

U.S. Department of Energy Orders Self-Study Program

DOE Order 225.1B
ACCIDENT INVESTIGATIONS



**DOE ORDER O 225.1B
ACCIDENT INVESTIGATIONS
FAMILIAR LEVEL**

OBJECTIVES

Given the familiar level of this module and the resources listed below, you will be able to:

1. State the purpose of implementing U.S. Department of Energy (DOE) O 225.1B.
2. Discuss the responsibilities of the heads of field elements for accident investigations.
3. Discuss the responsibilities of the appointing official in an accident investigation.
4. Discuss the responsibilities of the Accident Investigation Board Chairperson.
5. Discuss the criteria identified in appendix A of DOE O 225.1B.

Note: If you think that you can complete the practice at the end of this level without working through the instructional material and/or the examples, complete the practice now. The course manager will check your work. You will need to complete the practice in this level successfully before taking the criterion test.

RESOURCES

DOE O 225.1B, Accident Investigations, 3/4/11.

INTRODUCTION

In this module we will discuss the important elements of DOE O 225.1B. This Order replaces DOE O 225.1A. The familiar level of this module is divided into two sections. Section one addresses the purpose, general requirements, and responsibilities. Section two addresses the criteria described in appendix A of the Order. We have provided examples and a practice in the module to help familiarize you with the material. The practice will help prepare you for the criterion test.

Before continuing, you should obtain copies of the resources listed in this module. Copies of the Orders are available at <https://www.directives.doe.gov/directives> or through the course manager. You should have access to these resources and be familiar with their contents. You may need to refer to these documents to complete the examples and criterion test.

SECTION 1

Purpose

DOE O 225.1B prescribes organizational responsibilities, authorities, and requirements for conducting investigations of certain accidents occurring at DOE sites, facilities, areas, operations, and activities.

The purpose of the accident investigation is to understand and identify the causes that contributed to the accident so those deficiencies can be addressed and corrected. This, in turn, is intended to prevent recurrence and promote improved environmental protection and safety and health of DOE employees, contractors, and the public.

Moreover, accident investigations are used to promote the values and concepts of a learning organization. The department's integrated safety management (ISM) feedback and improvement function envisions organizations that are continually monitoring performance; identifying deviations or questionable conditions; self-assessing; and using quality analysis to improve. An essential component of organizational learning is learning from accidents and near misses. This requires, through the application of DOE O 225.1B, that investigators go beyond the surface levels and understand how the underlying sources of operational vulnerability combined to result in failure. The explanation of how the failure was able to emerge in a normally safe and reliable system will lead to an understanding of where the system and processes can be improved and promote accident prevention.

Requirements

Determination

The heads of headquarters elements must consider the criteria identified in appendix A, the value of the knowledge to be gained by conducting the investigation, and other relevant factors, to determine whether an Accident Investigation Board (AIB) must be appointed. This determination must be made expeditiously, taking into account that timeliness is crucial to conducting an accurate investigation, preserving the accident scene and evidence, and identifying causal factors. The head

of headquarters elements must document the determination and immediately notify the Office of Health, Safety and Security (HSS) of the determination whether to appoint or not appoint an AIB. If the Chief Health, Safety and Security Officer does not concur with rationale for not appointing an AIB, the Chief may elevate the matter for resolution by the Deputy Secretary. After resolution, the head of headquarters elements must document the final determination of a decision not to conduct an investigation with a copy provided to HSS.

Notification of Other Agencies

Public laws or regulations assign other agencies responsibility for investigating certain types of accidents that could occur at DOE facilities or as a result of DOE activities. In some cases, DOE may have a memorandum of understanding with another Federal or state agency to this effect. The appointing official must determine whether applicable memoranda of understanding have been executed, ascertain investigative jurisdiction prior to the appointment of an AIB, and, as appropriate, ensure that notifications are made in accordance with these agreements.

