

Section 2: Overview of the GSFC Safety Program

A. GSFC Safety Policy and Objectives

1. GSFC Safety Policy

GSFC's most important core value is safety - safety of the public, astronauts and pilots, safety of our civil servant and contractor personnel, and safety of our high value ground and space equipment and property. It is GSFC's policy to provide a safe and healthy environment for all civil servants, contractor employees, and visitors.

Safe operations in all activities are a condition of any individual's opportunity to work on and for the Goddard Space Flight Center. No activity is so important that it cannot be performed in a safe manner. Employees will advise management about inherently unsafe work without fear of retaliation or intimidation. Management will work with employees to ensure they have the proper training and equipment to perform work in a safe manner. GSFC contracts will include provisions that require work to be performed in a safe manner.

To assure safety and mission success, every project, program, or operation, regardless of size, will employ risk management processes. All projects or similar activities will implement a Risk Management Plan as defined by NPG 7120.5A section 4.2. The Risk Management Plan will address all potential risks to people, property, the environment, and mission assurance, in addition to budget and schedule risks. Management will only accept risk when expected benefits outweigh identified risks. Projects may only proceed after approval of the Risk Management Plan.

All employees, supervisors, and contractors will implement and follow the letter and intent of this policy. This policy is in accordance with NPD8700.1, NASA Policy for Safety and Mission Assurance and NPD 8710.2B, NASA Safety and Health Program Policy. Safety performance and adherence to this policy shall be the premier element in all employee and contractor evaluations.

2. Objectives

The goal of the Goddard Safety Program is to reduce and ultimately eliminate all mishaps that lead to occupational injuries and illnesses, result in equipment and facility damage, or have mission impact.

Our Safety Program is intended to support the Agency's mission through increased awareness, accountability and responsibility by managers, supervisors, employees and contractors. Since most mishaps are the result of unsafe behaviors or actions of people, the focus of this program is on providing every person that works at GSFC with the tools and resources they need to help them make safety an integral part of everything they do.

Although everyone ultimately participates and must assume responsibility for their safety and the safety of those around them, each supervisor and manager has special responsibilities to ensure the GSFC Safety Program is implemented effectively.

This supervisors' guide will give specific instructions and guidance on how managers and supervisors should implement the GSFC Safety Program.

B. GFC Safety Program Structure – Nine Elements

Element 1: GSFC Safety Principles

Senior management fully supports the following “Safety Principles”. Supervisors are responsible for managing their operations and leading their staff by exemplifying these principles:

1. Mission success starts with safety
2. In everything you do, aggressively identify and mitigate hazards to:
 - The public
 - Our astronauts and pilots
 - NASA employees, both on and off the job; and
 - NASA's high value equipment and property
3. All mishaps can be prevented; NASA's goal is zero mishaps.
4. Management is accountable for safety; everyone is responsible .
5. Working safely is a condition of employment at NASA
6. Learn, understand, communicate, implement, and do not compromise NASA's fundamental safety and mission success requirements (URL: <http://www.hq.nasa.gov/office/codeq/doctree/doctree.htm>)
7. Safety and quality come before cost and schedule
8. Learn from the mistakes of the past; don't repeat them
9. Ensure adequate safety training for all personnel
10. Be an active participant in NASA's safety culture
11. Don't be silent about safety – talk about it
12. If it's not safe, say “Time out!”
13. Don't assume – periodically check to make sure the safety message is getting through.

Element 2: System Safety

System safety is a highly successful tool for systematically identifying and controlling our hazards. It is often used for high-risk facilities, operations and projects such as chemical processes, and the processing of space flight hardware but may be used in any endeavor.

System safety includes:

- Initial Identification of hazards by means of Preliminary Hazard lists
- Hazard Analysis (Including ranking their combined severity and probability)

- Reducing or eliminating hazards (Hazard Control)
- Formal risk acceptance

GSFC uses several types of system safety hazard analysis such as:

- **Preliminary Hazard Analysis (PHA)** – Analysis performed at system level to identify safety-critical areas, to provide initial assessment of hazards, and to identify requisite hazard controls and follow-on actions.
- **Failure Modes and Effects Analysis (FMEA)** – Procedure in which potential system faults are analyzed to determine the results or effects on the system and to classify each potential fault according to its severity.
- **Fault Tree Analysis (FTA)** – Graphical method for analyzing faults, fault causes, and relationships between these causes. Useful for assessing probability of an event associated with multiple faults.

System safety has been practiced at GSFC (and elsewhere) for many years. GSFC is committed to the improvement of the system safety program by: standardizing the related risk classifications, acceptance and tracking; improving our hazard analysis techniques and capabilities; increasing training and implementing hazard tracking databases.

