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NASA Procedural Requirements

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COMPLIANCE IS MANDATORY

NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping

Responsible Office: Office of Safety and Mission Assurance

NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping

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Change History

NPR 8621.1B, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping

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| 1 | August 31, 2006 | Administrative corrections to remove typographical errors. Update to requirement for CDs and AA/OIA to report mishaps to the Administrator (paragraph 1.4.7) |
| 2 | May 18, 2007 | Administrative corrections for clarification for paragraph 1.4.5.d, 1.4.5.c, 1.4.7.e, 1.4.7.f, 1.7.3, definitions, and Mishap organizational responsibilities matrix |

Preface

P.1 Purpose

a. The purpose of this NASA Procedural Requirements (NPR) is to provide requirements to report, investigate, and document mishaps, close calls, and previously unidentified serious workplace hazards to prevent recurrence of similar accidents. This NPR does not apply to investigative procedures concerning civil, criminal, or administrative culpability or legal liability. Furthermore, the safety investigation outlined in this NPR shall not be used to direct or justify disciplinary action for mishaps or close calls (Requirement 30984).

b. This NPR provides requirements that specify how to respond to any mishap or close call from discovery through corrective action and closure. It contains requirements for classifying mishaps, establishing investigation authorities, and performing investigations. It formalizes notification, analysis, and reporting obligations; describes roles and responsibilities; provides instruction on release of information to the public; and specifies the relationship and interaction with the Occupational Safety and Health Administration (OSHA), the National Transportation Safety Board (NTSB), and other government agencies.

P.2 Applicability

a. This NPR is applicable to NASA Headquarters and Centers, including Component Facilities; the Jet Propulsion Laboratory, and other NASA contractors and grantees as specified in their contracts or grants; and to other organizations (i.e., commercial partners, other Federal agencies, international parties, and tenants on Centers) as specified and described in written operating agreements. This NPR is applicable to mishaps and close calls for NASA-funded activities at any government, contractor, subcontractor, or grantee site.

b. The concept of word usage and intended meaning is as follows: "Shall" has been used only when application of a procedure is a mandatory requirement. "Should" has been used only when application of a procedure is recommended.

P.3 Authority

a. 29 CFR Part 1904, Recording and Reporting Occupational Injuries and Illnesses (U.S. Department of Labor, Occupational Safety and Health Administration).

b. 29 CFR Part 1960, Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters.

c. 49 CFR Part 830, Notification and Reporting of Aircraft Accident or Incidents and Overdue Aircraft, and Preservation of Aircraft Wreckage, Mail, Cargo, and Records.

d. 42 U.S.C. 2473 (c)(1), Section 203 (c)(1) of the National Aeronautics and Space Act of 1958, as amended.

e. 29 U.S.C. 668, Section 19 of the Occupational Safety and Health Act of 1970, as amended.

f. Inspector General Act of 1978, as amended, 5 U.S.C. App. 3.

g. NPD 8700.1, NASA Policy for Safety and Mission Success.

P.4 References

- a. NPD 9800.1, NASA Office of Inspector General Programs.
- b. NPR 1441.1, NASA Records Retention Schedules (Schedule 1).
- c. NPR 1600.1, NASA Security Program Procedural Requirements.
- d. NPR 7120.5, NASA Program and Project Management Processes and Requirements.
- e. NPR 3792.1, Plan for a Drug-Free Workplace.
- f. NASA Federal Acquisition Regulation (FAR) Supplement (NFS) Part 1807, Acquisition Planning.
- g. NFS Part 1852.223-70, Safety and Health.
- h. Publication L. 109-155, Sec. 821, NASA Authorization Act of 2005; Human Space Flight Independent Investigation Commission.
- i. Incident Reporting Information System (IRIS).
- j. NASA Lessons Learned Information System (LLIS) (<http://llis.gsfc.nasa.gov/>).

P.5 Cancellation

NPR 8621.1, dated June 2, 2000.

/s/

Bryan O'Connor
Chief, Safety and Mission Assurance

CHAPTER 1. General Information

1.1 Objectives of NASA Mishap and Close Call Investigations

The objective of mishap and close call investigations is to improve safety by identifying what happened, where it happened, when it happened, why it happened, and what should be done to prevent recurrence and reduce the number and severity of mishaps.

1.2 Description of NASA Mishaps and Close Calls

1.2.1 NASA Mishap. An unplanned event that results in at least one of the following:

1.2.1.1 Injury to non-NASA personnel, caused by NASA operations.

1.2.1.2 Damage to public or private property (including foreign property), caused by NASA operations or NASA-funded development or research projects.

1.2.1.3 Occupational injury or occupational illness to NASA personnel.

1.2.1.4 NASA mission failure before the scheduled completion of the planned primary mission.

1.2.1.5 Destruction of, or damage to, NASA property.

1.2.2 The following are not considered NASA mishaps.

1.2.2.1 A malfunction or failure of component parts that are normally subject to fair wear and tear and have a fixed useful life that is less than the fixed useful life of the complete system or unit of equipment, provided that all of the following are true:

a. There was adequate preventative maintenance.

b. The malfunction or failure was the only damage, and the sole action is to replace or repair that component. (This exception does not apply to a malfunction or failure of a component part that results in damage to another component or the facility or injury to personnel.)

1.2.2.2 A test failure involving damage to equipment or property as a result of testing, provided that all of the following are true:

a. The test article is not flight hardware.

b. The testing is part of an authorized research/development/qualification/certification program.

c. Damage is limited to the test article and test instrumentation.

d. Risk of damage to the test article and test instrumentation resulting from failure was accepted explicitly (i.e., documented) by program/project management and concurred on by the Center safety office.

e. The test team performs a test failure analysis and generates a technical report instead of treating it as a mishap and completing a mishap report.

1.2.2.3 A failure resulting in damage to flight hardware during the ground Acceptance Test Procedure (ATP) is not a mishap when all of the following are true:

a. The failure is a predictable outcome.

b. Only the flight article is damaged or failed, and testing did not damage the test stand or facility or cause personnel injury.

c. The test equipment functioned properly.

d. There were no anomalies in the facility or test procedures that could have contributed to the article failure.

e. The test team performs a test failure analysis that identifies the root cause(s) of the failure and generates a technical report instead of treating it as a mishap and completing a mishap report.

1.2.2.4 Destruction of, or damage to, any property (public, private, or government) on a Center or involving NASA property outside the Center's gates, as a direct result of only the following weather conditions: hurricane, lightning, tornado, tidal wave, tsunami, water spout ice/snow loads (e.g., on electrical wires).

Note: In these cases, the weather is the initiating event (proximate cause) for the mishap. If the weather was an intermediate cause or a contributing factor to a mishap, this exemption to "mishap classification" would not apply.

1.2.2.5 Destruction of, or damage to, any property (public, private, or government) on a Center or involving NASA property outside the Center's gates, as a direct result of a natural phenomenon such as a flood, landslide, earthquake, meteoroid landing, or

volcanic eruption.

Note: In these cases, the natural phenomenon is the initiating event (proximate cause) for the mishap. If the natural phenomena was an intermediate cause of an incident or contributed to a mishap, this exemption to "mishap classification" would not apply.

1.2.2.6 When an event is not considered a mishap because the initiating event (proximate cause) is natural phenomenon or weather, the cognizant Center safety office shall enter the event and a description of the damage in IRIS. (Requirement).

Note: Close calls involving aircraft may be entered into the NASA Aviation Anomaly Reporting System (NAARS) in lieu of IRIS.

Note: The cognizant Center safety office is the safety office of the Center that hosts the project or that has been assigned Safety and Mission Assurance (SMA) responsibilities for the program.

Note: NASA classifies all weather and natural phenomena as "Acts of Nature" in IRIS.

Incident Category: "Incident"

Incident Type: "Acts of Nature "

Incident subtype: " wind, rain, snow, lightning, earthquake"

Classification: "Non-NPR 8621.1 issue"

1.2.2.7 When an event is not considered a mishap because the initiating event (proximate cause) is natural phenomenon or weather, the organization incurring the damage shall perform a technical assessment to evaluate design and construction aspects, contingency planning, and emergency response and provide facts, findings, and recommendations to the Center Director through the Center SMA Director (or equivalent office with responsibilities for the Center's facility safety program) (Requirement).

1.2.2.8 NASA property damage or personnel injuries that are the result of vandalism, riots, civil disorders, or felonious acts such as arson or sabotage are not considered NASA mishaps. These incidents should be reported and investigated in accordance with procedures under NPD 9800.1, NASA Office of Inspector General Programs, and NPR 1600.1, NASA Security Program Procedural Requirements.

1.2.3 Close Call. An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than \$1000), but which possesses a potential to cause a mishap.

1.3 Determining the Classification Level and Type of Investigation to be Conducted

1.3.1 The severity of the personnel injury and the direct cost of the mishap or close call (property damage and/or mission failure) shall determine the classification level of the mishap or close call (see Figure 1) and the corresponding type of investigation to be conducted ([Requirement 31069](#)).

1.3.2 When the Administrator, Associate Administrator (AA), Mission Directorate Associate Administrator (MDAA), Chief Office of Safety and Mission Assurance (Chief/OSMA), the Designated Agency Safety and Health Official (DASHO), Center Director (CD), or the Assistant Administrator, Office of Infrastructure and Administration (AA/OIA), believes that the mishap or close call is a high-visibility event, he/she may elevate the mishap classification level of investigation to the classification he/she deems appropriate and request the appropriate appointing official to form a Mishap Investigation Board (MIB).

1.3.3 Determining the direct cost of the mishap or close call (for the purpose of mishap classification).

1.3.3.1 The responsible manager, with review and concurrence by the Center safety office, shall calculate the direct cost of a mishap or close call by adding all the actual costs (or the estimate of the cost) (the greater value of actual or fair market value) of damaged property, destroyed property, or mission failure, actual cost of repair or replacement, labor (actual value of replacement or repair hours for internal and external/contracted labor), cost of the lost commodity (e.g., the cost of the fluid that was lost from a ruptured pressure vessel), as well as resultant costs such as environmental decontamination, property cleanup, and restoration ([Requirement 31072](#)).

1.3.3.2 In cases where replacement parts are available from salvaged or excess equipment at little or no cost to NASA, the direct cost of the mishap or close call shall include the actual costs of replacement parts (if they were purchased new) plus labor calculated as if the salvage/excess parts were unavailable ([Requirement 31073](#)).

1.3.3.3 In cases where insurance compensation, contractor compensation, or other compensation is available or provided, the direct cost of the mishap or close call shall include the direct cost (or estimate of the cost) as if this compensation were not available or provided ([Requirement 31074](#)).

1.3.3.4 The cost of the safety mishap investigation shall not be included in the direct cost ([Requirement 31075](#)).

Figure 1. Mishap Classification Levels and Type of Investigation to be Conducted

| Classification Level & Investigation Type | Property Damage | Injury |
|--|---|--|
| Type A Mishap | Total direct cost of mission failure and property damage is \$1,000,000 or more, <i>or</i> Crewed aircraft hull loss has occurred, <i>or</i> Occurrence of an unexpected aircraft departure from controlled flight (except high performance jet/test aircraft such as F-15, F-16, F/A-18, T-38, OV-10, and T-34, when engaged in flight test activities). | Occupational injury and/or illness that resulted in: A fatality, <i>or</i> A permanent total disability, <i>or</i> The hospitalization for inpatient care of 3 or more people within 30 workdays of the mishap. |
| Type B Mishap | Total direct cost of mission failure and property damage of at least \$250,000 but less than \$1,000,000. | Occupational injury and/or illness has resulted in permanent partial disability. <i>or</i> The hospitalization for inpatient care of 1-2 people within 30 workdays of the mishap. |
| Type C Mishap | Total direct cost of mission failure and property damage of at least \$25,000 but less than \$250,000. | Nonfatal occupational injury or illness that caused any workdays away from work, restricted duty, or transfer to another job beyond the workday or shift on which it occurred. |
| Type D Mishap | Total direct cost of mission failure and property damage of at least \$1,000 but less than \$25,000. | Any nonfatal OSHA recordable occupational injury and/or illness that does not meet the definition of a Type C mishap. |
| Close Call | An event in which there is no equipment/property damage or minor equipment/property damage (less than \$1000), but which possesses a potential to cause a mishap. | An event in which there is no injury or only minor injury requiring first aid, but which possesses a potential to cause a mishap. |

1.4 Roles and Responsibilities

1.4.1 Administrator. The Administrator:

- a. May elect to be the appointing official for Type A mishaps or delegate to the AA. (If the Administrator elects not to be the appointing official, the MDA, CD, or another designee will serve as the appointing official.) ([Requirement 31078](#)).
- b. Shall serve as appointing official for NASA joint participation on a MIB with the Department of Defense (DoD) and other agencies unless authority is delegated by existing agreements ([Requirement 31079](#)).
- c. May elect to be an endorsing official for Type A mishaps and other mishaps in which he/she is the appointing official.

1.4.2 Chief/OSMA. The Chief/OSMA or designee shall:

- a. Ensure the proper reporting, investigating, and recordkeeping for mishaps and close calls by defining the mishap reporting and investigating process, updating this NPR, verifying its implementation, developing mishap investigation training, and identifying candidate mishap investigation tools ([Requirement 31082](#)).
- b. Concur with the mishap classification level, investigation approach, and the MIB membership and serve as an endorsing official for the mishap report for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls ([Requirement 31083](#)).
- c. Provide a qualified NASA person to support NTSB investigations of NASA aircraft mishaps ([Requirement 17014](#)).
- d. Archive NASA Headquarters-approved NASA mishap investigation board reports and related documents per NPR 1441.1 ([Requirement 17015](#)).

1.4.3 Inspector General. The Inspector General shall investigate criminal activity associated with mishaps and close calls ([Requirement 31084](#)).

1.4.4 AA. The AA shall:

- a. Serve as the appointing official for Type A mishaps if designated by the Administrator ([Requirement 31090](#)).

- b. Obtain concurrence from the Chief/OSMA and the Chief Engineer on the MIB membership of mishaps in which he/she is the appointing official ([Requirement 31092](#)).
- c. Serve as an endorsing official for all mishaps in which he/she is the appointing official ([Requirement 31093](#)).

1.4.5 MDAA. The MDAA shall:

- a. Implement the mishap and close call reporting, investigating, and recordkeeping requirements for their assigned Mission Directorates for mishaps and close calls that occur outside the Center's gates, during in-space flight, or at a program/project contractor site that is not managed by a Center ([Requirement 31086](#)).
- b. Approve via signature all his/her program and project (as defined in NPR 7120.5) Program/Project Mishap Preparedness and Contingency Plans. (These plans will be developed by the cognizant Center safety offices, and will include procedures to notify, report, investigate, and record mishaps and close calls that involve Mission Directorate programs/projects/activities whether onsite or offsite, and whether on the ground or in flight.) ([Requirement 31088](#)).

Note: All mishaps that occur at a Center are investigated per the Center's Mishap Preparedness and Contingency Plan. The program's plan supports the Center plan by providing additional information such as, but not limited to, hazardous materials, partner agreements, and program contact lists. It also serves as a stand-alone plan for mishaps and close calls that occur outside the Center's gates, during in-space flight, or at a program/project contractor site.

- c. Determine the mishap classification level (or assign a designee to determine the classification level) for all mishaps for which he/she has reporting responsibility and obtain concurrence on this classification level from the Chief/OSMA for Type A and B mishaps, high-visibility mishaps, and high-visibility close calls (Requirement).

Note: Aircraft Operations are managed by a program-independent flight operations office; therefore, the Center Director serves as the appointing official for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls involving aircraft managed by his/her Center.

- d. Serve as the appointing official for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls that involve Mission Directorate managed programs/projects/activities that occur during space flight or occur outside the Center's gates at MDAA program/project sites (excludes off-site Center support contractor locations).

Aircraft Operations are managed by a program-independent flight operations office; therefore, the Center Director serves as the appointing official for mishaps and close calls involving aircraft managed by his/her Center.

- e. Serve as the appointing official (or designate the responsibility in the Program/Project Mishap Preparedness and Contingency Plan) for Type C mishaps, Type D mishaps, and close calls that involve Mission Directorate managed programs/project/activities that occur during space flight or occur outside the Center's gates, during at MDAA program/project sites (excludes off-site Center support contractor locations).
- f. Provide funding and support for investigations within their programs and involving their hardware, facilities, or enabling activities ([Requirement 31094](#)).

- g. Ensure that agreements for joint programs with international partners and other Federal agencies incorporate elements of this NPR to ensure that joint mishap investigating and reporting complies with NASA requirements ([Requirement 17020](#)).

1.4.6 Assistant Administrator, Office of Public Affairs (AA/OPA).

- a. The AA/OPA shall establish guidelines for the public release of mishap reports and related information ([Requirement 31096](#)).
- b. With the assistance of the Center safety office, Interim Response Team (IRT), investigating authority, and CD or AA/OIA, the AA/OPA shall release information to the press and media (i.e., potential hazards that may affect the public, interim reports, and the authorized mishap report) ([Requirement 31097](#)).
- c. For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls, the AA/OPA (or designee) shall appoint a Headquarters public affairs advisor ([Requirement 31098](#)). (For Type B mishaps the AA/OPA may delegate authority to appoint a public affairs advisor to the Center Public Affairs Office [PAO].)