Conducting the Investigation

Upon determination that an accident investigation will be conducted, the Head of the headquarters element must appoint an AIB. Alternatively, if the head of the headquarters element and HSS agree that it is in the best interest of DOE, HSS will serve as the appointing official. Federal accident investigations must be conducted as follows:

- Appoint the AIB
 - Within three calendar days of the accident occurrence, the appointing official must formally appoint DOE Federal employees to an AIB. If the appointment of an AIB is delayed beyond three calendar days, the rationale for the delay must be explained and documented in the accident investigation report.
 - The AIB must consist of a chairperson and three to six members, at least one of whom must be a DOE accident investigator. All AIB members must be DOE Federal employees with subject matter expertise in areas related to the accident, including knowledge of the Department's ISM directives.
 - The chairperson and the DOE accident investigator must be selected from a different duty station than the accident location.
 - The AIB must be appointed in writing.
 - The appointing official or his/her representative must brief the AIB members on their roles and responsibilities and other pertinent information within three calendar days of their appointment.
 - The DOE AIB chairperson must
 - be a DOE manager with demonstrated managerial competence, preferably a member of the senior executive service, or at a senior general service grade level determined to be appropriate by the appointing official
 - be knowledgeable of DOE accident investigation techniques and experienced in conducting accident investigations through participation in at least one

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Federal accident investigation, or have equivalent accident investigation experience, as determined to be appropriate and documented by the appointing official.

- An AIB must have a chairperson and a DOE accident investigator whom meets the full experience and training requirements to serve in those AIB positions.
- The AIB may be supported by appropriate advisors and consultants who may be Federal, contractor, and/or consultant personnel as determined by the AIB chairperson. Investigative and technical expertise may be requested from other heads of the headquarters elements and/or HSS.
- The AIB chairperson and members must
 - report only to the appointing official or his/her representative, as identified in the letter/memorandum of appointment, during the investigation;
 - be independent of the direct line management chain responsible for day-to-day operation or oversight of the facility, area, or activity involved in the accident; and
 - not include a supervisor and his/her direct-report subordinate
- Investigate the accident
 - The AIB must conduct a thorough investigation of individuals, organizations, management systems, and facilities having an interest in or potential impact on the accident, as well as the operation or oversight of the facility, area, or activity involved in the accident.
 - The AIB must determine the facts of the accident by examining the accident scene, examining DOE and contractor documentation, interviewing witnesses and other personnel directly associated with the accident, and performing engineering tests and analyses as appropriate. Information provided to the AIB must be protected to the full extent provided by law. The AIB must also examine policies, standards, and requirements that apply to the accident being investigated, as well as DOE and contractor management systems that could have contributed to or prevented the accident.
 - The AIB must analyze the facts and derive causal factors associated with human performance and safety management systems. Each identified root and contributing causal factor must support a corresponding judgment of need.
 - The AIB must evaluate the effectiveness of safety management systems, the adequacy of policy implementation, and the effectiveness of line management oversight as they relate to the accident.
 - Prior to completion of the investigation, the AIB must conduct an internal review of the investigation process to ensure that:
 - the pertinent facts, standards, and requirements relating to the accident are identified and thoroughly analyzed, and that causal factors are determined by employing the core analytical techniques;

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- judgments of need are stated and can be supported by the facts and analysis contained in the report, so that the report can serve as a stand-alone document; and
- the accident investigation report can be used to promote the values and concepts of a learning organization.
- Report investigation results
 - The AIB must develop an accident investigation report. The purpose of the report is to tell what happened and why it happened so that we can use this understanding to prevent future accidents. The report must identify the causes that contributed to the accident to help explain how failure succeeded in a normally reliable and safe system. The report must help identify essential learning organizational opportunities.
 - The report must demonstrate that the judgments of need are based on objective analysis and application of the core analytical techniques using the facts to develop the root and contributing causes. The report must also identify DOE and contractor management systems that, if corrected, could have prevented the accident so those systems can be addressed and corrected to prevent recurrence.
 - The AIB must offer the facts underlying the draft investigation report to the affected DOE and contractor management for their review for factual accuracy before the report is completed.
 - Before completion of the accident investigation report, the AIB chairperson must
 - conduct a review of the report to ensure its technical accuracy, completeness, and internal consistency;
 - ensure that the report includes results from an analysis of management control, safety systems, and human performance, that may have contributed to the accident;
 - ensure that the report is reviewed by qualified and authorized personnel to determine that it does not include classified or unclassified controlled nuclear information, Official Use Only information, or information protected by the Privacy Act of 1974, as amended. Documentation that these reviews have been conducted must be retained as part of the investigation file; and
 - forward an electronic copy of the draft report to the HSS Office of Corporate Safety Analysis for quality review. The AIB will work with the HSS staff to address relevant comments.
 - The AIB chairperson and AIB members must sign and date the final draft accident investigation report. Should any AIB member wish to offer an opinion different from that of the AIB, the report must include a section for the minority opinion. The AIB chairperson and the AIB member wishing to provide a minority opinion will coordinate on development of the final report. The minority opinion must identify where facts, analysis, and conclusions, and judgments of need differ from the opinions expressed by the chairperson and other AIB members.

