# INTERAGENCY SERIOUS ACCIDENT INVESTIGATION GUIDE

NOVEMBER 2013

## DEDICATION

*This guide is dedicated to the memory of all who have lost their lives in the line of duty. Let us vow to learn from their tragedies and strive to prevent similar outcomes in the future. May our fallen rest in peace and not have died in vain.*

# MANAGING THE INTERAGENCY SERIOUS ACCIDENT INVESTIGATION GUIDE

In order to ensure that the *Interagency Serious Accident Investigation Guide* evolves and improves in a responsive and organized manner, the subject matter leads from each of the representative agencies will form the *Interagency Serious Accident Investigation Guide* Task Team as identified by original executive task order as the change management board for this document. Each representative member will serve as his/her agency contact for all changes to the guide. The task team will annually solicit, collect, organize, and evaluate improvement and modification inputs, and update and distribute the *Interagency Serious Accident Investigation Guide* as necessary.

The *Interagency Serious Accident Investigation Guide* Task Team members are listed below. Please forward your improvement and modification suggestions to your agency task team representative.

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# CHAPTER 1 – SERIOUS ACCIDENT INVESTIGATIONS

## 1.1 INTRODUCTION

Every day countless accident-free operations are conducted throughout this country in a variety of work environments. Unfortunately, serious accidents occasionally occur. The *Interagency Serious Accident Investigation Guide* provides direction on how to respond when these serious accidents involve the operations, employees, contractors, volunteers, or property of the signatory agencies.

A serious accident investigation (SAI) collects and interprets information to help agencies understand how and why the accident occurred, and to recommend corrective actions that change or establish agency policy or mitigate hazards in an effort to prevent future similar accidents. Interagency SAIs are particularly important in that they may influence organizational and operational change across multiple agencies.

Interagency investigations are often complex in a way that single-agency investigations are not. Even slight differences in jurisdictional authorities, policy requirements, and operational practices can increase complexity significantly. Interagency serious accident investigation teams (SAITs) must have a broad, experience-based perspective and a solid mix of skills and knowledge in order to effectively navigate these complexities.

The *Interagency Serious Accident Investigation Guide* is intended to help administrators, managers, investigators, and other involved personnel conduct interagency SAIs in a consistent, coordinated, organized, and effective manner.

## 1.2 POLICY

The objective of accident investigation is accident prevention and learning. Information from SAIs should only be used by the agencies for accident prevention purposes, not to assign blame or serve as the basis for disciplinary action. This is in accordance with *Executive Order 12196 paragraph 1-201[f] and 29 CFR 1904.36* and *CFR 1960*, which apply specifically to federal employees; states should refer to respective state regulations.

Investigations or reviews conducted for administrative, disciplinary, legal, or liability purposes must be separate and independent of the SAI.

Types and levels of investigations will be determined by the policies of the jurisdictional agencies in accordance with established laws and agreements, and by the complexity and severity of the accident.

## 1.3 PURPOSE

The *Interagency Serious Accident Investigation Guide* establishes core direction for all interagency SAIs and may be used entirely or in part for other accident investigations as well. This guide provides SAITs a comprehensive process to use when conducting interagency investigations. Additionally, the guide provides detailed information on the investigative process, gathering and maintaining custody of physical and photographic evidence, interviewing witnesses, documenting witness statements, preparing investigation reports, and other critical subjects.

This guide pertains to any type of SAI; however, there are unique and additional technical requirements for SAIs involving wildland fire and fire aviation operations. These requirements are stated or referenced in this guide.

For wildland fire, this guide was developed under National Wildfire Coordinating Group (NWCG) auspices. The guide is also consistent with the October 26, 1995, *Memorandum of Understanding between the United States Department of the Interior and the United States Department of Agriculture* that, "establishes the basis for interagency investigation of fire-related accidents."

## 1.4 ACCIDENT DEFINITIONS

The type of accident investigation is generally based on the standard interagency accident and incident definitions provided below. Investigations may range from large teams conducting complex interagency investigations and producing comprehensive reports to first-level supervisors reporting minor accidents through agency-specific reporting systems.

***Serious Accident****:* An unplanned event or series of events that resulted in death; injury, occupational illness, or damage to or loss of equipment or property. A serious accident involves any of the following:

- One or more fatalities
- Three of more personnel who are inpatient hospitalized, for other than observation, as a direct result of or in support of operations
- Property or equipment damage of $250,000 or more
- Consequences that the Designated Agency Safety and Health Official (DASHO) or designated agency official judges to warrant a SAI
- Some state agencies may have further definitions of a serious accident that also includes:
    - In-patient hospitalization for more than 24 hours for other than observation (regardless of number of employees)
    - The loss of a body part
    - Serious disfigurement

***Accident:*** An unplanned event or series of events that resulted in injury, occupational illness, or damage to or loss of equipment or property to a lesser degree than defined as a serious accident.

***Near-miss:*** An unplanned event or series of events that could have resulted in death, injury, occupational illness, or damage to or loss of equipment or property but did not.

***Entrapment:*** A situation where personnel are unexpectedly caught in a fire behavior-related, life threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. Entrapment may or may not include deployment of a fire shelter for its intended purpose. Entrapment may result in a serious wildland fire accident, wildland fire accident, or a near-miss.

***Fire Shelter Deployment:*** The removal of a fire shelter from its case and use as protection against fire. Fire shelter deployment may or may not be associated with entrapment. Fire shelter deployment may result in a serious wildland fire accident, a wildland fire accident, or a near-miss.

## 1.5 AUTHORITY

Federal, state, and local agencies have designated officials that are authorized to and responsible for investigating serious accidents for their respective agencies. These officials may delegate their authority to investigate serious accidents. Some federal agencies title these officials Designated Safety and Health Officials (DASHOs).

Following initial notification of a serious accident the pertinent delegating official(s) will assign one Team Leader or two co-leaders. The Team Leaders will be provided a written delegation of authority which will enable them to organize and deploy a SAIT and conduct the investigation.

## 1.6 INTERAGENCY (MULTI-AGENCY) INVESTIGATIONS

Serious accidents involving multiple agencies will require the delegating officials to develop and issue a joint interagency delegation of authority that is signed by each of the involved agencies.

Team Leaders should ask for and review any interagency agreements that may affect the conduct of the accident investigation.

Team Leaders should establish cooperative relationships with the other agencies involved in the investigation to ensure that responsibilities to conduct the SAI are met. This may involve negotiations, cooperative agreements, and coordination with the agency delegating officials.

Interagency agreements may exist at various levels that provide additional accident investigation requirements and should be considered when conducting accident investigations.

## 1.7 FEDERAL WILDLAND FIRE INTERAGENCY INVESTIGATIONS

For federal wildland fire serious accidents involving the *U.S. Department of the Interior and the U.S. Department of Agriculture, the Memorandum of Understanding (MOU) between the U.S. Department of the Interior and the U.S. Department of Agriculture* establishes the basis for interagency investigation of serious wildland fire-related accidents and provides information on policy, procedures, and timeframes. The MOU states that, "interagency investigation teams will include personnel from both Departments." The MOU can be located in Exhibit 1-1.

## 1.8 COLLATERAL INVESTIGATIONS

Other agencies such as law enforcement, Federal Occupational Safety and Health Administration (OSHA), State OSHA, National Institute for Occupational Safety and Health (NIOSH), and the Office of Inspector General (OIG) may have a jurisdictional responsibility to conduct their own investigations. These investigations are independent and can run concurrently while serious accident investigations are being conducted. Team Leaders should continue their inquiries and establish a cooperative relationship with these other agencies.

### OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

Occupational Safety and Health Administration (OSHA) determines whether an employer violated occupational safety and health standards leading to a death or hospitalization of three or more employees. (Figure 1)

- Federal OSHA
    - Federal OSHA offices have jurisdiction over federal employees and will have been notified by the agency Safety Manager prior to SAIT arrival.
- State OSHA
    - State OSHA offices do not generally have jurisdiction over federal employees, federal volunteers, or federal agencies. The local OSHA Area Director will have knowledge of any local jurisdictional issues. State OSHA offices may get involved if there are victims that are not federal employees; e.g., state personnel, contractors, municipal employees. They may also be involved if the accident is on state land.

Figure 1: Occupational Safety and Health Administration (OSHA) logo

When an OSHA Compliance Officer responds to conduct an investigation of an accident, the result may be that OSHA issues the responsible unit one or more "Notices of Violation." Factual information shared with OSHA in the course of an SAI may be used to issue these notices.

## AVIATION ACCIDENTS

Congress has designated the National Transportation Safety Board (NTSB) (Figure 2) as the organization with primary responsibility over the investigation of all civil and public aircraft accidents (*49 CFR 831.2*). The NTSB can delegate to the Federal Aviation Administration (FAA) or affected agency. The Department of the Interior, Office of Aviation Services, and U.S. Forest Service may be granted as a "party" to these investigations.

Figure 2: NTSB logo

### *Aviation and Ground Accident*

Should aviation or a combined aviation and ground accident occur, the NTSB will have overall authority of the accident scene and investigation. Close coordination and collaboration with the NTSB will be critical to the SAI's mission.

- The delegation of authority will include the Team Leader's responsibility to request *party status* to the NTSB investigation.
- An agency has the option to conduct an independent investigation (concurrent with the NTSB investigation) to look at agency-specific management, policy or processes, and organizational concerns.

## THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

In 1998, Congress allocated funds to The National Institute for Occupational Safety and Health (NIOSH) to address the continuing national problem of occupational firefighter fatalities and injuries.

NIOSH has the authority to conduct independent investigations. Agencies should notify NIOSH for these types of accidents. This notification is done by the respective agencies wildland fire safety managers.

Based upon their investigations, NIOSH will develop narrative reports of events surrounding firefighter deaths. These reports are distributed throughout the United States fire community.

## UNITED STATES DEPARTMENT OF AGRICULTURE OFFICE OF INSPECTOR GENERAL (OIG)

Figure 3: USDA OIG logo

United States Department of Agriculture Office of Inspector General (OIG) (Figure 3) has been authorized by Congress (Public Law 107-203) to conduct independent investigations of all fire-related entrapments or burnovers that result in a fatality involving USDA Forest Service personnel.

The purpose of the OIG investigation is to provide a report to Congress. Upon completing the investigation, the Inspector General of

the Department of Agriculture shall submit to Congress and the Secretary of Agriculture a report containing the results of the OIG investigation.

## LAW ENFORCEMENT

Law enforcement (Figure 4) assumes control of accident scenes until the nature of the accident is determined. The jurisdictional law enforcement agency will release the accident scene to local Agency Administrator once the incident is determined to be a workplace accident with no criminal activity suspected. There are two situations where collateral law enforcement investigation could occur:

- Confirmed criminal activity (e.g., arson-started wildfire)
- Potential tort claims investigations (e.g., U.S. Forest Service law enforcement have authority to conduct tort claims investigations independent of the SAI)

Figure 4: Law enforcement personnel at accident scene

## OTHER POTENTIAL COLLATERAL INVESTIGATIONS

- United States Coast Guard
- Department of Defense
- Local law enforcement and fire marshals
    - Local law enforcement and/or fire marshals become involved when an accident falls under their jurisdiction.
    - Assess their involvement and need to be a part of the accident investigation process.

Coordination with these organizations usually occurs when they have resources that are involved in the accident or have jurisdictional responsibilities. This can happen during serious wildland fire accidents and would constitute an interagency investigation.

## 1.9 SERIOUS ACCIDENT INVESTIGATION PROCESS

The SAI process (Figure 5) is best described chronologically and moves sequentially from start to finish. The process is as follows:

1. Team selection and activation
2. Initial team briefing
3. In-briefing with Agency Administrator
4. Site visit
5. Evidence gathering
6. Evidence analysis and deliberations
7. On-site closeout briefings
8. *Final Report* preparation
9. Post *Final Report* closeout briefings
10. Accident review process
11. Follow-up actions/Corrective Action Plan

**SERIOUS ACCIDENT INVESTIGATION PROCESS**


Figure 5: Serious Accident Investigation Process

# Exhibit 1-1: Memorandum of Understanding between the Departments of the Interior and Agriculture

## MEMORANDUM OF UNDERSTANDING

**Between the**
**United States Department of the Interior**
**and the**
**United States Department of Agriculture**

**I. Purpose.** This Memorandum of Understanding establishes the basis for interagency investigation of serious fire-related accidents.

**II. Introduction.** If the causal factors of a serious fire-related accident are identified, effective corrective actions to prevent a recurrence can be taken. Interagency investigations add perspective and enhance the mix of skills and knowledge on the investigation team. Interagency investigations are especially important where there are common management and corrective action issues.

**III. Policy.** Interagency investigations will be conducted whenever a serious fire-related accident occurs on a USDA Forest Service managed fire, Department of the Interior managed fire, or a jointly managed fire. Aircraft accidents occurring during wildland fire operations will be investigated by the national Transportation Safety Board, the USDA Forest Service, and the Department of the Interior in accordance with established laws and agreements.

**IV. Definitions**

A. *Serious Fire-Related Accidents.* Accidents occurring to personnel participating in wildland fire suppression or prescribed burning operations, or to personnel working in direct support of those activities, which result in one or more fatalities or the hospitalization of three or more personnel.

B. *Co-Lead Investigations.* Team leaders from both Departments and team members from both Departments.

C. *Agency-Lead Investigations.* Single team leader and team members from both Departments.

**V. Procedures.** Interagency investigation teams will include personnel from both the Department of the Interior and the Department of Agriculture. Representatives of the Department of Labor, Occupational Safety and Health Administration will be invited to participate in these investigations, or will be given full support to conduct their own investigation.

A. *Co-Lead Investigations* will be conducted whenever:

1. A serious fire-related accident occurs on a USDA Forest Service/Department of the Interior jointly managed fire, or,

2. A serious fire-related accident involving USDA Forest Service personnel occurs on a Department of the Interior managed fire, or,

3. A serious fire-related accident involving Department of the Interior personnel occurs on a USDA Forest Service managed fire.

B. *Agency-Lead Investigations* will be conducted whenever only one agency is responsible for managing a fire, and a serious fire-related accident occurs affecting only personnel of that same agency. The agency responsible for managing the fire will lead the investigation.

**VI. Timeframes.** The report should be completed and a copy submitted to the appropriate Departmental Designated Safety and Health Official(s) within 45 calendar days of the accident.

**VII. Training and Qualifications.** Team leaders, investigators, and specialists will meet minimum training and qualification standards as jointly established by the Department of Agriculture, the Department of the Interior, and the National Wildfire Coordinating Group.

Wardell C. Townsend Jr.
Assistant Secretary Operations
U.S. Department of Agriculture

Claudia P. Schecter
Director of Operations
U.S. Department of the Interior

10/26/95

# CHAPTER 2 – INITIAL ACTIONS TO BE TAKEN BY UNIT

## 2.1 INTRODUCTION

An accident investigation must be done promptly to ensure that important information is not lost, misplaced, forgotten, or otherwise contaminated. The agency's immediate priority is to ensure no further injury or damage occurs and to aid the injured. As soon as the emergency situation is over, the on-site accident investigation can begin.

## 2.2 INITIATE UNIT EMERGENCY RESPONSE PROCEDURES

The Agency Administrator is responsible to immediately initiate actions which provide effective, efficient, and timely leadership in critical incidents within their jurisdiction. The *Local Unit Initial Actions for Serious Accident Investigations* checklist (Exhibit 2-1) serves as a general guide for actions to be initiated by the Agency Administrator. Additional actions may also be found in the unit Emergency Response Plan.

The checklist should be faxed or emailed to the local unit upon notification of the accident by respective agency(ies) office who is responsible for delegating the SAI.

The Agency Administrator should determine the scope of the accident, ensure those involved are medically treated and accounted for, determine the jurisdictions involved and other affected agencies, and implement the unit's Emergency Response Plan. Names of the involved personnel are not communicated over the radio.

The National Wildfire Coordinating Group (NWCG) publication *Agency Administrator's Guide to Critical Incident Management, PMS 926*, is an excellent resource that is available to Agency Administrators for the overall management of critical incidents within their jurisdictions. This publication is available for download at http://www.nwcg.gov/pms/pubs/pubs.htm.

## 2.3 ENSURE INJURED FIREFIGHTERS RECEIVE MEDICAL TREATMENT (BURN INJURY PROCEDURES)

Treatment, transport, and follow-up care must immediately be arranged for injured and involved personnel.

The *Wildland Fire Incident Management Field Guide, PMS 210* (p. 10), contains the "NWCG Burn Injury Procedures." This publication is available for download at http://www.nwcg.gov/pms/pubs/pubs.htm.

## 2.4 SECURE ACCIDENT SCENE

The site of the incident should be secured immediately by agency personnel and/or law enforcement and nothing moved or disturbed until the area is photographed and visually reviewed.

If the accident occurred on a wildland fire, there may be a standard temporary flight restriction (TFR) in place "to provide a safe environment for the operation of disaster relief aircraft" *(14 CFR 91.137a[2])*. Verification of such restriction should occur.

***IMPORTANT NOTE:***
**A TFR cannot be established to prevent media access. Should multiple aircraft be in the area, aerial supervision should be ordered to facilitate air space congestion.**

## 2.5 ACCOUNTING FOR INCIDENT PERSONNEL

The responsible Agency Administrator will account for all injured or missing personnel.

## 2.6 NOTIFICATION OF SERIOUS INJURY OR FATALITIES

As soon as a serious accident is verified, and after the initial response, notification of the incident should proceed to the following groups or individuals:

- Agency headquarters
- County Sheriff or local law enforcement as appropriate to jurisdiction
- Agency law enforcement
- Responsible Safety Manager
    - Occupational Safety and Health Administration (OSHA) (within 8 hours of a work-related serious accident resulting in one or more fatalities or the in-patient hospitalization of three or more employees). Call 1-800-321-OSHA.
- ***For wildland fire entrapments*:** The Agency Administrator or Incident Commander shall prepare and submit the NWCG *Wildland Fire Fatality and Entrapment Initial Report, PMS 405-1*, (Exhibit 2-2). The form is available for download at http://www.nwcg.gov/pms/forms_otr/pms405-1.pdf.
- Submit the *Wildland Fire Fatality and Entrapment Initial Report* to National Interagency Coordination Center (NICC)
- Public Affairs

Agency-specific reporting requirements shall be followed and notification made through chain of command. The Agency Administrator shall prepare and issue the *24-hour Preliminary Report* to the appropriate officials.

More information on the *24-hour Preliminary Report*, including a template, can be found in Chapter 7 - Reports.

## 2.7 NOTIFICATION TO LAW ENFORCEMENT OF FATALITIES

Agency-specific reporting requirements shall be followed. Normally the agency dispatch organization will make the contact with the Sheriff's Office and agency law enforcement and provide information on the accident, location, and on-site contact information.

## 2.8 PUBLIC SAFETY OFFICER BENEFITS PROGRAM AND FIREFIGHTER AUTOPSY PROTOCOL

The *Firefighter Autopsy Protocol* is critical in helping determining eligibility under the U.S. Department of Justice, Public Safety Officers' Benefits (PSOB) Program (Figure 6), as well as state and local programs.

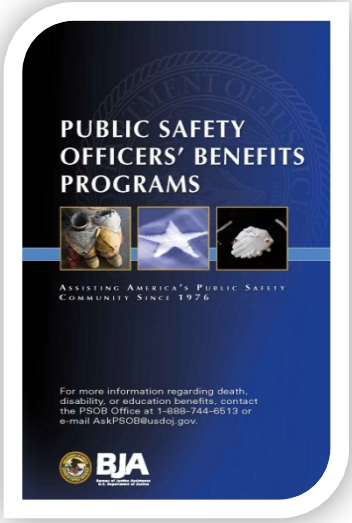

Figure 6: PSOB brochure

Family members may be entitled to benefits under the PSOB when "Public Safety Officers are found to have died as a direct and proximate result of a personal injury sustained in the line of duty" (28 CFR 32.1). To acquire these benefits, claimants are required to demonstrate that the injury resulting in death was a direct result of activities performed in the line of duty.