1.4.7 CD and AA/OIA. The CD and the AA/OIA shall:

- a. Develop Center and Program Mishap Preparedness and Contingency Plans to support this NPR (this includes procedures to notify, report, investigate, and record mishaps and close calls that involve programs, projects, and activities that fall under their responsibility) (Requirement).
- b. Implement the mishap reporting, investigating, and recordkeeping requirements for all projects, programs, and activities that fall under their SMA responsibility (Requirement).
- c. Provide funding and support for investigations at their Centers, within their projects and programs, and involving their hardware, facilities, or enabling activities (Requirement).

d. Determine the mishap classification level (or assign a designee to determine the classification level) for all mishaps for which the Center has reporting responsibility and obtain concurrence on this classification level from the Chief/OSMA for Type A and B mishaps, high-visibility mishaps, and high-visibility close calls ([Requirement 31101](#)).

e. Serve as the appointing official for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls that occur at his/her Center, at off-site Center support contractor locations, or at off-site contractor locations that are managed by the Center and are not part of any MDAA program/project activity (Requirement).

Note: Aircraft Operations are managed by a program-independent flight operations office; therefore, the Center Director serves as the appointing official for mishaps and close calls involving aircraft managed by his/her Center.

f. Serve as the appointing official (or designate the responsibility in the Center Mishap Preparedness and Contingency Plan) for Type C mishaps, Type D mishaps, and close calls that occur at his/her Center, at off-site Center support contractor locations, or at off-site contractor locations that are managed by the Center and are not part of any MDAA program/project activity.

g. In the event that there is a mishap involving injury of a human research subject at a NASA Center, request the Chief Health and Medical Officer (CHMO) concurrence on the investigating authority's membership (Requirement).

h. Personally report, by telephone or e-mail, to the Administrator within 24 hours of learning the instance of any NASA Type A mishap, or NASA Type B mishap, and personally report (or Deputy to report), by telephone or e-mail, to the Associate Administrator within 24 hours of learning the instance of any NASA Type C mishap that involves a lost-time injury or illness (Requirement).

i. Personally report, by telephone or e-mail, to the Administrator within 24 hours of any nonoccupational fatality, such as sudden cardiac arrest of a NASA civil service employee or a resident contractor that occurred on site (a resident contractor is a NASA contractor whose primary place of business is on or near a NASA Center or NASA-owned facility) (Requirement).

j. Personally report, by telephone or e-mail, to the Administrator when it becomes known that there is any off-the-job fatality or serious injury/illness of a NASA civil service employee or resident contractor (Requirement).

k. Ensure that local procedures for dealing with the needs of the NASA workforce (civil service employees and contractor employees) when they are experiencing a crisis situation (e.g., serious injury, illness, or fatality of workforce member or family member) are:

(1) Reviewed annually (Requirement).

(2) Include a process for immediately notifying the next of kin for mishaps and on site nonoccupational medical events resulting in fatality or serious injury (Requirement).

(3) Provide information to the person or family (when the person is unable to receive such information due to the injury or illness) concerning benefits, such as extended sick-leave and disability (Requirement).

l. Ensure that the NASA civil service employees designated to communicate with the family of an injured, ill, or deceased individual have received training in NASA policy concerning benefits and crisis intervention (Requirement).

m. Initiate the use of the NASA Family Assistance Fund (NFAF), upon the NASA civil service employee family's agreement or request (Requirement).

Note: The NFAF, in cooperation with the Federal Employees Education and Assistance Fund (FEEA), is available to help meet the unforeseen medical, financial, and educational needs of NASA civil service employees. NFAF and FEEA do not provide assistance to contractors. Upon request from a NASA civil service employee, NASA Human Resources, Personnel Division, will contact the Chair of the NFAF and FEEA's Washington Representative, to request assistance. FEEA can assist with immediate financial needs, such as funeral expenses, medical expenses, and short-term financial hardships.

n. Obtain concurrence from the Chief/OSMA and the Chief Engineer on the MIB membership of Type A, Type B, high-visibility mishaps, and high-visibility close calls in which he/she is the appointing official ([Requirement 31103](#)).

o. Provide administrative and logistical support for the investigating authority working on the Center and distribute the authorized mishap report per this NPR ([Requirement 31104](#)).

p. Verify that NASA contractors and grantees conduct mishap investigations and provide mishap reports as specified in their contracts and in NFS 1852.223-70 ([Requirement 31105](#)).

q. Serve as an endorsing official for mishaps and close calls in which he/she is the appointing official ([Requirement 31106](#)).

1.4.7.1 The AA/OIA shall provide funding and support for investigations of mishaps that occur at NASA Headquarters ([Requirement 31107](#)).

1.4.8 Program and Project Managers. Program and project managers shall:

- a. Concur on the Program/Project Mishap Preparedness and Contingency Plan ([Requirement 31109](#)).
- b. In the event of a mishap or close call at the Center, activate the Program Mishap Preparedness and Contingency Plan ([Requirement 31111](#)).
- c. Provide funding and support for investigations within their program jurisdiction or involving their hardware and facilities ([Requirement 31112](#)).
- d. Assist the investigating authority as requested ([Requirement 31113](#)).
- e. When tasked by the appointing official, develop the Corrective Action Plan (CAP), implement the CAP, support the Center safety office personnel as they verify that the CAP has been completed, and generate the lessons learned ([Requirement 31114](#)).

1.4.9 Responsible Organization. The responsible organization shall:

- a. Assist the investigating authority as requested ([Requirement 31116](#)).
- b. When tasked by the appointing official, develop the CAP, implement the CAP, support the Center safety office personnel as they verify that the CAP has been completed, and generate the lessons learned ([Requirement 31117](#)).

1.4.10 Appointing Official. The appointing official shall:

- a. Use this NPR to determine the type of investigating authority (i.e., Mishap Investigation Board [MIB], Mishap Investigation Team [MIT], or Mishap Investigator [MI]) that will investigate a mishap or close call or, alternately, whether NASA will accept the investigation and subsequent mishap report of another competent authority that may have jurisdiction ([Requirement 31119](#)).
- b. Determine the level of NASA involvement, if any, when a mishap resulted from the actions of an outside source that was not involved in NASA operations ([Requirement 31120](#)).
- c. Initiate a NASA investigation pursuant to this NPR, when the appointing official believes that a NASA contractor's/grantee's mishap report is not adequate because it failed to reach root cause(s), failed to provide recommendations that prevent recurrence, is not suitably independent, or is in some other way deficient ([Requirement 31121](#)).
- d. Generate a formal memorandum for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls that communicates the appointment of the investigating authority members, the chairperson, the ex officio, and the advisors (). (For Type C mishaps, Type D mishaps, and close calls, the appointment orders can be less formal and communicated via a Center process.)
- e. Serve as an endorsing official for mishaps and close calls in which he/she is the appointing official ([Requirement 31123](#)).
- f. Assign the responsible organization(s)/program(s)/project(s) to develop the CAP, implement the CAP, and generate the lessons learned ([Requirement 31124](#)).
- g. Ensure that the mishap investigation process for the assigned mishap or close call is properly completed ([Requirement 31125](#)).
- h. Verify that the mishap report is reviewed, endorsed, and authorized for public release ([Requirement 31126](#)).
- i. Ensure that the CAP is developed and implemented ([Requirement 31127](#)).
- j. Ensure that the lessons learned are developed, reviewed, and authorized for public release ([Requirement 31128](#)).
- k. Release the investigating authority from duty ([Requirement 31129](#)).
- l. Generate the CAP closure statement and the mishap activities completion statement ([Requirement 31130](#)).
- m. Assist the investigating authority as requested ([Requirement 31134](#)).
- n. If the NTSB performs an investigation, the appointing official shall:
 - (1) Initiate a NASA mishap investigation per this NPR ([Requirement 31132](#)).
 - (2) Request that a NASA representative be a party to the NTSB's investigation ([Requirement 31133](#)).

1.4.11 Endorsing Official.

- a. The endorsing official shall review the mishap investigation report and provide a signed written endorsement, comments, and a recommendation as to whether the mishap report should be approved or rejected ([Requirement 31135](#)).
- b. This endorsement and any comments shall be attached to the mishap report and become part of the permanent record ([Requirement 31136](#)).

1.4.12 Ex Officio. The ex officio shall:

- a. Serve as the authorized representative of the Chief/OSMA ([Requirement 31138](#)).
- b. Be a nonvoting participant in all investigation deliberations ([Requirement 31139](#)).

- c. Participate in all investigation proceedings as he/she deems appropriate ([Requirement 31140](#)).
- d. Assure that the investigation is conducted in conformance with NASA policy and this NPR and the investigation process is fair, independent, and nonpunitive ([Requirement 31141](#)).
- e. Assure that the mishap report contains the proper elements including proximate cause(s), root cause(s), failed barrier(s), and observation(s); sufficient facts/data to support the finding(s) and recommendation(s); and a mishap investigation summary ([Requirement 31142](#)).
- f. Sign the final mishap report demonstrating his/her belief that paragraphs 1.4.12.d-1.4.12.e, and paragraphs 1.7.1.a-1.7.1.l of this NPR have been satisfied or attach a signed written description of the report's deficiencies ([Requirement 31143](#)).
- g. For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls, provide the Chief/OSMA interim briefings on the status of the investigation, upon his/her request ([Requirement 31144](#)).

1.4.13 Chairperson. The chairperson of the investigating authority shall:

- a. Manage and coordinate all aspects of the mishap investigation, including, but not limited to, the following tasks: assign group leaders; interview witnesses; reconstruct the mishap or close call; identify facts; identify proximate cause(s) and root cause(s); generate recommendation(s); and complete the mishap report ([Requirement 31146](#)).
- b. Have the authority to impound data, records, equipment, and facilities and collect/salvage data and debris.
- c. For mishaps at contractor or subcontractor sites, work through the contracting officer with guidance from the legal advisor to obtain and impound data.

Note: For mishaps outside the Center's gates, NASA has the authority to impound NASA property, however, the ability to impound or collect other data, records, and equipment is determined by the local and Federal laws, Agency agreements, and contracts.

- d. Release impounded data, records, equipment, facilities, and the mishap site when they are no longer needed by the investigating authority.

Note: If repairs or modifications need to be made prior to returning equipment or facilities to use, the release of impounded items should include a letter stating what action(s) is (are) needed.

- e. Define the roles and/or areas of investigative responsibility for each group or subgroup on the MIB or MIT, as needed ([Requirement 31147](#)).
- f. Coordinate with the investigating authority's legal advisor, Headquarters or Center public affairs advisor, and import/export control advisor throughout the investigation ([Requirement 31148](#)).
- g. Report only to the appointing official (or designee) during the investigation ([Requirement 31149](#)).

Note: The intent of this requirement is to provide the Chair of the Investigating Authority with only one supervisor during the investigation, thereby preventing numerous NASA requests for data and status. The report to the appointing official may include information such as a status, facts, preliminary findings (if the Chair desires), and recommendations which need immediate implementation.

- h. Refer allegations and evidence of criminal activity that are identified in the course of an investigation to the Office of Inspector General ([Requirement 31150](#)). Privileged witness statements will be protected to the extent provided by law.

1.4.14 Investigating Authority. The investigating authority shall conduct a comprehensive investigation within the defined scope of the appointment letter or appointment orders, generate the products indicated in paragraph 1.7 and Figure 5 of this NPR, prepare a mishap report, and sign the report ([Requirement 31151](#)).

1.4.15 Investigating Authority's Advisors. The advisors shall:

- a. Attend meetings as needed, travel with the investigating authority as requested, and have access to all investigative material with the exception of witness statements and testimony ([Requirement 31153](#)).

Note: The legal advisor may review witness statements and testimony in order to provide adequate legal guidance.

- b. Provide advice to the investigating authority ([Requirement 31154](#)).
- c. Sign the mishap report stating that he/she has reviewed the mishap report and that it meets NASA policies and procedures in his/her functional area. ([Requirement 31155](#)).

1.4.16 Legal Advisor. The legal advisor shall:

- a. Develop nondisclosure agreements if the investigating authority uses a contractor as administrative support (Requirement).

- b. Develop nondisclosure agreements if the investigating authority uses a contractor to analyze interview data or participate in interviews (Requirement).
- c. Provide legal advice and counsel as requested by the board chair (Requirement).
- d. Attend interviews, if the interviewee is accompanied by a lawyer during the interview process.

1.4.17 The advisors may be included or excluded from listening to any deliberations at the discretion of the chairperson.

1.4.17.1 The chairperson may exclude advisors (with the exception of the legal advisor) from participating in deliberations that discuss privileged witness testimony (Requirement).

Note: The legal advisor may review witness statements and testimony in order to provide adequate legal guidance.

1.4.18 Investigating Authority's Consultants. Per their contract, consultants shall:

- a. Provide advice to the investigating authority.
- b. Perform analysis.
- c. Assist in formulating conclusions, as requested.

1.4.19 The consultants shall not:

- a. Participate in deliberations (vote on findings) ([Requirement 31161](#)).
- b. Sign the mishap report ([Requirement 31162](#)).
- c. Read, listen to, or participate in witness interviews unless they are tasked to analyze interviews, and they have signed a nondisclosure agreement prepared by NASA Office of the General Counsel or Center Chief Counsel ([Requirement 31163](#)).

Note: Contractors specializing in witness interview techniques or technical expertise may be hired by the MIB, if the following are true: the contractor hired to support the MIB: a. is not affiliated with the mishap, the contractors, or responsible organizations involved in the mishap; b. is specifically tasked by contract to support the interview process or analyze interviews; c. has signed the nondisclosure agreement prior to their participation or support; and d. NASA does not have a sufficient number of Federal employees or expertise on the board to perform the task.

1.4.20 If the Chair of the Investigating Authority chooses to use a person that is not a Federal employee as administrative support, that person shall sign a nondisclosure agreement prior to having access to any mishap data or International Traffic Arms Regulations (ITAR), Export Administration Regulations (EAR), proprietary, or privileged information (Requirement).

Note: An administrative support person may support the mishap board. This support may include access to privileged interview statements as long as the person is a Federal employee or the person has signed the appropriate nondisclosure agreement prior to having access to any mishap data or information.

1.4.21 Interim Response Team (IRT). The IRT shall:

- a. Notify the Center PAO about casualties, damages, and any potential hazards to the public, and notify legal advisors (as appropriate) ([Requirement 31168](#)).
- b. Assist the incident commander, as requested ([Requirement 31169](#)).
- c. Preserve evidence, document the scene, identify witnesses, and collect debris.
- d. Only Federal employees on the IRT shall support the Center safety office in impounding data and collecting witness statements (written statements when possible) ([Requirement 31170](#)).
- e. For mishaps at contractor or subcontractor sites, the IRT shall work through the contracting officer, with the guidance from the legal advisor, to obtain and impound data.

Note: For mishaps outside the Center's gates, NASA has the authority to impound NASA property, however, the ability to impound or collect other data, records, and equipment is determined by the local and Federal laws, Agency agreements, and contracts.

f. Advise the supervisor if drug testing should be requested per the NPR 3792.1, Plan for a Drug-Free Workplace ([Requirement 31171](#)).

Note: Per NPR 3792.1 the supervisor shall initiate drug testing after a mishap if the mishap results in a fatality or personal injury requiring immediate hospitalization or in damage estimated to be in excess of \$10,000 to government or private property. This applies to Federal employees only. Drug testing of contractors is dependent upon their contract.

- g. Provide all available mishap data and evidence to the investigating authority ([Requirement 31172](#)).
- h. Support the AA/OPA (or designee), Center safety office, IRT, and CD or AA/OIA in the release of information to the press and media to alert Center personnel and the public of any known hazards and their potential effects, and provide instructions that will mitigate the risk and harm (Requirement).
- 1.4.22 Incident Commander. The incident commander shall implement the procedures outlined in the Center Mishap Preparedness and Contingency Plan to coordinate rescue activities, mitigate hazards, and safe and secure the mishap site ([Requirement 31173](#)).
- 1.4.23 Center Safety Office. The Center safety office shall:
- a. Support the development of the Center Mishap Preparedness and Contingency Plan, Program Mishap Preparedness and Contingency Plan(s), contract clauses, mishap investigation training, and a mishap investigation tool repository (that makes tools readily accessible to investigating authorities) ([Requirement 31175](#)).
- b. Develop the Program/Project Mishap Preparedness and Contingency Plans for Programs/Projects as defined by NPR 7120.5 and that their Center manages. Programs with aircraft in the developmental, qualification, or certification phases of the program shall have a Program Mishap Preparedness and Contingency Plan that is tailored for the particular phase of the program. ([Requirement 31110](#)).
- c. Ensure that their Center's employees are familiar with the roles and responsibilities as documented within the Center Mishap Preparedness and Contingency Plan and this NPR ([Requirement 31176](#)).
- d. Implement the Center Mishap Preparedness and Contingency Plan; when applicable, support the program as they initiate the Program Mishap Preparedness and Contingency Plan; and initiate, facilitate, and coordinate all investigation activities per the plan ([Requirement 31177](#)).
- e. Report the mishap to Headquarters per the reporting requirements defined in this NPR and to OSHA (when applicable) ([Requirement 31178](#)).
- f. Support the incident commander as he/she safes and secures the mishap site ([Requirement 31179](#)).
- g. Impound data, records, equipment, and facilities ([Requirement 31180](#)).
- h. Advise the supervisor that drug testing should be initiated ([Requirement 31181](#)).
- i. Collect witness statements (written statements preferred) ([Requirement 31182](#)).
- j. Ensure that mishap and close call information is entered in the Incident Reporting Information System (IRIS) per the requirements outline in this NPR ([Requirement 31183](#)).