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- The AIB must submit the final draft report to the appointing official for acceptance within the required time frame to assure that the accident investigation has met the scope and any special provisions of the appointing letter/memorandum. Once the final draft accident investigation report is accepted in writing by the appointing official, the report is considered final. AIB team members may then be released by the chairperson as appropriate.
- A statement signed and dated by the appointing official must be included in the final report accepting the investigation report, including the AIB's identified causal factors, conclusions, and judgments of need.
- The appointing official must publish and distribute the final report within seven calendar days of report acceptance; provide an electronic version of the final report to HSS for posting on the DOE accident investigation program web site; and distribute to organizations identified in the judgments of need.
- The chairperson of an AIB must conduct a formal briefing on the outcome of the investigation. The appointing official for the investigation must coordinate and arrange for appropriate representatives to attend this formal briefing at a mutually convenient time and location.

Investigation Closeout

The appointing official must close the Federal accident investigations after ensuring the following are completed:

- As required by DOE O 210.2, *DOE Corporate Operating Experience Program*, or head of headquarters element quality assurance program, the lessons learned from the AIB are formally distributed.
- All corrective action plans are approved, completed and implemented to satisfy the judgments of need identified in the final AIB report.
- A memorandum, signed by the appointing official is issued stating that since all corrective actions have been instituted and the accident investigation is closed.

Head of Field Element Responsibilities

Identify contracts to which the CRD should apply and notify the cognizant contracting officers.

After incorporating DOE 225.1B into contracts, ensure its implementation and identify to the head of the headquarters element and HSS a single point of contact to act as liaison to headquarters on matters pertaining to the Accident Investigation Program.

Provide for the necessary on-site support to the AIB, as requested by the chairperson, to facilitate the timely and effective completion of the accident investigation.

Review draft accident investigation reports for factual accuracy within the time frame allowed for the investigation.

As appropriate, develop or provide assistance in developing lessons learned for accident investigations.

As appropriate, require the submittal of contractor corrective action plans to address the judgments of need, approve the implementation of those plans, and track the effective implementation of those plans to closure.

As directed by the head of the headquarters element, conduct extent-of-condition reviews for specific issues resulting from accident investigations that might be applicable to work locations or activities under the head of field element's authority, and address applicable lessons learned from investigations conducted at other DOE sites.

Appointing Official Responsibilities

Review the list of AIB candidates and eliminate those who have a potential conflict of interest. The chairperson and the DOE accident investigators are required to be selected from a different duty station than the accident location. Formally appoint DOE employees to AIBs, normally within three calendar days of determining that an AIB is required. The appointment must be in writing.

Ensure that the AIB's authority is clear about investigating all potential causes of a given accident, including with no restrictions, DOE organizations and management systems up to and beyond the level of the appointing official.

Ensure that the AIB is briefed on its roles and responsibilities stressing the AIB's authority and scope, normally within three calendar days of appointment.

Accept the investigation report by signing and dating a statement to this effect, which is subsequently incorporated into the final report. Once accepted, the report is considered final and the AIB is released from its responsibilities.

Publish and distribute the accident investigation report, normally within seven calendar days of report acceptance.

AIB Chairpersons Responsibilities

Manage the investigation process and represent DOE in all matters regarding the accident investigation.

Ensure that a thorough and competent investigation is completed.

Document the situation and obtain guidance from general counsel and HSS where a conflict between another Government agency's CFR. and DOE O 225.1B are identified during the accident investigation.

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Notify the Director, HSS Office of Enforcement, of any potential regulatory noncompliance issues identified during the investigation.

Submit the draft accident investigation report to the HSS Office of Corporate Safety Analysis for quality review and assurance that the report meets the DOE Accident Investigation Program's objectives and standards.

Refer allegations and evidence of criminal or suspected unlawful activity that are identified in the course of the accident investigation to the Office of Inspector General.

As the spokesperson for the AIB, coordinate AIB activities and general progress with all relevant and appropriate internal and external stakeholders having an interest in the accident, employing the local Office of External Affairs for interface as appropriate.