The *Firefighter Autopsy Protocol* was developed by the U.S. Fire Administration for the purpose of providing medical examiners, coroners, and pathologists a uniform recommended procedure for investigating the causes and contributing factors related to firefighter deaths. The *Firefighter Autopsy Protocol* is available for download at http://www.usfa.fema.gov/downloads/pdf/publications/firefighter_autopsy_protocol.pdf.

Every attempt will be made to provide this protocol to the medical examiner/coroner. The Team Leader or the Agency Administrator (autopsies may occur prior to the SAIT's arrival) should follow up with the medical examiner/coroner to ensure the protocol was provided. The *Sample Letter to the Medical Examiner/Coroner* (Exhibit 2-3) is a template that can be used to request autopsy reports.

## 2.9 REVIEW OF INCIDENT MANAGEMENT COMPLEXITY (POST ACCIDENT)

The Agency Administrator should review the complexity of the incident and ensure the appropriate level of incident management organization is in place to ensure continued safe and effective operations.

## 2.10 COLLECT DOCUMENTATION FOR INCOMING SERIOUS ACCIDENT INVESTIGATION TEAM (SAIT)

Refer to the *Local Unit Initial Actions for Serious Accident Investigations* checklist (Exhibit 2-1) for types of information that should be collected for investigations.

## 2.11 ASSIGN UNIT POINT OF CONTACT TO THE SERIOUS ACCIDENT INVESTIGATION TEAM

The Agency Administrator shall assign a Unit Point of Contact (POC) for the SAIT. The POC serves as a liaison with the SAIT and facilitate needs of the team in order to complete investigation in a timely and efficient manner.

The Unit POC is **not** considered part of the SAIT and should not be involved in any SAIT discussions regarding the accident.

***IMPORTANT NOTE:***
**Ensure the individual assigned as the Unit POC was not directly or indirectly involved in the accident.**

## 2.12 INFORMATION AND MEDIA RELEASES

Release of information to the news media (e.g., news releases, talking points) should be coordinated with the respective agencies' headquarter Public Affairs Office (PAO) or as determined by the delegating official(s).

For federal wildland fire-related SAIs, the National Interagency Fire Center (NIFC) PAO will coordinate release of SAI or related information.

Information can include:

- Number of victims (**never release names of injured victims**)
- Name of fatality victim(s) (**if next of kin has been notified**)
- Severity of injuries or property damages
- Synopsis of known facts
- Cause of death from autopsy results
- Release of *Factual Report*

# Exhibit 2-1: Local Unit Initial Actions for Serious Accident (SAI) Investigations

The Agency Administrator is responsible to immediately initiate actions which provide effective, efficient, and timely leadership in critical incidents within their jurisdiction.

The Agency Administrator should determine the scope of the accident; the jurisdictions involved and other affected agencies and implement the unit's Emergency Response Plan.

**Implement local Emergency Response Plan and initiate the following actions:**

| | |
|---|---|
| | Ensure all victims receive emergency medical treatment and receive advocacy representation. |
| | Follow established *NWCG Burn Injury Procedures* for wildland fire burn victims. |
| | Ensure that rescue operations can be conducted safely and do not further endanger emergency responders. |
| | Account for all injured or missing personnel and/or damaged equipment. |
| | Secure and document the accident site to preserve evidence and protect personal and government property. |
| | Ensure that communications are controlled to guarantee privacy until next of kin are notified. |
| | The Agency Administrator should inquire from the witnesses if any photographs/videos were taken of the accident event. If witnesses have photos/videos they should be encouraged to share those with the SAIT. ***To maintain the integrity of the investigation and to protect the identity of employees involved in the accident, witnesses should be informed to refrain from posting any photo's or video's on social media networks or personal emails.*** |
| | For wildland fire events the local Agency Administrator shall review the complexity of the incident and order the appropriate incident management team level needed. |

**Gather, verify and record initial accident information:**

| | | |
|---|---|---|
| **Who** | Full name of victims, including nicknames | |
| **When** | Approximate time and date of accident | |
| **Where** | Location of accident (closest town, jurisdiction, or other geographic information) | |
| **What** | Cause of damage or injuries | |
| **Why** | Actual or suspected cause of injury or death | |

**As soon as a serious accident is verified, and after the initial response, notification of the incident should proceed to the following groups or individuals:**

| | |
|---|---|
| | Agency headquarters |
| | County Sheriff or local law enforcement as appropriate to jurisdiction. Coordinate with law enforcement to ensure autopsies are requested for all fatalities. |
| | Agency law enforcement |
| | Responsible Safety Manager |
| | Public Affairs |

***For Wildland Fire Accidents***

| | |
|---|---|
| | National Interagency Coordination Center. The Agency Administrator/Incident Commander shall prepare and submit *NWCG Wildland Fire Fatality and Entrapment Initial Report, PMS 405-1*, downloadable from http://www.nwcg.gov/pms/forms_otr/pms405-1.pdf. |
| | County medical examiner/coroner. Immediately provide the county medical examiner/coroner with a copy of the *FA-156, Firefighter Autopsy Protocol* http://www.usfa.fema.gov/downloads/pdf/publications/firefighter_autopsy_protocol.pdf. |

**Follow agency protocol for OSHA notification (1-800-321-OSHA) within 8 hours of the accident and provide them with the following information:**

| | |
|---|---|
| | The establishment name; |
| | The location and zip code of the incident; |
| | The time of the incident; |
| | The number of fatalities and/or hospitalized employees; |
| | Your contact person and his/her phone number; |
| | A brief description of the incident; and |
| | Inform OSHA that an agency SAIT is on the way, answer any other questions they have, and leave your direct contact information if you leave a voicemail. |

**DO <u>not</u> collect evidence at the scene unless it is in danger of disappearing. Try to contact the Team Leader or Chief Investigator if you think it is necessary to remove evidence from the scene.**

**The following are the types of documents that should be collected in preparation for the arrival of the SAIT:**

| | |
|---|---|
| | Radio logs (written and recorded) |
| | Dispatch logs |
| | Occupant emergency plans |
| | Maps |
| | Job Hazard Analyses/Risk Assessments |
| | Safety briefings |
| | Employee training records |
| | Medical examination records |
| | Qualifications/certifications |
| | Work/rest (timesheets) for at least two pay periods (current and before the accident) |
| | Equipment maintenance records |
| | Equipment performance tests |

**The following are the types of documents that should be collected in preparation for the arrival of the SAIT:**

| | |
|---|---|
| | Inspection documents |
| | Remote Automated Weather System (RAWS) information |
| | Weather (forecast/conditions) |
| | Delegation of authority |
| | MOU/agreements |
| | Specifications/drawings |
| | Press releases |
| | Autopsy/toxicology report |
| | Death certificate |
| | 911 dispatch log |
| | Witness statements |
| | Photos, videos, recordings |
| | Internal policies/guidelines |
| | Tailgate safety session documentation |
| | Unit's safety plan |

**The following is a list of fire-related documents that should be collected:**

| | |
|---|---|
| | Fire behavior/weather observations |
| | Incident Complexity Analysis |
| | Documented risk management process (e.g., ICS 215A) |
| | Recent fire assignments |
| | Fire management plan |
| | Incident organizer (Type 4 or 3 incidents) |
| | Incident Action Plans/personnel lists |
| | Fire qualifications. Consult with appropriate IQCS managers regarding Incident Qualification Cards. |
| | Team briefings |
| | Work Capacity Test results |
| | Prescribed fire documents (e.g., burn plan, “go-no-go” checklists) |

## EMPLOYEE ASSISTANCE PROGRAM

The Agency Administrator should determine need for the level of Critical Incident Stress Management (CISM) and implement.

Additional information can be found in the following:

- *NWCG Agency Administrator’s Guide to Critical Incident Management (PMS-926)*
- Agency-specific line-of-duty death response guides

## FAMILY LIAISON

A Family Liaison should be designated by the Agency Administrator to maintain open lines of communication between the agency and the family. The liaison will provide the family support, assistance, and information during the crisis situation.

## UNIT POINT OF CONTACT

The Agency Administrator shall assign a Unit Point of Contact (POC) for the SAIT. The POC serves as liaison with the SAIT and facilitate needs of the team in order to complete investigation in a timely and efficient manner.

***IMPORTANT NOTE:*** **Ensure the individual assigned as the Unit POC was not directly or indirectly involved in the accident.**

For additional SAI information, go to http://www.nifc.gov/safety/safety_reprtsInvest.html.

# Exhibit 2-2: NWCG Wildland Fire Fatality and Entrapment – Initial Report



## Wildland Fire Fatality and Entrapment
## INITIAL REPORT

Complete this report for fire-related entrapment and/or fatalities. Timely reporting of wildland-related entrapments or fatalities is necessary for the rapid dissemination of accurate information to the fire management community. It will also allow fire safety and equipment specialists to quickly respond to these events as appropriate. This initial report does not replace agency reporting or investigative responsibilities, policies, or procedures. Immediately notify the National Interagency Coordination Center (NICC). Submit this written report within 24 hours—**even if some data are missing**—to the address given below.

NICC—National Interagency Fire Center
3833 South Development Ave.
Boise, ID 83705-5354

Phone: 208-387-5400
Fax: 208-387-5414

NICC Intelligence Section
E-mail: nicc_intell@nifc.blm.gov

Submitted by: _____ Position: _____

Agency: _____ Location: _____

Phone: _____ E-mail: _____

### 1. General Information

- Date of event _____ Time _____
- Number of personnel involved _____
- Number of: Injuries _____ Fatalities _____
- Fire name, location, agency, etc. _____

### 2. Fatalities

- Type of accident:
  - ☐ Aircraft
  - ☐ Vehicle
  - ☐ Natural (lightning, drowning, etc.)
  - ☐ Smoke
  - ☐ Medical (heart, stroke, heat, etc.)
  - ☐ Entrapment
  - ☐ Struck by falling object
  - ☐ Other
- Where fatality/entrapment occurred:
  - ☐ Fire site
  - ☐ In transit
  - ☐ Incident base
  - ☐ Other

**Note: In the event of fatality(s), do not release name(s) until next of kin are notified.**

- Employing agency _____
- Unit name _____
- Address _____
- For further information, contact _____
- Home unit address _____
- Phone _____

*(Continued)*

## 3. Fire-Related Information

- Fuel model _____
- Temperature _____ RH _____ Wind _____ mph
- Topography _____
  _____ Slope _____%
- Fire size at the time of the incident/accident _____ acres
- Incident management type at the time of the incident/ accident (circle one): 1 2 3 4 5
- Urban/wildland intermix? ❑ Yes ❑ No
- Cause of fire: ❑ Natural ❑ Incendiary ❑ Accidental ❑ Unknown

## 4. Entrapment Information

A situation where personnel are unexpectedly caught in a fire-behavior-related, life-threatening position where escape routes or safety zones are absent, inadequate, or have been compromised. An entrapment may or may not include deployment of a fire shelter. Note: Engine and dozer burnovers also constitute entrapments.

- Brief description of the accident _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

**Entrapment Description**

- Person trapped ❑ With fire shelter ❑ Without fire shelter
- Burns/smoke injuries incurred while in fire shelter ..... ❑ Yes ❑ No
- Burns/smoke injuries incurred while escaping entrapment ..... ❑ Yes ❑ No
- Burns/smoke injuries incurred while fighting fire ..... ❑ Yes ❑ No
- Fire shelter was available, but not used .... ❑ Yes ❑ No

**Personal Protective Equipment Used**

Fire shelter..... ❑ Yes ❑ No Gloves .....❑ Yes ❑ No
Protective pants..... ❑ Yes ❑ No Boots .....❑ Yes ❑ No
Protective shirt..... ❑ Yes ❑ No Goggles...❑ Yes ❑ No
Face/neck protection . ❑ Yes ❑ No Hardhat....❑ Yes ❑ No

PMS 405-1, revised (01/2008)

# Exhibit 2-3: Sample Letter to the Medical Examiner/Coroner

**[Letterhead]**

**[Date]**

Dr. **[Name]**
**[Title; e.g., County Medical Examiner/Coroner]**
**[Address]**

Dear Dr. **[Name]**:

On **[Date]** **[Agency]** employee **[Name]** was fatally injured during performance of duties at/on **[at Location or on Incident Name/Fire]** near **[City/State]**.

The purpose of this letter is to formally request copies of the official autopsy and toxicology reports. As you know, these reports are essential in the completion of a thorough and accurate accident investigation. The reports will be reviewed by the serious accident investigation team (SAIT) and made a part of the official accident investigation that is being conducted by the **[Agency]**.

The reports should be forwarded to the SAIT Leader, **[Mailing Address]**. Please send the reports in an envelope marked "Confidential - Do Not Open in Mail Room."

Please refer to the U. S. Fire Administration's *Firefighter Autopsy Protocol* for the recommended procedure for investigating the causes and contributing factors related to firefighter deaths. The *Firefighter Autopsy Protocol* is available for download at http://www.usfa.fema.gov/downloads/pdf/publications/firefighter_autopsy_protocol.pdf.

Questions regarding this request may be addressed to **[Team Leader's Name]** at the above address or at **[Phone Number]**.

Thank you for your prompt response to this request.

Sincerely,

**[Team Leader's Name]**
Team Leader

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# CHAPTER 3 – TEAM MEMBERSHIP, INITIAL BRIEFINGS, AND TEAM MANAGEMENT

## 3.1 COMPOSITION OF INVESTIGATION TEAM

The serious accident investigation team (SAIT) will be comprised of a core team, subject matter experts, and in certain circumstances additional technical specialists. The core team shall consist of Team Leader, Chief Investigator, Safety Manager, and for fire-related accidents, an Interagency Representative.

Any additional members added to the team after mobilization may be requested as determined by the Team Leader and approved by delegating official(s) or designee(s).

Figure 7 depicts a typical SAIT organization. Team positions with general description of duties are located in this chapter. Agency-specific qualifications for these positions are not contained within this guide. Refer to agency manuals and handbooks for agency-specific qualifications.

Agencies will accept other agency's qualifications for SAIT members for interagency accident investigations.

***IMPORTANT NOTE:***
**Team members should be selected from outside the unit where the accident occurred.**

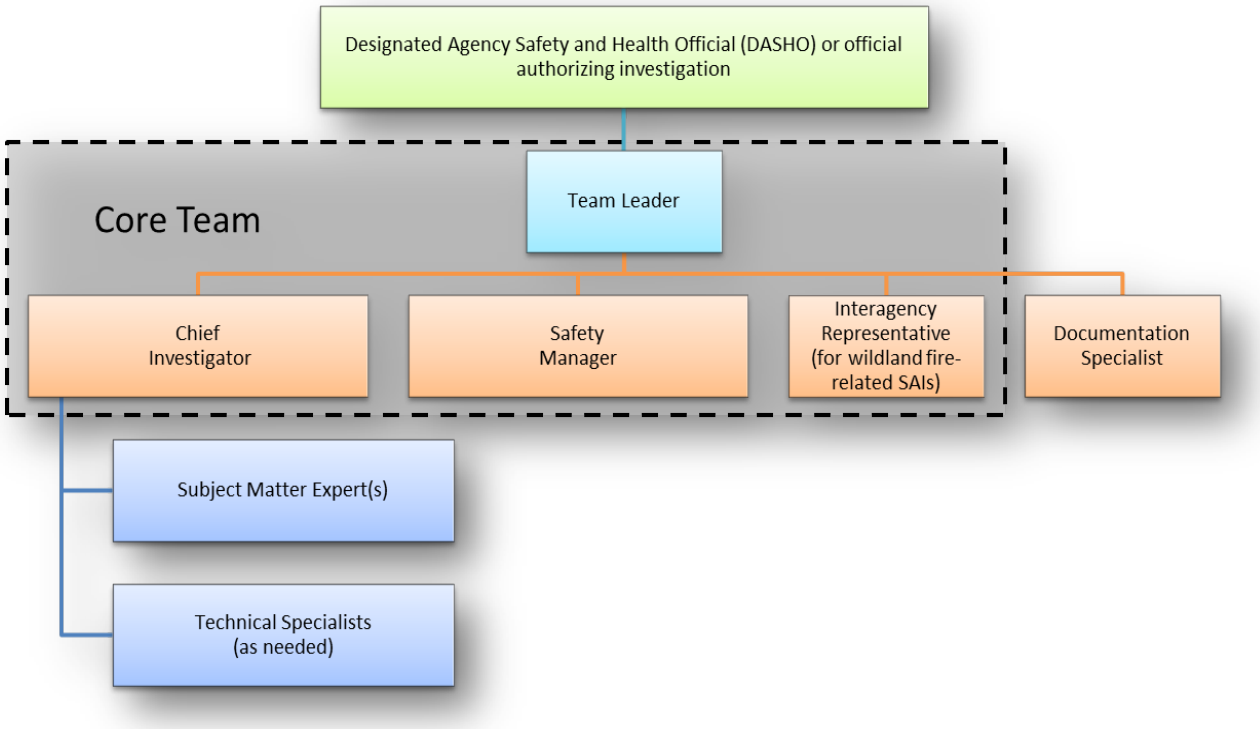


Figure 7: Typical serious accident investigation team organization. Team membership will vary depending upon accident event and complexity.

## CORE SERIOUS ACCIDENT INVESTIGATION TEAM MEMBERS

### *Team Leader*

- The Team Leader is responsible for all activities needed to accomplish the objectives of the investigation and serves as the immediate point of contact with the agency.
- Team Leaders are selected based on the severity of the incident and the level of management representation needed. Duties are assigned via a delegation of authority letter.
- In co-lead investigations, Team Leaders from the involved agencies will be assigned by the agency and receive a joint letter of delegation (Exhibit 3-1). They will manage the investigation jointly and serve as the immediate point of contact with their respective agency(ies).
- The Team Leader will present the *Final Report* (includes the *Factual* and *Management Evaluation Reports*) to the delegating official(s) and/or potentially the agency-specific Accident Review Board.

### *Chief Investigator*

- The Chief Investigator (Figure 8) is responsible for the direct management of technical investigation activities.

Figure 8: Accident investigation (Digger-Derrick Truck Tip-Over Incident, Factual Report, NPS, 2011, cover)

### *Safety Manager*

- The Safety Manager is an occupational safety and health professional responsible for advising the Team Leader on occupational safety and health issues pertinent to the investigation.

- Delegating official(s) may, at their discretion, fill this position with a trained and qualified NWCG Fire Safety Officer (SOFR) or higher safety position (e.g., SOF1/SOF2).

### *Interagency Representative (for wildland fire-related SAIs)*

- An Interagency Representative will be assigned to every fire-related SAIT.
- Non-fire related SAI may utilize Interagency Representatives as well.
- Interagency Representatives will assist as designated by the Team Leader and are considered full-time members of the SAIT.

## OTHER POTENTIAL SERIOUS ACCIDENT INVESTIGATION TEAM MEMBERS

Other SAIT members may be added or requested depending upon the complexity and technical needs of the accident investigation. Below is a list of additional team members that may be found on an SAI; however, this list is not all-inclusive and other specialists can be added as necessary.

### *Subject Matter Experts (SMEs)*

- In most cases, subject matter experts (SMEs) will be needed to assist with the accident investigation. SMEs are experienced program specialists and are typically agency employees.
- SMEs are expected to be full-time SAIT members and will be part of the process from beginning to end.
- SMEs shall be selected from outside the unit where the accident occurred and must not have a conflict of interest.
- SMEs directly report to the Chief Investigator.

### *Technical Specialists*

- A technical specialist is skilled in a specific profession related to the type of accident, property damage, terrain, etc., who can conduct a specific analysis or determination related to equipment or other specific component of the accident.
- Technical specialists are not full-time SAIT members and are generally utilized only within the scope of the specific analysis or determination they are qualified to address.
- Contracted industry professionals may be used for specific technical specialist needs; this is a common occurrence in complex accidents.
- *Wildland fire:* Specific SMEs or technical specialists may be needed for wildland fire SAIs to address technical issues such as weather, fire behavior, aviation, and fire equipment. SAITs have the option to utilize these persons as either SMEs (full-time team members) or as technical specialists (part-time team members). Examples of SMEs/technical specialists unique to wildland fire include:
    - Fire Management Officer (FMO)

- Fire Operations Expert
- Fire Behavior Analyst (FBAN)
- Fire Weather Meteorologist (IMET) from the National Oceanic and Atmospheric Administration's (NOAA) Fire Weather Service
- Fire Safety Officer
- Fire Equipment Specialist
- Technical professional photographer
- GIS Specialist

### *Documentation Specialist*

- Document Specialists maintain and manage the original accident investigation case file and supporting documentation.
- The Documentation Specialist works directly for the Team Leader. Document Specialists provide document management support to the investigation until released by the Team Leader.