Note: Close calls involving aircraft may be entered into the NASA Aviation Anomaly Reporting System (NAARS) in lieu of IRIS.

- k. Verify the CAP is complete and all elements of the investigation have been completed ([Requirement 31184](#)).
- l. Retain mishap investigation records per NPR 1441.1 and physical evidence (debris) as necessary ([Requirement 31185](#)).
- m. Keep an updated list of all Center personnel that have training and experience in mishap investigation including information such as relevant training courses, date of training, recent participation in a mishap investigation, and security clearances ([Requirement 31186](#)).
- n. Establish a Center-specific process to disseminate to other Centers the final mishap report and to rapidly disseminate preliminary mishap and close call precautionary information that meets the PAO guidelines for release ([Requirement 17028](#)).

1.4.24 The Office of Security and Program Protection (OSPP) shall:

- a. Upon request from the appointing official, perform a classification review of the endorsed mishap report to determine if any section of the report (or the whole report) needs to be classified or if it may be authorized for public release.

1.4.25 The Center security office shall:

- a. Support the Incident Commander, Center safety office, and IRT in securing the mishap site and impounding data, records, equipment, and facilities ([Requirement 31187](#)).

1.4.26 Supervisors. Supervisors shall:

- a. Notify the Center safety office when a mishap or close call occurs ([Requirement 31189](#)).
- b. Support the incident commander as he/she secures and safes the mishap site ([Requirement 31190](#)).
- c. Initiate drug testing after a mishap if the mishap results in a fatality or personal injury requiring immediate hospitalization or in damage estimated to be in excess of \$10,000 to government or private property ([Requirement 31191](#)).

- d. Assist the investigating authority, as requested ([Requirement 31192](#)).
- e. Complete the initial mishap or close call report in accordance with the Center Mishap Preparedness and Contingency Plan ([Requirement 31193](#)).

1.4.27 All Employees. All employees shall:

- a. If witness to, or involved in, a NASA mishap or close call, immediately notify both emergency response (e.g., 911, fire, ambulance, Center security office) of the need for assistance and a supervisor, management official, or a safety/health staff member of the circumstance of the mishap or close call ([Requirement 31195](#)).
- b. Complete witness statements prior to leaving the mishap investigation site, to the extent possible ().
- c. Provide as much information as possible to the investigating authority ([Requirement 31197](#)).

1.4.28 Center's Chief of Aircraft Operations. The Chief of Aircraft Operations shall notify the NTSB of a mishap involving aircraft per paragraph 1.6.6 of this NPR and complete NTSB Form 6120 per paragraph 1.6.8 of this NPR and NTSB requirements ([Requirement 31198](#)).

1.4.29 Contracting Officers. Contracting officers shall:

- a. Involve the Center safety office in the acquisition strategy planning activities for proposed contracts as detailed in NASA NFS Part 1807, "Acquisition Planning" ([Requirement 31200](#)).
- b. Incorporate applicable mishap and close call reporting and investigating procedures and corrective action requirements detailed in the NFS into contracts and grants covering NASA programs and operations ([Requirement 31201](#)).
- c. Coordinate with the contractor and subcontractor sites to assist the investigating authority in gaining contractor site access, impound contractor data, and interview contractor personnel as permitted by the contract (Requirement).

1.4.30 CHMO. The CHMO shall:

- a. Serve as the appointing official for a mishap involving a human research subject participating in NASA-funded research at a grantee site, or at another offsite location, and obtain the concurrence from the Chief/OSMA on the investigating authority's membership (Requirement). In these investigations, the investigating authority composition shall include a safety officer that is trained in mishap investigation (Requirement).

Note: If the mishap involving a human research subject occurs at a Center, the Center Director will serve as the appointing official per this NPR. For mishaps involving a human research subject the endorsement and authorization for public release processes will remain the same.

- b. Serve as an endorsing official for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls involving an injury or fatality ([Requirement 31202](#)).

1.4.31 Office of Institutions and Management, Office of Infrastructure and Administration, Aircraft Management Division (AMD). For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls involving aircraft AMD shall serve as an endorsing official ([Requirement 31203](#)).

1.4.32 Office of the General Counsel. The Office of the General Counsel shall:

- a. Develop and implement procedures for collateral investigations that will be performed for mishaps and close calls that do not involve criminal activity ([Requirement 31205](#)).
- b. Assist the AA/OPA (or designee) in the review of the approved mishap report as it is being prepared for public release ([Requirement 31206](#)).

1.4.33 Chief Engineer. The NASA Chief Engineer shall:

- a. Concur on MIB membership for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls (Requirement).
- b. Serve as an endorsing official for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls (Requirement).

1.4.34 Roles and responsibilities are summarized in Figure 2.

1.5.2 The Center safety office shall collect employee safety concerns, mishap reports, and close call reports through a Center process, review the employee reports, verify that they meet the definitions of mishap or close call found in Appendix A and Figure 1, and report those that are consistent with the NPR ([Requirement 31210](#)).

1.5.3 Notify Office of Safety and Mission Assurance, Safety and Assurance Requirements Division (OSMA/SARD). After emergency response has been initiated, within one hour of the occurrence of a Type A mishap, Type B mishap, high-visibility mishap, or high-visibility close call, the Center safety office shall notify OSMA/SARD by calling 1.202.358.0006, or, if no answer, by calling the NASA Headquarters After Hours Contact Center at 1.866.230.6272 ([Requirement 31211](#)).

a. Mishap notification must be acknowledged (verbally, e-mailed, or faxed) to meet the intent of this requirement ([Requirement 31212](#)).

b. Per NPR 7100.1, paragraph 11.4.1, this includes immediately reporting a human test subject injury or fatality that resulted in a loss of life, a permanent disability, hospitalization, extensive first aid, or lost workday[s] ([Requirement 31213](#)).

1.5.3.1 During this notification, the Center safety office shall provide the following information: the Center name, location of incident, time of incident, number of fatalities (if known), number of hospitalized employees (if known), type of injury (if known), type of damage (if known), contact person, contact person's phone number, and a brief description of the mishap ([Requirement 31214](#)).

1.5.4 Notify OSHA. Within 8 hours of a work-related mishap involving death of a Federal employee, or the hospitalization for inpatient care of three or more employees (provided at least one is a Federal employee), the Center safety office shall notify OSHA by calling the area office nearest the site of the mishap or OSHA's toll-free number, 1.800.321.6742 ([Requirement 31216](#)).

1.5.4.1 OSHA notification is required for any fatality or three or more hospitalizations that occur up to 30 workdays after the respective mishap ([Requirement 31217](#)).

1.5.4.2 The Center safety office shall persist in making contact with OSHA to provide this report until OSHA has acknowledged receipt of the report ([Requirement 31218](#)).

1.5.4.3 In notifying OSHA, the Center safety office shall provide OSHA with the following information: the establishment name, location of incident, time of incident, number of fatalities (if known), number of hospitalized employees (if known), contact person, contact person's phone number, and a brief description of the mishap ([Requirement 31219](#)).

1.5.4.4 After notifying OSHA, the Center safety office shall inform OSMA/SARD that an oral report has been provided to OSHA ([Requirement 31220](#)).

1.5.5 Within 24 hours of a Type A mishap, Type B mishap, high-visibility mishap, or high visibility close call, the Center safety office shall follow up the initial phone notification by sending an electronic notification to OSMA/SARD that includes the following information: Center submitting report; author of report; author's phone number and mail code; date report submitted; time report submitted; incident date; incident time; incident general location; exact location (if known); responsible organization; organization's point of contact; point of contact's phone number and mail code; mission affected; program impact (if known); number and type of injuries or fatalities (if known); type of damage to equipment, flight hardware, flight software, or facilities; estimate of direct cost of damage; and a brief description of the mishap or close call ([Requirement 31215](#)).

1.5.6 Report Criminal Activity Associated with NASA Mishaps to the Office of Inspector General (OIG) and to either the Office of the General Counsel or Center Chief Counsel.

1.5.6.1 The OIG and the Center's Office of the Chief Counsel or the NASA Office of the General Counsel shall be notified if it is suspected that a mishap resulted from criminal activity ([Requirement 31222](#)).

1.5.6.2 Any facts related to criminal activity in connection with a mishap shall be referred to the OIG ([Requirement 31223](#)). Privileged witness statements will be protected to the extent provided by law.

1.6 Additional Notification and Reporting Requirements for Aircraft Investigations

1.6.1 NASA employees shall report immediately to the Center safety office any of the aircraft mishaps or anomalies described in Figure 3, paragraph 1.2, and paragraph 1.6.2 of this NPR ([Requirement 31225](#)).

Figure 3. NTSB Reportable Events (Per 49 CFR Part 830).

| All Aircraft | |
|--------------|---|
| o | Flight control system malfunction or failure. |
| o | All aircraft accidents with substantial damage. |
| o | Inability of any required flight crewmember to perform normal flight duties as a result of injury or illness. |

| | |
|--|---|
| o | Failure of structural components of a turbine engine, excluding compressor and turbine blades and vanes. |
| o | In-flight fire. |
| o | Aircraft collision in flight. |
| o | Damage to property other than the Agency aircraft. |
| <i>For large multiengine aircraft (more than 12,500 pounds maximum certificated take-off weight)</i> | |
| o | In-flight failure of hydraulic systems that results in sustained reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces. |
| o | Sustained loss of the power or thrust produced by two or more engines. |
| o | An evacuation of an aircraft in which an emergency egress system is used. |
| o | An aircraft is overdue and is believed to have been involved in a mishap or close call. |

Figure 4: Information Required for All Agency Aircraft Mishaps and Close Calls

| |
|---|
| 1. Type, nationality, and registration marks of the aircraft. |
| 2. Name of owner and operator of the aircraft. |
| 3. Name of the pilot in command. |
| 4. Date and time of the mishap, malfunction, or failure. |
| 5. Last point of departure and point of intended landing of the aircraft. |
| 6. Position of the aircraft with reference to some easily defined geographical point. |
| 7. Number of persons aboard and number killed or seriously injured. |
| 8. Nature of the mishap or occurrence, the weather, and the extent of damage to the aircraft, so far as is known. |
| 9. A description of any explosives, radioactive materials, or other dangerous articles carried. |

1.6.2 Employees shall report unexpected aircraft departure from controlled flight for all aircraft except the following high performance jet/test aircraft which can experience departure from controlled flight when engaged in flight test activities: F-15, F-16, F/A-18, T-38, OV-10, and T-34 ([Requirement 31228](#)). These aircraft are exempt because it is a common occurrence for a high performance jet/test aircraft that does dynamic maneuvering to depart from controlled flight.

1.6.3 Immediately after the occurrence of an aviation mishap or NTSB-defined mishap or close call, the Center aircraft operator shall provide all the information listed in Figure 4 to the Center safety office and the Center Chief of Aircraft Operations ([Requirement 31229](#)).

1.6.4 The Center safety office shall notify OSM/SARD and AMD of any aircraft mishap or close call as listed in paragraph 1.6.2 and Figure 3 of this NPR.

Note: Figure 3 and paragraph 1.6.2 are NTSB reporting requirements. Consequently, this requirement is in addition to reporting all aircraft-related Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls to the OSM/SARD.

1.6.5 The Center safety office shall ensure that for aircraft mishaps and close calls all information listed in Figure 4 of this NPR (with the exception of the pilot's name) is entered in IRIS.

Note: Close calls involving aircraft may be entered into the NAARS in lieu of IRIS.

1.6.6 The Center's Chief of Aircraft Operations or his/her designee shall immediately notify the NTSB of any aircraft mishap, incident, or close call listed in Figure 3 and paragraph 1.6.2 of this NPR and in accordance with 49 CFR Part 830 and notify OSM/SARD that NTSB notification has been completed.

1.6.7 In the event that the NTSB exercises its authority to investigate a NASA aircraft mishap, NASA shall conduct a separate investigation in accordance with this NPR ([Requirement 31232](#)).

1.6.8 Within 10 workdays of an aircraft mishap or close call that meets the reporting requirements as defined in Figure 3 and paragraph 1.6.2 of this NPR, the Center Chief of Aircraft Operations shall submit an NTSB Form 6120 to the NTSB regional office nearest to the location of the mishap or close call ([Requirement 31233](#)).

1.6.9 An unmanned aerial vehicle (UAV) is not currently considered an aircraft by the NTSB, consequently NTSB reporting requirements are not applicable to a UAV unless personnel are injured or the UAV comes down in a populated area outside a Center's gates.

1.7 Investigation Products for each Classification Level/Type of Investigation

1.7.1 The investigating authority shall conduct an investigation and include the following products in the mishap report according to the requirements listed in Figure 5:

- a. Investigating authority and ex officio signatures demonstrating their approval of the mishap report ([Requirement 31237](#)).
- b. Advisor(s) signatures demonstrating that he/she has reviewed the mishap report; that it meets NASA policies and procedures in his/her functional area; that any privileged or proprietary information, ITAR information, EAR information, or material subject to the Privacy Act has been identified and marked as nonreleasable to the public; and that sections that are releasable to the public are marked releasable and, to the best of his/her knowledge, are ready for public release (pending endorsements and Headquarters and Center public affairs authorization) ([Requirement 31238](#)).
- c. List of the investigating authority's consultants ([Requirement 31239](#)).
- d. An executive summary that does not contain privileged or proprietary information, material subject to the Privacy Act, ITAR information, or EAR information ([Requirement 31240](#)).
- e. The OSHA Final Mishap Summary (OSHA 301 Form: Injury and Illness Incident Report, or an equivalent form), if the mishap is an OSHA recordable incident ([Requirement 31241](#)).
- f. Description of the type of data gathered and evaluated during the investigation ([Requirement 31242](#)).
- g. Narrative description of the facts including what, when, and where ([Requirement 31243](#)).
- h. Timeline ([Requirement 31244](#)).
- i. Description of all structured analysis techniques used and how they contributed to determining the findings ([Requirement 31245](#)).
- j. Event and causal factor tree or similar graphical representation of the mishap ([Requirement 31246](#)).
- k. Description explaining why the mishap/close call occurred including all finding(s) such as proximate cause(s), root cause(s), contributing factor(s), failed barrier(s), observation(s), and the evidence upon which the findings are based ([Requirement 31247](#)).
- l. Conclusions and recommendations ([Requirement 31248](#)).
- m. Minority report, if there is one ([Requirement 31249](#)).

Figure 5. Classification Level/Investigation Type with Corresponding Appointing Official, Endorsing Officials, and Required Products in the Mishap Report

| | Classification Level & Investigation Type | | | | | |
|---|--|---|--|---|---|---|
| | High-Visibility Mishap or Close Call | Type A | Type B | Type C | Type D | Close Call |
| Investigating Authority | MIB ¹ | MIB (at least 5 members) | MIB (at least 3 members) | MIT or MI | MIT or MI | MIT or MI |
| Required Products | All (a-m) ¹ | All (a-m) | All (a-m) | a-e, g, l, k, m | a, b, g, k, l, m | a, b, g, k, l, m |
| Appointing Official | MDAA (For Offsite, In-flight or Program Contractor Site) ¹ or CD or AA/OIA (For Center Onsite, or Offsite Center Support Contractor) ¹ or CHMO (For Offsite Human Research Subjects) | Administrator ² or AA ² , or CD or AA/OIA (For Center Onsite or Offsite Center Support Contractor) or MDAA (For Offsite, In-space flight or at a Program Contractor Site) or CHMO (For Offsite Human Research Subjects) | CD or AA/OIA (For Center Onsite or Offsite Center Support Contractor) or MDAA (For Offsite, In-space flight or at a Program Contractor Site) or CHMO (For Offsite Human Research Subjects) | CD designee or AA/OIA designee (For Center Onsite or Offsite Center Support Contractor) or MDAA Designee (For Offsite, In-space flight or at a Program Contractor Site) or CHMO (For Offsite Human Research Subjects) | CD designee or AA/OIA designee (For Center Onsite or Offsite Center Support Contractor) or MDAA Designee (For Offsite, In-space flight or at a Program Contractor Site) or CHMO (For Offsite Human Research Subjects) | CD designee or AA/OIA designee (For Center Onsite or Offsite Center Support Contractor) or MDAA Designee (For Offsite, In-space flight or at a Program Contractor Site) or CHMO (For Offsite Human Research Subjects) |
| Concurrence on MIB Membership | Chief/OSMA ¹ Chief Engineer ¹ CHMO ⁷ | Chief/OSMA Chief Engineer CHMO ⁷ | Chief/OSMA Chief Engineer CHMO ⁷ | CHMO ⁷ | CHMO ⁷ | CHMO ⁷ |
| Endorsing Officials | Appointing Official ¹ , Chief/OSMA ¹ , Chief Engineer AMD ^{1,2} , Procurement ¹ , CHMO ^{1,4} , Other ¹ | Appointing Official, Administrator ² , Chief/OSMA Chief Engineer AMD ² , CHMO ⁴ , Procurement ¹ , Other ¹ | Appropriate MDAA, Appointing Official, Chief/OSMA Chief Engineer AMD ² , CHMO ⁴ , Procurement ¹ , Other | Appointing Official and Center Process | Appointing Official and Center Process | Appointing Official and Center Process |
| Officials Reviewing Mishap Report Prior to Authorization for Public Release | General Counsel ¹ , OPA ¹ , NASA Export Administrator ¹ , OSPP (Security) ¹ | General Counsel, OPA, NASA Export Administrator, OSPP (Security) | General Counsel, OPA, NASA Export Administrator, OSPP (Security) | Center Chief Counsel, Center PAO, Center Export Administrator, Center Process | Center Chief Counsel, Center PAO, Center Export Administrator, Center Process | Center Chief Counsel, Center PAO, Center Export Administrator, Center Process |

KEY

1. Occurs when the Administrator, AA, MDAA, CD, Chief/OSMA, or CHMO decides that the high-visibility mishap or high-visibility close call should be investigated by a MIB.
2. Only when Administrator desires.
3. Only when the mishap or close call involves an aircraft.
4. Only when the mishap or close call involves an injury or fatality.
5. When needed.
6. When the mishaps or close calls involve Mission Directorate programs/projects/activities that are not managed by a Center, program, or project, where the mishaps or close calls have occurred outside the Center's gates.
7. Onsite human research subjects.