The system safety emphasis in this Supervisors’ Guide is to strongly encourage managers to continue (or start) the early utilization of this powerful tool in our higher risk facilities, operations and projects in order to improve the overall safety at GSFC. Assistance in applying this tool can be obtained from the three Goddard Safety Offices (Codes 205, 302, and 803); see Section 4.

GSFC System Safety References:

1. Goddard Directive No. 300 – PG-7120.2.2
2. NPG 7120.5 – NASA Program and Project Management Processes and Requirements
3. 803-PG-8072.1.6 (WFF) Ground Safety Process
4. NASA STD 8719.7 Facility System Safety Guidebook

Element 3: Safety Program Organization

- a. Safety, Health, and Environmental Council (SHEC): The Center’s safety, health, and environmental programs are overseen by the SHEC, which is chaired by the Center Director. Each Director Of is a member of this committee, as well as representatives of each union. As the SHEC, they have the authorities, responsibilities, and accountabilities for programs, organizations, and employees in the area of safety, health, and environmental. Most notably, this includes program direction, risk assessment and management, and metrics evaluation.

- b. **Employee Safety Forum:** An “Employee Safety Forum” is being formed at the Center. This committee will serve as an information conduit from all employees directly to the SHEC. It will also serve as a platform for activities and actions of a Centerwide nature, such as developing employee handbooks or planning safety awareness activities. This committee will be chaired by the Associate Center Director.
- c. **Contractor Safety Forum:** In cooperation with the Goddard Contractor Association, the Contractor Safety Committee is being formed to recognize the importance that contractors play in all of our programs. This forum will work to ensure that the safety culture change at Goddard involves all of our employees, both civil servant and contractor. This committee will be chaired by the Deputy Center Director.

Element 4: Organization Safety Planning

Each Directorate shall prepare or update, on an annual basis, a “Directorate Safety Plan” that includes the following topics:

a. Goals and Objectives

Each Directorate, as well as their respective Divisions and Branches, are to develop goals and objectives for eliminating injuries and occupational related illnesses. In other words, how will your organization create a safe work environment for each employee.

b. Metrics

Each Directorate, as well as their respective Divisions and Branches, shall develop metrics that meet specific organizational needs and aid in tracking progress towards goals and objectives. For example, you may have set a goal to write/rewrite all Safe Operation Procedures (SOPs) for all hazardous operations in your organization and your metric might be SOPs completed vs. SOPs needed.

c. Evaluation Tools

As we jointly develop the new safety culture and its associated programs, new tools (like this guide) will be provided to employees and supervisors to aid in meeting their safety responsibilities. These tools will include areas or functions like:

- **Assessment Checklists:** for self-evaluation of hazards at your worksite or your job, as well as how to assess the effectiveness of your organization’s safety program
- **Training:** Quick training topics for staff meetings; targeted training videos
- **Recordkeeping:** Readily available recordkeeping methods (perhaps web-based), preloaded with necessary data to maximize the usefulness of the information to the supervisor, but minimize the time needed to manage the data.

As these and other evaluation tools are developed, they will be made available through the GSI website at <http://safety1st.gsfc.nasa.gov> .

d. Safety Awards Program

In addition to the Center's overall awards program, each Directorate should consider formal and informal ways to recognize and reward employees who contribute significantly to maintaining and improving a safe and healthful workplace. Your awards program can be as simple as a monthly employee recognition award. Choose an award system that works best for your environment and one that helps the Directorate meet its goals.

e. Safety Communications Plan

The communication plan should address how the Directorate, Divisions and Branches will communicate safety and health information within the organization. For example, in addition to the required monthly safety training sessions, you may decide to have regular "all hands" meetings with employees or safety meetings to review topics of particular interest and application within your organization. Plans should be tailored to meet the specific needs of the organization.

Element 5: Hazard Assessment

Hazard analysis can be either reactive or proactive; you can be involved in the accident investigation and assessment after one of your employees is hurt (you might be the one being investigated!) or you can be involved in assessing and managing hazards before they result in a mishap. Clearly the later approach is preferable.

Hazard analysis involves the assessment of things that might cause us harm and the evaluation of the potential or likelihood that the undesirable event may happen. By assessing the potential harm and its likelihood, we better understand the risks involved and the appropriate actions to take to mitigate them.

There are several types/classes of Hazard Assessment:

- Preliminary Hazard Assessment – An initial review of all aspects of an activity/organization to identify those areas which pose the greatest risk and should be addressed first. The intent is to find the more obvious and important problems quickly so that immediate action can be taken to mitigate the hazard in parallel with more refined hazard analysis to identify the less obvious issues. PHAs are done during the design phase of a system to roughly evaluate hazards associated with the design so that final design work can address them effectively.
- Job Safety Analysis – An assessment of the hazards associated with a specific job. The JSA is done by examining the various steps of the job to identify and record existing or

potential hazards. This analysis will lead to the determination of the best way to perform the job and reduce or eliminate the risk. This information, along with the remaining potential hazards and the steps where they may be encountered, will then be included in the formulation of required training.