### *Public Affairs Officer (PAO)*

- A Public Affairs Officer (PAO) should be considered as part of the SAIT when an investigation has high public visibility and significant news media interest. (Figure 9)
- The PAO works under the direction of the Team Leader.
- All media-related documents (news releases, talking points, etc.) will be approved through the delegating official(s) or designee(s) prior to external release.

Figure 9: Media briefing (Photo credit: Kari Greer)

- A PAO qualified as an NWCG Type 1 or Type 2 Public Information Officer (PIOF) meets the skills set for this position.

### *Writer/Editor*

- In more complex investigations, the assistance of a writer/editor may be useful for completing the *Final Report*.
- Team Leader will determine the need for a writer/editor and request one through the delegating official(s) or their designee(s).

***Union Representative***

- Agency agreements will identify the requirement for collective bargaining unit/union representation within the accident investigation process.
- The union representative works under the direction of the Team Leader and may be assigned team specific duties as determined by the Team Leader.

## 3.2 DELEGATION OF AUTHORITY

Each agency (federal, state, and local) will have a jurisdictional representative that is the responsible official for ensuring that serious accidents are fully investigated for the agency.

The Team Leader will be given delegation of authority from:

- Agency DASHOs or responsible agency officials
- Department of the Interior Fire Directors
    - Department of the Interior agencies are delegated authority to conduct fire program-related serious accident investigations.

This delegation of authority is the Team Leader's authority to conduct the investigation and request the needed resources.

For interagency accident investigations, the delegation is through one joint delegation of authority letter from the involved agencies officials. Refer to the *Sample Delegation of Authority Letter* template (Exhibit 3-1).

Due to the complexities of an interagency investigation, there are some key areas that may require upfront discussions and these should be determined and identified in the delegation of authority. These areas may include:

- Office of Record – Identify the Office of Record (for retaining final case file and processing Freedom of Information Act [FOIA] requests).
- Accident Review Board (ARB) – Identify a single-agency or joint-interagency ARBs as applicable.

## 3.3 TEAM SELECTION AND ACTIVATION

SAITs are selected and activated by the affected agencies. For interagency investigations, team membership will be negotiated by the agencies that are part of the delegation of authority.

Team member mobilization will be coordinated according to each agency's process.

## 3.4 INITIAL TEAM BRIEFING

The initial team briefing, conducted by the Team Leader, serves as the basis for the SAIT to understand how the investigation will be conducted and each team member's roles and responsibilities. Additional topics include:

- Delegation of authority
- Team introductions
- Investigation methodology
- Team performance and conduct
- Standards for confidentiality
- Evidence collection and accountability
- Team assignments
- Team safety, health, and wellness
- Team logistics

## 3.5 IN-BRIEFING WITH AGENCY ADMINISTRATOR

When the SAIT arrives at the field unit, it is imperative that there be a transition briefing between the local Agency Administrator/staff and the SAIT. This briefing provides the SAIT with an overview of the activities that occurred prior to their arrival. All records and information collected to date should be transferred to the SAIT at this time. The briefing should include information regarding:

- Local coordination
- Accident site transfer to SAIT
    - For U.S. Forest Service accidents, coordination with agency law enforcement program must be accomplished in accordance with the *Accident Investigation Protocol for Investigations of Serious Injuries and Fatalities of On-Duty Forest Service Employees*.
- Medical examiner/coroner (if applicable)
- Witnesses
- Victims
- Local issues (political, land use, etc.)
- Media

## 3.6 TEAM MANAGEMENT

### LOGISTICS

Preplanning and acquiring the resources needed to accomplish the accident investigation will significantly contribute to the SAIT's functionality and success. Once logistical needs are identified and acquired, the decision needs to be made about who is going to manage them. The Team Leader may assign these tasks to a team member who has the skill and time to manage this important.

Possible administrative support includes:

- Lodging/meeting place for SAIT (including private interview room[s])
- Office supplies (flip charts, markers, etc.)
- Map to accident site
- Consider the need for an escort to the site
- Shredder
- Fax machine
- Laptop computers
- Printers
- Computer projector
- Computer scanner
- Computer flash drives
- Vehicles
- Cellular phones
- Speaker phone (for conference calls)
- Personal protective equipment (PPE)
- Access to TV/DVD
- Programmable portable radio
- Satellite phone (remote areas)
- Global positioning system (GPS)

## TEAM MEETING LOCATION

When selecting a location for team meetings, there are some things to consider. There are advantages and disadvantages to meeting and working out of agency offices.

Pros of utilizing agency headquarters:

- Equipment availability
- Access to agency personnel
- Building security (limited access to public)

Cons of utilizing agency headquarters:

- Appearance of conflict of interest or lack of objectivity
- Distractions/interruptions
- Greater opportunity for interviewers/discussions to be overheard by agency personnel
- Lack of personnel security

The Team Leader and the Chief Investigator should discuss the pros and cons of the location that will best meet the needs for the investigation.

## TEAM SAFETY, HEALTH, AND WELLNESS

The Team Leader has the overall responsibility to ensure that team members are protected from hazards while conducting the investigation. The Safety Manager should conduct daily safety briefings on what hazards to expect for the planned activities and prepare risk assessments as necessary.

Monitor individual team member performance and well-being.

- Continuously watch for signs of stress due to circumstances surrounding the accident.
- Monitor work-rest cycles.
- Determine if Critical Incident Stress Management (CISM) is needed (during or after investigation).

# Exhibit 3-1: Sample Delegation of Authority Letter

**[Letterhead]**

**[Date]**

Memorandum

To: Team Leader/Co-Lead Team Leader **[Names]**, Serious Accident Investigation

From: Delegating Official(s) **[Name(s)]**

Subject: Joint Delegation of Authority—Serious Accident Investigation **[Names]**

This memorandum formalizes your appointment as Team Leader/Co-Lead Team Leader to investigate the accident which occurred on the **[Incident Information]**.

This serious accident investigation (SAI) will be conducted as an interagency investigation between the **[Agency]** and **[Agency]**. As such, the SAI shall be investigated cooperatively following **[Agency's]** policy.

This investigation will be conducted as an interagency serious accident investigation team (SAIT) with co-leads from each agency. Your duties as Co-Lead Team Leaders for your respective agencies may include, but are not limited to:

1. Following established guidelines and policies **[List Policies]**:

   **EXAMPLES:**
   - DOI, Departmental Manual (DM) 485 Chapter 7, and USDA Forest Service Manual FSM 6700, Chapter 6730
   - *Interagency Standards for Fire and Fire Aviation Operations* (Red Book), Chapter 18 – Reviews and Investigations
   - *Wildland Fire and Aviation Program Management and Operations Guide* (Blue Book), Chapter 18 – Reviews and Investigations (Bureau of Indian Affairs)

2. Organizing, conducting, and controlling the accident investigation in accordance with the *Interagency Serious Accident Investigation Guide.*
3. Take appropriate measures to control information related to the investigation and maintain confidentiality.
4. Conducting an analysis of human elements and organizational factors that may have influenced the accident.
5. Briefing affected agency officials as appropriate, including a closeout with affected agency personnel.

6. Coordinating information exchange between the team members and all pertinent involved agencies, including local law enforcement, OSHA, and the medical examiner/coroner's office.
7. Maintaining liaison with affected agency units.
8. Approving and allocating requests for funds related to conducting the investigation.
9. Securing technical, logistical or other support necessary to conduct the investigation.
10. Coordinating the scheduling of interviews and other activities with other line-of-duty entities such as Critical Incident Stress Management (CISM) teams, and funeral/memorial services.
11. Briefing delegating official(s) or designee(s) as appropriate within each affected agency.
12. Providing the following formal reports:

    - *72-Hour Expanded Report*
    - *Final Report*—Includes both the *Factual* and *Management Evaluation Reports*

    These reports are due within 45 days from the time of the accident.

    - An extension may be requested and will be sent to each Agency Administrator for approval. All requests will be in writing and will include rationale for the extension.

13. Present a draft *Final Report* to the delegating official(s). This process may also include presenting draft *Final Report* to Accident Review Board(s).
14. The official Office of Record for the final case file will be **[Office Name]**.

The *Final Report* will be prepared in accordance with agency standards or as outlined in the *Interagency Serious Accident Investigation Guide*. Addendums to the report may be necessary as a result of an Agency Review Board process.

You will be provided an agency-specific charge code for all travel and associated costs to conduct the investigation.

Delegating Official, **[Agency]**
**[Name]**
**[Title]**

Delegating Official, **[Agency]**
**[Name]**
**[Title]**

cc: **[Names]**

# CHAPTER 4 – VISITING THE ACCIDENT SCENE

## 4.1 SITE CONTROLS

Any site security procedures that had been established prior to the SAIT arrival should be documented and the Team Leader should coordinate with the Agency Administrator or Incident Commander (IC) for continued site security as necessary.

The accident site must be secured and hazards identified and mitigated to an acceptable level prior to entering or visiting the site.

Contact agency or local law enforcement to ensure that any available preliminary investigation information and/or special interest in the incident are known.

The entire accident site needs to be controlled and the evidence protected until it is released back to the local unit by the Chief Investigator.

- If there is evidence that may be easily disturbed the Chief Investigator and Team Leader should consider controlling access.
- People not assigned to the SAIT or not authorized (as determined by the Chief Investigator) to the site should be prohibited from entering.

## 4.2 PLANNING THE ACCIDENT SITE SCENE VISIT

Once the team arrives at the local area and completes in-briefings, going to the accident site (Figure 10) is generally the next step. The Chief Investigator should coordinate all accident site visits with any other agencies assigned to investigate the accident and/or those who have jurisdictional responsibilities for the accident.


Figure 10: Site visit

For wildland fires, the following steps will be taken:

- Receive advanced approval from the incident management team (i.e., Incident Commander [IC] or delegated representative) for visiting the fireline.
- The IC will likely assign a liaison to the SAIT to ensure this coordination takes place for each visit.

- Visitors must maintain communications with the Division/Group Supervisor or the appropriate fireline supervisor of the area they are visiting.
- SAIT members visiting the fireline will need specific PPE and meet basic requirements for visiting the fireline (see non-escorted and escorted sections on the following page).

## REQUIRED FIELD ATTIRE AND FIRELINE PERSONAL PROTECTIVE EQUIPMENT (PPE)

SAIT members visiting the fireline will need specific PPE.

### *Field Attire*

- Appropriate field attire in accordance with agency policy.
- PPE as identified in the Job Hazard Analysis (JHA)/Risk Assessment (RA).

### *Wildland Fire*

- Boots – a minimum of 8-inch high, lace-type exterior leather work boots, with Vibram-type, melt resistant soles. The 8-inch height requirement is measured from the bottom of the heel to the top of the boot. Alaska is exempt from the Vibram-type sole requirement.
- Fire shelter (M-2002)
- Hard hat with chin strap
- Yellow long-sleeve, flame-resistant shirt
- Flame-resistant trousers
- Leather or leather/flame-resistant gloves
- Wear additional PPE as identified by local conditions, material safety data sheet (MSDS) or JHA/RA
- Hand tool
- Water canteen
- Ear plugs/hearing protection if exposed to high-noise-level equipment

SAIT members who visit the fireline should have these items or make arrangements to obtain these items upon arrival.

## VISITING THE FIRELINE

Visits to the fireline may be "escorted" or "non-escorted" depending on the following requirements:

### *Non-Escorted*

Visitors must have successfully completed the Work Capacity Test (WCT) at the "light" fitness level.

- Must have adequate communications and radio training
- Completed the following training:
    - Firefighter Training (S-130)
    - Introduction to Fire Behavior (S-190)
    - Annual Fire Safety Refresher Training (RT-130)

Deviation from this requirement must be approved by the IC for other non-escorted support personnel involved in vehicle operations or other support functions or established roadways and working in areas which pose no fire behavior threat.

### *Escorted Personnel*

All personnel lacking the above training and physical requirements must be escorted while on the fireline.

- Visitors must receive training in the proper use of PPE.
- Requirement for hand tool and water to be determined by escort.
- Visitors must be able to walk in mountainous terrain and be in good physical condition with no known limiting conditions.
- Escorts must be minimally qualified at the Single Resource Boss. Any deviation from this requirement must be approved by the IC.

## HELICOPTER FLIGHTS (FIRE AND NON-FIRE)

Personnel who take helicopter flights must receive a passenger briefing and wear the following PPE:

- Flight helmet
- Leather boots
- Fire-resistant clothing
- All-leather or leather and Aramid gloves

Occasional authorized official passengers have no training requirements; however, a qualified aircrew member is required to be on board or to attend to the loading and unloading of passengers and cargo at all landings and takeoffs.

## 4.3 APPROACHING THE ACCIDENT SITE

The Chief Investigator has control of the accident site, and should approach the site methodically getting the overall picture to determine conditions that occurred or potentially occurred at the time of the accident.

The Chief Investigator will establish:

- Who needs to go to the accident site
- Determine the extent of the site
- What tasks need to be done
- Order in which tasks should be done
- Who will do tasks
- Site security and entry requirements (if any)
- Initial description and mapping of the site
- Photographs detailing the entire site and evidence before being moved (refer to Chapter 5 – Evidence Gathering for additional photographing evidence information)
- Collection of evidence
- Logging of evidence
    - Anything taken from the accident site needs to be logged in on the *Evidence Log* so the chain of custody is established.

## 4.4 INITIAL DESCRIPTION OF THE ACCIDENT SITE

The description of the site needs to be prepared very carefully to ensure that it is accurate and well defined. Drawings, photographs, maps historical records can all be useful.

## 4.5 INTEGRITY OF THE ACCIDENT SITE

In most cases the accident site has been disturbed (e.g., EMS response). Witnesses should be used to determine how the site looked at the time of the incident or how it typically looks during a similar operation.

# CHAPTER 5 – EVIDENCE GATHERING

## 5.1 INTRODUCTION

Evidence provides the factual information needed to establish and support findings.

There are two reasons why it is important to gather all relevant evidence and facts:

- Establish the accident sequence. This includes events occurring before, during, and after the accident.
- Identify factors directly related to the accident while always considering the complexity of the human element within the system.

Collected evidence will be used during team deliberations to establish the sequence of events and support findings and causes and lead to the development of recommendations for preventative measures.

## 5.2 PHYSICAL EVIDENCE PRESERVATION AND COLLECTION

The Chief Investigator must determine what evidence is fragile or perishable and may be destroyed or lost due to weather or theft, or moved, in order to protect valuable evidence or equipment. This may require the need to increase site security personnel, expand the site security perimeter, cover the site (or parts of the site) with plastic to preserve evidence, obtain a secured facility, or carefully collect, catalog and remove evidence.

The Chief Investigator will establish:

- What evidence needs to be gathered and in what order
- Procedures for evidence collection
    - The evidence and the chain of custody logs
    - Who will gather the evidence
    - Where the evidence should be stored and secured

The Chief Investigator will need to evaluate the necessity of utilizing technical specialists, cartographers, photographers, depending on the complexity and severity of the serious accident.

Key tools that may be used for gathering evidence and documenting the accident site:

- Sketches
- Drawings
- Diagrams

- Measurement and mapping (Figure 11)
- Global positioning system (GPS)
    - Engineering – generally requires a technical specialist.
    - Navigational – good for most requirements and does not require a technical specialist
- Photography
- Video

Figure 11: Mapping example (Stocking Lake SAI Factual Report, 2011, p. 23)

Consider the following precautions when collecting evidence that may have, or have been exposed to, biohazards, blood borne pathogens, or hazardous materials:

- Team members and technical specialists dealing with hazardous substances must follow universal precautions and their agency protocols.
- PPE as identified in the JHA/RA will be used.

Any clothing recovered with body fluids that is going to be analyzed should be completely air dried in sunlight before being placed in red biohazard waste bags. This will allow for the clothing to dry and not get moldy.

For wildland fire PPE and clothing analysis, please refer to Missoula Technology and Development Center protocols in *Investigating Burnovers and Shelter Deployments: Assessing Personal Protective Equipment* (Exhibit 5-1).

Physical evidence such as equipment and parts need to be “bagged and tagged” at the time of collection.

For vehicle or heavy equipment evidence consider the following:

- Properly identify and document (e.g., vehicle identification number, property number, serial number).
- If further analysis is required, store the equipment in a secure location.

The Chief Investigator will establish logs for all evidence. It is imperative that all evidence be cataloged and accounted for at all times Refer to the *Evidence Log* (Exhibit 5-2) and the *Evidence Chain of Custody Log* (Exhibit 5-3).

The originals or a copy of important documents (evidence or potential evidence) should be placed in the investigation case file.

***IMPORTANT NOTE:***
**Evidence gathered during accident investigations may be utilized in other official proceedings and must be collected and processed correctly. The SAIT is the custodian on behalf of the agency until the evidence is sent to the official Office of Record as part of the case file.**

### CRIMINAL ACTIVITY

If there is evidence of criminal activity, the SAIT should discontinue the accident investigation and notify the delegating official(s) or designee(s) who make the appropriate law enforcement notifications.

The delegating official(s) or designee(s), in consultation with law enforcement and the Team Lead, may decide to continue with a parallel investigation.

Simple negligence, not following policy, and possible third-party liability, are not criminal activities; the SAI should continue. Consult specific agency policy(ies) should this situation occur.

## 5.3 TYPES OF EVIDENCE

There are three principle types of evidence:

- Human
- Material
- Environmental

### HUMAN EVIDENCE

Human evidence may include:

- Autopsy/toxicology reports
- Medical records and test results
- Training records
- Employment records
- Witness statements
- Dispatch logs

### *Human Factors*

Human factors are a combination of those aspects that affect human performance (personal, physical, psychological, situational) that may or may not contribute to an accident. A human factor can potentially lead a person to make an error in judgment or action resulting in an accident.

Human factors analysis is a systematic study of those elements involving the human interface with the organization, system, environment, operation, or machine. (Figure 12) From the standpoint of a serious accident investigation, this analysis is integrated into the investigation with the intent of correcting deficiencies and preventing future similar accidents. This is consistent with the intent of the overall investigation.

From an organizational risk management perspective, human error is generally viewed as a consequence rather than a cause. Human errors are the symptoms that reveal the presence of organizational weaknesses or latent (or potential) conditions within the system that may suddenly emerge and cause damage. The serious accident investigator must take this into account. The SAI team must be guarded against coming to easy solutions and simple explanations based on human error. When human error is mistakenly or too easily used as a causal factor, the organization loses the opportunity to identify and fix organizational weaknesses.

Incorporating human factors analysis into the serious accident investigation can be done according to a number of different approaches and models. Exhibit 5-4 provides key elements of one such model.