1.7.2 For close calls, where the potential for a Type A mishap or Type B mishap is significant, the Center Safety and Mission Assurance (SMA) director may consider application of a MIB or MIT investigation and their associated products. Serious workplace hazards previously unidentified and discovered as a result of inspections, audits, surveys, or concerns shall be investigated in the same manner as close calls ([Requirement 31672](#)).

1.7.3 For Type B mishaps, Type C mishaps, Type D mishaps, and close calls involving a single person, where the injury/illness occurred because an individual fell down the stairs, slipped or tripped on the floor or ground, experienced a musculoskeletal disorder (both cumulative trauma or acute) while performing routine office duties, was bitten by an insect, and/or aggravated a preexisting medical condition, the mishap investigation may be performed by one trained mishap investigator without the support from an ex officio.

***Rationale:** Brown recluse spider bites result in hospitalization. They do not require a full MIB, complex investigation, and/or report.*

1.7.4 The CD or AA/OIA shall elevate the level of investigation and required products of any mishap or close call upon the request of a higher authority, such as the Administrator, an Associate or Assistant Administrator, or upon his/her discretion ([Requirement 31673](#)).

1.8 Recording Requirements

1.8.1 Within 24 hours, the Center safety office shall ensure that all NASA mishaps and close calls are recorded in IRIS and include the following information: Center submitting report; author of report; author's phone number and mail code; date report submitted; time report submitted; incident date; incident time; incident general location; exact location (if known); responsible organization; organization's point of contact; point of contact's phone number and mail code; mission affected; program impact (if known); number and type of injuries or fatalities (if known); type of damage to equipment, flight hardware, flight software, or facilities; estimate of direct cost of damage; and a brief description of the mishap or close call ([Requirement 31252](#)).

Note: Close calls involving aircraft may be entered into the NAARS in lieu of IRIS.

1.8.2 For mishaps or close calls involving injury, the occupational health representative or other medical person shall provide the appropriate medical information regarding the person(s) injured and the nature of the injury(s) to the Center safety office for inclusion in IRIS ([Requirement 31253](#)).

1.8.3 The Center safety office shall record mishaps involving injury or illness to NASA civil service employees on the OSHA 300 Log as required by 29 CFR Part 1904.7 ([Requirement 31254](#)).

1.8.4 The Center safety office shall ensure that the information recorded in IRIS is updated as new information becomes available and, at a minimum, verify information is up to date once every 30 days until the investigation is complete and the corrective actions are complete ([Requirement 31255](#)).

1.9 Collateral Investigations

1.9.1 The NASA investigating authority performing the safety investigation per this NPR shall have primacy over other Agency collateral investigations, with the exception of OIG criminal investigations ([Requirement 31257](#)).

1.9.2 The investigating authority shall not distribute witness statements, notes, or transcripts of witness testimony taken during interviews, or medical records to the collateral investigation board or any other Agency, unless ordered in a court of law ([Requirement 31258](#)).

1.9.3 In an unusual case, the MIB chair shall release privileged witness testimony and related material to the OIG upon receipt of a written request that is signed by the Inspector General or Deputy Inspector General, addressed to the NASA Administrator or Deputy Administrator, and forwarded to the MIB chair from the Administrator's office.

Note: The OIG respects and, as a general rule, will defer to the disclosure restrictions attendant to NASA mishap investigations. Upon receipt of such testimonial information, the OIG will consider it to be confidential witness testimony and will treat it as such to the full extent required by the Inspector General Act of 1978.

1.9.4 The investigating authority may provide (at their discretion) the collateral investigation board with access to factual data, physical evidence (with the exception of privileged witness statements, notes and transcripts of privileged testimony, and medical records), analysis, and any other information that will be contained within the mishap investigation report authorized for public release.

1.9.5 Members of the investigating authority shall not participate in both collateral investigations or contractor and safety investigations for the same mishap or at the same time (Requirement).

1.10 Investigations by Outside Authorities

1.10.1 NASA shall support investigations of NASA mishaps by other Federal agencies authorized to investigate NASA mishaps ([Requirement 31261](#)).

1.10.2 NASA shall support investigations of mishaps experienced by other Federal agencies, foreign participants, and private industry in accordance with agreements ([Requirement 31262](#)).

1.10.3 If the NASA appointing official accepts an investigation by other authorities or contractors that is independent and adequately addresses proximate cause(s), root cause(s), and contributing factor(s), the appointing official is not required to conduct a separate NASA investigation.

1.10.4 Examples of situations where investigations by other parties may be accepted include the following:

- a. When a Presidential Commission is appointed pursuant to the NASA Authorization Act of 2005 (Public Law 109-155, Section 821) to investigate the loss of a Space Shuttle, the loss of ISS or its operational viability, the loss of any other United States space vehicle carrying humans that is owned by the Federal Government or that is being used pursuant to a contract with the Federal Government, or the loss of a crew member or passenger of any space vehicle described in this subsection.
- b. Traffic mishaps involving NASA employees in the course of their duty when investigated by local authorities (i.e., sheriff, state police, coroners) having jurisdiction.
- c. An injury or fatality where there is substantial reason to believe the mishap or close call is the result of a criminal or terrorist act to NASA employees and is investigated by local or Federal law enforcement authorities such as the Federal Bureau of Investigation; the Bureau of Alcohol, Tobacco, Firearms, and Explosives; the Department of State; the Drug Enforcement Agency; the Department of Homeland Security; or the OIG.
- d. An injury or fatality as a result of a commercial transportation mishap involving NASA personnel on official business that is investigated by authorities having jurisdiction, such as the Federal Aviation Administration and the NTSB.

1.10.5 Contractor and Grantee Mishaps. In those cases that are not NASA mishaps (i.e., solely involve a contractor or grantee mishap or close call at an offsite location, arising out of work performed under a NASA contract and the contractor/grantee is required to investigate pursuant to NFS 1852.223-70), the NASA appointing official is not required to appoint a separate NASA investigating authority unless the contractor's/grantee's mishap report indicates that a NASA policy or procedure was a causal factor or contributing factor and a NASA change is warranted.

1.10.5.1 A contractor onsite injury or illness that is classified as a Type C mishap, Type D mishap, or Close Call may be investigated by the contractor per their contract. The mishap report must be delivered to NASA, and NASA has the option of completing the endorsement process. (Requirement 31268)

1.10.6 When the onsite incident has been classified as a Type D mishap or a close call involving government property damage (including flight hardware, ground processing equipment, and/or the ground facility), the NASA appointing official may allow contractor investigation of the mishap per their contract provided the following are true:

- a. NASA serves as the appointing official and approves the investigating authority.
- b. The investigating authority has the same membership (e.g., disciplines and training) as defined in this NPR (NPR 8621.1) with the exception that all members and advisors are contractor personnel.
- c. The investigating authority performs the investigation per this NPR with the exception of taking privileged witness statements. (Rationale: NASA can not protect privileged witness statements taken by a contractor. Consequently, the contractor is not authorized to grant privilege.)
- d. The investigating authority produces the products listed in Figure 5.
- e. The NASA appointing official reviews and endorses the report.

Chapter 2. Readiness to Conduct Investigations

2.1 Headquarters Operations and Center Mishap Preparedness and Contingency Plan

2.1.1 The AA/OIA and each CD shall develop a Center Mishap Preparedness and Contingency Plan that describes the following:

- a. The local mishap and close call notification, reporting, investigating, recording, and prevention policies and procedures ([Requirement 31272](#)).
- b. The relationship between the emergency preparedness plan, the Center Mishap Preparedness and Contingency Plan, and Program Mishap Preparedness and Contingency Plans and which plan takes precedence given specific conditions ([Requirement 31273](#)).
- c. Management responsibilities for establishing mishap investigations ([Requirement 31274](#)).
- d. Procedures to appoint an IRT for those mishaps and close calls that are not covered by a program/project Mishap Preparedness and Contingency Plan (i.e., facility mishaps and close calls) ([Requirement 31275](#)).
- e. Procedures to appoint a MIT or MI for Type C mishaps, Type D mishaps, and close calls that occur at the Center or involve programs/projects/activities managed by the Center ([Requirement 31276](#)).
- f. Roles and responsibilities of the incident commander (or the location in the emergency preparedness plan where these can be found) ([Requirement 31277](#)).
- g. Procedures to impound appropriate records and equipment that may be involved in the mishap to prevent unauthorized use or modification ([Requirement 31278](#)).
- h. List of responsible organizations, along with Center safety office personnel, that shall take immediate action to safeguard (or impound) appropriate records, equipment, and facilities and secure the mishap site ([Requirement 31279](#)).
- i. Identification of the location or space where impounded data, records, and equipment shall be stored and secured during an investigation ([Requirement 31280](#)).
- j. Procedures for release of impounded data, records, equipment, facilities, and the mishap site ([Requirement 31281](#)).
- k. Mishap report approval process for Type C mishaps, Type D mishaps, and close calls that occur at the Center or involve programs/projects/activities managed by the Center ([Requirement 31282](#)).
- l. List of potential contractor support and onsite experts that can facilitate the immediate acquisition or purchase of products needed by the investigation board or team (e.g., high resolution cameras, recording devices, software, and others) ([Requirement 31283](#)).
- m. The mandatory schedule for mishap simulations that include simulation of accident investigation procedures as described in this NPR, the Center Mishap Preparedness and Contingency Plan, and the Program Mishap Preparedness and Contingency Plan ([Requirement 31284](#)).
- n. The information technology plan to provide computer data retrieval and data archive support to

the investigating authority ([Requirement 31286](#)).

o. Requisite security clearances, if any, for investigating authority members, chair, and ex officio ([Requirement 31287](#)).

p. Description of the "chain of custody process" that will be used to secure and safeguard personnel effects and sensitive information related to injured or deceased individuals (Requirement).

Note: This process includes the procedures to provide physical security over and controlled access to personal effects and other sensitive material.

q. The expiration date (Requirement).

Note: Depending on the Center personnel turnover and realignments, the Center Mishap Preparedness and Contingency Plan, including the contact list may need to be updated semiannually or quarterly.

2.2 Program and Project Mishap Preparedness and Contingency Plans

2.2.1 The program/project manager shall concur in a Program/Project Mishap Preparedness and Contingency Plan that:

a. Is a comprehensive plan for all mishaps and close calls that occur offsite, at offsite program/project (as defined by NPR 7120.5) contractor sites, or in flight.

b. Is consistent with the Centers' Mishap Preparedness and Contingency Plans, for all Centers in which the program operates ([Requirement 31290](#)).

c. Covers any information and procedures required specifically by the program that are not covered in the Centers' Mishap Preparedness and Contingency Plans (i.e., special procedures for safing, handling, or containing hazardous chemicals present in the program's/project's hardware) ([Requirement 31291](#)).

d. Describes the procedures to comply with NPR 8621.1 notification, reporting, investigating, and recording requirements for all program/project activities not located at a Center or managed by a Center (e.g., program/project activities managed by Headquarters and located at a University, contractor site, or other off-Center location) ([Requirement 31292](#)).

e. Describes the training requirements and the IRT's membership for mishaps and close calls that occur offsite, at offsite program/project (as defined by NPR 7120.5) contractor sites, or in flight ([Requirement 31293](#)).

f. Describes any special procedures for the emergency response personnel, the IRT, and the incident commander that are not covered in the Center Mishap Preparedness and Contingency Plan or the emergency response plan (e.g., identification and handling of hazardous commodities specific to the program) ([Requirement 31294](#)).

g. Describes the procedures to impound data, records, equipment, facilities, and property not located at a NASA facility ([Requirement 31295](#)).

h. Identifies existing memoranda of agreement with national, state, and local organizations and agencies that may be utilized during a mishap investigation ([Requirement 31297](#)).

- i. Describes how offsite debris shall be collected, transported, and stored ([Requirement 31298](#)).
- j. Describes the investigation and debris collection process required for any mishap or close call occurring in a foreign country ([Requirement 31299](#)).
- k. Requires that, for NASA-investigated mishaps, NASA personnel shall perform and control the impounding process ([Requirement 31300](#)).
- l. Lists the personnel who will assist in performing the procedures to impound data, records, equipment, facilities, and other property ([Requirement 31301](#)).

Note: Contractor personnel may provide data from their offices and/or facilities to the NASA personnel performing this task.

- m. Identifies the national, state, and local (and, where applicable, international) organizations and agencies which are most likely to take part in debris collection; identifies the roles and responsibilities of each organization; and identifies a point of contact ([Requirement 31296](#)).
- n. Addresses the responsibilities and procedures for mishap investigation in the bilateral or multilateral agreements when the program involves international partners, program managers, and project managers ([Requirement 31302](#)).
- o. Describes the resources that may be needed from other government agencies (e.g., Federal Emergency Management Agency, NTSB, DoD, Department of Justice) during a Type A mishap or Type B mishap investigation; identifies the point of contact and contact information for each of these Agencies; describes the procedures to acquire their assistance; and identifies the potential roles and responsibilities of each Agency ([Requirement 31303](#)).
- p. Includes a list of information such as databases, Web sites, documentation (including hardware history), drawings, basic system operation, and procedures that may be scrutinized in a Type A mishap involving loss of a vehicle and/or major facility damage and frequently updates this information so that it is easily deliverable to a mishap investigation board, and includes points of contact for the information. ([Requirement 31304](#)).
- q. Describes the information technology plan to provide computer data retrieval and data archive support to the investigating authority ([Requirement 31306](#)).
- r. Describes the requisite security clearances, if any, for investigating authority members, chair, and ex officio participating in program/project investigations ([Requirement 31307](#)).
- s. Describes the "chain of custody process" that will be used to secure and safeguard personal effects and sensitive information related to injured or deceased individuals (Requirement).

Note: This process includes the procedures to provide physical security over and controlled access to personal effects and other sensitive material.

- t. Names of key personnel from the Agency Public Affairs Office and Office of External Relations (OER) that should be notified for all Type A and Type B mishaps (Requirement).
- u. States the expiration date (Requirement).

Note: Depending on the Program personnel turnover and phase (e.g., test, processing, and flight), the Program/Project Mishap Preparedness and Contingency Plan, including the contact list may need to be updated semiannually or quarterly.

2.2.2 The program/project manager shall have the appropriate NASA Offices, at a minimum, General Counsel, OPA, OER, OSMA, and Centers (all Centers at which the program/project has activities) review and comment on the Mishap Preparedness and Contingency Plan prior to its approval ([Requirement 31308](#)).

2.2.3 The program manager (or designee) shall provide the Program Mishap Preparedness and Contingency Plan to OSMA/SARD for compliance review at least three weeks prior to the Safety and Mission Success Review (SMSR).

2.2.4 The program manager shall submit the Program Mishap Preparedness and Contingency Plan to the Chief/OSMA for concurrence two weeks prior to the Program SMSR

2.2.5 The program or project (as defined per NPR 7120.5) Safety and Mission Assurance representative shall review and approve the Mishap Preparedness and Contingency Plan, verifying that it has the content required per this NPR (NPR 8621.1), prior to submittal for signature (Requirement).

2.3 Mishap Preparedness and Contingency Plan Practice

2.3.1 The Program and Center Mishap Preparedness and Contingency Plans, including emergency response where appropriate, shall be practiced during contingency simulations that occur prior to a major test, launch, or space activity (Requirement).

Note: Practice is intended to mean tabletop and/or full enactment simulations (where possible).

2.3.2 For ongoing programs with repeated major test, launches, and space activities, the Program Mishap Preparedness and Contingency Plan, including emergency response where appropriate, shall be conducted at least every 18 months.

2.3.3 The Center Safety Office at the Center where the program is managed shall provide oversight of the Mishap Preparedness and Contingency Plan simulation.

2.3.4 At the conclusion of the simulation, the Center Safety Office and Program shall identify any deficiencies in the Mishap Preparedness and Contingency Plan, update the plan as needed, and/or take other necessary corrective actions to assure that the plan can be effectively implemented if a mishap occurs.

2.4 Contingency Plan Web Site

2.4.1 All MDAAs, Programs, Projects, and Centers shall submit their up-to-date Mishap Preparedness and Contingency Plans to OSMA/SARD for storage on the NASA Process Based Mission Assurance Secure Web Site.

Note: The mishap web site provides a secure central repository that NASA civil servants can use to find the latest versions of the contingency plans.

2.5 Contract Clauses

2.5.1 Contracting officers shall include appropriate mishap and close call notification, reporting, recording, and investigation procedures in NASA contracts ([Requirement 31310](#)).

2.5.2 The Center safety office shall involve itself in acquisition strategy meetings per NFS Part 1807, Acquisition Planning, to assure that the appropriate mishap and close call reporting, investigating, and evaluation criteria are incorporated into contracts ([Requirement 31311](#)).