- Facility Hazard Assessment – This assessment looks at the hazards associated with our operations/activities in the context of the facilities which house them. Facility suitability for the operation housed, safety and alarm systems, egress requirements, interfaces between lab equipment and the facilities (e.g. fume hoods, special power systems) are part of this assessment. One important aspect of the Facility Hazard Assessment that is often overlooked relates to activities adjacent to one another in a given building that may pose increased risk by virtue of some incompatibility (e.g., Acme Fireworks and Nitroglycerin Co. located in the same building as the Acme Jackhammer Users Training Institute). Some of these incompatibilities can be very subtle in nature and will only surface through a thorough assessment. An assessment of hazards associated with the basic operation and condition of the facility itself are also included in this assessment.
- Operations Hazard Assessment – Many of our operations are special in nature and must be assessed for the hazards that they may involve. This applies to on-going lab operations, range operations, and operations specific to the processing of a particular piece of hardware.

Once hazards are identified they must be evaluated in terms of severity and probability and resolved. The following flow chart outlines the overall process.

HAZARD RESOLUTION PROCESS

DEFINE THE SYSTEM

DEFINE THE PHYSICAL AND FUNCTIONAL CHARACTERISTICS AND
UNDERSTAND AND EVALUATE THE PEOPLE, PROCEDURES, FACILITIES
AND EQUIPMENT, AND THE ENVIRONMENT



IDENTIFY THE HAZARDS

IDENTIFY HAZARDS AND UNDESIRE EVENTS
DETERMINE THE CAUSES OF THE HAZARDS



ASSESS HAZARDS

DETERMINE SEVERITY
DETERMINE PROBABILITY
DECIDE TO ACCEPT RISK OR ELIMINATE/CONTROL

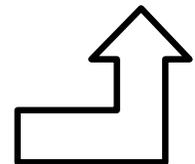
RESOLVE HAZARDS

ASSUME RISK OR IMPLEMENT CORRECTIVE ACTION
ELIMINATE/CONTROL



FOLLOW-UP

MONITOR FOR EFFECTIVENESS
MONITOR FOR UNEXPECTED HAZARDS



Several tools are described in Section 3 to assist you in conducting the hazard analyses and risk assessments for your areas of responsibility. In addition, Section 4 outlines the availability of a number of resources to assist you.

Element 6: Hazard/Safety Reporting and Tracking System

To meet a wide variety of needs to track critical actions, the Center has developed a Non-conformance Reporting and Corrective Action System (NRCAS). This system is used extensively to help us ensure the quality of our products and processes. A general safety module will be added to the NRCAS to capture significant safety concerns. Each organization will be required to do quarterly safety surveys (See Section 3) and any safety concerns raised during those surveys which cannot be resolved in 30 days will be entered into the NRCAS. In addition, the NRCAS can be used by anyone on Center to highlight a hazard or potential safety problem. The system requires the identification of an individual responsible for resolving the issue, the identification of the root cause of the problem, the definition of corrective action and associated schedule, the assessment of remedial action (does the finding have broader application/impact?), and an assessment of the effectiveness of the corrective action taken. In addition to highlighting specific problems, the NRCAS records metrics for the number of NCRs written, the number of NCRs open, and the number of NCRs open longer than 30 days.

The reporting of close calls (accidents or hazards that “almost happened”) is an important part of our safety program, as it gives us clues about where the next accident might occur. The Center is developing a simplified reporting method for close calls, through the GSI website at <http://safety1st.gsfc.nasa.gov/> . You’ll be able to report close calls directly through the website. In addition, you will be able to download report forms from this site and fax them to your local safety office at 6-1745 or 7-1518. Another option for reporting close calls, available now, is calling them in directly to the Greenbelt safety office at 6-6295 or to the Wallops Trouble desk at 7-2466. Naturally, if there is an emergency situation, you should call 112 at Greenbelt or 1333 at Wallops.

Element 7: Metrics – Specific Tracking and Reporting Requirements

In addition to the metrics which will come from the NRCAS, the Center has defined an initial set of metrics which will be used to manage and improve the Goddard Safety Initiative. These include:

- | | |
|-------------|---|
| People: | Number of personal injury accidents
Number of time lost injuries
Number of time lost days |
| Facilities: | Number of mishaps causing \$1M or more damage
Number of mishaps causing between \$250K and \$1M damage
Number of mishaps causing between \$25K and \$250K damage
Number of mishaps causing between \$1K and \$25K damage |

Mission: Number of mishaps preventing achievement of mission objective
 Number of scientists/engineers who have taken formal risk
 management training/Number requiring formal risk management
 training
 Number of activities with Risk Management Plans/Number requiring
 Risk Management Plans

As the GSFC Safety Initiative is implemented, metrics will be refined to meet the needs of the Center. These metrics can and should be complemented by additional metrics at the Directorate, Division, and Branch levels developed to help you manage the safety program in your organization and meet your specific needs.

