon as possible to determine if either a Type A or Type B investigation shall be conducted based on the criteria indicated below. Uncertainty in categorization shall be mutually resolved by the Assistant Secretary for Environment, Safety and Health, and the Head of Field Elements. The following categorization criteria shall apply to any accident resulting from DOE, its contractor, or subcontractor operations.
2. HUMAN EFFECTS.
  - a. Accidents Requiring Type A Investigations.
    - (1) Any fatal, or likely to be fatal, injury, chemical or biological exposure to an employee or a member of the public.
    - (2) Anyone accident that requires the hospitalization for treatment of three or more individuals, or has a high probability of resulting in the permanent total disability due to injuries, chemical exposures, or biological exposures of DOE, contractor, or subcontractor employees or members of the public.
    - (3) A single individual radiation exposure resulting in:
      - (a) A total effective dose equivalent of 25 rem or more;
      - (b) A dose equivalent to the lens of the eye of 75 rem or more;
      - (c) A shallow dose equivalent to an extremity or skin of 250 rem or more;
      - (d) The sum of the deep dose equivalent for external exposure and the committed dose equivalent to any organ or tissue other than the lens rem or more; or
      - (e) A dose equivalent to the embryo or fetus of a declared pregnant worker of 2.5 rem or more.
  - b. Accidents Requiring Type B Investigations.
    - (1) Any one or series of injuries, chemical exposures, or biological exposures that results in hospitalization of one or more employees or members of the public for more than 5 continuous days, or that results in permanent partial disability of one or more employees or members of the public

- (2) Any one accident or series of accidents within a 1-year time period, resulting in five or more lost-workday cases, or any, series of similar or related accidents involving five or more persons, one or more of which is a lost-workday case.
- (3) A single radiation exposure to an individual that results in:
  - (a) A total effective dose equivalent of at least 10 rem but less than 25 rem;
  - (b) A dose equivalent to the lens of the eye of at least 30 rem but less than 75 rem;
  - (c) A shallow dose equivalent to an extremity or skin of at least 100 rem but less than 250 rem;
  - (d) The sum of the deep dose equivalent for external exposure and the committed dose equivalent to any organ or tissue other than the lens of the eye of at least 100 rem but, less than 250 rem; or
  - (e) A dose equivalent to the embryo or fetus of a declared pregnant worker of at least 1 rem but less than 2.5 rem.

3. ENVIRONMENTAL EFFECTS.

- a. Accidents Requiring Type A Investigations. Release of a hazardous substance, material, waste, or radionuclide from a DOE facility (onsite or offsite), in an amount greater than five times the reportable quantities specified in 40 CFR Part 302, that results in serious environmental damage.
- b. Accidents Requiring Type B Investigations. Release of a hazardous substance, material, waste, or radionuclide from a DOE facility (onsite or offsite), in an amount equal to or greater than two times but less than five times the reportable quantities specified in 40 CFR Part 302, that results in serious environmental damage.

4. PROPERTY EFFECTS.

- a. Accidents Requiring Type A Investigations.
  - (1) Estimated loss of, or damage to, DOE or other property, including aircraft damage, 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 structures, equipment, or property.

- (2) Any apparent loss, explosion, or theft involving radioactive or hazardous material under the control of DOE, contractors, or subcontractors in such quantities and under such circumstances to constitute a hazard to human health and safety or private property.
- (3) Any unplanned nuclear criticality.

b. Accidents Requiring Type B Investigations.

- (1) Estimated loss of, or damage to, DOE or other property of less than \$2.5 million but more than \$1 million, including aircraft damage, and costs of cleaning, decontaminating, renovating, replacing, or rehabilitating structures, equipment, or property.
- (2) The operation of a nuclear facility beyond its authorized limits.

5. OTHER EFFECTS.

- a. Accidents Requiring Type A Investigations. Any accident or series of accidents for which a Type A investigation is deemed appropriate by the Secretary or the Assistant Secretary for Environment, Safety and Health.
- b. Accidents Requiring Type B Investigations. Any accident or series of accidents for which a Type B investigation is deemed appropriate by the Secretary; Assistant Secretary Environment for Safety and Health; Associate Deputy Secretary for Field Management; Cognizant Secretarial Officer; or Head of the Field Element. This includes for example, Departmental cross-cutting issues and issues warranting the attention of local news or interest groups.