2.6 Training

2.6.1 The Chief/OSMA with the support of the Center safety office shall provide the necessary training to ensure that at least one member of each investigating authority and the ex officio has, at a minimum, the following:

a. Knowledge of the NASA mishap investigation policy and process as demonstrated via test ([Requirement 31314](#)).

Note: The NASA "Introduction to Mishap" course provides the training to meet this requirement.

b. Knowledge and skills to secure the site; preserve the mishap scene; interview witnesses; collect and impound data, records, equipment and facilities; create time lines; document facts; generate fault trees; perform barrier analysis; perform change analysis; create event and causal factor trees; obtain forensic analysis; integrate evidence; draw conclusions; generate recommendations; and generate mishap reports ([Requirement 31315](#)).

2.6.2 The Chief/OSMA, with the support of the Center safety office, shall provide the necessary training to ensure that the human factors mishap investigator has the following:

a. At a minimum, knowledge (as demonstrated via test or on-the-job training) of the method to identify unsafe acts and errors, identify types of errors, identify causal and contributing factors for errors, identify performance shaping factors, interview witnesses, analyze data, create timelines, perform fault tree analysis, perform barrier analysis, create event and causal factor trees, draw conclusions, and generate recommendations that will reduce human error or mitigate the negative consequence of human actions ([Requirement 31317](#)).

b. Basic knowledge of physical and psychological processes, capabilities, skill levels, and limitations of humans, such as the science and practical application of cognitive psychology, human reliability, anthropometrics, biomechanics, and human factors engineering applications to design ([Requirement 31318](#)).

2.6.3 The Center safety office shall develop and maintain NASA mishap investigation introductory training (onsite orientation training) that can be provided to the investigating authority and advisors upon their assignment to the investigation ([Requirement 31319](#)).

a. The NASA mishap investigation introductory training shall include (at a minimum) a brief familiarization of the investigating authority's roles and responsibilities, NASA policy and procedures, and a description of root cause analysis ([Requirement 31320](#)).

2.7 Tools

The Chief/OSMA supported by the Center safety offices shall identify candidate mishap investigation tools that can be implemented quickly and maintain a tool repository that makes these tools readily available to investigating authorities ([Requirement 31321](#)).

Chapter 3. Initial Response to a Mishap or Close Call

Note: A notional timeline of the mishap investigation process, from the time of a mishap to the time that the corrective action plan and lessons learned are generated, is in Appendix C.

3.1 Safe the Mishap Site and Initiate Mishap Preparedness and Contingency Plan(s)

3.1.1 After the initial notifications are made, the supervisor shall provide any necessary assistance to safe the mishap site until the emergency response and/or personnel from the Center safety office arrive ([Requirement 31324](#)).

3.1.2 Upon notification of a mishap, the Center safety office shall initiate the Center Mishap Preparedness and Contingency Plan ([Requirement 31325](#)).

3.1.3 In the event of a program/project mishap, the program shall activate its Mishap Preparedness and Contingency Plan.

3.1.4 In accordance with the Center Mishap Preparedness and Contingency Plan, the incident commander, with support from the responsible organization, IRT, Center safety office, Center security office, emergency response personnel, and supervisor, shall take immediate action to prevent further injury to personnel and/or damage to any property and secure the site ([Requirement 31326](#)).

3.1.5 The incident commander and emergency response personnel shall have the authority to take action to mitigate dangerous conditions, direct emergency response actions, and/or clean up a hazardous materials release ([Requirement 31327](#)).

3.1.6 The Center safety office and incident commander shall ensure protection of personnel from residual hazardous material prior to entry into the mishap site ([Requirement 31328](#)).

3.1.7 The Center safety office and/or incident commander shall stipulate the type of personal protective equipment (PPE) required ([Requirement 31329](#)).

3.1.8 Every professional supporting the investigation, including the IRT and investigating authority, shall adhere to the PPE requirements as defined by the

Center safety office personnel or incident commander ([Requirement 31330](#)).

3.2 Notify Headquarters Office of Safety and Mission Assurance Within 1 Hour of Type A Mishap, Type B Mishap, High-Visibility Mishap, or High-Visibility Close Call

After emergency response has been initiated, within 1 hour of the occurrence of a Type A mishap, Type B mishap, high-visibility mishap, or high-visibility close call, the Center safety office shall notify Headquarters as described in paragraph 1.5.3 and NPR 7100.1, paragraph 11.4.1 (Per NPR 7100.1, paragraph 11.4.1, this includes immediately reporting a human test subject injury or fatality that resulted in a loss of life, a permanent disability, hospitalization, extensive first aid, or lost workday(s)) ([Requirement 31332](#)).

3.3 Deploy IRT

In accordance with the Center or program/project Mishap Preparedness and Contingency Plan, the Center safety office or other designee shall deploy the IRT to initiate and support the investigation until a determination can be made as to the need for, and selection of, an investigating authority ([Requirement 31333](#)).

3.4 Notify Personnel and the Public of Potential Hazards

The AA/OPA (or designee), with the assistance of the Center safety office, IRT, and CD or AA/OIA shall immediately release information to the press and media to alert Center personnel and the public of any known hazards and their potential effects and provide instructions that will mitigate the risk and harm ([Requirement 31334](#)).

3.5 Secure the Site and Preserve Evidence

3.5.1 The incident commander, with support from the responsible organization, IRT, Center safety office, Center security office, emergency response personnel, and supervisor, shall take immediate action to prevent further injury to personnel and/or damage to any property, secure the site, limit unnecessary access, and

preserve evidence ([Requirement 31336](#)).

3.5.2 Evidence preservation actions shall not hamper essential rescue operations ([Requirement 31337](#)).

3.5.3 In the event that a fatality occurred, a Federal employee that is part of the IRT (preferably a medical professional) or the physician that serves as a member of the investigating authority shall coordinate and consult with the Office of General Counsel and the coroner or medical examiner to determine medical jurisdiction and arrange for forensic analysis (i.e., autopsy) (Requirement).

3.6 Impound Data

3.6.1 The Center safety office, with the support of the IRT, Center security office personnel, and supervisor, shall impound all appropriate data, records, equipment, and facilities that may be involved in the mishap to prevent their unauthorized use or modification ([Requirement 31340](#)).

3.6.2 The Center safety office shall control access to all impounded items until they are released by the investigating authority per the procedures in the Center Mishap Preparedness and Contingency Plan ([Requirement 31341](#)).

3.6.3 Data and records, regardless of format, to be impounded may include, but are not limited to, check-out logs, test and check-out record charts, launch records, weather information, telemetry tapes, video tapes, audio tapes, time cards, training records, work authorization documents, inspection records, problem reports, notes, e-mail messages, and automated log keeping systems and procedures.

3.6.4 For NASA mishaps occurring on international programs and/or involving program participants, autopsies shall be conducted in accordance with the bilateral/multilateral agreements ([Requirement 31343](#)).

3.6.5 For NASA mishaps occurring on international programs and/or involving international program participants, data, records, equipment, and facilities shall be impounded in accordance with the bilateral/multilateral agreements ([Requirement 31344](#)).

3.7 Initiate Drug Testing

If the mishap results in a fatality or personal injury requiring immediate hospitalization, or in damage estimated to be in excess of \$10,000 to government

or private property, the supervisor shall initiate post-accident/unsafe practice testing per NPR 3792.1, NASA Plan for a Drug-Free Workplace ([Requirement 31345](#)).

3.8 Collect Witness Statements

a. All written witness statements obtained within the first 24 hours of the occurrence of a mishap or close call shall be considered privileged and protected (Requirement 31347). Where possible, written witness statements should be collected on a NASA form that includes the statement of privilege as shown in Figure 6.

b. All verbal witness statements and written statements given after 24 hours as part of a NASA mishap investigation, where the witness was explicitly informed that his/her account will not be released, shall be considered privileged and protected ([Requirement 31348](#)).

c. When privilege has been granted by the IRT, Center safety office, or investigating authority, NASA shall make every effort to keep witness testimony (both written and verbal) confidential and privileged to the greatest extent permitted by law (Requirement 31349). This privileged information will be strictly limited to only the information provided directly by the witness for the safety investigation.

d. The witness shall not be given a copy of the privileged written statement or transcripts of verbal witness statements given in the course of a NASA mishap investigation (Requirement 31350). (If witness statements or transcripts of witness testimony are provided to a witness, NASA cannot ensure that it remains privileged and confidential.)

e. The Center safety office, with the support of the IRT, shall either request initial written statements from all persons who were involved in or witness to the mishap or document verbal accounts from such persons ([Requirement 31351](#)).

f. Before a verbal witness statement is taken or an interview begins, the IRT, Center safety office, or investigating authority shall tell the witness whether the information gathered during the interview is confidential and privileged or not confidential and not privileged ([Requirement 31352](#)).

Note: If the same individual is interviewed multiple times, this should occur each time the individual is interviewed.

g. When conducting privileged witness interviews, the NASA investigating authority shall only have Federal employees present at the interview (with the exception of the interviewee), unless a contractor has been hired specifically to support interviews or provide technical guidance to the Board during the interviews and has signed a nondisclosure agreement prepared by General Counsel prior to participating in the interviews (Requirement).

h. When it is expected that an external investigating body will be the sole mishap investigation authority (e.g., for catastrophic vehicle failure such as Space Shuttle or International Space Station loss, or airplane loss), NASA shall not grant privilege to witnesses for either written witness statements or verbal witness statements, even when those statements are taken within the first 24 hours after the mishap (Requirement).

Note: If an outside investigating authority, such as a congressionally appointed mishap investigating board or the National Transportation Safety Board (NTSB), conducts a mishap investigation for a mishap involving an airplane or catastrophic vehicle loss, they are not required to comply with NPR 8621.1. Consequently, NASA is unable to ensure that privilege will be maintained and may not be able to withhold privileged statements from the investigation authority.

i. When the IRT, Center safety office, or investigating authority decides to take a verbal statement or interview a witness and keep that witness interview confidential, the interviewer shall read the statement in Figure 6 of this NPR and inform the witness that:

(1) The oral statement (taken during interview) and/or written statement will be retained as part of the investigation report background files but will not be released as part of the mishap report ([Requirement 31354](#)).

(2) NASA will make every effort to keep the testimony privileged to the greatest extent permitted by law ([Requirement 31355](#)).

Figure 6. Statement That Shall Be Read to Witness at the Start of the Formal Interview

The purpose of this safety investigation is to determine the proximate cause(s) and root cause(s) of the mishap that occurred on _____ and to develop recommendations toward the prevention of similar mishaps. It is not our purpose to place blame or to determine legal liability. Your

testimony is entirely voluntary, but we hope that you will assist the investigating authority to the maximum extent of your knowledge in this matter.

Your testimony will be documented and retained as part of the mishap report background files but will not be released with your name as part of the mishap report.

The investigating authority will make every effort to keep your testimony confidential and privileged to the greatest extent permitted by law.

For the record, please state your full name, title, address, employer, and place of employment.

3.9 Coordinate Release of Information

3.9.1 Release of Information Concerning Casualties and Extensive Property Damage

3.9.1.1 The NASA Headquarters OPA must approve the release of all information related to NASA Type A mishaps and Type B mishaps, prior to its release to the press or public ([Requirement 31362](#)).

3.9.1.2 The CD or AA/OIA shall coordinate release of all information to the press and the public via the Center PAO ([Requirement 31360](#)).

3.9.1.3 The Center PAO shall, as appropriate, disseminate any preliminary information, video, and imagery to the public relating to the mishap ([Requirement 31361](#)).

3.9.2 Release of Information Concerning NASA-Owned Property Damage on Other Than Government-Owned Facilities, Overseas Tracking Stations, and Contractor-Owned Plants

3.9.2.1 When a mishap involving extensive damage to, or destruction of, NASA property occurs at other than government-owned facilities, overseas tracking stations, or contractor-owned plants, the contractor, tracking station manager, base commander, or other authority shall inform their point of contact at NASA ([Requirement 31364](#)).

3.9.2.2 The Center safety office cognizant of the mishap shall confirm that the mishap occurred to the NASA-owned property on other than government-owned

facilities ([Requirement 31365](#)).

3.9.3 Release of Information to the Press and Public Concerning Casualties

3.9.3.1 NASA Employee Casualties. When a NASA employee is killed or receives a permanent disability within the confines of a Center, the Center PAO shall promptly announce to the public that a mishap has taken place and injuries or fatalities have occurred ([Requirement 30995](#)).

a. In the case of a fatality, the CD or AA/OIA or appropriate Headquarters Official-in-Charge, shall ensure that notification of the family has been made prior to release of the victim's name ([Requirement 30996](#)).

b. All initial announcements shall include what is known at the time, including the injuries or fatalities that have occurred and when additional information is expected to be available ([Requirement 30997](#)).

c. In the case of fatalities, release of the victim's name(s) shall be made as soon as possible after the notification of the next of kin ([Requirement 30998](#)).

3.9.3.2 Military and Other Agency Personnel Casualties. The procedures for public announcements of mishaps involving military and other Federal personnel (including astronauts) detailed to NASA shall be the same as for NASA employees, with these additional requirements:

a. The CD or AA/OIA shall inform the appropriate military service headquarters or other Federal agency of the mishap ([Requirement 31000](#)).

b. The CD or AA/OIA shall inform the Center PAO that the military service organization or other Federal agency has been notified of the mishap ([Requirement 31001](#)).

c. When the Center is on a military base, release of a victim's name shall be made according to procedures previously agreed upon by the base commander and CD or AA/OIA ([Requirement 31002](#)).

3.9.3.3 Contractor and Grantee Employee Casualties. NASA does not assume responsibility for the release of information concerning mishaps involving contractor or grantee employees, except as follows:

a. When a Type A mishap or Type B mishap occurs on a Center or at Headquarters or involves a NASA-managed program managed by that Center, the CD or AA/OIA, in coordination with the Center PAO/Headquarters PAO, shall announce as soon as possible that a mishap has occurred, as well as the number of known fatalities and/or injured ([Requirement 31004](#)).

b. The CD or AA/OIA shall not announce the identity of contractor or grantee personnel involved ([Requirement 31005](#)).

c. When a mishap occurs at a contractor's/grantee's plant engaged in NASA work, NASA has no responsibility to release information concerning the mishap and shall not issue statements as to the cause and extent of injury or damage ([Requirement 31006](#)).

3.9.3.4 Center Visitor Casualties. When a Type A mishap or Type B mishap occurs which involves visitors on a Center or at Headquarters, the CD or AA/OIA, in coordination with the Center PAO or Headquarters PAO, shall announce as soon as possible that a mishap occurred and the number of known fatalities and/or injured ([Requirement 31007](#)).

3.9.3.5 Overseas Mishaps. When a Type A mishap or Type B mishap occurs overseas, for example, at a tracking station or during an overseas rocket or balloon campaign involving NASA personnel, the Official-in-Charge shall release mishap information through the U.S. consular office in accordance with policies and procedures established by that office ([Requirement 31008](#)).

a. If the program involves foreign participation, the release of information shall be coordinated with the foreign entities sponsoring and participating in the program ([Requirement 31009](#)).

b. The Official-in-Charge shall notify, by the most expeditious means, the Chief/OSMA and the appropriate MDAA that a mishap has occurred overseas ([Requirement 31010](#)).

c. The MDAA shall notify, by the most expeditious means, the AA that a mishap has occurred overseas ([Requirement 31010](#)).

d. The AA shall immediately notify the Administrator, the Deputy Administrator, the AA/OPA; the Assistant Administrator, Office of External Relations; the Office of the General Counsel, as well as other appropriate staff that a mishap has occurred overseas.

3.10 Notify OSHA

3.10.1 Within 8 hours of a work-related mishap involving death of a Federal employee, or the hospitalization for inpatient care of three or more employees (provided at least one is a Federal employee), the Center safety office shall notify OSHA per paragraph 1.5.4 of this NPR ([Requirement 31012](#)).

3.10.2 OSHA notification is required for any fatality and for three or more hospitalizations for inpatient care that occur up to 30 workdays after the respective mishap ([Requirement 31671](#)).

3.11 Record the Mishap

3.11.1 For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls, the Center safety office shall send an electronic notification to OSMA/SARD containing information found in paragraph 1.5.3.2 of this NPR ([Requirement 31014](#)).

3.11.2 Within 24 hours, the Center safety office shall ensure that all NASA mishaps and close calls are recorded in IRIS in accordance with paragraph 1.8.1 of this NPR ([Requirement 31015](#)).

Note: Close calls involving aircraft may be entered into the NAARS in lieu of IRIS.

Chapter 4. Select the Investigating Authority and Support

4.1 Determine the Appointing Official for Mishap and Close Call Investigation

4.1.1 The Chief/OSMA or the AA shall contact the Administrator within 1 hour of the initial notification of the Type A mishap to determine if the Administrator wishes to exercise appointment authority ([Requirement 31018](#)).

4.1.2 Within 48 hours of a mishap or close call, the appointing official, as specified in Figure 5, shall appoint the investigating authority ([Requirement 31019](#)).

4.1.3 The Administrator shall serve as appointing official for NASA joint participation on a MIB with the DoD and other agencies unless authority is delegated by existing agreements ([Requirement 31020](#)).

4.2 Select the Members of the Investigating Authority (MIB, MIT, or MI)

Note: Investigating Authority members include: chairperson, voting members, and ex officio. Support personnel, such as advisors and consultants, are not members of the investigating authority (MIB, MIT, or MI).