Ensure that the AIB is supported by appropriate advisors and consultants with specialized expertise as deemed necessary. If additional technical resources, logistical support, and/or investigative time is needed to produce a high quality investigation and report, notify the appointing official and head of the field element when those needs are recognized so that requested support can be acquired early in the investigation.

Note: You do not have to do example 1 on the following pages, but it is a good time to check your skill and knowledge of the information covered. You may do example 1 or go to the next section.

EXAMPLE 1

Using the familiar level of this module and the resources, answer the following questions.

1. What is the purpose of implementing DOE O 225.1B?
 2. What are the three steps required to complete an accident investigation?
 3. What are three responsibilities that are assigned to heads of field elements for accident investigations?

Note: When you are finished, compare your answers to those contained in the example 1 self-check. When you are satisfied with your answers, go to the practice.

EXAMPLE 1 SELF-CHECK

1. State the purpose of implementing DOE O 225.1B.

To prescribe requirements for conducting investigations of certain accidents occurring at Department of Energy (DOE) operations and sites; to prevent the recurrence of such accidents; and to contribute to improved environmental protection and safety and health of DOE employees, contractors, and the public.

2. List the three steps required to complete an accident investigation.

- Appoint the accident investigation board.
- Investigate the accident.
- Report investigation results.

3. What are three responsibilities that are assigned to heads of field elements for accident investigations?

Note: Any three of the following constitutes a complete answer.

- Identify contracts to which the CRD should apply and notify the cognizant contracting officers.
- After incorporating DOE 225.1B into contracts, ensure its implementation and identify to the head of the headquarters element and HSS a single point of contact to act as liaison to headquarters on matters pertaining to the Accident Investigation Program.
- Provide for the necessary on-site support to the AIB, as requested by the chairperson, to facilitate the timely and effective completion of the accident investigation.
- Review draft accident investigation reports for factual accuracy within the time frame allowed for the investigation.
- As appropriate, develop or provide assistance in developing lessons learned for accident investigations.
- As appropriate, require the submittal of contractor corrective action plans to address the judgments of need, approve the implementation of those plans, and track the effective implementation of those plans to closure.
- As directed by the head of the headquarters element, conduct extent-of-condition reviews for specific issues resulting from accident investigations that might be applicable to work locations or activities under the head of field element's authority, and address applicable lessons learned from investigations conducted at other DOE sites.

SECTION 2

Accident Investigation Criteria

GENERAL

The following criteria must be considered to determine whether any accident resulting from DOE, contractor, or subcontractor operations requires the appointment of an AIB. Accidents must be analyzed expeditiously to determine whether an AIB must be appointed based on the criteria indicated, the value of the knowledge to be gained by conducting the investigation, and other relevant factors.

DETERMINATION CRITERIA

Human Effects

Any injury or chemical or biological exposure that results in, or is likely to result in, the fatality of an employee or member of the public. Fatal injury is defined as any injury that results in death within 30 calendar days of the accident.

Any single accident that results in the hospitalization for more than five calendar days, commencing within seven calendar days of the accident, of one or more DOE, contractor, or subcontractor employees or members of the public due to a serious personal injury or acute chemical or biological exposure. Serious personal injury means any injury that: 1) results in a fracture of any bone (except simple fracture of fingers, toes, or nose); 2) causes severe hemorrhages or nerve, muscle, or tendon damage; 3) involves any internal organ; or 4) involves second or third degree burns or any burns affecting more than 5 percent of the body surface.

Any single accident resulting in three or more DOE, contractor, or subcontractor employees having lost-workday cases.

Accidents involving Federal or contractor employees driving vehicles while on official government business, on or off government property, if the consequences result in meeting any of the criteria above.

Loss of Control of Radioactive Material

Any single accident that results in:

- A general employee exceeding any of the external dose limits in 10 CFR 835.202, "Occupational Dose Limits for General Employees," by a factor of two or more.
- The embryo/fetus of a declared pregnant worker, a minor, or a member of the public in a controlled area exceeding an external dose of 1 rem effective dose.
- Any confirmed monitoring result indicating an intake of radioactive material by a general employee equivalent to 2 or more times the annual limit on intake (ALI).
- Any confirmed monitoring result indicating an intake of radioactive material to a declared pregnant worker; a minor; or a member of the public in a controlled area equivalent to 20 percent or more of an ALI.

Environmental Release of Hazardous Material

An accident that resulted in the environmental release of a hazardous material from a DOE facility in an amount greater than five times the reportable quantities specified in 40 CFR 302, “Designation, Reportable Quantities, and Notification.”