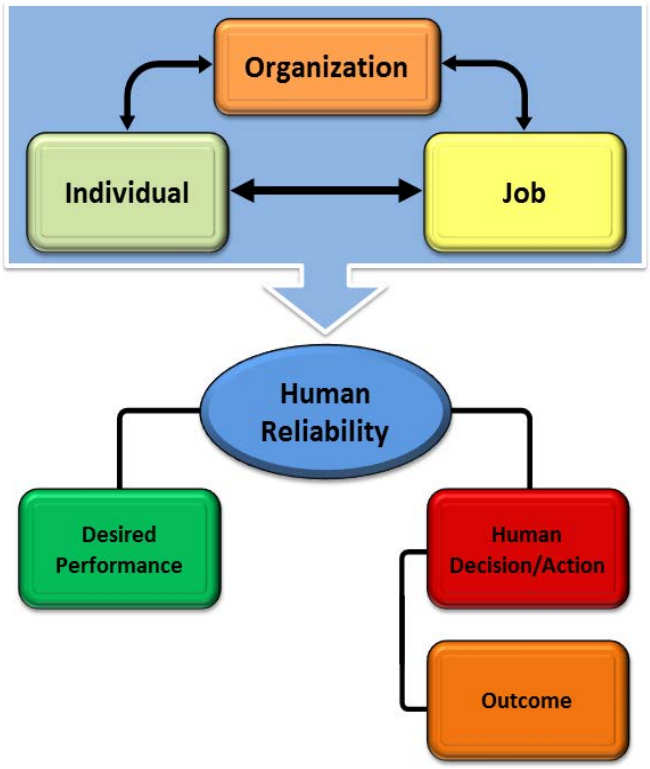


Figure 12: Human and Organizational Factors Relationship

## MATERIAL EVIDENCE

Material evidence may include:

- Equipment, parts, and structures
- Manufacturer's operating instructions
- Equipment inspections
- Condition reports and operation logs
- Repair reports (documenting previous equipment failures)
- Building blueprints
- Facility layout diagrams
- PPE
- Field Attire

## ENVIRONMENTAL EVIDENCE

Environmental evidence may include:

- Weather reports
- Meteorological analysis
- Weather damage analysis
    - Lightning strike points
    - Wind damage
- Terrain analysis
- Altitude
- Environmental hazards
    - Smoke
    - Fire
    - Asbestos
    - Radiation
- River volume and speed (e.g., U.S. Geological Service source data)
- Surface slip resistance
- Noise levels
- Remote Automated Weather (RAWS) Information

## 5.4 MEASUREMENTS AND MAPPING

Measurement and mapping of the accident site is critical, as hand drawn documentation will be used for many purposes after leaving the accident site. Thoughtful and deliberate planning should occur prior to visiting the accident site.

The Chief Investigator will determine the type and specifics of accident measurements and mapping.

Consideration should be given to:

- Establishing a baseline of the accident site for your drawings or sketches.
- Determining measurements that must be taken.
- Providing definitive scope and size of the accident site (It is helpful to use a grid pattern for a debris field, identifying each grid in its x- and y-axis.).
- Being careful when entering the debris field to not disturb evidence locations and condition.

***IMPORTANT NOTE:***
**Remember to identify and document any personal items that have already left the accident scene by victims or emergency response personnel.**

### GLOBAL POSITIONING SYSTEM (GPS)

Global positioning systems (GPS) are commonly available and a very useful tool for accident investigations.

There are two types of GPS:

- Navigational
- Engineering

#### *Navigational GPS*

Navigational GPS data and software is usable for quick, accurate mapping, for spatial locations and gross distances between areas of interest. Do **not** rely on navigational GPS units to provide accurate minute detail.

#### *Engineering GPS*

Engineering GPS units used with Geographic Information System (GIS) programs (e.g., ArcView) will provide accurate minute detail as well as data documentation and multiple mapping opportunities to more accurately display the accident scene and occurrences.

Generally, a technical specialist will be required to use this equipment. Depending on accident complexities, the Chief Investigator may determine that a professional GPS/GIS specialist is needed.

## 5.5 PHOTOGRAPHIC

Cameras provide a versatile medium for the investigator to document the accident scene.

Camera/Photography technology is constantly changing and Chief Investigators should ensure that quality and reliable accident photos are taken. (Figure 13)

Figure 13: Trekking pole (Stocking Lake SAI Factual Report, 2011, p. 58)

Consideration should be given to the following:

- A dedicated camera is preferred for taking accident-related photos.
- Ensure that the medium used for photographs are secured and not attached to social media (e.g., smart phone photos maybe loaded directly to "cloud" technology).
- Law enforcement may have pictures of the undisturbed accident scene.
- Witnesses may have taken photos or videos. Note in the *Evidence Log* who took photo and location and any other pertinent identifying information.
- The news and social media may have photos and/or videos of the accident scene and readily accessible.
- Depending on accident complexities, the Chief Investigator may determine that a professional photographer is needed.
- Promptly take photos of perishable evidence—items that are likely to change or disappear if not photographed immediately. Examples include:
    - Accident aftermath or rescue in progress
    - Victim(s) position, gauge readings, ground scars, radio setting, fire damage, body fluids/parts, items that may switch positions, etc.

### WILDLAND FIRE PHOTOS

There is specific photographic evidence that needs to be obtained for wildland fire-related accident investigations. Examples include:

- Surrounding fuel type and burn patterns, containment lines and/or personnel travel routes as it pertains to the accident.
- Entrapment and/or deployment sites.
- All fire-resistant clothing, PPE, line gear, and tools (Figure 14). Include detailed photographs of components showing identifying marks, name tags, labels, etc.

- Exemplar photographs can be taken of personal protective firefighting clothing and equipment replicating the positions at the accident site.
- Other equipment that responded to the incident.

Figure 14: Melted hardhats (Mudd Fire Entrapment/Fire Shelter Deployment Factual Report, 2006, p.7)

### VIDEO

Video is particularly valuable for showing slope and terrain features. Video can also be helpful in during team deliberations and accident reviews.

Employees or private citizens may have video footage of the accident or aftermath. Original video or copies of original video should be gathered as evidence for the investigation.

## 5.6 WITNESS STATEMENTS AND INTERVIEWS

Persons who observed or were involved in the accident are included in the "witness" category.

Investigators should identify witnesses, develop a witness list, and hold interviews as soon as possible.

Treat SAIs involving multi-cultural employees with sensitivity and respect for cultural differences. For example, in wildland fire:

- Have the Interagency Resource Representative (IARR) attached to the crew act as a liaison between the team and the tribe.

If there is no IARR, contact tribal leaders through the employing agency's home unit manager.

Agencies may have specific policies and/or bargaining unit agreements as it relates to employee rights and responsibilities in accident investigative interviews. Refer to respective agency-specific policies prior to conducting interviews.

The *Accident Investigation Witness List* (Exhibit 5-5), can be used by the Chief Investigator to establish contact information as well as document interview scheduling times.

During the in-briefing from the Agency Administrator, the Team Leader should have received:

- List of persons who observed or were involved in the accident.
- Witness statements and/or personal notes that were collected by the local unit.
- Contact information for witnesses.
- Anticipated level of witness cooperation.
- Any contact information changes from initial witness statements.
- Information regarding the relationship of the witness to the victim(s).

All of this information can assist you in establishing the SAIT's witness list.

***IMPORTANT NOTE:***
**Individuals assigned to take witness statements need to inform the witness that the SAIT's intended use of their statements is for accident prevention purposes. However, an assurance of confidentiality cannot be given.**

The *Accident Investigation Witness Statement* (Exhibit 5-6), can be used to serve as a template to document witness statements.

To increase accuracy while obtaining statements, witnesses should be separated from each other while making their individual statements.

Witness statements and interview/conversation notes are not to be construed as formal written depositions; they are simply another tool to help the SAIT establish the sequence of events.

***IMPORTANT NOTE:***
**Some individuals are not very descriptive in their writing and the SAIT may not gain a lot of information based solely on their statements. A follow-up interview may reveal additional information.**

There may be instances where witnesses are only available to the SAIT for a short period of time and the witness statement is the only opportunity to obtain witness information. Immediate action may be necessary to get witness statements in these situations.

## PREPARING FOR INTERVIEWS

Before conducting witness interviews, consider the following:

- Witness may be distraught or unavailable due to funeral/memorial services.
- A Critical Incident Stress Debriefing may have taken place.
- Relationships of the witnesses to the victim(s) or the accident.
- Witnesses may be on medication or may be hospitalized and the team may need the approval of a physician or family members to conduct an interview.
- No witness can be compelled by the SAIT to be interviewed or to write a statement.

Review the *Accident Investigation Witness List* and *Accident Investigation Witness Statements* to determine which witnesses will need to be interviewed and scheduled. This will also assist in developing specific interview questions.

The local unit Point of Contact (POC) may be able to assist the SAIT in locating and scheduling witnesses for interviews.

The Chief Investigator should coordinate the preparation of the questions for witness interviews, but may not necessarily be the interviewer in all investigations. There should be at least two SAIT members in every interview.

- Interviews need to be taken in a quiet, private, comfortable, safe location that is free of disruption.
- Frequent breaks should be offered.

Depending on the amount of information needed, an interview may need to be divided and held in subsequent sessions. However, try not to break up the interview if at all possible.

***IMPORTANT NOTE:***
**Should an employee refuse to cooperate, the Team Leader should contact the Agency Administrator and delegating official. If no cooperation ensues, make note in the *Final Report* within the *Management Evaluation Report.***

## CONSIDERATION OF CRITICAL INCIDENT STRESS

Witness interviews should be conducted prior to any Critical Incident Stress Debriefing (CISD). Often times CISDs involve groups of individuals and sharing of stories which may homogenize witness's recollection of events.

However, should the events of an accident cause severe psychological burden on a witness, the services of a CISD counselor may be necessary before interviews are completed. Always try to get a statement from the witness prior to any CISD.

If you observe signs of employees being affected by critical incident stress during interviews, have the Team Leader recommend to the Agency Administrator to arrange for employee counseling as needed.

## CONDUCTING THE INTERVIEWS

The *Accident Investigation Witness Interview* form (Exhibit 5-7) can be used to document interviews.

Investigators conducting interviews need to introduce themselves and identify their role in the interview/SAIT process. They also need to inform the witnesses that the purpose of the interview by the SAIT is to obtain information for accident prevention only. State that an assurance of confidentiality cannot be given.

If an employee is part of a bargaining unit, they may request union representation during an interview. Any time a representative is requested, the interview will be discontinued until representation is obtained.

The interviewee may request that peer support, legal counsel, or other personal representative be present during their interview. Other individuals who were directly involved in the accident should not be present since they will be interviewed separately.

## RECORDING INTERVIEWS

For complex investigation interviews, and with consent of the witness, consider recording the interview. If the recorded interview is transcribed, a reasonable effort should be made to allow the witness to review the transcription. The recording becomes a part of the accident investigation case file.

Digital recorders can hold hours of recordings on them and are available with many features that can be helpful to your investigation. There are models of the recorders that can take the recording and download the information to your computer.

There are services available that can transcribe your recorded interviews and transcription services may be available within the area that you have been assigned. Contact the Local Unit Point of Contact to see if these services are available locally. There also may be vendors available through a General Services Administration (GSA) source.

Recording of witness interviews can be valuable to the team members that did not participate in the interview. Recordings can be helpful during the team deliberation phase of the investigation.

The investigator conducting the interview should take notes during the interview for follow-up questions and documentation of the interview.

The interview begins by asking the witnesses for their:

- Name
- Work address
- Phone number
- Position (job title)
- Location during the accident

The goal of the interview is to help the witnesses recall everything they know in their own words from beginning to end without being influenced by either the question or by what they think investigators want to hear. The “cognitive interviewing technique” is a proven method of interviewing to obtain this goal.

Cognitive interviewing technique includes (*Geiselman & Fisher*):

- The interviewer tries to mentally reinstate the environmental and personal context of the accident for the witnesses, perhaps by asking them about their general activities and feelings on the day. This could include sights, sounds, feelings and emotions, the weather, etc.
- Witnesses are asked to report the incident from different perspective, describing what they think other witnesses might have seen.

- Recounting the incident in a different narrative order. Due to the recency effect, people tend to recall more recent events more clearly than others. Witnesses should be encouraged to work backwards from the end to the beginning.
- Witnesses are asked to report every detail, even if they think that detail is trivial. In this way, apparently unimportant detail might act as a trigger for key information about the event.

The change of narrative order and change of perceptive techniques aid recall by reducing a witness' use of prior knowledge, expectations or schema.

During the interview, information regarding the following items should be obtained:

- Chronology of events
- Environmental factors issues
- Human factors issues
- Material factors issues

Additional follow-up questions may need to be utilized should key information be missing.

Experts (*Dekker, Klein*) suggest the following approach:

1) Have witnesses tell their story from their view point (do not prompt them with any type of replays to "refresh their memory" at this step).
2) Tell the story back to them as an investigator.
3) Assist the witnesses with determining the critical junctures in the sequence of events.
4) Progressively probe and rebuild how the world looked to witnesses of the accident at each juncture. Replays, such as, maps, pictures maybe helpful at this step.

Additional considerations for each juncture in the sequence of events, here are the "cues" the investigation team would want to know:

| | |
|---|---|
| *Cues* | What were you seeing? |
| | What were you focusing on? |
| | What were you expecting to happen? |
| *Interpretation* | If you had to describe the situation to your colleague at that point, what would you have told them? |
| *Previous Experience* | Were you reminded of any previous experience? |
| | Did this situation fit a common practice or routine? (The gap between work as imagined and work as performed can contain critical additional information) |
| *Knowledge* | Were you trained to deal with this situation? |
| | Did you rely on other sources of knowledge to tell you what to do? |
| *Goals* | What goals governed your actions at the time? |
| | Were there conflicts or trade-offs to make between goals? |
| | Was there time pressure? |

| | |
|---|---|
| Taking action | How did you think your actions influenced the course of events? |
| | Did you discuss or mentally imagine a number of options or did you know straight away what to do? |
| Outcome | Did the outcome fit your expectation? |
| | Did you have to update your assessment of the situation? |

**Considerations that should be taken into account during the interview process are:**

- In some instances, the witness may be taken to the accident site or crash scene after the initial interview for clarification of their statement.
- Avoid interviewing more than one witness at a time.
- Avoid leading questions.
- One team member should ask the questions. Other members should only interrupt and ask questions with the permission of the interview lead.
- Restate what you think the witness told you in your words and ask if that is correct.
- Do not prejudge a witness. Keep an open mind. Be receptive to all information regardless of its nature—be a good listener.
- Be serious. Maintain control of the interview. Do not make promises you cannot keep. Avoid contemptuous attitudes. Avoid controversial matters. Respect the emotional state of the witness.
- Interviewers should review pertinent information prior to conducting interviews (e.g., witness statements, photos, dispatch logs).
- Permit witnesses to tell what happened in their own words. Do **not** interrupt.
- Be a good listener. A nod of your head or an expectant pause may encourage the witness to talk.
- Be unobtrusive in note taking.
- Maintain self-control during interviews. Do not become emotionally involved in the investigation.
- The interviewer can ask follow-up questions of the witness as necessary. SAIT members should coordinate their questions at the direction of the Chief Investigator. Do not assist the witness in answering questions.
- Avoid revealing to the witness conflicting statements or items discovered during interviews with other witnesses.

## 5.7 COLLATERAL INVESTIGATIONS – EVIDENCE SHARING

As stated in Chapter 1 – Serious Accident Investigations, collateral investigations may occur during an SAI. While full cooperation and coordination is imperative with these other investigations, the SAIT needs to protect the integrity of the SAI investigation. In doing so, there are protocols to be followed for sharing evidence.

The Unit Point of Contact or employee's home unit can assist other agencies with making all witnesses available.

The Team Leader should assign the SAIT Safety Manager or a liaison to work with collateral investigations. Collateral investigators should be accompanied by a SAIT member or an assigned liaison for accident site visits. For other collateral investigation fact finding activities, the SAIT should provide facilitation, but not be required to accompany the other teams throughout the entire process.

Should issues arise with collateral investigations, the Team Leader should contact the delegating official(s) or designee(s).

Evidence that can be shared:

- Make all factual information available (e.g., photos, maps, logs, training records). Ensure investigator notes are removed.
- Make copies of paper evidence. Do not provide the original(s).
- Physical evidence should be checked out and tracked on the *Evidence Log* (Exhibit 5-2). This evidence must be returned to SAIT for the accident investigation for proper disposition.
- Witness lists
    - Specific to Federal OSHA – Only provide a copy of the *Accident Investigation Witness List* (per Federal OSHA's *Field Operations Manual*)

Evidence that **cannot** be shared:

- Witness statements and/or interview statements. Collateral investigators must gather their own statements and conduct independent interviews.
- Personal information (medical, work performance, etc.). Release of this information may be protected and has to be approved by the appropriate agency official.

## 5-8 EVIDENCE PROTECTION

The SAIT is the temporary custodian for all evidence gathered. Evidence shall be protected in locked area and not returned to other entities (including family members of victims) until the investigation is complete, or the Team Lead and the delegating official(s) or designee(s) determine which items shall stay within case file.

Any deviation from this should be requested to the delegating official(s) or their designee(s).

# Exhibit 5-1: Investigating Burnovers and Shelter Deployments – Assessing Personal Protective Equipment

## GENERAL INFORMATION

Specialists familiar with the technical aspects of personal protective equipment (PPE), especially fire shelters, should examine the PPE used during a burnover. These assessments can help investigators clarify events surrounding a burnover and can help improve equipment, procedures, and training. Missoula Technology and Development Center (MTDC) equipment specialists or individuals recommended by MTDC can:

- Interview the firefighters who were involved about the use and performance of PPE
- Examine the entrapment area
- Analyze the fire shelters and PPE

Technical specialists must be ordered through the National Interagency Coordination Center (NICC). To prepare for the arrival of the technical specialists, see Part A of this document, "Steps to Take before Technical Specialists Arrive."

Persons who are not trained in the analysis of wildland firefighting PPE should not attempt to analyze PPE used in a burnover or entrapment. If the technical specialists from MTDC are not at the site, PPE can be sent to MTDC for evaluation. Reports based only on offsite examination of materials will be limited in scope and detail compared to those based on on-site inspections. Important information has been lost when the technical specialists have not been present at the site of the deployment or entrapment. Instructions for collecting, preparing, packaging and sending PPE and supporting documentation can be found in Part B of this document, "Process to Follow when Sending PPE to MTDC."

The written report provided by the technical specialist should become part of the investigation record.

## PART A – STEPS TO TAKE BEFORE TECHNICAL SPECIALISTS ARRIVE

The technical specialists will want to interview those directly involved in the deployment and examine the deployment site and PPE that was used. You can help by:

1. Protecting the site to prevent disturbance, to the extent possible. Fire shelters left on-site can be weighted with rocks or other heavy objects to keep them from blowing away;
2. Collecting affected clothing from firefighters who were involved. It is not necessary to collect clothing from coroners. Technical specialists can do this, if necessary; and
3. Helping make arrangements for the technical specialists to interview firefighters directly involved in the entrapment.

a) Arranging to make the firefighters available to talk to the technical specialists. Let firefighters know that the purpose of the interview is to learn as much as possible from the event so that equipment and training can be improved.

b) Having union representation available if necessary.

## PART B – PROCESS TO FOLLOW TO SEND PERSONAL PROTECTIVE EQUIPMENT TO MTDC

If PPE is to be sent to MTDC, it must be collected, prepared and packaged properly. Supporting documentation should be collected and sent with the equipment to assist in the analysis.

### *Collection Precautions*

1. Items may be exposed to body fluids. Anyone coming in contact with these items must follow their agency's protocols against contracting blood borne diseases.
2. Clothing recovered from burned firefighters cannot be laundered. It should be completely air dried in sunlight before being placed in red biohazard waste bags.
3. Protective latex gloves should be worn when handling these items, even after they have dried.

### *Supporting Documentation*

Include the following photographs and additional information with the equipment sent to MTDC:

1. Pictures of the site. Identify where the items of PPE were located and to whom they belonged, if known.
2. Pictures of surrounding fuels and terrain.
3. Pictures of the items found underneath the fire shelter.
4. As much information as possible about the deployment.
    a) If it is possible to interview victims, try to obtain answers to the questions listed below in the section titled "Interview Questions."
    b) If it is not possible to interview victims, try to provide answers to as many of the interview questions as possible, based on the available evidence.

### *Interview Questions*

1. Firefighter information:
    a) How many seasons of fire experience have you had?
    b) What was your position on this fire?
    c) Were you wearing flame-resistant pants and shirt? Leather boots? Hardhat? Leather gloves? Where did you obtain these items?

d) What is your height? Weight?

e) If a shelter was used, was it a regular- or large-size shelter? Did you feel it fit you properly?