4.2.1 The appointing official shall select the members of the investigating authority, the chairperson, the executive secretary (when needed), and the support staff ([Requirement 31022](#)).

4.2.2 The MDAA shall request concurrence from the Chief/OSMA and the Chief Engineer on the proposed MIB membership for Type A mishaps, high-visibility mishaps, and high-visibility close calls in which he/she is the appointing official ([Requirement 31023](#)).

4.2.3 For Type A mishaps and Type B mishaps, the investigating authority membership shall be determined with the advice of the Office of the General Counsel or the Office of the Chief Counsel, as appropriate ([Requirement 31024](#)).

4.2.4 For Type A mishaps and Type B mishaps, high-visibility mishaps, and high-visibility close calls involving aircraft, the investigating authority membership shall be determined with the advice of the AMD ([Requirement 31024](#)).

4.2.5 The Chief/OSMA shall concur with the selection of MIB membership for Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls ([Requirement 31025](#)).

4.2.6 For Type C mishaps, Type D mishaps, and close calls, the CD or AA/OIA, or designee, shall seek advice concerning investigating authority membership from the Center safety office ([Requirement 31026](#)).

a. The MDAA [or designee] shall seek advice concerning investigating authority membership from OSMA/SARD for NASA Type C mishaps, Type D mishaps, and close calls that involve Mission Directorate programs/projects/activities where the mishaps or close calls have occurred outside the

Center's gates and are not managed by a Center, program, or project ([Requirement 31027](#)).

4.2.7 The appointing official shall use the following requirements to determine the composition of the investigating authority:

a. All members of the investigating authority (including the chairperson) and the executive secretary must be Federal personnel ([Requirement 31029](#)).

b. The severity and complexity of the mishap to be investigated shall dictate the total number of members ([Requirement 31030](#)).

c. The investigating authority shall consist of an odd number of voting members (including the chairperson) ([Requirement 31031](#)).

d. The majority of the members of the investigating authority shall be independent from (have no responsibilities for) the operation or activity ([Requirement 31032](#)).

Note: During a mishap investigation, root cause analysis may evaluate actions of those performing the activity or overseeing the activity. It is difficult to conduct an unbiased investigation of one's own actions.

e. Members and the chairperson shall have the requisite security clearances as identified in the Center and/or program/project Mishap Preparedness and Contingency Plans ([Requirement 31033](#)).

f. The chairperson for the investigating authority shall be independent of the program or facility that experienced the mishap or close call (Requirement).

Note: It is preferred, for Type A mishaps and Type B mishaps, that the chairperson is not from a Center directly involved in the oversight or assurance of the program or facility operation.

g. The members shall not be from the direct chain of authority responsible for day-to-day or line management oversight of the facility, area, or activity involved in the mishap or have a vested interest in the outcome of the investigation ([Requirement 31034](#)).

h. The MIB and MIT shall be composed of a chairperson, members, and an ex officio ([Requirement 31035](#)).

i. The MIB shall have at least five members for a Type A mishap and at least three members for a Type B mishap ([Requirement 31036](#)).

(1) The number of MIB members for high-visibility mishaps and high-visibility close calls shall be determined by the appointing official ([Requirement 31037](#)).

j. For all Type A mishaps involving injury, illness, or fatality, the MIB shall include an occupational health physician as a member ([Requirement 31038](#)). (Mishaps involving an aircraft may have a flight surgeon rather than an occupational health physician.)

Note: The chairperson may request a medical doctor to serve as an advisor or consultant, if one is not a member of the mishap investigation board.

k. For all Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls involving aircraft, the MIB shall have a member knowledgeable in aircraft operations, a member knowledgeable in aircraft maintenance, and a member knowledgeable in aviation safety ([Requirement 31039](#)). (The member knowledgeable in aviation safety may serve as the safety

officer.)

l. The MIB and MIT shall include a safety officer and a human factors mishap investigator as members ([Requirement 31040](#)).

m. All investigating authorities are encouraged to have an independent member from an external Federal agency.

n. The investigating authority shall have at least one member that has completed all the NASA mishap investigation training listed in paragraph 2.6.1.a in the last 1 year and paragraph 2.6.1.b in the last three years ([Requirement 31042](#)).

o. When possible, all investigating authority members should be selected from personnel who have completed the NASA mishap investigation training (or equivalent) and have received refresher training in the last 3 years (if training was acquired more than 3 years ago).

p. Members shall have sufficient experience and technical expertise to understand the technology and management interfaces related to the mishap ([Requirement 31044](#)).

q. When needed, if the area of investigation expertise can not be obtained within NASA, the investigating authority's members may be appointed from Federal agencies having technical expertise in the area of investigation.

r. For international programs, members shall be selected as described in bilateral/multilateral or international agreements ([Requirement 31046](#)).

s. As documented in the Center Mishap Preparedness and Contingency Plan, the supervisor may serve as the investigating authority (mishap investigator) for Type D mishap and close calls in his/her organization as long as the following are true:

(1) The close call has not been deemed "high visibility" by the Center safety office, CD, or a higher authority.

(2) The supervisor has received introductory training on NPR 8621.1, root cause analysis, and investigating close calls and mishaps.

(3) The safety office assigns a person to serve as the ex officio to ensure that the investigation and report is nonpunitive and that the report meets the requirements in NPR 8621.1.

(4) The safety office assigns a person to endorse the mishap report.

4.3 Select the Ex Officio

4.3.1 For any mishap or close call, the Chief/OSMA may serve as the ex officio or appoint, at his/her discretion, the ex officio; otherwise that selection shall be made by the senior SMA official in the appointing official's organization ([Requirement 31048](#)).

4.3.2 For Type C mishaps, Type D mishaps, and close call investigations, the ex officio shall be at a level consistent with the authority level of the MIT chair ([Requirement 31049](#)).

Note: For investigations completed by a single mishap investigator, an ex officio is not required.

4.3.3 The ex officio shall be a Federal employee selected from personnel who have completed the NASA mishap investigation training or equivalent and have received refresher training in the last 3

years (if training was acquired more than 3 years ago) ([Requirement 31050](#)).

4.3.4 For Type C level investigations and below, the ex officio function may be fulfilled by a professional from the Center safety office who participates in the investigation activities he or she deems appropriate and approves the mishap report demonstrating assurance that the conditions in paragraph 1.4.12.d of this NPR have been met.

4.3.5 Only one ex officio shall be appointed to an investigating authority ([Requirement 31052](#)).

4.4 Select Investigating Authority's Advisors

4.4.1 For all mishaps, the appointing official shall request that the appropriate mission support office appoint advisors to the investigating authority ([Requirement 31054](#)).

4.4.2 For Type A, Type B, and Type C mishaps, the investigating authority shall have a legal advisor, a public affairs advisor, an import/export control advisor, and (where appropriate) an external relations advisor (Requirement).

4.4.3 The advisors shall be NASA civil service employees selected from the respective mission support offices and be authorized to represent their mission support office's interests in the investigation ([Requirement 31055](#)).

4.4.4 When possible, the advisors should be selected from personnel who have completed the NASA mishap investigation training or equivalent and have received refresher training in the last 3 years (if training was acquired more than 3 years ago).

4.5 Select Investigating Authority's Consultants

4.5.1 Non-Federal employees may serve as consultants to the investigating authority.

4.5.2 When possible, consultants should be selected from personnel who have completed the NASA mishap investigation training or equivalent and have received refresher training in the last 3 years (if training was acquired more than 3 years ago).

4.5.3 As appropriate, consultants should have sufficient experience and technical expertise to understand the technology and management interfaces related to the mishap.

4.6 Provide Support to Investigating Authority

4.6.1 The appointing official shall arrange for administrative, logistical, and information technology support to the investigating authority via the appointment letter or by contacting the appropriate CD or the AA/OIA, as appropriate (Requirement 31372). Administrative support may include, but is not limited to, meeting rooms, clerical help, photographic support, records management assistance, and laboratory analysis.

4.6.2 The responsible organization, the Center safety office, and the CD or AA/OIA shall provide support as deemed necessary by the investigating authority ([Requirement 31373](#)).

4.7 Contents of the Appointment Letter or Appointment Orders

4.7.1 For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls, the appointing official shall prepare an appointment letter to communicate the selection of the

investigating authority members, the chairperson, the ex officio, and the advisors (Requirement 31375). (For Type C mishaps, Type D mishaps, and close calls, the appointment orders can be less formal and communicated via a Center process.)

4.7.2 The appointment letter shall identify the chairperson, membership (including ex officio), the legal advisor, the Headquarters public affairs advisor, import/export control advisor, the external relations advisor (where appropriate), the scope of the investigation, and the projected completion date ([Requirement 31376](#)).

4.7.3 The appointment letter/appointment orders shall relieve the investigating authority chairperson and members from other duties while they are engaged in investigation activities ([Requirement 31377](#)).

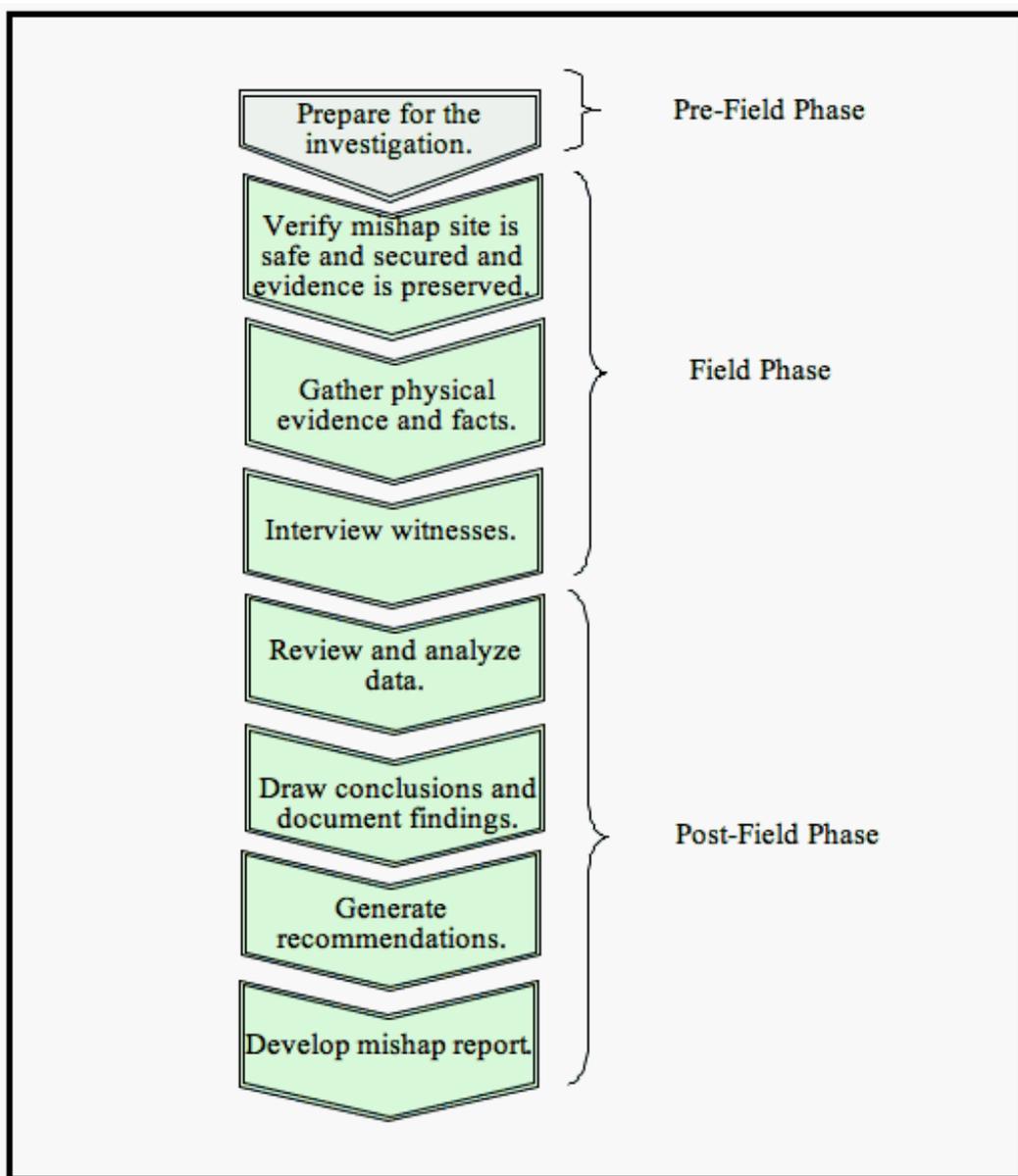
Chapter 5. Mishap Investigation Process

5.1 Overview of the Mishap Investigation Process

5.1.1 The investigating authority shall use a structured technique to collect and review all available data, construct a timeline of events, conduct witness interviews, reconstruct the mishap or close call, and analyze the mishap occurrence to determine what happened, when it happened, and why it happened ([Requirement 31380](#)).

5.1.2 Figure 7 illustrates the typical steps that the investigating authority shall perform during the mishap investigation ([Requirement 31381](#)).

Figure 7. Typical Steps in the Mishap Investigation



5.2 Prepare for the Investigation

The investigating authority shall perform the following activities prior to arrival at the mishap site or shortly thereafter:

a. Mishap investigation overview training ([Requirement 31382](#)).

(1) The Investigating Authority members and advisors shall take the NASA "Introduction to Mishap Investigation Training" upon their assignment to the investigation to familiarize themselves with NASA mishap investigation policies and procedures and root cause analysis ([Requirement 31383](#)). (Investigating authority members and advisors may opt out of the training if they have taken it within the last 12 months.)

b. Assessment of personnel resources ([Requirement 31384](#)). The chairperson may make a request to the appointing official to modify the investigating authority's membership to fill technical and/or analytical expertise gaps, provide management experience and knowledge, or eliminate members that have a conflict of interest.

(1) For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close call investigation boards, the Chief/OSMA and Chief Engineer shall concur on membership changes prior to any MIB member additions or deletions ([Requirement 31385](#)).

c. Identification and selection of consultants as necessary ([Requirement 31386](#)).

d. Establishment of member duties, meeting times, and investigation schedules ([Requirement 31387](#)).

5.3 Verify that the Site is Safe and Secured and Ensure Evidence is Preserved/Impounded

5.3.1 Verify that the Mishap Site is Safe and Secured.

5.3.1.1 Upon arrival, the chairperson shall verify the site is safe and secured ([Requirement 31390](#)).

5.3.1.2 Neither the investigating authority nor the IRT has the authority to direct emergency response actions or activities to clean up a hazardous materials release ([Requirement 31391](#)).

(1) These actions shall be directed by the incident commander ([Requirement 31392](#)).

5.3.2 Ensure that Evidence is Preserved and Impounded.

5.3.2.1 The chairperson shall ensure that all the appropriate perishable evidence has been collected, photographed, documented, and/or impounded ([Requirement 31394](#)).

5.3.2.2 The chairperson shall ensure that all the necessary data, records, and equipment have been impounded and are being stored in a secure site ([Requirement 31395](#)).

5.3.2.3 The IRT, Center safety office personnel, emergency response personnel, and Center security office personnel shall provide the investigating authority with all evidence gathered at the scene; all data pertaining to the investigation, including impounded records; a status of impounded records/equipment; and a description of the actions taken ([Requirement 31396](#)).

5.3.2.4 When there is a mishap involving an injury or a fatality, the chairperson shall appoint a Federal employee to serve as an evidence custodian(s) who will implement the "chain of custody process" documented in the Program Mishap Preparedness and Contingency Plan to provide physical security over and controlled access to the injured/deceased personal effects and related sensitive material (Requirement).

5.4 Gather Physical Evidence and Facts

5.4.1 The investigating authority should evaluate three general sources of data (material, personnel, and records) during the investigation. The material area includes all parts, components, and support facilities directly or indirectly involved. The personnel area includes all persons associated with the activities immediately surrounding the mishap, such as the flight crew, launch complex personnel, maintenance personnel, test personnel, operations personnel, range safety personnel, management and supervisory personnel, and witnesses and their associated training records, certification, e-mail, notes, and other records. The records data, regardless of format, include all records, telemetry, recordings, analyses, inspections, and historical data associated with the specific equipment, operations, and operating personnel.

5.4.2 The investigation should not be limited to data and records generated concurrently with, or as a result of, the mishap. It should also include historical, environmental, operational, psychological, and other factors bearing on the situation.

5.4.3 Lack of physical evidence. If there is no recoverable physical evidence available, the investigating authority shall use existing program and/or mission documentation, any collected mission data, and applicable analytical techniques to determine the probable proximate cause(s) and probable root cause(s) of the mishap ([Requirement 31400](#)).

5.5 Interview Witnesses

5.5.1 It is NASA's philosophy to interview witnesses rather than interrogate them. "Interview" connotes a cooperative meeting where the interviewer approaches the interviewee as an equal. The cooperation of the interviewee is sought; encouragement is given to tell the story freely without interruption or intimidation. An interview is usually conducted informally with a voluntary or cooperative answering of questions. However, the investigating authority may also conduct more formal interviews. Even in those cases, witnesses shall not be sworn in ([Requirement 31402](#)).

5.5.2 The investigating authority shall interview mishap witnesses with two basic objectives in mind:

- a. To find out what the witness observed or did ([Requirement 31404](#)).
- b. To find out the witness's opinion of potential cause(s) of the mishap ([Requirement 31405](#)).