Element 8: Training

Supervisors will ensure that their direct reports are adequately trained to ensure safe operations. This involves identifying requirements for training and making the necessary arrangements with our Employee Development organization (See Section 4).

Supervisors will conduct monthly safety meetings with their employees. A supervisor's guide for these monthly meetings and employee handouts will be provided by the Safety, Environmental, and Security Office. The material for the first three months is included in Section 5 of this Guide. Attendance at these meetings will be recorded by the supervisor using the **GSFC Safety, Health and Environmental Training Sign-In Log** and filed in **Section 8: Safety Program Records**.

Element 9: Supporting Resources – See Section 4

C. Roles and Responsibilities

The following provides an outline of the various responsibilities assigned for implementing and managing the Goddard Safety Initiative. Everyone on the Center is involved and should identify their specific responsibilities for meeting the Program's requirements.

Senior Management

- Lead by example, modeling the behavior expected from all employees
- Provide employees with a safe and healthful working environment
- Center Director: Chair, Safety, Health, and Environmental Council (SHEC) overseeing overall implementation of the Goddard Safety Initiative (GSI)
- Directors Of/Deputy Directors Of: Directorate representatives on SHEC
- Safety Initiative Project Manager (Alda Simpson): Designated to implement the GSI
- Develop policy statement
- Develop overall program structure and content
- Develop tools to facilitate program implementation
- Provide training resources

- Assess efficacy of training program
- Establish appropriate metrics and tracking and reporting methodologies
- Conduct regular reviews of safety metrics and Center performance
- Review proposed corrective action plans, monitor implementation and assess effectiveness

Line Management:

General Requirements:

- Lead by example, modeling the behavior expected from all employees
- Responsible for the safety and health of employees
- Furnish a safe and healthful place of employment and ensure that identified hazards are eliminated or controlled
- Ensure that employees are informed of NASA safety and health programs and of the protection afforded employees through these programs
- Inform employees of the location of the nearest medical treatment facility, procedures for obtaining treatment, and methods for reporting occupational injuries or illnesses.
- Instruct employees to report hazardous conditions to their supervisors
- Take appropriate action to protect employees in imminent danger situations
- Inform employees of specific hazards associated with their workplace and duties, ensure the use of appropriate personal protective equipment and train employees in a manner which will ensure their safety and health
- Ensure that employees are informed of their specific responsibilities and rights under OSHA, E.O. 12196, and 29 CFR Part 1960 and how they may participate in the safety and health program
- Cooperate with and assist safety and health personnel while they are performing their duties as specified.
- Understand the requirements of the GSI and communicate requirements to employees
- Take advantage of Center resources
- Track safety performance and report through your management chain as a part of regular business
- Ensure training requirements are identified for individuals in organization, communicated to training providers, scheduled, fulfilled, and documented. **Refer to the Supervisor's Guide to Safety and Environmental Training for a list of required training.**
- Identify unusual or unique requirements which must be addressed by the GSFC Safety Initiative
- Provide feedback to senior management regarding the efficacy of program

Specific Supervisor's Responsibilities Summary

- Develop/maintain organization safety plan (See Section 3)
- Develop/maintain Organizational Hazard communication plan (See Section 3)
- Conduct Job Safety Analysis for each employee requiring one (See Sections 3, 6)
- Develop Safety Training Plan for each employee and keep records of training
- Conduct monthly safety meetings (See Section 5)
- Conduct quarterly worksite safety surveys and keep records of such surveys (See Sections 3, 6)
- Use/track Center defined metrics and develop and use organizational specific metrics as required (a streamlined reporting approach has yet to be defined but will be provided)

Note: A checklist is provided in Section 6 to assist you in tracking these specific requirements.

Employees:

- Accept individual responsibility for their own safety at work and at home.
- Accept responsibility for the safety of others (coworkers, visitors, public, etc.) facilities, equipment, our operations, and our product.
- Comply with safety and health standards, rules, regulations, and guidelines issued by NASA
- Use established procedures to report and resolve suspected safety or health hazards
- Obtain the necessary emergency medical care as a result of an occupational injury or illness
- Promptly report occupational injuries or illnesses in accordance with established procedures
- Cooperate with safety and health personnel during inspections, surveys and investigations
- Utilize protective equipment when prescribed and/or required by safety or health standards, good work practices, or when directed by supervisors.