2. Training:

a) Have you received fire shelter training?

b) When did you receive your training?

c) Did you view a training video?

d) Which video did you watch?

e) Did you practice any deployments? If so, in what conditions did you practice?

f) Did you read the fire shelter training booklet?

g) How did you feel your training prepared you for this deployment?

h) Do you have any recommendations for changes in the training?

3. Decision to deploy:

a) How did you determine that you should deploy your fire shelter?

4. Deployment sequence:

a) When did you remove your fire shelter from your pack?

b) When did you remove your shelter from its clear plastic bag?

c) Were there any problems with either step?

d) What did you do with your pack once your shelter was removed?

e) How did you deploy your fire shelter? (For instance, from a standing position or a kneeling position?)

f) Was the fire shelter fully deployed?

g) Where were you located? (Show on map, ground, or photo.)

h) Which way was your body positioned? (For instance, where were your feet? Were you lying face down? Were you lying on your back?)

i) Did you have any trouble getting into the shelter? Please describe.

j) What items did you take into the shelter with you?

5. Shelter experience:

a) Please describe your experience inside the shelter.

b) Did you feel heat inside the shelter?

c) Was smoke inside the shelter?

d) How long did you remain in the shelter?

e) Did you change locations during the deployment?

f) How did you know when to come out of the shelter?

6. Other questions:
   a) Did you receive any injuries? If so what were they? When did they occur?
   b) Did you notice any problems with the shelter?
   c) Did you notice any problems with your PPE (pants, shirt, gloves, hardhat, etc.)?
   d) What can other firefighters learn from your experience?

### *Shipping Equipment to MTDC*

1. Fire shelters and fire shelter bags, PPE, packs, and personal belongings can be shipped to MTDC for examination.
2. Follow the precautions listed at the beginning of Part B.
3. Collect and bag the fire shelters and affected clothing. Label the bags with the name of the user, if known.
4. Mark the location where the items were found on a map of the site.
5. Send as much of the supporting documentation described in this document as possible, along with the equipment.
6. Before sending items to MTDC, contact the Center's PPE Project Leader or:

   Missoula Technology and Development Center
   5785 Highway 10 West
   Missoula, MT 59808
   Phone number: 406-329-3900

If no one is available at MTDC, call the Missoula Interagency Dispatch Center at 406-829-7070.

# Exhibit 5-2: Evidence Log

## EVIDENCE LOG

Incident Identification: _____

Evidence Custodian: _____

| Date Collected | Name of Individual Who Collected the Evidence | Name of Person Logging the Evidence | Description of Evidence | Remarks (Location found, etc.) | Evidence Identification Number | Sign-In (Signature Required) | Date Signed In |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

# Exhibit 5-3: Evidence Chain-of-Custody Log

## EVIDENCE CHAIN-OF-CUSTODY LOG

(For Non-Photographic Evidence)

Incident Identification: _____

Evidence Custodian: _____

| Description of Item | Evidence ID # | Name of Person Logging Item Out | Printed Name & Signature of Person Receiving Item | Date Item Received | Printed Name & Signature of Person Receiving Item Back In | Date Item Received |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# Exhibit 5-4: Human Reliability/Performance Factors

*Several models of analysis exist to evaluate human interaction and organizational influences associated with complex systems. The following model is recommended as an evaluation tool, as it is inclusive of many factors and its explanations within the model are easily understood and applicable. Other models may be used at the discretion of the SAIT.*

This exhibit provides elements of the Information-Decision-Action-Cognitive (IDAC) model developed by Katrina Groth and Ali Mosleh. These may be used to evaluate human factors influence during the serious accident investigation. The complete paper is located in *Reliability Engineering and System Safety*, Volume 108, December, 2012.

## Introduction

This model categorizes Performance Influencing Factors (PIF) to help describe aspects of the human–system interaction. Performance influencing factors that may be evaluated during a serious accident investigation include the following.

### 1. Person-based Factors

#### Skills

Skills refer to the abilities of the worker to do ‘‘work of the craft,’’ necessary task-related abilities that require little cognitive effort. Less than adequate skills can result in time delay for necessary actions or reduced work quality.

#### Familiarity with Situation

Familiarity with situation refers to the worker’s general industry knowledge and previous experiences. Workers with more experience likely exhibit familiarity with more situations and remember more than inexperienced workers. However, workers with high situational familiarity may also exhibit bias toward certain conclusions based on previous experience, despite indicators to the contrary. Lack of familiarity can occur when unanticipated situations arise, including situations that were not covered in training. Familiarity with a situation can have a mixed effect on the scenario evolution, because people with more familiarity with a system may diagnose and solve system problems faster. However, people very familiar with a situation may not consider indicators that make the situation unique. It may also impact teamwork because familiar personnel may discount the concerns of less experience team members.

#### Physical and Psychological Abilities

Physical and psychological abilities (PPA) refer to the mental and physical resources available to the individual while in the workplace. This includes alertness, sensory limits, and fitness for duty and also to situations where the worker’s physical ability falls outside of the normal range.

Fitness for duty non-compliance, circadian factors/individual differences, or impairment PPA can be altered by the use of alcohol and illegal or legal drugs, or the absence of necessary prescription drugs (e.g., diabetes medication). PPA can also be affected by the emotional state of the worker, illness, hunger, and overexertion. PPA also includes the natural abilities of the worker as influenced by circadian rhythms.

Psychological and physical abilities should not be confused with knowledge and experience or training. Training, knowledge, and experience relate to the knowledge possessed by the worker, whereas the PPAs refer to the readiness of the worker to use the knowledge possessed.

It is difficult to separate entirely physical versus entirely psychological responses. Psychological states can affect one's physical performance and physical condition can affect one's psychological state. The constant interplay between physical and psychological states allows for the argument that they cannot be separated when studying performance.

**Fatigue**

Fatigue relates to the physical and mental weariness resulting from too little rest, high demands, or overexertion. It is the state of feeling ''worn out.'' Fatigue relates directly to physical and psychological abilities, because fatigued workers may have reduced physical capability and slower or less effective cognitive responses. Fatigue can be affected by diet, work hours, work breaks, shift rotation, and night work.

**Alertness**

Alertness is related to the ''awakeness'' of the worker as it relates to responding to planned or unplanned demands. It refers to the amount of attention available to be distributed among the tasks. Reduced alertness can affect the cognitive abilities of the worker.

**Attention**

Attention refers to how the worker distributes the available cognitive resources. Attention can be affected by many external distractions and it can also be affected by internal thoughts, distractions or emotional state. Attention is influenced by the number and complexity of tasks, communication with others, and background noise and activity. It is composed of attention to task and attention to surroundings.

Attention to task refers to the attention resources dedicated to a specific task. Workers must properly balance attention to task and attention to surroundings to ensure that they are focusing on the task at hand but not becoming so involved in the task that they do not notice critical changes in the background.

Attention to surroundings involves being aware of the state of the environment, the actions of other workers, and other surroundings. This includes much of the information that is registered passively while completing tasks.

**Bias**

Bias is the tendency of humans to make conclusions based on selected pieces of information while excluding information that does not agree with the conclusion. There are many types of bias, including expectation bias, confirmation bias (i.e., looking only for information that supports one's hypothesis), belief bias (i.e., selecting information to reinforce one's own personal beliefs), and averaging bias (i.e., regression toward the mean).

Bias is closely tied to familiarity with situation; bias refers specifically to situations where the worker disregards some available information in an attempt to seek out information to confirm a theory. Bias may result from previous experiences as well. Bias may be demonstrated by operators attempting to reinforce their own suspicions while ignoring information to the contrary. Bias may influence a worker's actions and decision making.

**Morale/motivation/attitude**

Morale, motivation, and attitude (MMA) together refer to style, temperament, personality, and intrinsic human variability. These characteristics manifest as willingness to complete tasks, the amount of effort a person devotes to tasks, and the state of mind of the worker. Just like each organization has a different values and motivators, people also have unique underlying influences. Morale, motivation, and attitude can be affected by external factors such as organizational culture, teamwork, and resources, but each person will internalize these factors differently leading to varying MMA even among team members.

Personal work practices are behaviors that indicate morale, attitude or intrinsic characteristics of the person that prescribe the way they behave. Since it is extremely difficult to measure attitude, especially in retrospective analysis, it is necessary to include specific work practice behaviors as metrics of attitude.

Problem-solving style (behavior) refers to the way which people and teams approach a problem. It includes the way that people communicate with each other as well as the non-vocalized thought process. It is related to hastiness behavior (quick way of working). People may adapt different problem solving styles based on the composition of the group.

**Stress**

Stress is tension caused by physical or psychological factors; it can be either disruptive or facilitative. The IDAC model (Figure 15) includes four types of stress: pressure, conflict, frustration, and uncertainty. Urgent matters that require immediate attention result in a feeling of pressure. Multiple incompatible goals result in conflict stress, while the perception of a blocked goal leads to frustration. Inability to fully understand and plan an appropriate response to a situation results in uncertainty.

Different types of stress influence worker performance differently. Large demands could result in a worker feeling pressure and increasing the internal resources (e.g., attention) used to meet the demand. Individuals may respond to conflict stress by changing certain goals or obtaining additional external resources. They may respond to frustration caused by blocked goals by altering the goals or the methods used to achieve the goals. They may respond to uncertainty by attention to gather additional information or other resources to better understand and respond to the situation.

**Tasks**

- Task load

  Task load refers to the actual task demand assigned to a person, in terms of the number and type of tasks (varying complexity, importance, fault tolerance, duration, etc.). These tasks can be simultaneous or in sequence. Task load is a component of the perceived workload. The task load PIF typically applies in cases where there are too many tasks assigned to one person, but there may be cases where having too few tasks can lead to errors via worker complacency. Task load is related to the task scheduling PIF, because effective task scheduling will ensure that workers are not overloaded with planned tasks. Task load can also be impacted by unplanned or emergency events. The number of tasks is relevant to errors because high task load could result in workers rushing to complete tasks without quality checks. It can also influence the stress level of the worker.

- Time load

  Time load is similar to task load, but it adds the element of perception of time to the number of tasks; this time perception can affect worker stress beyond the stress of having too many tasks. In time load situations, the worker is expected to complete a specific task or a number of tasks in a certain time. If time load is less than adequate, the worker perceives the time limit to be too short and this perception can affect the stress level of the worker. Like task load, time load may also have infrequent cases where too much time could contribute to error. Errors can occur during less than adequate time load situations because workers may rush through tasks, skip quality checks, limit communication and teamwork, or fail to complete tasks

- Other loads

  Other loads refer to the tasks beyond those necessary to complete the task at hand. Other loads can be considered any routine tasks that are not necessarily covered in training. Tasks directly relevant to the work are task load factors, but tasks such as communication are considered other loads.

- Task complexity

  Task complexity refers to the cognitive and physical demands of the task at hand. Task complexity considers the difficulty of diagnosing and executing work, the amount of knowledge required to complete the task, the number of steps required to complete the task, the precision required, and the ambiguity of the situation. Complexity also includes the mental and physical effort required to execute the selected problem solving strategy for the task. While task complexity is subjective depending on the worker, it is still possible to estimate the relative complexity of a situation from the perspective of the average worker; there are scenarios which can be clearly labeled more complex.

**Perception and Appraisal**

It is important to emphasize the role of perception in this category—the loads are objective characteristics of the situation, but the perception of the loads is what makes them a stressor. Perception serves as the filter that turns situational characteristics into an internalized load. The subjective loads can increase based on the perception of the objective difficulty of diagnosing and executing work, the amount of knowledge required, the number of steps required, and the ambiguity of the situation. The number of alarms flashing is objective, but the perception of the alarms is what creates stress. The perception of the alarms can vary between personnel and can also vary within the same person depending on the state of other PIFs. Each person performs an individual situational assessment and forms individual perceptions of situational severity and urgency.

**Perceived Situation Severity**

The perceived severity of the situation is a personal assessment of the magnitude of the impact of the situation and its potential consequences. Possible outcomes could adversely affect the worker, the plant, or the general public. Perception of severity could be influenced by attitude, but attitude may also be affected by the personal assessment of severity.

**Perceived Situation Urgency**

Much like the severity of the situation, the perceived situation urgency is a personal assessment of the situation. It is an assessment of how quickly an outcome is approaching. Perceived urgency indicates how close the worker believes the task is to the state of failure and thus impacts the perceived time load. A similar concept in the literature is the ‘‘rate at which the situation moves toward the moment at which negative consequences materialize.’’

**Perceived Decision Responsibility**

Perceived decision responsibility is the worker’s perceived responsibility and accountability for his/her decisions and actions. Individuals may have to weigh several impacts and make the optimal decision that balances the impact on the operation, the public, and the worker. An individual may take a different course of act depending on his or her sense of responsibility and if they have to account for the actions later. A decision that is made based on a procedure would have a different perceived decision responsibility than a decision based on the operator’s own knowledge. An individual’s perceived decision space may differ from actual appointed decision space.

**Human–machine Interface**

The human–machine interface PIF covers how information is communicated between humans and broadly defined machine (e.g., tools, equipment, technology). It includes ergonomics, usability, and physical access. This PIF includes maintenance work on machines as well.

There are two ways that humans interact with machines: providing input and receiving output. Humans interact by giving input to the machine in ways such as turning a dial or entering a command on a keyboard. This PIF considers arrangement of equipment/layout of the system as well. Poorly designed layout could include inaccessible displays, difficult-to-turn dials, or tasks that require contorting the body to operate the machine.

Humans also interact with machines to get information (machine output). This includes reading analog and digital output. Humans must be able to get to the physical location of the output device, and they must also be able to clearly read the output. Inaccurate labels, display range, or markings could prevent the human from getting the correct output. If the human is able to access the device and chooses not to, it is a personal work practices issue, not an interface problem.

**2. Organization-based Factors**

**Safety Culture**

Safety culture characterizes the organizational attitude, values, and beliefs toward worker and public safety. The safety culture is typically set by management and trickles down through the ranks to affect performance at all levels. An organization with a positive safety culture takes effort to maintain safety even when it might adversely impact productivity or budgets. Different organizations, and groups within organizations, have different priorities with regard to safety and productivity. Safety culture is at the root of many system-wide failures. Individual performance cannot be completely independent of safety culture, and thus the effect of safety culture propagates through worker performance throughout the organization.

Safety culture itself is not inherently observable. However, we can observe ways in which safety culture manifests itself. The safety policies, the way management prioritizes tasks, and the way workers comply with procedures, are more visible elements that can be linked to safety culture.

**Training**

Training refers to the knowledge and experience imparted to the personnel by the organization. Training includes the content of training courses, the manner in which they are trained (e.g., as a team or individual; simulation or classroom), and the frequency/recurrency of training. Personnel must be trained on proper use of tools/equipment/etc. and must be prepared to deal with emergency situations. Training must contain correct information and must be broad enough to provide personnel with the knowledge to deal with dynamic problem situations. Training is causally linked to knowledge, but it differs specifically from the knowledge PIF in that the same training is provided to all crews and crew members, but the information retained in from training may differ. This retained information is where training becomes knowledge, and this knowledge is different for every crew member.

**Procedures**

Procedures are explicit, step-by-step instructions for performing a task. Hypothetically there should be no error made if the procedures are followed to the letter. However, procedures are often imperfect and can lead staff to make errors. Less than adequate procedure quality can be broadly defined as any condition where a procedure exists but is insufficient to ensure that the job is completed correctly. Less than adequate procedure availability is the situation where procedures for the task at hand do not exist or are not accessible. This could include unanticipated conditions or conditions where the available procedures are only partially relevant.

**Workplace Adequacy**

Workplace adequacy refers to aspects of the workplace environment that can be changed by the organization. This includes aspects of workplace layout and configuration, workplace environmental stressors (e.g., ergonomics, lack of adequate HVAC). Workplace adequacy generally refers to the quality of the office environment.

**Tools/Equipment**

Tools/equipment availability and quality refer to the physical tools/equipment provided to workers by the organization. Proper tools/equipment (including number and type) must be available to ensure that personnel do not have to develop work-arounds or postpone tasks. Tools/equipment must also be adequately maintained, including proper calibration, etc.

**Staffing**

Staffing refers to the way that the organization hires personnel and assigns tasks. It is an organizational responsibility to ensure that the personnel they hire have the knowledge necessary to perform their jobs. It is also an organizational responsibility to assign appropriate numbers of personnel to tasks, to ensure that teams have members with complementary skills, and to ensure that teams have had appropriate opportunities to train together. Staffing must balance the organization's interest in keeping costs low, preventing errors, and ensuring a continuous workforce (e.g., training new workers before experienced workers reach retirement). This requires consideration of the number of experts versus inexperienced staff that are placed on a task.

Staffing issues can impact personnel performance in several ways. Less than adequate staffing may cause personnel to be assigned too many tasks, certain staff to carry the majority of the task load, or personnel to work without sufficient rest time between shifts. Staffing can also include team issues, wherein the organization rearranges crews without giving them enough opportunity to train together before being placed in operating situations. Staffing also considers inappropriate hiring decisions that result in personnel without the necessary skills being assigned unfamiliar tasks.

**Task Scheduling**

Task scheduling refers to how the organization plans and distributes tasks to personnel. Task scheduling encompasses activity planning and scheduling, resource allocation, and ordering (prioritization) of planned tasks. Task prioritization by the organization should not be confused with the personal prioritization behavior of individual workers. The organizational prioritization problems occur over a longer time scale and multiple people are involved in the planning and decision making directly or through a review process. Personal prioritization problems usually occur over a shorter time period (e.g., during an emergency situation) and involve a single individual making the decision.

Task scheduling can be related to staffing issues, including cases where inadequate number of staff is available to complete tasks, so tasks cannot be completed in expected time. Less than adequate scheduling can be indicated as frequent task rescheduling, inadequate scheduling of test and surveillance activities, or assigning too many tasks to an employee or team. In the latter case, there is a strong relationship between task scheduling and staffing. While staffing and task scheduling may/or may not have a direct relationship, they are highly correlated because the same organizational influences both PIFs.

**Necessary Information**

Information availability and information quality refer to necessary information about the system or task that is pertinent to the work. Information can include log books from previous shifts, vendor manuals, or action plans, etc. The information availability and information quality is intended to capture information that is exclusive of the procedures or tools.

**3. Team-Related Factors**

**Communication**

Communication refers to the ability of team members to pass information to each other. It allows team members to have shared knowledge of a situation. Communication can be verbal or in writing. Communication refers only to information sharing between people.

Communication is broken down into communication availability and communication quality. Complete lack of communication—no information is passed. With less than adequate communication quality, some information is passed, but it may be partial information or incorrect information. Untimely communication has the same effect as lack of communication—the information is not communicated when necessary. Poorly communicated information may not impact the scenario if the information does not alter human performance. Poor safety culture likely also affects communication

## Team Cohesion

Team cohesion refers to the way that team members interact with each other. It has been referred to as group morale, interpersonal solidarity and team compatibility. It is closely related to team coordination, as teams that are less cohesive may not coordinate as efficiently as other comparable teams. Members of cohesive teams are able to work together within their roles to complete tasks effectively. Team cohesion includes group morale and group attitude toward the task.

## Team Coordination

Team coordination refers to the overall interactions of the team, including division of responsibilities and ability to work as a unit (teamwork). Communication and direct supervision are aspects of team coordination, but team coordination also goes farther and considers additional factors that contribute to overall team performance. This includes planning and scheduling on the team level and decisions made during team meetings. While poor communication could be responsible for poor coordination, there are additional factors that could lead to poor coordination, such as a lack of knowledge in the team, or poor team interactions wherein one member dominates or some team members are unwilling to contribute.

## Direct Supervision

Direct supervision serves as the link between management and the team members. Direct supervision is separate from management because direct supervisors work with and assign tasks to personnel, whereas management is a more indirect authority working through the supervisor. The direct supervisor can be seen as a member of the team, albeit a member with additional authority and responsibility. The supervisor sets a direction for the team and influences the attitudes of the team members. The supervisor has the dual responsibility of setting goals for the group and also working with group members to accomplish these goals. Inadequate direct supervision can be found in the form of insufficient direction/guidance or in a supervisor being overly involved in tasks.