5.5.3 The investigating authority conducting the witness interviews shall perform all steps as listed in paragraph 3.8 of this NPR ([Requirement 31406](#)).

5.6 Review and Analyze Data

5.6.1 The investigating authority shall determine the sequence of events and document them in a timeline ([Requirement 31408](#)).

5.6.2 The investigating authority shall create a fault tree, or perform an equivalent analysis, to identify all potential cause(s) and contributing factor(s) to the mishap and the relationships among them ([Requirement 31409](#)).

Note: A fault tree should be used by the MIB to demonstrate that all potential causes of the mishap have been evaluated. An event and causal factor tree should be used to

represent all the events that did occur, and the relationship between the proximate, intermediate, and root causes.

5.6.3 The investigating authority shall analyze all potential cause(s), including both technical and human cause(s) ([Requirement 31410](#)).

5.7 Draw Conclusions and Document Findings

5.7.1 The investigating authority shall evaluate all information collected during the course of the investigation, including, but not limited to, physical evidence, witness statements and testimony, and analytical results from testing and analysis; draw conclusions concerning what happened and why it happened; and document these as investigation findings ([Requirement 31412](#)).

5.7.2 All findings shall be supported by facts ([Requirement 31413](#)).

5.8 Generate Recommendations

5.8.1 At a minimum, the investigating authority shall develop recommendations that address both the proximate cause(s) and the root cause(s) to prevent recurrence of the mishap or close call or similar mishaps and close calls ([Requirement 31415](#)).

5.8.2 The investigating authority shall verify that the recommendations are practical, feasible, and achievable ([Requirement 31416](#)).

5.8.3 The investigating authority shall prioritize the recommendations ([Requirement 31417](#)).

5.8.4 At any time during the investigation, the investigating authority may recommend to the appointing official that immediate corrective actions be taken to ensure the safety of ongoing operations internal or external to NASA.

5.8.5 Upon receipt of a safety critical recommendation, the appointing official shall evaluate the recommendation and communicate the recommendation to the responsible program, project, organization, or external body to initiate implementation of corrective measures ([Requirement 31419](#)).

5.9 When and How to Turn Over for Criminal Investigation

If it is reasonably suspected that a mishap resulted from criminal activity, the investigating authority shall halt the investigation; notify immediately the OIG and the Office of the General Counsel or the Office of the Chief Counsel, as appropriate; notify the appointing official; and wait for further direction ([Requirement 31420](#)). (The safety investigation should be completed regardless of the initiation of collateral investigations.)

5.10 Release the Mishap Site and Restore Site Operations

5.10.1 Only the investigating authority shall release the mishap site for post-investigation cleanup or other activities ([Requirement 31422](#)).

5.10.2 Only the investigating authority shall release impounded data, records, equipment, or facilities ([Requirement 31423](#)).

5.10.3 The investigating authority shall not release data and records unless copies of the documents are made and retained with mishap investigation records ([Requirement 31424](#)).

Chapter 6. Mishap Report

6.1 Develop the Mishap Report

6.1.1 The investigating authority shall develop a mishap report that contains the information as specified in paragraph 1.7 and Figure 5 in this NPR ([Requirement 31427](#)).

6.1.2 Witness statements, witness names, and names of those involved in the mishap or related activities shall not be included as a part of the mishap report ([Requirement 31428](#)).

6.1.3 The mishap report shall be technically accurate; properly documented; easily understood; have traceability between facts, findings, and recommendations; and include the products required in Figure 5 in this NPR, in the following order:

- a. Section 1: Signature page(s), list of consultants, executive summary, and OSHA summary (when applicable) ([Requirement 31430](#)).
- b. Section 2: Narrative description and facts (what, when, where, how) ([Requirement 31431](#)).
- c. Section 3: Type of data gathered and data analysis (level of detail and products dependent upon Figure 5 in this NPR) ([Requirement 31432](#)).
- d. Section 4: Finding(s) ([Requirement 31433](#)).
- e. Section 5: Recommendation(s) ([Requirement 31434](#)).
- f. Section 6: Minority Report(s) ([Requirement 31435](#)).

6.1.4 The investigating authority shall include the mishap classification level (e.g., Type A, Type B, Type C, Type D, or close call) and the IRIS/NAARS case number in the mishap report title page and the report executive summary (Requirement).

6.1.5 The investigating authority shall describe, in the mishap report, the type of property damage, type of the mission failure, and/or describe the personal injury(ies)/illness/(es) (Requirement).

6.1.6 The investigating authority shall describe, in the mishap report, the actual direct cost of the mishap or if the actual direct cost is not available, the estimate of the direct cost of the mishap (Requirement).

6.1.7 In the event that the investigating authority does not reach agreement on findings or recommendations, any member may develop and attach a minority report to the mishap report.

6.1.8 If the investigating authority would like to receive a preliminary review of the mishap report and feedback concerning the adequacy of the report, they may provide a draft mishap report to the appointing official and request a preliminary review.

- a. This preliminary review must occur within the time allocated for the completion of the mishap report ([Requirement 31438](#)).
- b. Upon receipt of a draft mishap report, the appointing official shall determine the appropriate preliminary review process and reviewing offices that should participate in the preliminary review, have them review the draft mishap report, and provide feedback to the investigating authority within 15 workdays ([Requirement 31439](#)).

c. The Center safety office or OSMA (dependent on level of investigation) shall participate in all preliminary reviews ([Requirement 31440](#)).

d. Feedback from reviewers may include, but is not limited to, requests for clarification, additional facts, further root cause analysis (or other analysis), feasibility evaluation of recommendations, compliance with NPR, and/or removal (or placement in a nonreleasable appendix) of privileged or proprietary information, ITAR information, EAR information, material subject to the Privacy Act, or other inappropriate information (i.e., witness names).

e. The chairperson and/or investigating authority is not required to make any changes to the mishap report with which he or she does not agree ([Requirement 31442](#)).

6.1.9 All investigating authority members shall sign the completed mishap report ([Requirement 31443](#)).

6.1.10 The ex officio shall sign the completed mishap report attesting to the following:

a. The investigation was conducted in conformance with NASA policy and this NPR ([Requirement 31445](#)).

b. The investigation process was fair, independent, and nonpunitive ([Requirement 31446](#)).

c. The mishap report contains all the required elements ([Requirement 31447](#)).

d. The mishap report accurately identifies the proximate cause(s), root cause(s), and contributing factor(s) ([Requirement 31448](#)).

e. Adequate facts have been gathered and analyzed to substantiate the findings ([Requirement 31449](#)).

f. The recommendations reasonably address the causes and findings ([Requirement 31450](#)).

g. The recommendations track one-to-one to each significant finding ([Requirement 31451](#)).

h. If these conditions have not been met, the ex officio shall describe the mishap report's deficiencies in writing and sign and attach this description to the mishap report in lieu of signing the report ([Requirement 31452](#)).

6.1.11 Each NASA advisor shall sign the mishap report stating that he/she has reviewed the mishap report, that it meets NASA policies and procedures in his/her functional area ([Requirement 31155](#)) and:

a. The export control advisor's signature indicates that any ITAR information and EAR information has been identified and marked as non-releasable to the public (e.g., NASA Sensitive But Unclassified).

b. The contracting officer's signature indicates that any proprietary information or material subject to the Privacy Act has been identified and marked as non-releasable to the public (e.g., NASA Sensitive But Unclassified).

c. The legal advisor's and public affairs advisor's signature indicates that any privileged or proprietary information, ITAR information, EAR information, or material subject to the Privacy Act has been identified and marked as nonreleasable to the public (e.g., NASA Sensitive But Unclassified); and that volumes/appendices that are releasable to the public are marked releasable.

Note: Although marked, this release is pending endorsements and Public Affairs Office authorization.

6.1.12 The names of the consultants may be listed in the mishap report; however, the consultants shall not sign the mishap report (Requirement 31454).

6.1.13 Within 75 workdays of the mishap or close call, the investigating authority shall submit the completed and signed mishap report to the appointing official ([Requirement 31455](#)).

Note: Until this report has been signed and is officially endorsed by the endorsing officials, it is not an "official NASA Mishap Report" and should not be distributed to anyone other than the investigating authority, appointing official, endorsing officials, their reviewers, and the Headquarters SMA Mishap Coordinator.

6.1.14 If the investigating authority needs additional time to complete the investigation and/or the mishap report, they may submit a verbal or written request to the appointing official.

6.2 Release Investigating Authority

Upon receiving the signed mishap report, the appointing official shall inform the investigating authority that the mishap report fulfills the requirements of the appointment letter and that they are released from duty ([Requirement 31457](#)).

6.3 Review, Endorse, and Approve Mishap Report

6.3.1 Upon receipt of the signed mishap report, the appointing official shall request the appropriate officials to review and endorse the mishap report (see Figure 5 of this NPR for endorsing officials) ([Requirement 31459](#)).

6.3.2 The review and endorsement process should verify, at a minimum, the following:

- a. The mishap report content is technically accurate and complete ([Requirement 31461](#)).
- b. Proper analysis techniques were selected and completed correctly ([Requirement 31462](#)).
- c. The mishap report adequately describes proximate cause(s), root cause(s), and contributing factor(s) ([Requirement 31463](#)).
- d. There are adequate facts to substantiate the findings ([Requirement 31464](#)).
- e. Recommendations track one-to-one to each finding ([Requirement 31465](#)).
- f. Recommendations are practical, feasible, achievable, and will, in the opinion of the reviewer, prevent recurrence of similar mishaps or close calls ([Requirement 31466](#)).
- g. Proprietary information, ITAR information, EAR information, material subject to the Privacy Act, or privileged information that should not be released has been identified ([Requirement 31467](#)).

6.3.3 For those mishap or close call reports where the Chief/OSMA is an endorsing official, all endorsements shall be forwarded to OSMA for review prior to completion of the Chief/OSMA endorsement (Requirement).

6.3.4 Within 30 workdays, the endorsing officials will provide their signed endorsement, recommendation for mishap report approval or rejection, and (when applicable) comments related to amplification or disagreement with elements of the report to the appointing official. (These endorsements and comments (when applicable) shall be attached to the mishap report and become part of the permanent record) ([Requirement 31468](#)).

6.3.5 Within 5 workdays, the appointing official shall attach all endorsements and comments (including his/her own) to the mishap report, review the comments, and determine if the report is approved or rejected based on the review and comments/direction from endorsing officials ([Requirement 31469](#)).

6.3.6 If the appointing official rejects the mishap report, he/she must provide a written description of the deficiencies that warrant this rejection, attach this to the mishap report, send the report to the Center safety office (or OSMA for Type A mishaps, Type B mishaps, high visibility mishaps, and high-visibility close calls) for records retention, and charter a new investigation ([Requirement 31470](#)).

6.4 Authorize Mishap Report for Public Release

6.4.1 If the mishap report is approved, the appointing official shall immediately send the approved report with endorsements/comments to the Export Administrator, the Center PAO, Office of Security and Program Protection, and then to OPA, Procurement, and legal counsel for review ([Requirement 31472](#)).

Note: For Type D mishaps and Close Calls, the Center Director, via documentation in the Center Mishap Preparedness and Contingency Plan, may allow the authorization for public release to occur only after a Freedom of Information Act (FOIA) request is made. However, this does not negate the responsibility to place lessons learned into the lessons learned information system.

6.4.2 Within 10 workdays of the request, the Export Administrator, OPA, Office of Security and Program Protection, Procurement, and legal counsel shall review the mishap report and specify in writing which sections of the mishap report are authorized for public release ([Requirement 31473](#)).

Note: The Office of Security and Program Protection role is to review the report to determine if any information in the report should be classified Secret or Top Secret.

6.5 Distribute Mishap Report

6.5.1 Upon receipt of notification that the mishap report is authorized for public release, the appointing official shall send the approved mishap report with authorization comments to OSMA/SARD and the Center safety office (dependent upon level of investigation) ([Requirement 31475](#)).

6.5.2 Within 10 workdays, the MDAA or the Center safety office shall distribute the mishap report to the appropriate NASA programs and organizations including, but not limited to, the responsible organization and/or program, all Center safety offices, the CHMO (when an injury or fatality has occurred), and AMD (when the mishap involved an aircraft) ([Requirement 31476](#)).

6.5.3 Within 15 workdays, the Center safety office shall distribute information about the Type A mishap or Type B mishap via "weekly safety highlights" (or equivalent) to Center personnel, including a brief description of what caused the mishap and how it can be prevented ([Requirement 31477](#)).

6.5.4 The AA/OPA shall determine whether a mishap report, whatever its origin, shall be issued from Headquarters or the Center ([Requirement 31478](#)).

6.5.5 Generally, the appropriate public affairs officer shall make the news release on the mishap

report available simultaneously at Headquarters and the appropriate Center ([Requirement 31479](#)).

6.5.6 The appropriate public affairs officer shall make the mishap report available to the public at the same time ([Requirement 31480](#)).

6.5.7 For aircraft mishaps, final submittal of the NASA mishap reports to the NTSB will be made by the Office of Institutions and Management. The Office of Institutions and Management will ensure that the NTSB submission meets the essential information required by the NTSB and may reformat and streamline the approved NASA report as necessary to meet that need without changing the report's causes, findings, and conclusions.

6.5.8 Within 48 hours of a mishap or close call, NASA shall provide all NASA employees and contractors access to information that is releasable to the public via a database including date, location, and brief description of the event.

6.5.9 As the mishap or close call record is updated, the employees will be given access to the updated information that is releasable to the public, including the executive summary, findings, and recommendations.

Chapter 7. Post-Investigation Activities

7.1 Develop CAP

7.1.1 Immediately after the mishap report has been authorized for public release, the appointing official shall direct the responsible organization or program/project to develop a CAP for those recommendations approved by the endorsing officials ([Requirement 31484](#)).

7.1.2 The appointing official may extend the CAP deadline upon written request from the responsible organization or program/project.

7.1.3 Within 15 workdays from being tasked, the responsible organization or program/project shall develop and submit the CAP to the appointing official ([Requirement 31486](#)).

7.2 CAP Contents

7.2.1 The CAP shall include the following:

- a. A description of the corrective actions along with a designation of the organization(s) responsible for implementing the corrective actions and a completion date for each corrective action ([Requirement 31489](#)).
- b. Which NASA organization, contractor organization, or grantee organization (to the lowest level) is responsible for ensuring the corrective action is completed ([Requirement 31490](#)).
- c. A matrix or other means of matching corrective actions to all findings and recommendations ([Requirement 31491](#)).
- d. A review of any process changes required based on corrective actions ([Requirement 31492](#)).

7.3 Review and Approve CAP

7.3.1 The appointing official may provide the CAP to the investigating authority, applicable safety organization, and other selected offices as is deemed appropriate for review.

7.3.2 Based on the results of these reviews and his/her own review, the appointing official shall either accept or reject the CAP ([Requirement 31495](#)).

7.3.3 If the plan is rejected, the appointing official shall return the CAP, with comments, to the responsible organization or program/project for revision and resubmission ([Requirement 31496](#)).

7.3.4 The appointing official shall determine the timeframe for resubmission of the CAP ([Requirement 31497](#)).

7.4 Implement CA

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7.4.1 The responsible organization shall implement the corrective actions as directed by the appointing official and as documented in the approved CAP ([Requirement 31499](#)).

7.4.2 The responsible organization shall track the corrective action performance and completion in IRIS and inform the appointing official of the status of the actions at intervals determined by the appointing official ([Requirement 31500](#)).

7.4.3 Close calls involving aircraft that have been entered into the NAARS, in lieu of IRIS, must track the corrective action performance and completion in NAARS.

7.4.4 The Center safety office shall assist the responsible organization, if needed, to enter updates into IRIS, as described in the Center Mishap Preparedness and Contingency Plan ([Requirement 31501](#)).

7.4.5 The Center safety office shall enter into IRIS the actual direct cost of the mishap or if the actual direct cost is not available, the estimate of the direct cost of the mishap (Requirement).

7.4.6 Should a need arise to change the CAP after it has been approved (because the actions are deemed unwise or not feasible), the responsible organization shall submit the change to the appointing official for approval, similar to the process used for the original plan approval ([Requirement 31502](#)).

7.4.7 The appointing official shall assess and, if warranted and desired, approve any changes to the CAP ([Requirement 31503](#)).

7.4.8 The appointing official shall send approved changes to the responsible organization and the Center safety office ([Requirement 31504](#)).

7.5 Monitor and Closeout CAP

7.5.1 The applicable Center safety office shall monitor corrective action activities to determine if they were carried out according to the plan and report noncompliance to the appointing official ([Requirement 31506](#)).

7.5.2 When the corrective actions are closed, the appointing official shall develop and provide a CAP closure statement to the supporting Center safety office and the responsible organization to notify them that the corrective action plan is closed ([Requirement 31507](#)).

7.5.3 The Center safety office shall verify that the CAP is complete and all elements of the investigation have been completed and correctly recorded in IRIS (or NAARS for aviation close calls using NAARS in lieu of IRIS) ([Requirement 31508](#)).

7.6 Develop, Disposition, Submit, and Approve Lessons Learned

7.6.1 Following the authorization of the mishap report for public release, the appointing official shall designate a person or team of persons to develop the lessons learned identified in the mishap report ([Requirement 31510](#)).

7.6.2 The individual or team shall develop lessons learned that, at a minimum, include the executive summary, findings, and recommendations from the mishap report that are authorized for public release. ([Requirement 31511](#)).