An accident that resulted in the 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, *Comprehensive Emergency Management System*.

Any offsite transportation incident involving hazardous materials that would require immediate notice pursuant to 40 CFR 302.

For facilities in which 29 CFR 1910.119, “Process Safety Management of Highly Hazardous Chemical,” is applicable, an incident that resulted in, or could reasonably have resulted in, a catastrophic release of a highly hazardous chemical in the workplace.

Property Effects

Estimated loss of or damage to DOE property, including aircraft, 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. DOE facility damage is estimated within 72 hours of the accident based on comparison with the facility replacement value in the Facility Information Management System database maintained by the Headquarters Office of Administration, Office of Engineering and Construction Management.

Any unplanned nuclear criticality.

Other Effects

Any accident or series of accidents for which an AIB is deemed appropriate by the Secretary or Deputy Secretary. In such circumstances, the Secretary or Deputy Secretary may direct the Head of the Headquarters Element or Chief Health, Safety and Security Officer, to conduct an accident investigation.

Note: You do not have to do example 2 on the following page, but it is a good time to check your skill and knowledge of the information covered. You may do example 2 or go directly to the practice.

EXAMPLE 2

Using the familiar level of this module and the resources, answer the following questions.

1. What is the purpose of the accident investigation criteria?
 2. What is the criteria associated with hospitalization that would warrant the appointment of an accident investigation board?
 3. What is the criteria associated with an environmental release that is classified as an emergency that would warrant the appointment of an accident investigation board?

Note: When you are finished, compare your answers to those contained in the example 2 self-check. When you are satisfied with your answers, go on to the practice.

EXAMPLE 2 SELF-CHECK

1. What is the purpose of the accident investigation criteria?
The criteria must be considered to determine whether any accident resulting from DOE, contractor, or subcontractor operations requires the appointment of an AIB.
2. What is the criterion associated with hospitalization that would warrant the appointment of an accident investigation board?
Any single accident that results in the hospitalization for more than five calendar days, commencing within seven calendar days of the accident, of one or more DOE, contractor, or subcontractor employees or members of the public due to a serious personal injury or acute chemical or biological exposure.
3. What is the criterion associated with an environmental release that is classified as an emergency that would warrant the appointment of an accident investigation board?
An accident that resulted in the 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.

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PRACTICE

This practice is required if your proficiency is to be verified at the familiar or general level. This practice will prepare you for the criterion test that will be required if your proficiency is to be verified at the general level. You will need to refer to the Orders to answer the questions in the practice correctly. The practice and criterion test will also challenge additional skills that you have acquired in other formal and on-the-job training.

1. What is the purpose of DOE O 225.1B?
 2. What is the personnel structure of an AIB?
 3. What credentials are required of the AIB chairperson?

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4. What three actions must be completed by the appointing official before closing a Federal accident investigation?

 5. What are three responsibilities for accident investigations that are assigned to the appointing official?

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OBJECTIVES

Given the familiar level of this module, and a scenario, you will be able to perform the following:

1. List the key elements you would look for in the contractor's action plan to correct the situation described in the scenario; and
2. State which requirements, sections, or elements of U.S. Department of Energy (DOE) Order O 225.1A apply to the situation described in the scenario.
3. Determine if the accidents were categorized correctly.

Note: If you think that you can complete the practice at the end of this level without working through the instructional material and/or the examples, complete the practice now. The course manager will check your work. You will need to complete the practice in this level successfully before taking the criterion test.

RESOURCES

DOE Orders Self-Study Program, DOE O 225.1B, Familiar Level, May 2011.
DOE Order O 225.1B, Accident Investigations, 3/4/11.

INTRODUCTION

The familiar level of this module introduced the purpose of DOE O 225.1B. Several requirements associated with the Order and the criteria for determining if an accident investigation board should be appointed were discussed. In the general level of this module, students are asked to apply the information contained in the familiar level and the Order to a scenario related to the Order. Please refer to the resources listed to make your analysis and answer the questions. You are not required to complete the example. However, doing so will help prepare you for the practice and criterion test.

Note: You do not have to do the example on the following page, but it is a good time to check your skill and knowledge of the information covered. You may do the example or go on to the practice.

EXAMPLE SCENARIO

Please review the following scenario, and then answer these questions.