## Role Awareness

Role awareness is related to how each team member perceives his/her duties, responsibilities, and role as a team member. It is related to how the team divides tasks and how team members interact. Members of a team have defined roles and it is necessary for every team member to comply with expectations of his/her role. During an unplanned situation, if one or more member of the team deviates from the expected role it can have a negative impact on teamwork and on the progression of the situation.

Role awareness has two main functions: to ensure that tasks are completed and to enhance team coordination. Proper role awareness ensures that all necessary tasks are completed and reduces conflict among team members. A team cannot properly function without a leader, but a team also cannot function with too many leaders.

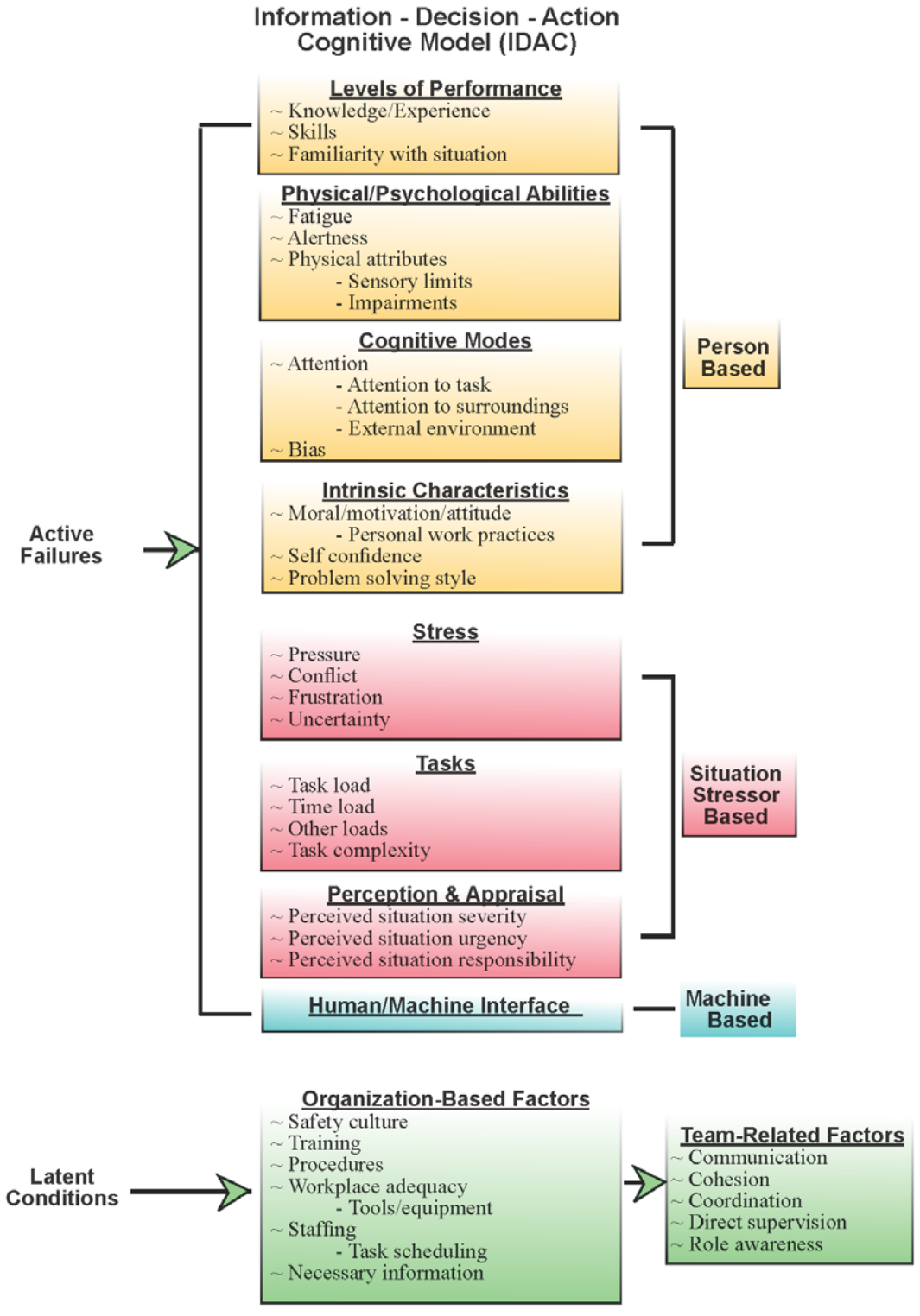


Figure 15: Information – Decision – Action – Cognitive (IDAC) model (*Katrina Groth and Ali Mosleh)*

# Exhibit 5-5: Accident Investigation Witness List

**ACCIDENT INVESTIGATION WITNESS LIST**

| Witness Name | Agency | Work Address | Supervisor | Office Contact Information | Date and Time of Scheduled Interview | Location |
|---|---|---|---|---|---|---|
| | | | | | | |
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# Exhibit 5-6: Accident Investigation Witness Statement

## ACCIDENT INVESTIGATION WITNESS STATEMENT

| | | |
|---|---|---|
| ACCIDENT/INCIDENT | | |
| PERSON MAKING STATEMENT *(last, first, middle)* | | HOME PHONE NUMBER |
| HOME ADDRESS *(street, city, state, zip code)* | | WORK PHONE NUMBER |
| EMPLOYMENT *(occupation and location)* | | |
| LOCATION STATEMENT TAKEN | NAME OF INVESTIGATOR TAKING STATEMENT | DATE TIME STARTED |
| STATEMENT | | |
| | | DATE/TIME ENDED |
| SIGNATURE OF PERSON GIVING STATEMENT | | |
| | WITNESS' SIGNATURE (*If Applicable*) | |
| | | |

# ACCIDENT INVESTIGATION WITNESS STATEMENT

PAGE _____ of _____

# Exhibit 5-7: Accident Investigation Witness Interview

## ACCIDENT INVESTIGATION WITNESS INTERVIEW

☐ Initial Interview

☐ Follow-up

| | | |
|---|---|---|
| NATURE OF INVESTIGATION: | | |
| NAME OF PERSON INTERVIEWED: | | |
| HOME ADDRESS (street, city, state, zip code): | HOME PHONE WITH AREA CODE: | |
| EMPLOYER (name and address): | WORK PHONE WITH AREA CODE: | |
| LOCATION OF INTERVIEW: | NAME OF INTERVIEWER: | |
| OTHERS PRESENT: | STARTED<br>DATE:<br>TIME: | ENDED<br>DATE:<br>TIME: |
| REMARKS: | | |
| INTERVIEWER'S SIGNATURE: | WITNESS' SIGNATURE: | |

PAGE _____ of _____

**ACCIDENT INVESTIGATION WITNESS INTERVIEW** (continued)

PAGE _____ of _____

# CHAPTER 6 – EVIDENCE ANALYSIS AND DELIBERATIONS

## 6.1 INTRODUCTION

When team members have completed all their tasks and begin evaluating evidence, the SAIT should meet to collectively review the data and finalize the investigation analysis—also called the deliberative process/team deliberations. The Chief Investigator leads this analysis. SAIT members, including subject matter experts, are part of the deliberations. Technical specialists are typically not part of the deliberative process since they generally provide the Chief Investigator with their respective technical report(s) and are released.

The SAIT will review all the evidence gathered in course of the investigation, identify the facts (verified information based on the evidence the team members concludes to be factual), and categorize all evidence as human, material or environmental (See Chapter 5 – Evidence Gathering). The objective is to determine facts and come to a consensus based on the evidence.

During deliberations four key tasks should be accomplished:

1. Agree on the accident sequence based upon the facts gathered
2. Establish the findings
3. Construct cause(s)
4. Develop recommendations

The deliberative process/team deliberations must be flexible enough to capture the complex nature of the work with consideration given to the associated human factor variables.

### WILDLAND FIRE

The following accepted guiding principle for safe and effective wildland fire operation should be considered when conducting wildland fire accident investigations:

> The primary means by which we implement command decisions and maintain unity of action is through the use of common principles of operations. These principles guide our fundamental wildland fire management practices, behaviors, and customs, and are mutually understood at every level of command. They include Risk Management, Standard Firefighting Orders and Watch Out Situations, LCES and the Downhill Line Construction Checklist. These principles are fundamental to how we perform fire operations, and are intended to improve decision making and firefighter safety. They are not absolute rules. They require judgment in application. (*Interagency Standards for Fire and Fire and Aviation Operations*)

Given the stated guiding principle above, the SAIT should refrain from conducting a separate analysis of the “Standard Firefighting Orders” and “18 Watch Out Situations.” This type of analysis can result in the lack of constructing true causes resulting in poor preventative measures. (They are symptoms, not causal factors.)

## 6.2 ACCIDENT CHRONOLOGY

Once developed, the SAIT must carefully review the chronology to ensure that the accident timeline is complete and no unexplained gaps of time are present. Looking at the three types of evidence, consider the following when reviewing the accident chronology:

1. Pre-accident – events leading up to the accident
2. Accident – accident sequence of events
3. Post-accident – actions taken post-accident

If there is a gap within the accident chronology, provide an explanation.

### PRE-ACCIDENT

Establish the sequence of events leading to the accident to answer the following questions:

- *Who*, *what*, *when*, *where*, *why*, and *how* the operation was planned and how it actually was implemented (e.g., "the gap").

Identify any pre-accident contributing factors, for example:

- Human:
    - Sense of urgency
    - Fatigue
    - Physical/medical condition
    - Organizational factors (policies, standard operating procedures, culture/norms, etc.)
        - Management pressure to complete a job or task
- Material:
    - Equipment condition/performance
    - Maintenance records
- Environmental:
    - Anticipated weather conditions (micro and macro) that were not taken into consideration
    - Terrain/Topography

## ACCIDENT

Determine the accident sequence of events. All types of evidence must be considered and categorized into three areas: human, material, and environmental. Identify any contributing factors within each category.

- Human:
  - Lack of information
  - Instructions not understood
- Material:
  - Use of seatbelts
  - Worn tires
  - Equipment malfunction
- Environmental:
  - Known weather conditions
  - Condition of road surface

## POST-ACCIDENT

Identify the post-accident sequence of events/actions (e.g., search and rescue effort, medical efforts), how the accident was first reported, and the locations of personnel/equipment at the conclusion of the accident. (Figure 16)

Describe any actions that may have contributed to post-accident injury or damage.

Describe rescue, first aid, extraction/ evacuation, equipment retrieval/recovery efforts, etc.

Identify all medical facilities that provided treatment.

Note any disturbance to the accident site, including:

- Security/preservation measures taken
- EMS/medical response
- Equipment retrieval/recovery

Figure 16: CAL FIRE employees during medical evacuation in Northern California (NIFC, 2008)

### *Injuries*

Record all injuries. Include any injury sustained during the accident through the subsequent rescue and medical care.

Document the condition of the patients, medical treatment, and summarize autopsy reports and/or information provided by medical examiner/coroner, if applicable.

### *Damage*

Estimate the extent and cost of the equipment or property damage and through agency policy determine level as minor, major, destroyed or repairable.

Once the SAIT has agreed on factual evidence, the next step is to determine findings.

## 6.3 FINDINGS

Each finding is a single event or condition based on a fact; findings are essential steps in the accident sequence and based on the weight of evidence, professional knowledge, and judgment.

Each finding is an essential step in the accident sequence, but each finding is not necessarily causal. Do not include any more information in each finding than is necessary to explain the event occurrence.

Ensure all findings are supported by facts and that critical events required sustaining the accident sequence have not been omitted.

Findings are identified by category (human, material, and environmental) in the findings section of the *Factual Report*. Number findings consecutively in the order in which they occurred, not necessarily in the order they were discovered. Precede each finding as full sentences and not bullet points within the *Final Report*.

***EXAMPLE:***
**Finding 1 (Material): The front right retread tire on the vehicle failed.**

***IMPORTANT NOTE:***
**There may be findings that are not causal and/or did not impact the outcome of the accident; however, they were related to the accident and are significant enough to potentially result in program improvements and should be included in the *Factual Report* as a finding (but not a cause) with associated recommendations provided in the *Management Evaluation Report (MER)*. Place these findings in the list in most logical sequence possible.**

### OTHER FINDINGS

The SAIT may have determined other findings during the investigation which were not directly related to the accident, but if left uncorrected, could lead to an accident.

***EXAMPLE:***
**The investigation team checked fleet vehicles not involved in the accident and determined low tire pressure inflation in the majority of fleet vehicles.**

"Other Findings" shall be documented with recommended corrective actions within the *MER*.

Once findings are determined, the SAIT should evaluate all findings and decide which are causal.

## 6.4 CAUSE

A cause is an event, situation, or condition (a deficiency) which if corrected, eliminated, or avoided, would likely have prevented or mitigated the mishap, damage, or significant injury; cause does not imply blame.

***IMPORTANT NOTE:***
**Each cause must be supported by a finding.**

Findings that started or sustained the actual accident sequence are the basis of causal factors. Although all findings are significant, not all are causal; for example, findings that sustained the accident sequence but were normal to the situation as it developed are not causal.

***EXAMPLE:***
**Crossing a roadway at a pedestrian crosswalk would not be causal.**

Additionally, some conditions are the effects or the expected result of a previously identified cause.

***EXAMPLE:***
**A car tire blows out during highway travel causing the driver to lose control, leave the roadway, and hit a tree. The cause of the accident was not leaving roadway or hitting the tree; the cause was the tire blow out.**

The team must continue to ask the question "why" until all the cause(s) of each event, situation, or condition leading to the accident has been identified. Failure to identify all causes, could lead to inadequate recommendations to prevent future occurrences/accidents. Multiple causes can be identified, but it is imperative to continue the investigative process until all possible causes have been determined. Continue to ask "why."

Occasionally the SAIT may not be able to conclusively determine the specific cause(s). In these rare instances, the cause(s) may remain unknown and should be emphatically stated as such in the *MER*.

## ACCIDENT TRAJECTORY/SWISS CHEESE MODEL

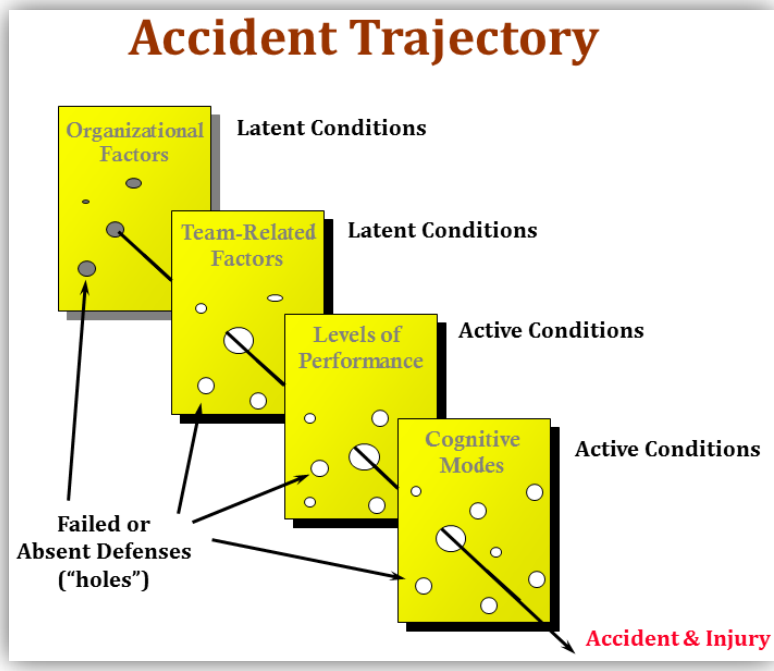
During the investigation, SAITs must consider the broad concept of system/organizational failures as they deliberate, determine, and construct findings and causes. Accidents result from multiple or combinations of causes that are influenced by human interaction and decision making within a complex system. Gaps and weaknesses (e.g., holes) contribute to conditions that lead to undesired outcomes. These gaps and weaknesses are described as active failures and latent conditions.

Active failures have an immediate undesired consequence. They may include changes in equipment, systems or processes that trigger an immediate undesired consequences.

Latent conditions are organization-related weaknesses, conditions, or equipment flaws that are buried inside the organization undetected for long periods of time but can be triggered in a particular set of circumstances.

The condition and circumstances that led to the active failures may be the symptom of existing latent conditions which contributed to the individual(s) making the decision(s) that led to the undesired outcome. In this case, a causal factor is not the decision made, rather it is the latent condition and lack of defenses in the system along with the individual(s) decision that resulted in the accident. The cause was not solely the individual(s) decision.

***Important Note:***
**Understanding the sense behind why the individuals involved in the accident made the decisions they did is critical. What team members think "should have" happened or "could have" happened may not be relevant—be mindful of the human tendency towards hindsight bias.**




The accident trajectory diagram (Figure 17) demonstrates how the gaps and weaknesses (e.g., holes) line up that result in the undesired outcome/accident. This diagram is also often referred to as the "swiss cheese model." *(Reason)*

This model is a tool for SAITs to consider as they deliberate, determine, and construct findings and causes. This will lead to more appropriate recommendations that can lead to corrections actions in an effort to prevent future similar occurrences.

Figure 17: Accident trajectory passing through corresponding holes in the layers of defenses, barriers, and safeguard. (James Reason, Managing the Risks of Organizational Accidents)

### WRITING CAUSE(S)

Write each cause in the active voice, clearly identifying the initiating event and/or persons, action, and outcome; along with any necessary clarifying information.

**EXAMPLE:**
**Cause 1 (Human): The right front retread tire was underinflated, causing the tire to fail.**

Apply the reasonable person concept. If a person's performance or judgment was reasonable considering the accidents circumstances, performance or judgment might not be a causal factor. To expect extraordinary or uniquely superior performance in such cases is not appropriate.

## 6.5 RECOMMENDATIONS

Once the team has completed the analysis of the findings and identified cause(s) and reached consensus, the next step is to develop recommendations.

Recommendations are reasonable courses of proposed management actions based on the identified findings and cause(s) that are intended to reduce organizational and individual risk by controlling or minimizing hazards.

- Recommendations are generally related to specific findings of the investigation.
- Recommendations should be specific, achievable, and directed to particular individuals or entities that are capable of acting on them.

The Team Leader and Chief Investigator will lead the SAIT in the development of recommendations.

Recommendations can vary in scope and can be directed to various levels within the organization for implementing the corrective action. In some cases, more than one level in the organization or even other agencies will have action responsibility.

If an organizational level is assigned, responsibility for the corrective action should have authority commensurate with the nature of the recommendation.

***IMPORTANT NOTE:***
**Not every finding and/or cause will have a recommendation; *however*, every recommendation needs to be supported by a finding and/or cause.**

**Recommendations should:**

- Identify measurable action(s) that can be assigned to an organizational level.
- Include definitive solution(s) to the problem/cause(s) that are achievable and realistic.
- Be specific to the related finding and/or cause(s).

- Provide the most optimal opportunity of success in preventing potential future related events.

**Recommendations should not:**

- Identify punitive actions addressing an individual's failure or error.
- Recommend briefing unit personnel on the accident. Such briefings are a basic management responsibility on every accident.
- Recommend sweeping or general recommendations that cannot be implemented by the assigned action level (s) or identified as a completed action.

Findings, causes, and recommendations should be grouped, or related, together as necessary to indicate the relationship of finding(s), cause(s), and subsequent recommendation(s). Remember not every recommendation requires a cause, but should always have a finding(s).

Specific templates for the *Final Report*, including the *MER* are provided in Chapter 7 – Reports.

In summary, during deliberations four key tasks should be accomplished:

- Agree on the accident sequence based upon the facts gathered.
- Establish the findings.
- Construct cause(s).
- Develop recommendations.

# CHAPTER 7 – REPORTS

## 7.1 INTRODUCTION

The purpose of this chapter is to provide standardization for interagency serious accident investigation reports.

Any additional agency-specific guidelines will be applied once the final interagency accident report is complete. Consult specific-agency manual handbooks or guides when preparing additional agency-specific reports.

## 7.2 24-HOUR PRELIMINARY REPORT

The local unit has the responsibility to produce the *24-Hour Preliminary Report* and submit to the delegating official(s) or designee(s) for distribution. This report contains the first details of the accident. This information does not necessarily become part of the *Factual Report* but is retained as part of the accident investigation case file.