7.6.3 Program and/or project managers that have mission failures or NASA mishaps for long-duration missions shall develop lessons learned for possible application to existing or future programs ([Requirement 31512](#)).

7.6.4 Within 10 workdays of being tasked, the person or team assigned to develop lessons learned

shall submit the prepared lessons learned to the appointing official ([Requirement 31513](#)).

7.6.5 Prior to submission into NASA Lessons Learned Information System (LLIS), NASA program and policy officials, including, but not limited to, legal, import/export control, and public affairs, shall:

a. Review the proposed lessons learned to ensure they are consistent with NASA policy and do not contain any privileged or proprietary information, ITAR information, EAR information, or material subject to the Privacy Act ([Requirement 31515](#)).

b. Provide the appointing official with a written statement indicating that the lessons learned are cleared for submission into the NASA LLIS ([Requirement 31516](#)).

7.6.6 Based on the results of the review of the lessons learned, the appointing official shall either accept or reject the lessons learned and forward accepted lessons learned to the NASA LLIS ([Requirement 31517](#)).

7.6.7 OCE and program managers shall review the LLIS quarterly to determine if any mishap lessons learned should be translated into programmatic or Agency requirements (Requirement).

7.7 Conclude Mishap Activities

7.7.1 The appointing official shall submit the mishap activities completion statement to the responsible organization, OSMA/SARD (For Type A mishaps, Type B mishaps, high-visibility mishaps, and high-visibility close calls), the Center safety office, and other appropriate organizations indicating that the investigation was performed; the CAP was developed, implemented, and closed; and the lessons learned have been entered into the NASA LLIS ([Requirement 31519](#)).

7.7.2 Once the appointing official has delivered the mishap activities completion statement, his/her duties for the mishap investigation are concluded, and the mishap file is closed.

7.8 Record and Retain Evidence

7.8.1 The final CAP and approved lessons learned shall be filed with the official approved mishap report in a location specified in the Center Mishap Preparedness and Contingency Plan ([Requirement 31522](#)).

7.8.2 NASA medical reports and witness statements are excluded from a mishap report, but should be retained, marked confidential and privileged, and filed with the official approved mishap report.

7.8.3 The CAP, lessons learned, and witness statements, plus other records documenting the investigation, shall be managed and dispositioned by the Center safety office in accordance with NPR 1441.1, NASA Records Retention Schedule (Requirement 31524). Such records, regardless of format, include, but are not limited to, mishap reports and associated records; relevant notes and e-mail messages of the IRT and investigation authority; meeting agendas, minutes, and other documentation of the investigation process; and copies of all data and records that are used in evaluation and analysis of the mishap.

Appendix A. Terms and Definitions

Aircraft Mishap. An aircraft mishap is an occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers a fatality or serious injury, or in which the aircraft receives substantial damage.

Appointing Official. The official authorized to appoint the investigating authority for a mishap or close call, to accept the investigation of another authority, to receive endorsements and comments from endorsing officials, and to approve the mishap report.

Barrier. A physical device intervention (e.g., a guardrail) or an administrative intervention that can provide procedural separation in time and space (i.e., lock-out/tag-out procedure) that is used to reduce risk of the undesired outcome to an acceptable level.

CAP Closure Statement. A final statement made by the appointing official that documents that all corrective actions have been completed and the CAP is closed.

Cause. An event or condition that results in an effect. Anything that shapes or influences the outcome.

Center Safety Office. The Center or Headquarters safety organization responsible for reporting and recording mishaps.

Chairperson. The individual in charge of a mishap investigation board or mishap investigation team.

Close Call. An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than \$1000), but which possesses a potential to cause a mishap.

Cognizant Center Safety Office. The safety office of the Center that hosts the project or that has been assigned SMA responsibilities for the program.

Condition. Any as-found state, whether or not resulting from an event, that may have safety, health, quality, security, operational, or environmental implications.

Contributing Factor. An event or condition that may have contributed to the occurrence of an undesired outcome but, if eliminated or modified, would not by itself have prevented the occurrence.

Corrective Actions. Changes to design processes, work instructions, workmanship practices, training, inspections, tests, procedures, specifications, drawings, tools, equipment, facilities, resources, or material that result in preventing, minimizing, or limiting the potential for recurrence of a mishap.

Direct Cost of Mishap or Close Call (for the purpose of mishap classification). The sum of the costs (the greater value of actual or fair market value) of damaged property, destroyed property, or mission failure, actual cost of repair or replacement, labor (actual value of replacement or repair hours for internal and external/contracted labor), cost of the lost commodity (e.g., the cost of the fluid that was lost from a ruptured pressure vessel), as well as resultant costs such as environmental decontamination, property cleanup, and restoration, or the estimate of these costs.

Endorsing Official. The Chief/OSMA, AMD, CHMO, Procurement, or other official who reviews the signed mishap report and provides a signed written endorsement, comments (when applicable), and a recommendation as to whether the mishap report shall be approved or rejected.

Event. A real-time occurrence describing one discrete action, typically an error, failure, or malfunction. Examples: pipe broke, power lost, lightning struck, and person opened valve.

Event and Causal Factor Tree. A graphic representation of the mishap or close call that shows the event (accident) at the top of the tree, depicts the logical sequence of events, illustrates all causal factor(s) (including condition[s] and failed barrier[s]) necessary and sufficient for the mishap or close call occurrence, and depicts the root cause(s) at the bottom of the tree.

Executive Summary. A very top-level summary of the circumstances of a mishap that includes who, what, when, where, and why, including a description of the proximate cause(s) and root cause(s).

Ex Officio. An individual authorized to participate in all investigation proceedings and tasked to assure that the investigation is conducted in conformance with NASA policy and this NPR.

Finding. A conclusion, positive or negative, based on facts established during the investigation by the investigating authority (i.e., cause, contributing factor, and observation).

First Aid. Refer to OSHA definition in 29 CFR 1904.7.

Final Mishap Investigation Report. The signed mishap investigation report with the endorsements and comments attached.

Flight Hardware. Any hardware that is flown on or is a part of an aircraft, experimental flight vehicle, satellite, lighter than air vehicles, unoccupied aerial vehicle, or space transportation system.

Flight Software. Any software that is flown on or is a part of an aircraft, experimental flight vehicle, satellite, lighter than air vehicles, unoccupied aerial vehicle, or space transportation system.

High Visibility (Mishaps or Close Calls). Those particular mishaps or close calls, regardless of the amount of property damage or personnel injury, that the Administrator, Chief/OSMA, CD, AA/OIA, or the Center SMA director judges to possess a high degree of programmatic impact or public, media, or political interest including, but not limited to, mishaps and close calls that impact flight hardware, flight software, or completion of critical mission milestones.

Hull Loss. An aircraft damaged to the extent that it is not economically feasible to repair it. This includes aircraft that are destroyed and aircraft that are missing.

Human Factors Mishap Investigator. An investigator with expertise in human factors engineering and mishap causation who has the primary responsibility to assist in the collection and analysis of data, determine how human factors caused or contributed to the mishap or close call, evaluate relevant human error and determine its root cause(s), and generate recommendations that eliminate or reduce the occurrence of the error or minimize the negative effects of the error to prevent the recurrence of the mishap.

Incident. An occurrence of a mishap or close call.

Investigating Authority. The individual mishap investigator, mishap investigation team, or mishap investigation board authorized to conduct an investigation for NASA. This includes the mishap investigation board chairperson, voting members, and ex officio but does not include the advisors and consultants.

Lessons Learned. The written description of knowledge or understanding that is gained by experience, whether positive (such as a successful test or mission), or negative (such as a mishap or failure).

Lost Time Injury/Illness. A nonfatal traumatic injury that causes any loss of time from work beyond

the day or shift it occurred; or a nonfatal nontraumatic illness/disease that causes disability at any time.

Mishap Investigation Board (MIB). A NASA-sponsored board that:

- a. Is appointed for a Type A mishap, Type B mishap, high-visibility mishap, or high-visibility close call.
- b. Requires concurrence from the Chief/OSMA and the Chief Engineer on membership.
- c. Consists of an odd number of Federal employees (including the chairperson) where the majority of the members are independent from the operation or activity in which the mishap occurred.
- d. Has a minimum of five voting members for Type A mishaps and three voting members for Type B mishaps.
- e. Includes a safety officer and a human factors mishap investigator. For all Type A mishaps involving injury, illness, or fatality, also includes an occupational health physician (or flight surgeon for aircraft-related mishaps) as a member.
- f. Is tasked to investigate the mishap or close call and generate the mishap report per the requirements specified in this NPR.

Mishap Investigation Team (MIT). A NASA-sponsored team that:

- a. Is appointed by the CD or AA/OIA, or designee, for a Type C mishap, Type D mishap, or close call.
- b. Does not require concurrence from the Chief/OSMA or the Chief Engineer on team membership.
- c. Consists of an odd number of Federal employees (including the chairperson) where the majority of the members are independent from the operation or activity in which the mishap occurred. (The actual number of members is chosen at the discretion of the appointing official.)
- d. Includes a safety officer and a human factors mishap investigator as members.
- e. Is tasked to investigate the mishap or close call and generate the mishap report per the requirements specified in this NPR.

Mishap Investigator (MI). A Federal employee who has expertise and experience in mishap or close call investigation; has knowledge of human error analysis in mishaps; serves as the sole investigator for a Type C mishap, Type D mishap, or close call; and is tasked to investigate the mishap or close call and generate the mishap report per this NPR.

Mishap Preparedness and Contingency Plans. Pre-approved documents outlining timely organizational activities and responsibilities that must be accomplished in response to emergency, catastrophic, or potential (but not likely) events encompassing injuries, loss of life, property damage, or mission failure.

Mission Failure. A mishap of whatever intrinsic severity that, in the judgment of the MDAA, program/project manager, or the Chief/OSMA, prevents the achievement of primary NASA mission objectives as described in the mission operations report or equivalent document.

NASA Contractor or Grantee Mishap or Close Call. Any mishap or close call that a NASA contractor/grantee is required to report or investigate due to the provisions of its contract.

NASA Mishap. An unplanned event that results in at least one of the following:

- a. Injury to non-NASA personnel, caused by NASA operations.

- b. Damage to public or private property (including foreign property), caused by NASA operations or NASA-funded development or research projects.
- c. Occupational injury or occupational illness to NASA personnel.
- d. NASA mission failure before the scheduled completion of the planned primary mission.
- e. Destruction of, or damage to, NASA property except for a malfunction or failure of component parts that are normally subject to fair wear and tear and have a fixed useful life that is less than the fixed useful life of the complete system or unit of equipment, provided that the following are true: 1) there was adequate preventative maintenance; and 2) the malfunction or failure was the only damage and the sole action is to replace or repair that component.

NASA Operation. Any activity or process that is under NASA direct control or includes major NASA involvement.

NTSB Serious Injury. Any injury resulting from an aircraft mishap in which any one or more of the following apply:

- a. Requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received.
- b. Results in a fracture of any bone (except simple fractures of fingers, toes, or nose).
- c. Causes severe hemorrhages or nerve, muscle, or tendon damage.
- d. Involves any internal organ.
- e. Involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface.

Observation. A factor, event, or circumstance identified during the investigation that did not contribute to the mishap or close call, but, if left uncorrected, has the potential to cause a mishap or increase the severity of a mishap; or a factor, event, or circumstance that is positive and should be noted.

Organizational Factor. Any operational or management structural entity that exerts control over the system at any stage in its life cycle, including, but not limited to, the system's concept development, design, fabrication, test, maintenance, operation, and disposal. Examples: resource management (budget, staff, training); policy (content, implementation, verification); and management decisions.

OSHA Final Mishap Summary. A report (OSHA 301 Form: Injury and Illness Incident Report, or an equivalent form) provided in accordance with 29 CFR 1960.70 by NASA to the Office of Federal Agency Programs for each mishap involving an OSHA recordable incident.

Permanent Total Disability. Any nonfatal injury or occupational illness that, in the opinion of competent medical authority, permanently and totally incapacitates a person to the extent that he or she cannot follow any gainful occupation and results in a medical discharge or civilian equivalent.

Permanent Partial Disability. Any injury or occupational illness that does not result in a fatality or permanent total disability, but, in the opinion of competent medical authority, results in permanent impairment through loss of use of any part of the body, with the following exceptions: loss of teeth, loss of fingernails or toenails, loss of tip of fingers or tip of toe without bone involvement, inguinal hernia (if it is repaired), disfigurements, or sprains or strains that do not cause permanent limitation of motion.

Property Damage. Damage to any type of government or civilian property, including, but not limited

to, flight hardware, flight software, facilities, ground support equipment, and test equipment.

Proximate Cause. The event(s) that occurred, including any condition(s) that existed immediately before the undesired outcome, directly resulted in its occurrence and, if eliminated or modified, would have prevented the undesired outcome. Also known as the direct cause(s).

Recommendation. An action developed by the investigating authority to correct the cause or a deficiency identified during the investigation.

Responsible Organization. The organization responsible for the activity, people, or operation/program where a mishap occurs or the lowest level of organization where corrective action shall be implemented.

Root Cause. One of multiple factors (events, conditions, that are organizational factors) that contributed to or created the proximate cause and subsequent undesired outcome and, if eliminated or modified, would have prevented the undesired outcome. Typically, multiple root causes contribute to an undesired outcome.

Rationale. The "or" in the definition confuses readers, and they think that if the event or condition is not an organizational factor (e.g. is a proximate or intermediate cause level) it could be considered a root cause.

Root Cause Analysis. A structured evaluation method that identifies the root causes for an undesired outcome and the actions adequate to prevent recurrence. Root cause analysis should continue until organizational factors have been identified or until data are exhausted.

Serious Workplace Hazard. A condition, practice, method, operation, or process that has a substantial probability that death or serious physical harm could result and the employer did not know of its existence or did not exercise reasonable diligence to control the presence of the hazard.

Substantial Damage. Damage or failure which adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips are not considered "substantial damage" for the purpose of this part (from 49 CFR Part 830).

Type A Mishap. A mishap resulting in one or more of the following: (1) an occupational injury or illness resulting in a fatality, a permanent total disability, or the hospitalization for inpatient care of 3 or more people within 30 workdays of the mishap; (2) a total direct cost of mission failure and property damage of \$1 million or more; (3) a crewed aircraft hull loss; (4) an occurrence of an unexpected aircraft departure from controlled flight (except high performance jet/test aircraft such as F-15, F-16, F/A-18, T-38, OV-10, and T-34, when engaged in flight test activities).

Type B Mishap. A mishap that caused an occupational injury or illness that resulted in a permanent partial disability, the hospitalization for inpatient care of 1-2 people within 30 workdays of the mishap, or a total direct cost of mission failure and property damage of at least \$250,000 but less than \$1,000,000.

Type C Mishap. A mishap resulting in a nonfatal occupational injury or illness that caused any days away from work, restricted duty, or transfer to another job beyond the day or shift on which it occurred, or a total direct cost of mission failure and property damage of at least \$25,000 but less than \$250,000.

Type D Mishap. A mishap that caused any nonfatal OSHA recordable occupational injury and/or illness that does not meet the definition of a Type C mishap, or a total direct cost of mission failure and property damage of at least \$1,000 but less than \$25,000.

Witness. A person who has information, evidence, or proof about a mishap and provides his/her knowledge of the facts to the investigating authority.

Witness Statements. A verbal or written statement from a witness that describes his/her account including a description of the sequence of events, facts, conditions, and/or causes of the mishap.

Appendix B. Acronyms

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| AA/OIA | Assistant Administrator, Office of Infrastructure and Administration |
| AA/OPA | Assistant Administrator, Office of Public Affairs |
| AMD | Aircraft Management Division |
| CAP | Corrective Action Plan |
| CD | Center Director |
| CFR | Code of Federal Regulations |
| Chief/OSMA | Chief, Safety and Mission Assurance, Office of Safety and Mission Assurance |
| CHMO | Chief Health and Medical Officer |
| DASHO | Designated Agency Safety and Health Official |
| DoD | Department of Defense |
| EAR | Export Administration Regulations |
| FEEA | Federal Employees Education and Assistance Fund |
| HQ | Headquarters |
| IRIS | Incident Reporting Information System |
| IRT | Interim Response Team |
| ITAR | International Traffic Arms Regulations |

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| NAARS | NASA Aviation Anomaly Reporting System |
| LLIS | Lessons Learned Information System |
| MDAA | Mission Directorate Associate Administrator |
| MI | Mishap Investigator |
| MIB | Mishap Investigation Board |
| MIT | Mishap Investigation Team |
| NFAF | NASA Family Assistance Fund |
| NFS | NASA Federal Acquisition Regulation Supplement |
| NPD | NASA Policy Directive |
| NPR | NASA Procedural Requirements |
| NTSB | National Transportation Safety Board |
| OIG | Office of Inspector General |
| OJT | On-the-Job Training |
| OPA | Office of Public Affairs |
| Ops | Operations |
| OSHA | Occupational Safety and Health Administration |
| OSMA | Office of Safety and Mission Assurance |
| OSMA/SARD | Headquarters Office of Safety and Mission Assurance, Safety and Assurance Requirements Division |

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|--------|---|
| OSPP | Office of Security and Program Protection |
| PAO | Public Affairs Office |
| PPE | Personal Protective Equipment |
| SMA | Safety and Mission Assurance |
| SMSR | Safety and Mission Success Review |
| UAV | Unmanned Aerial Vehicle |
| U.S.C. | United States Code |

Appendix C. Mishap Investigation Notional Timeline