1. Is the contractor's action plan correct? If not, state what should have been done.
2. Were the correct DOE documents or requirements cited? If not, state the correct documents or requirements.
3. Was the correct criterion used to appoint the accident investigation board (AIB)?

SCENARIO

On February 13, 2010, an employee received third degree burns while performing a cutting/welding operation to remove a converter. The work involved the removal of six converters scheduled to be shipped as spare parts. Although the cell's roof was removed, the lighting in the cell was very poor, and temporary lighting was installed. The physical layout of the equipment in the cell required the welders to work in a constricted space, with very difficult ingress and egress.

At the time of the accident, the welder was wearing multiple layers of clothing that were not flame-retardant and radiological protective equipment that limited his ability to detect and extinguish the flames quickly.

Although the facility's procedure requires a fire watch to be present during welding or cutting operations outside an approved shop area, a fire watch was not designated on permits for the work performed on the day of the accident. A fire watch is a designated individual trained in monitoring the work site for possible fires during welding/cutting activities and for 30 minutes after the work has stopped. Reviews of three previous permits available for work in the cell revealed that two did not have a fire watch identified.

First aid was administered to the employee at the scene and then he was transported to the hospital and placed in the intensive care unit.

On February 14, 2010, the family informed the facility that the injured employee had passed away.

The head of the field element determined that because the accident resulted in third degree burns, an AIB should be appointed to investigate this accident.

An investigation was conducted and revealed the following.

- There are some urgent policy issues with respect to flame-retardant clothing and fire-watch responsibilities that have to be addressed as a result of this accident.
- The overarching concern stemming from this investigation is the failure to conduct adequate work planning and hazards analyses. Part of this failure may be because of complacency expressed by line management who believe structured work planning is not necessary because "this is a job we have performed thousands of times before."

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- Another contributor to poor work planning in DOE may be the assumption that such activities require very elaborate analysis of the hazards and preparation of a thick report. None of these reasons are accurate, nor do they reflect the policy or guidance the department has promulgated to date.

Actions taken by contractor.

- The area was secured to preserve the accident scene pending completion of the investigation.
- Nonessential welding, burning, and hotwork activities outside approved fixed weld shops was placed in a stand-down mode immediately.
- The fire and health protection standard was revised to reflect an additional responsibility for employees designated as fire watchers. Fire watchers were directed to maintain a line of sight of welders during field activities.
- The training module for fire watchers was revised.
- The Assistant Secretary of Energy for Environmental Management directed the manager to prepare a video on the lessons learned from the accident.

DOE requirements that apply to this scenario are:

- The heads of headquarters elements must consider the criteria identified in appendix A, the value of the knowledge to be gained by conducting the investigation, and other relevant factors, to determine whether an accident investigation board (AIB) must be appointed. (DOE O 225.1B, paragraph 4.a.)
- The accident investigation must conduct a thorough investigation of all individuals, organizations, management systems, and facilities having an interest in or potential impact on the accident. [DOE O 225.1B, paragraph 4.c. (2) (a)]
- The AIB must analyze the facts and derive causal factors associated with human performance and safety management systems. Each identified root and contributing causal factor must support a corresponding judgment of need. [DOE O 225.1B, paragraph 4.c.(2)(c)]

Take some time to review the example scenario and the actions the contractor took or didn't take to correct the situation. Then decide if the contractor's actions were complete and correct; determine if the requirements cited in the scenario were appropriate; and determine if the correct criterion was used to appoint the AIB.

Write your answers on the next page and then compare your answer to the one contained in the example self-check.

EXAMPLE SELF-CHECK

Your answer does not have to match the following exactly. You may have added more corrective actions or cited other requirements from the Order that apply. To be considered correct, your answer must include at least the following.

The contractor took all the appropriate actions. However, some additional actions should have been taken.

- Work planning procedures should be revised to account for non-routine work. Improper classification of work (i.e., routine vs non-routine) can lead to a failure to adequately identify hazards.
- Pre-job hazard screening and analysis procedures should be developed. An integrated, tailored, pre-job hazard screening and analysis, based on the risks and complexity of work activity, is an integral component of an effective work planning process designed to ensure that potential and known hazards are identified and controlled.
- The policies regarding flame-retardant clothing and appropriate personal protective equipment should be reviewed for welding/cutting operations.

The criterion to determine if an AIB should be appointed was incorrect. The correct criteria is any injury that results in the fatality of the employee requires an AIB be appointed.