In the event the report was not completed by the local unit, the Team Leader should:

- Prepare the report using the format provided in *24-Hour Preliminary Report* (Exhibit 7-1).
- Obtain information from Agency Administrator in-brief (and other sources).
- Confirm/verify information received.
- Avoid speculation.
- Coordinate with the delegating official(s) or designee(s) for content prior to final approval. Once the form has been approved by both the Agency Administrator and the delegating official(s), the delegating official(s) or designee(s) shall release the report per agency-specific direction.

## 7.3 72-HOUR EXPANDED REPORT

The *72-Hour Expanded Report* is the first product prepared by the SAIT. The report is prepared by the Chief Investigator within 72 hours of the team's arrival and signed by the Team Leader. The Team Leader sends the report to the delegating official(s) or designee(s) for approval and release.

Reports shall be prepared in accordance with the following:

- Prepare the report following the format provided in *72-Hour Expanded Report* (Exhibit 7-2).

- Coordinate with the delegating official(s) or designee(s) for content prior to final approval. Once the form has been approved by both the Team Lead and the delegating official(s), the delegating official(s) or designee(s) shall release the report per agency-specific direction.
- If no *24-Hour Preliminary Report* was completed when the *72-Hour Expanded Report* is due, the Team Leader should consider not completing the *24-Hour Preliminary Report* and state that there was no *24-Hour Report* issued within the *72-Hour Expanded Report*.

This report provides more detail about the accident:

- Number of victims.
- Names of fatality victim(s) (if next of kin has been notified**); do not release names of injured victims.**
- Severity of injuries or property damage.
- Synopsis of known facts.

If the delegating official(s) or designee(s) determines that immediate action needs to be taken (e.g., safety alerts, stand-downs), they will initiate those actions through a separate process.

## 7.4 SAFETY ALERT

A *Safety Alert* is prepared when the investigation has identified a safety hazard that poses an imminent threat to life or property. Examples include a failure of a piece of equipment or an inadequate policy or procedure or environmental conditions that could lead to an accident before the investigation report is completed.

The Team Leader may be requested to prepare a draft *Safety Alert* which identifies the hazards and recommended corrective actions to be taken. The draft *Safety Alert* is forwarded to the delegating official(s) or the designee(s) for approval and release.

For wildland fire-related safety alerts, the delegating official(s) or the designee(s) will submit the final *Safety Alert* to their respective wildland fire safety/risk management representative who will submit the safety alert through appropriate channels.

A *Safety Alert* can be submitted at any time during the accident investigation process.

Prepare the safety notification using the *Safety Alert* template (Exhibit 7-3) or an agency-specific format.

## 7.5 FINAL REPORT

The SAIT will provide its *Final Report*, which consists of the *Factual and Management Evaluation Reports*, to the delegating official(s) within 45 calendar days of the accident.

## 7.6 FINAL REPORT EXTENSIONS AND STATUS REPORT

Extensions beyond the 45-day deadline need to be requested by the Team Leader and approved by the delegating official(s) authorizing the accident investigation. If extensions are requested, the Team Leader will provide an update identifying current status of investigation and any other related pertinent information.

## 7.7 FACTUAL REPORT

The purpose of the *Factual Report* (Exhibit 7-4) is to provide a narrative of the events leading up to, during, and after the accident.

This information about the factual events and the findings of the accident will help prevent similar types of accidents from happening in the future.

The report should provide:

- Executive summary of the event
- Chronology of the accident sequence
- Any post-accident actions (e.g., emergency response)
- Attachments or addendums essential to support the factual information (e.g., maps)

The Team Leader and Chief Investigator are responsible for the *Final Report*. They may assign the draft report writing (or portions of the report) to other members of the SAIT, depending on the complexity of the accident. In more complex investigations a writer/editor may be used.

Only the facts go into the *Factual Report*—no inferences, conclusions, or recommendations.

Autopsies, witness statements, names of witnesses, or other documentation containing personal information will not be included in the *Factual Report*. These documents will be included in the case file.

Prepare the *Factual Report* using the format found in Exhibit 7-4.

## 7.8 MANAGEMENT EVALUATION REPORT (MER)

The *Management Evaluation Report (MER)* (Exhibit 7-5) is the second part of the *Final Report* and is intended for internal agency use only. The purpose of the *MER* is to review the following:

- Management policies
- Practices
- Procedures
- Human/Organizational factors related to the accident

The *MER* takes the findings identified in the *Factual Report* and identifies the cause(s) of the accident.

In addition to information used from the *Factual Report*, the *MER* contains:

- Findings identified in the *Factual Report*
- Cause(s) of the accident
- Conclusions and observations
- Confidential information (no witness statements or autopsy reports)
- Recommendations for corrective measures
- Other findings—findings not related to the accident which if left uncorrected could lead to future accidents/organizational failures (follow specific agency policy regarding other findings)

Prepare the *MER* using the format found in Exhibit 7-5.

## 7.9 DISTRIBUTION OF ACCIDENT REPORTS

Within 45 days of the accident, the original and two copies of the *Factual and Management Evaluation Reports* will be sent to the agency delegating official(s) or designee(s). These documents must be sent by traceable means. The agency will review the reports and approve them or submit them for other review processes within their agency or interagency as outlined within their policy.

The respective agency delegating official(s) or designees(s) will review the *Final Report* and submit for agency-specific accident review (e.g., Accident Review Board).

***IMPORTANT NOTE:***
**These reports are draft until they have been approved by the respective agency leadership and/or gone through their established agency accident review process.**

## 7.10 CASE FILES AND PHYSICAL EVIDENCE

The accident investigation case file has two components: the accident investigation *Final Report* (*Factual* and *Management Evaluation Reports*) and the supporting documentation and equipment that are not in the investigation report. Evidence (e.g., tapes, photos not used or unfit for distribution, witness statements, and documents that may be too large) should not be included in the investigation report. This information should be kept in the case file and only referenced in the accident investigation report to support SAIT findings.

Any physical evidence that the Chief Investigator feels should be kept, such as a hardhat that failed, becomes part of the case file.

Case files including factual data that was generated during the investigation but not contained within the report will be forwarded, by traceable means, to the agency Office of Record. Refer to agency-specific policy or consult with delegating official(s) or designee(s).

Prior to returning physical evidence, coordinate with the delegating official(s) or designee(s) to ensure evidence collected is appropriately disseminated. Most property may be returned to the property owner or insurance company under signed receipt. Return of contractor property will be coordinated through the appropriate Contracting Officer.

The identification of the Office of Record (for retaining final case file and processing FOIA requests) should be identified in the delegation of authority or provided to the SAIT by the delegating official(s) or designee(s). For interagency SAIs, this will need to be negotiated and determined by involved agencies at the delegating authority level.

An inventory of case file contents shall be included with the case file prior to releasing to Office of Record. The *Serious Accident Investigation Case File Inventory* template (Exhibit 7-6) should be used to create case file inventories.

The Team Leader should verify with any other investigative entities/collateral investigation(s) before releasing any evidence gathered during the investigation.

After the *Final Report* approval, Team Leader must ensure that all previous working draft copies of the report are destroyed.

## 7.11 RELEASE OF FINAL REPORT

The internal distribution and external release of the *Final Report* (or its parts) will be determined by the delegating official(s) or designee(s) and is agency-specific.

The SAIT does not have authority to release or distribute the *Final Report* (or any portion of the report).

# Exhibit 7-1: 24-Hour Preliminary Report Cover Letter and Format

**[Letterhead]**

[**Date**]

To: [**Delegating Official(s)**]

From: [**Local Unit Agency Administrator**]

Subject: 24-Hour Preliminary Report, [**Name of Incident**]

**THE FOLLOWING INFORMATION IS PRELIMINARY AND SUBJECT TO CHANGE**

**Location:**

**Date of Occurrence:**

**Time of Occurrence:**

**Local Agency Administrator or Team Leader:**

**Activity:**

**Number of Injuries:**

**IMPORTANT NOTE*:***
***Names of injured personnel are not to be included in this report. Reference them by position.***

**Number of Fatalities:**

**Property Damage (such as to vessels, equipment, and structures):**

**Narrative:**

//s// Local Unit Agency Administrator

cc: [**Follow agency notification protocol**]

# Exhibit 7-2: 72-Hour Expanded Report Cover Letter and Format

[**Letterhead**]

[**Date**]

To: [**Delegating Official(s)**]

From: [**Team Leader**]

Subject: 72-Hour Expanded Report, [**Name of Incident]**

**Number and Type of Injuries:**

> **IMPORTANT NOTE*:***
> ***Names of injured personnel are not to be included in this report.***
> *Reference them by position.*

**Number and Name of Fatality Victim(s):**

> **IMPORTANT NOTE*:***
> ***Names of fatality victims are not listed UNTIL next of kin have been notified.***

**Narrative:** (Be consistent with *24-Hour Preliminary Report* information and/or clarify discrepancies plus mission/activity information)

**Action Taken to Date:**

Optional: (Highlight any related safety review topics for field use.)

//s// [**Team Leader/Co-Team Leader]**

cc: [**Follow agency notification protocol**]

# Exhibit 7-3: Safety Alert

## Safety Alert

**Date:**

**Subject:**

**Issue:**

**Required Action:**

**Recommended Action: (none)**

**Discussion/Background:**

**Additional Information:**

# Exhibit 7-4: Factual Report

**Cover Title Sheet:** Include name, date, and location of the accident.

**Table of Contents:** Include page numbers for each section.

**Serious Accident Investigation Team Signature Page:** Include a list of investigation team members and their respective agencies with signature/date lines.

**Executive Summary:** Include a brief narrative of the facts involving the accident. Keep this section to one page or less.

**Narrative:** The narrative portion explains why the accident happened and should provide a detailed chronology of the facts, before, during, and after the accident. This section should address the *who*, *what*, *when*, and *where* as much as possible.

Do not identify involved personnel by name in the narrative. Identify involved personnel by their position (e.g., Victim 1, Engine Leader 6-1). Fatality victim(s) names may used (family notification should have occurred at this point).

**Investigation Process:** A brief narrative stating that the SAIT was assigned to investigate the accident. The narrative should include a standard statement that human, material, and environmental factors were considered. State what analysis process(es) were used.

**Findings:** Findings are based on the weight of evidence, professional knowledge, and judgment and are listed in chronological order.

Each finding is a single event or condition. Each finding is an essential step in the accident sequence, but each finding is not necessarily causal. Do not include any more information in each finding than is necessary to explain the event occurrence.

Ensure all findings are supported by facts.

Each finding shall be listed individually as a single event or condition and grouped in the factual report into three categories: human, material, and environmental.

If a factor (e.g., temperatures, driving speed) is determined to be non-finding to the accident, clearly indicate such by stating so in the report.

***IMPORTANT NOTE:*** **Opinions or observations are not findings.**

**Maps, Illustrations, and Photographs:** Include graphic information used to document and visually portray facts. They need to be properly identified throughout the reports (e.g., Figure/Illustration-1, Figure/Illustration-2).

**Appendices:** Include excerpts, test results, and similar items used as reference information for documented facts involving the accident.

***IMPORTANT NOTE:***
**Autopsies, witness statements, names of witnesses, or other documentation containing personal information will not be included in *Final Report.* These documents will be included in the case.**

# Exhibit 7-5: Management Evaluation Report

**Cover Title Sheet:**

- Name of the accident
- Date of the accident
- Location of accident
- "For Official Use Only" statement
- Freedom of Information Act disclaimer statement and Privacy Act statement:

  *This report contains information protected by the Privacy Act. Disclosure of protected information is a violation of the Privacy Act of 1974, as amended, (5 USC and 552a).*

- "Copy ____ of ___" statement

**Table of Contents:** Include page numbers.

**Serious Accident Investigation Team Signature Page:** Include a list of investigation team members and their respective agencies with signature/date lines.

**Executive Summary:** Use information from the *Factual Report.*

**Narrative:** Use information from the *Factual Report.*

**Findings, Causes, and Recommendations:** Findings, causes, and recommendations should be grouped, or related, together as necessary to indicate the relationship of finding(s), cause(s), and subsequent recommendation(s).

**Findings:** Taken from the *Factual Report.*

**Cause(s):** A cause is an event, situation, or condition (a deficiency) which if corrected, eliminated, or avoided would likely have prevented or mitigated the mishap, damage, or significant injury; cause does not imply blame.

**Recommendations:** Reasonable courses of proposed management actions based on the identified findings and cause(s) that are intended to reduce organizational and individual risk by controlling or minimizing hazards.

A "Discussion" element may also be added if necessary to explain circumstances leading to the recommendation.

**EXAMPLE:**

***RECOMMENDATION 1 (Finding 1 and Cause 1):***

***Finding 1 (Material):*** The front right retread tire on the vehicle failed.

***Cause 1 (Human):*** The right front retread tire was underinflated, causing the tire to fail.

***Discussion (optional):*** Although the retread tire was under-inflated by a marginal level (3-4 psi), there is a reasonable expectation that the tire should not fail. A greater margin of safety should exist for an acceptable range of under/over tire inflation.

***Recommendation 1:*** The agency should collaborate with General Services Administration (GSA) to determine if retread tires are safe for continued use.

***IMPORTANT NOTE:***
**Not every finding and/or cause will have a recommendation; *however*, every recommendation needs to be supported by a finding and/or cause.**

**Other Findings:** Other findings that did not contribute to the accident but, if left uncorrected, could lead to other accidents.

**Enclosures:** Information used to support the recommendations that were not included in the *Factual Report.*

***IMPORTANT NOTE:***
**Autopsies, witness statements, names of witnesses, or other documentation containing personal information will not be included in *Final Report.* These documents will be included in the case.**

# Exhibit 7-6: Serious Accident Investigation Case File Inventory

**Cover Title Sheet**

- Name of the accident
- Date of the accident
- Location of accident

The case file contains factual data that was generated during **[Name of Accident]** accident investigation. The case file also includes a flash drive with electronic documentation. The SAIT does not have authority to release or distribute any information contained within the case file. Any release of this information will be determined by the delegated official(s) or designee(s).

The case file needs to be established in logical sections with individual files for each section identified. Depending on the incident and the complexity of the situation the list can change. The following format can be used in the development of the accident case file:

**Administrative**

- Delegation of authority
- Serious accident investigation team roster
- 24-Hour Preliminary Report and 72-Hour Expanded Report
- Travel documentation
- Unit Point of Contact
- Initial actions taken by the unit

**Contact Information**

- Local unit contact information
- Law enforcement contact information
- Family members contact information
- Participating agencies contact information
- Point of Contact/Liaison contact information

**Local Law Enforcement/Emergency Medical Service/Medical Examiner's Reports**

- Sheriff's Office incident report and case number
- Calls for service log from Sheriff's Office
- Local Fire/EMS ambulance reports
- Official Autopsy and Toxicology Report

**Witness Information**

*Witness List*

- List of witnesses and contact information
- Scheduling

*Written Statements by Individuals*

- Written witness statements
- Email statements
    - Supervisors, IMT members, eye witnesses, Safety Officer, etc.

*Interview Questions*

- Interview questions developed by the serious accident investigation team

*Interviews*

- Individual files of witness interviews

*Unit Logs and Dispatch Notes*

- Operations Section Chief Unit Log
- Safety Officer's Unit Log
- Dispatch Tracker Log (local unit and incident support dispatch center)
- Dispatch notes (communications logs) from 911 Dispatch

**Victims Documents**

- Medical standards information
- Time reports
- Work Capacity Test records
- Incident Qualification Card(s)
- Incident Qualification and Certification System (IQCS) printout
- Training documentation
- Wildland Firefighter Medical Standards Annual Exam
- Physical Fitness Inquiry Form for motor vehicle operations
- *SF-50—Notification of Personnel Action*
- Inventory of Initial Attack Bag and Gear
- Copy of State driver's license
- Position description
- Personal Emergency Information Card

**Incident Action Plans/Project Plans (fire/non-fire)**

- *Incident Action Plan* – Original and corrected copy (from Planning Section Chief)
- Picture copy of the *Incident Action Plan Safety Analysis Form*
- Incident management situation reports
- National Interagency Coordination Center situation reports
- Electronic copies of relevant incident Planning Section documents (from IMT Planning Section Chief)
- Specific project plan documentation

**Maps and Weather Information**

- Maps
    - Contour maps
    - Project maps
    - Fire maps
    - Map of suspected point of origin
    - Lightning display map
    - Hazard map
- Weather
    - Spot Weather Forecast
    - RAWS weather
    - Weather data from local airport

**Crew/Employee Information (fire/non-fire)**

- Crew/Employee names
- Position descriptions
- Daily documentation
- Training records
- Specialized certifications (e.g., ATV Certification/Chainsaw Certification)
- Crew Resource Orders

**Physical Evidence**

- Personal protective equipment (PPE)
    - PPE evaluation
- Photo log and CD of pictures (from all sources)
- Equipment evidence (e.g., chainsaw, vehicle, ATV)

- Returned property: Include documentation of any property returned to the agency, property owner or insurance company (e.g. signed receipt or documentation in *Evidence Log*).
- Documentation/technical reports (e.g., Missoula Technology and Development Center [MTDC])

**Reference Documents/Miscellaneous Items**

- Agency guides and handbooks (appropriate chapters or citations)

**Collateral Investigation Documentation**

- Any documentation related to the coordination with collateral investigation such as NIOSH and OSHA

**Press Releases (fire/non-fire)**

- Local newspaper articles
- Local newspaper article on cause of death
- National Associated Press (AP) articles
- BLM-NIFC press releases
- Transport of remains message
- BLM-NIFC press releases on cause of death

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# CHAPTER 8 – CLOSEOUT AND FINAL BRIEFINGS

## 8.1 TEAM CLOSEOUT BRIEFING

The Team Leader facilitates the internal SAIT closeout briefing with the help of the Chief Investigator.

The purpose of this briefing is to make any final team assignments and to conduct an after action review (AAR).

Items to be discussed in the closeout briefing are:

- Determine remaining tasks to be accomplished.
- Assign follow-up task assignments to team members.
- Determine who will maintain evidence (until the *Final Report* is completed).
- Cleaning and turning in equipment.
- Collection and destruction of all working papers and draft copies of reports.
- Conduct AAR (see Team Performance Review section below).

## 8.2 TEAM PERFORMANCE REVIEW

Figure 18: Team performance review

As part of the closure for the serious accident investigation team (SAIT), a review and critique of the team's performance is important. This process is an opportunity for the team members to improve their skills and abilities for future assignments. This feedback is also valuable to the agency to make improvements in serious accident investigation training and processes. (Figure 18)

The Team Leader facilitates the briefing ensuring all members participate, keeping the team focused on the issues. The review should include:

- Discussion of what was planned.
- What actually happened?

- What can be done in future assignments to improve process and performance of the team?
- Critique the accident investigation process used.

At the conclusion of the team review briefing the Team Leader should send any suggestions for process improvement to the respective agency(ies) safety office(s).

The Team Leader and Chief Investigator should evaluate and make recommendations for team members to receive Critical Incident Stress Debriefing (CISD). Many times team members will say that they do not need the debriefing when in reality they have been affected by the event. The Team Leader and Chief Investigator should encourage the SAIT to attend and monitor team members for signs of stress during and after the investigation.

Another closeout briefing with the SAIT may be needed after the *Final Report* is finalized and accepted.

The *Investigation Team Closeout Briefing and Team Performance Review* (Exhibit 8-1) can be used to facilitate the briefing process.

## 8.3 ON-SITE CLOSEOUT BRIEFING WITH AGENCY ADMINISTRATOR

The on-site closeout briefing, presented by the Team Leader, occurs with the Agency Administrator at the conclusion of the field investigation portion of the process. Attendees at this meeting should include the local/host Agency Administrator and their key staff, incident management team members as identified by the Incident Commander, and any local cooperators (as approved by the Agency Administrator) who were involved or had interest in accident.

This briefing is important since the Team Leader's presentation will influence how the SAIT is perceived as they leave the on-site investigation portion of the process. Team Leaders should keep in mind as they prepare their briefing that they may not have complete information as the investigation and evidence analysis is in progress and could significantly change.

The on-site closeout briefing information shall be pre-approved by the delegating official(s) prior to the on-site closeout.

Information found in *On-site Closeout Briefing with Agency Administrator* (Exhibit 8-2) can be used to facilitate this briefing.

***IMPORTANT NOTE:***
**The Team Leader should emphasize that the accident investigation and the *Final Report* are for accident prevention and learning purposes only! Accident investigations do not assign blame or administrative accountability.**

## 8.4 CLOSEOUT BRIEFING WITH INTERNAL AND EXTERNAL ENTITIES

Different levels and types of briefings are conducted throughout the course of the investigation process and are tailored to a specific audience. The same is true with closeout briefing. The closeout briefings with internal and external entities occur prior to the completion of the draft *Final Report*.

Given the fact that the accident investigation process will most likely not be completed at this time, requested closeout briefings will be limited in scope (i.e., status of process) and shall be approved by the delegating official(s) or designee(s).

Closeout briefings may be given to:

- Delegating official(s) and/or designee(s)
- Fire & Aviation Directors
- Agency safety/risk management office
- Affected cooperators
- Local authorities (e.g., fire marshal)

## 8.5 POST-FINAL REPORT CLOSEOUT BRIEFINGS

Upon completion of the draft *Final Report*:

- The Team Leader, Chief Investigator, and specified subject matter experts may be requested by the agency(ies) to make presentations to their management and/or agency(ies) Accident Review Boards/Board of Reviews. See Chapter 9 – Accident Review Process.

Upon agency(ies) approval of the *Final Report*:

- The Team Leader and/or Chief Investigator may be requested by the agency(ies) to present the *Final Report* to agency leadership and stakeholders.
- The Team Leader and/or Chief Investigator may be requested by the agency(ies) to present the *Factual Report* to the immediate family.
- The agency director(s) may be requested to personally brief higher level authorities (e.g., Secretary of the Interior/Agriculture, Governors) to explain the accident and the corrective actions. The Team Leader and/or Chief Investigator may be asked to assist in these briefings.
- OSHA may request a formal presentation detailing the factual findings and causes of the accident.

Each of these closeout briefings will need to be prepared to and present the appropriate information to a specific audience.

## 8.6 FINAL REPORT BRIEFINGS, PRESS RELEASES AND FAMILY MEETINGS

Each accident investigation will likely have some level of interest and involvement from other governmental agencies, the media, family members, and agency employees. The Team Leader and Chief Investigator may be asked to participate in meetings, briefings, and possibly congressional testimony. These contacts should always be done in coordination with the DASHO/delegating official(s). Presentations should be restricted to factual data and findings from the report and any potential corrective action should be presented in general terms with an explanation of the process.

Because recommendations and *Corrective Action Plan* implementation is at the discretion of agency leadership, SAIT members not discuss recommendations or corrections with external audiences. Release of this information resides with agency director(s)/official(s).

## 8.7 SERIOUS ACCIDENT INVESTIGATION TEAM RELEASE

Once the *Final Report* has been approved by the agency(ies) director(s)/official(s) and all follow-up briefing are completed, the SAIT is released by the delegating official(s).

# Exhibit 8-1: Investigation Team Closeout Briefing and Team Performance Review

The purpose of the investigation team closeout briefing is to tie up loose ends and critique the SAIT's performance. Typically the following things are covered:

- Determine remaining tasks to be accomplished.
- Assign follow-up task assignments to team members.
- Determine who will maintain evidence (until the *Final Report* is completed).
- Cleaning and turning in equipment.
- Collection and destruction of all working papers and draft copies of reports.
- Use of a computer flash drive for all accident investigation documentation.
- Critique team performance.
- Critique accident investigation process used.
- Send suggestions for training or process improvement to the respective agency's National Safety Office and/or the Fire & Aviation Office.
- Evaluate and make recommendations for team members to receive Critical Incident Stress Debriefing (CISD) for team members.

# Exhibit 8-2: On-Site Closeout Briefing with Agency Administrator

The on-site closeout briefing with the Agency Administrator is conducted by the Team Leader. On-site closeout briefings must be approved by the delegating official(s), and attendance by the delegating official(s) is at their discretion.

Key elements include the following:

- Inform the Agency Administrator that information may be incomplete as the investigation and evidence analysis is in progress and could significantly change.
- Reemphasize that the purpose of the investigation, the report, and the supporting material is for accident prevention purposes only.
- Provide facts that cover the timeline of the accident that SAIT discovered during on-site investigation and causes of injury(s) if known and verified.
    - There may be facts that are sensitive in nature and should not be discussed during the Agency Administrator closeout and will be managed by the delegating official(s) or designee(s). The Team Leader should discuss with delegating official(s) or designee(s) prior to Agency Administrator closeout briefing.
- Describe where the team is in the investigation process—the time frame in which you expect to finish the report, follow-up processes (e.g., Accident Review Boards). Remind the Agency Administrator that the DASHO/delegating official(s) has control of report and process after SAIT turns in draft final report to them. The *Final Report* release and briefings will be coordinated from the national level to the state/regional level and Agency Administrators will be briefed through chain of command prior to *Factual Report's* release.
- Provide status of any external outstanding reports (e.g., police reports, autopsy) that could impact findings.
- Identify any immediate actions that the local unit needs to take to address safety issues.

**EXAMPLE:**
**Any "Other Findings" that the team discovered that need immediate corrective actions.**

- Identify any evidence in local storage and the SAIT member that will be tracking its release.
- Notification that the SAIT is releasing the accident site back to the local unit.
- Addressing any outstanding support that the Team Leader received from the unit during the closeout briefing is appropriate. Be careful about addressing any negative issues with this subject—efforts may not be productive.

**NOTE:**
**Disciplinary actions should <u>not</u> be discussed. A separate administrative investigation can be initiated by the Agency Administrator, at their discretion, to determine if any disciplinary actions are appropriate.**

# CHAPTER 9 – ACCIDENT REVIEW PROCESS

## 9.1 INTRODUCTION

Once the SAIT completes the draft *Final Report*, some agencies conduct another step in their investigative process. This agency management-level review of the accident is often called the Accident Review Board/Board of Review. This process may also include the development of and/or concurrence with corrective actions in an effort to prevent further occurrences.

The Team Leader and Chief Investigator should become familiar with this process when assigned to an SAI where the involved agency(ies) utilize a review board. Consult with delegating official(s) or designee(s) to determine agency-specific follow-up processes.

For interagency investigations, review board process(es) will be determined at the delegating official(s) level.

## 9.2 PURPOSE OF ACCIDENT REVIEW BOARDS

The purpose of an Accident Review Board is to examine and evaluate the draft *Final Report* (which includes *Factual Report and the Management Evaluation Report*) and validate the findings, causes, and recommendations.

The Team Leader (Chief Investigator and SMEs may also be requested to participate) will brief the Accident Review Board on the factual accident information, findings, causes, and recommendations.

Accident Review Board responsibilities are to:

- Ensure there are no unexplained gaps or holes in the accident chronology of events or other facts,
- Ensure all recommendations are based upon findings and causes and have applicability in accident prevention and organizational learning and that they can be implemented by the organization,
- Ensure that the overall report thoroughly addresses organizational accident concerns, and
- Establish/consider corrective actions to prevent future potential occurrences.

## 9.3 ACCIDENT REVIEW BOARD MEMBERSHIP

The delegating official(s) authorizing the investigation will designate Accident Review Board members. Agencies may have established policy that pre-identifies review board members by position. The Accident Review Board is typically comprised of representatives from agency leadership/management, safety/risk management, specific program areas, and technical experts. Attendance by non-board members is at the discretion of the chairperson.

## 9.4 ACCIDENT REVIEW BOARD PROCESS

When the Team Leader (and most often the Chief Investigator) presents the *Final Report* (*Factual/Management Evaluation Reports*) to the board members, the Accident Review Board may approve the report in its entirety or the review board may:

- Request clarifying or additional specific information be added to the report,
- Make additional recommendations, or
- Establish timeline for resubmission of draft *Final Report*.

Upon the Accident Review Board's *Final Report* concurrence, the review board may develop (or review) the *Corrective Action Plan (CAP).* The *CAP* is agency-specific and development may/may not occur at the Accident Review Board level.

*Final Report* approval and distribution will occur after the review board process. Specifics on approval and distribution can be found in Chapter 7 - Reports.

## 9.5 CORRECTIVE ACTION PLAN

This *Corrective Action Plan* outlines corrective actions related to the identified recommendations. The *CAP* identifies actions, timelines, and responsibility for the completion of each action item. Progress of the plan will be tracked through completion by the appropriate Safety/Risk Manager.

# APPENDIX A: GLOSSARY AND ACRONYMS

## GLOSSARY

***Accident*** – An unplanned event or series of events that resulted in injury, occupational illness, or damage to or loss of equipment or property to a lesser degree than defined as a serious accident.

***Active Failures*** – Immediate undesired consequence. Active failures may include changes in equipment, systems or processes that trigger an immediate undesired consequences.

***Agency Administrator*** – The authorized official on the unit where the accident occurred.

***Briefing, 24-hour Preliminary Report*** – Report, prepared by the unit and transmitted within 24 hours of the accident to the delegating official(s) or designee(s), containing the first details of the accident.

***Briefing, 72-hour Expanded Report*** – SAIT's first report prepared by the Chief Investigator within 72 hours of the team's arrival and signed by the Team Leader.

***Burnover*** – An event in which a fire moves through a location or overtakes personnel or equipment where there is no opportunity to utilize escape routes and safety zones, often resulting in personal injury or equipment damage.

***Cause*** – Event, situation, or condition (a deficiency) which if corrected, eliminated, or avoided, would likely have prevented or mitigated the mishap, damage, or significant injury; cause does not imply blame.

***Collateral Investigations*** – Investigations of other agencies with a jurisdictional responsibility to conduct their own investigation (e.g., law enforcement, Federal OSHA, State OSHA, NIOSH, and OIG). These investigations are independent and can run concurrently while serious accident investigations are being conducted.

***Designated Safety and Health Official (DASHO)*** – Agency official responsible for ensuring that serious accidents and incidents are fully investigated. Some agencies title these representatives Designated Safety and Health Official (DASHO) or these duties are contained within their agency responsibilities.

***Entrapment*** – A situation where personnel are unexpectedly caught in a fire behavior-related, life threatening position where planned escape routes or safety zones are absent, inadequate, or compromised. Entrapment may or may not include deployment of a fire shelter for its intended purpose. Entrapment may result in a serious wildland fire accident, wildland fire accident, or a near-miss.

***Evidence*** – Everything gathered during the course of the investigation and categorized as human, material or environmental.

***Fact*** – Verified information based on evidence.

***Factual Report*** – Narrative of the events leading up to, during, and after the accident.

The factual events and the findings of the accident will help prevent similar types of accidents from happening in the future.

The report should provide:

- Executive summary of the event
- Chronology of the accident sequence
- Any post-accident actions (e.g., emergency response)
- Attachments or addendums essential to support the factual information

***Final Report*** – Report that consists of the *Factual and Management Evaluation Reports* submitted to the delegating official(s) or designee(s) within 45 calendar days of the accident. Extensions beyond this deadline need to be requested by the Team Leader.

***Finding*** – A single event or condition that is supported by facts. Each finding is an essential step in the accident sequence, but each finding is not necessarily causal.

***Fire Shelter Deployment*** – The removal of a fire shelter from the protective case and use as protection against fire. Fire shelter deployments may or may not be associated with an entrapment. Fire shelter deployments may result in a serious wildland fire accident, a wildland fire accident, or a near-miss.

***Interagency (Multi-Agency) Investigations*** – Serious accidents involving more than one agency will require the DASHO(s) or designee(s) to collaboratively develop a delegation of authority that is signed by each of the respective agencies.

***Latent Conditions*** – Organization-related weaknesses, conditions, or equipment flaws that are buried inside the organization undetected for long periods of time but can be triggered in a particular set of circumstances.

***Management Evaluation Report*** – The second part of the *Final Report* intended for internal agency use only. The purpose of the MER is to review the following:

- Management policies
- Practices
- Procedures
- Human factors related to the accident

***Near-Miss*** – An unplanned event or series of events that could have resulted in death, injury, occupational illness, or damage to or loss of equipment or property but did not.

***Recommendations*** – Recommendations are reasonable courses of proposed management actions based on the identified findings and cause(s) that are intended to reduce organizational and individual risk by controlling or minimizing hazards.

***Performance Influencing Factor*** – Characteristics of the job, the individual, and the organization that influence human performance.

***Safety Alert*** – Alert created and issued when a safety hazard that poses an imminent threat to life or property has been identified.

***Serious Accident*** – An unplanned event or series of events that resulted in death; injury, occupational illness, or damage to or loss of equipment or property. For operations, a serious accident involves any of the following:

- One or more fatalities
- Three of more personnel who are inpatient hospitalized as a direct result of or in support of operations
- Property or equipment damage of $250,000 or more
- Consequences that the Designated Agency Safety and Health Official (DASHO), or Designated Agency Official, judges to warrant Serious Accident Investigation
- Some state agencies may have further definitions of a serious accident that also includes:
    - In-patient hospitalization for more than 24 hours for other than observation (regardless of number of employees)
    - The loss of a body part
    - Serious disfigurement

## ACRONYMS/ABBREVIATIONS

| | |
|---|---|
| AA | Agency Administrator |
| CFR | Code of Federal Regulations |
| CI | Chief Investigator |
| CISD | Critical Incident Stress Debriefing |
| CISM | Critical Incident Stress Management |
| DASHO | Designated Agency Safety and Health Official |
| DM | Departmental Manual (DOI) |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HFA | Human Factors Analysis |
| IC | Incident Commander |
| ICP | Incident Command Post |
| IDAC | Information-Decision-Action Cognitive Model |

| | |
|---|---|
| IHOG | Interagency Helicopter Operation Guide |
| IRPG | Incident Response Pocket Guide |
| LE | Law Enforcement |
| M.E. | Medical Examiner |
| MER | Management Evaluation Report |
| MOU | Memorandum of Understanding |
| NICC | National Interagency Coordination Center |
| NIFC | National Interagency Fire Center |
| NIOSH | The National Institute for Occupational Safety and Health |
| NWCG | National Wildfire Coordinating Group |
| OIG | Office of the Inspector General |
| OSHA | Occupational Safety & Health Administration |
| PAO | Public Affairs Officer |
| PIF | Performance Influencing Factors |
| PIO | Public Information Officer |
| POC | Point of Contact |
| PPE | Personal Protection Equipment |
| RMC | Risk Management Committee |
| SAI | Serious Accident Investigation |
| SAIT | Serious Accident Investigation Team |
| SME | Subject Matter Expert |
| USDA | United States Department of Agriculture |
| USDI or DOI | United States Department of Interior or Department of the Interior |

# APPENDIX B: FIGURES AND EXHIBIT INVENTORY

| Figure Number | Figure Name |
|---|---|
| 1 | Occupational Safety and Health Administration (OSHA) logo |
| 2 | National Transportation Safety Board (NTSB) logo |
| 3 | USDA Office of Inspector General (OIG) logo |
| 4 | Law enforcement personnel at accident scene |
| 5 | Serious Accident Investigation Process |
| 6 | Public Service Officers' Benefit brochure |
| 7 | Typical serious accident investigation team organization. |
| 8 | Accident investigation (Digger-Derrick Truck Tip-Over Incident, 2011) |
| 9 | Media briefing (Photo credit: Kari Greer) |
| 10 | Site visit |
| 11 | Mapping example (Stocking Lake SAI Factual Report, 2011) |
| 12 | Human and Organizational Factors Relationship |
| 13 | Trekking pole (Stocking Lake SAI Factual Report, 2011) |
| 14 | Melted hardhats (Mudd Fire Entrapment/Fire Shelter Deployment Factual Report, 2006) |
| 15 | Information – Decision – Action – Cognitive (IDAC) model (Katrina Groth and Ali Mosleh) |
| 16 | CAL FIRE employees during medical evacuation in Northern California (NIFC, 2008) |
| 17 | James Reason's Accident Trajectory |
| 18 | Team Performance Review |

| Exhibit Number | Exhibit Name |
|---|---|
| 1-1 | Memorandum of Understanding between the Departments of the Interior and Agriculture |
| 2-1 | Local Unit Initial Actions for Serious Accident (SAI) Investigations |
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| 2-3 | Sample Letter to the Medical Examiner/Coroner |
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| 5-2 | Evidence Log |
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| Exhibit Number | Exhibit Name |
|---|---|
| 5-4 | Human Reliability/Performance Factors |
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| 5-6 | Accident Investigation Witness Statement |
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# APPENDIX C: SUPPORTING REFERENCE DOCUMENTS

## MANUALS AND POLICIES

14 CFR 91.137a[2]) – Aeronautics and Space, Federal Aviation Administration, Department of Transportation. Air Traffic and General Operating Rules, General Operating and Flight Rules, Temporary Flight Restrictions in the Vicinity of Disaster/Hazard Areas

28 CFR 32.1 – Judicial Administration, Public Safety Officer's Death and Disability Benefits, Purpose and OMB Control Number

29 CRF 1904.39, OSHA, Recording and Reporting Occupations Injuries and Illnesses, Reporting Fatalities and Multiple Hospitalization Incidents to OSHA

29 CFR 1960.29, Occupational Safety and Health Administration (OSHA), Basic Program Elements for Federal Employees, Accident Investigation

49 CFR 831.2, Transportation, Accident/Incident Investigation Procedures, Responsibility of Board

CAL FIRE, 7070.15.1 Manual Section

Department of the Interior DM 485 Chapter 7
http://elips.doi.gov/ELIPS/DocView.aspx?id=1648&dbid=0

DOI Operational Procedures Memorandum (OPM) No. 13-04, Aviation User Training Program http://oas.doi.gov/library/opm/CY2013/OPM_13-04.pdf

Executive Order 12196, Occupational Safety and Health Programs for Federal Employees

Public Law 107-203. 107th Congress. Department of Agriculture Inspector General Investigation of Forest Service Firefighter Deaths.

U.S. Forest Service, FS 6709.11 Manual Section

## AGENCIES, ORGANIZATIONS, AND PROGRAMS

National Park Service RM 50 B Occupational Health Safety Program http://www.nps.gov/policy/RM50Bdoclist.htm

National Safety Council
http://www.nsc.org/pages/home.aspx

National Transportation Safety Board
http://www.ntsb.gov/

## GUIDES, PUBLICATIONS, AND PROTOCOLS

Agency Administrators Guide (PMS 926)
http://www.nwcg.gov/pms/pubs/pubs.htm

Agency Line-of-Duty Death Guides and Handbooks

- BLM
  http://www.blm.gov/style/medialib/blm/nifc/training/lodd.Par.42165.File.dat/BLM_LODD_HB_6_2012.pdf
- FWS http://sharepoint.fws.net/Programs/nifc/Shared%20Documents/LODD/FWS_LODD_Final_091312.pdf
- NPS
  http://classicinside.nps.gov/documents/LODD%20Handbook%2011-25-09.pdf

Interagency Helicopter Operations Guide
http://www.nwcg.gov/pms/pubs/pms510/00_pms510.pdf

Interagency Standards for Fire and Fire Aviation Program Management and Operations Guide (Red Book), Chapter 07 – Safety and Chapter 18 – Review and Investigations
http://www.nifc.gov/policies/pol_ref_redbook_2013.html

Firefighter Autopsy Protocol
http://www.usfa.fema.gov/fireservice/research/safety/autopsy.shtm

Forest Service Accident Investigation Guide, 2005
http://www.fs.fed.us/t-d/pubs/htmlpubs/htm05672806/index.htm

NWCG Glossary of Fire Terminology

U.S. Air Force Instruction on Accident Investigations, AFI 91-204

Wildland Fire and Aviation Program Management and Operations Guide, Bureau of Indian Affairs (Blue Book), Chapter 9 – Fire Safety and Chapter 18 – Reviews and Investigations
http://www.bia.gov/nifc/bluebook/index.htm

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