PRACTICE

This practice is required if your proficiency is to be verified at the general level. The practice will prepare you for the criterion test. You will need to refer to the Order to answer the questions in the practice correctly. The practice and criterion test will also challenge additional analytical skills that you have acquired in other formal and on-the-job training.

Please review the following scenario and then answer the following questions.

1. Were the conclusions and judgments of need presented by the board correct and complete? If not, what should else should be considered?
2. Was the list of requirements, sections, and elements complete and correct? If not, state the correct or omitted requirements.
3. Was the correct criterion used to appoint the accident investigation board (AIB)?

SCENARIO

On May 7, 2011, an ironworker was injured when he was pinched between two large, steel I-beams. The accident occurred when the ironworker, an ironworker supervisor, and a crane operator rigged one of the columns in preparation for placing it on a deck. The workers were lowering the column temporarily to adjust the rigging sling. The column was setting on a protruding gusset on one end and settling on dunnage on the other end when the ironworker stepped between it and another column. The column they were lowering rolled toward the ironworker, pinching his pelvis between the two columns. The load was lifted immediately, but the ironworker's pelvis was fractured.

An investigation of the situation revealed the following conclusions and judgments of need.

- All personnel involved in the accident had extensive construction experience. This included the injured worker, his coworkers, the ironworker supervisor, and the structural superintendent.
- The injured ironworker did not attend the required job safety analysis training.
- This accident occurred one day after a carpenter on the same project was injured during a fall. The carpenter was protected by his safety harness and lanyard, but was knocked momentarily unconscious when he hit his head during the fall. The carpenter was dismantling some shoring at the time of the accident.
- Most of the contractor personnel interviewed by the board believed the columns were too close for welding and rigging operations. The injured ironworker had noted this but said nothing to his supervision or management. Another ironworker said that he had mentioned his concern to the ironworker supervisor, but action had not been taken.
- The workers involved in the accident told the board they recognized the dunnage used to support the weight of the columns was inadequate. The safety professionals reached the same conclusion.
- The workers involved in the accident told the board that staffing of the rigging operation was inadequate. In particular, the ironworker supervisor was filling the roles of designated leader, signaler, and rigger. The hoisting and rigging manual does not prohibit

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the designated leader from serving other functions. However, the board concluded the supervisor could not serve effectively in all three roles.

- The ironworker supervisor did not follow the training requirements of the hoisting and rigging manual and failed to ensure workers understood how to properly rig the column.
- The job safety analysis did not address the specifics of the rigging operation and did not require mitigation of the hazards. The board concluded that task safety analysis was less than adequate.

Actions taken by contractor

- The load was pulled immediately from the injured ironworker and the crane operator sounded his horn.
- The injured ironworker received immediate attention from his coworkers, one of whom called 911.
- Management judged the columns in the lay down area were unsafe. They ordered the columns to be moved so they were all set on dunnage and appropriately spaced. While some stabilization of the material may have been in order, the board concluded the accident scene was unnecessarily disturbed by this action.
- The manager directed an investigation be conducted. This decision was based on the requirement of DOE O 225.1B, Accident Investigations, appendix A that requires an investigation for any accident resulting in hospitalization of one or more employees for more than five days.

Requirements related to this scenario.

- The heads of headquarters elements must consider the criteria identified in appendix A, the value of the knowledge to be gained by conducting the investigation, and other relevant factors, to determine whether an accident investigation board (AIB) must be appointed. (DOE O 225.1B, paragraph 4.a.)
- The accident investigation must conduct a thorough investigation of all individuals, organizations, management systems, and facilities having an interest in or potential impact on the accident. [DOE O 225.1B, paragraph 4.c. (2) (a)]
- The AIB must analyze the facts and derive causal factors associated with human performance and safety management systems. Each identified root and contributing causal factor must support a corresponding judgment of need. [DOE O 225.1B, paragraph 4.c.(2)(c)]

Take some time to review the scenario and the actions the contractor took or didn't take to correct the situation. Then decide if the contractor's actions were complete and correct; determine if the requirements, sections, or elements of DOE O 225.1B cited in the scenario were correct; and determine if the correct criterion was used to appoint the AIB.

Write your answer below and on the next page and then bring the completed practice to the course manager for review.

Write your answer here.

Note: The course manager will check your practice and verify your success at the general level. When you have successfully completed this practice, the course manager will give you the criterion test.