

Chapter 1 – Safety & Health Management System

1.1 Scope

1.1.1 Introduction

This Chapter describes the Glenn Safety and Health Management System, which covers occupational safety and health. This Chapter defines the processes, programs, and resources dedicated to ensure that Glenn Research Center (GRC) is a safe and healthful workplace.

1.1.2 Applicability

The Glenn Safety and Health Management System applies to all activities, operations, and organizations at GRC, both Lewis Field (LF) and Plum Brook Station (PBS).

1.1.3 Authority

- NPR 8715.3, NASA Safety Manual.
- NPR 8715.1, NASA Safety and Health Handbook - Occupational Safety and Health Programs.
- NPR 8715.2, NASA Emergency Preparedness Plan Procedural Requirements
- NPR 8621.1, NASA Procedural Requirements for Mishap Reporting, Investigating, and Recordkeeping.
- Executive Order 12196, Occupational Safety and Health Programs for Federal Employees.
- 29 CFR 1960, Basic Program Elements for Federal Employees Occupational Safety and Health Administration (OSHA).
- Center Procedure No. GRC-P3.10.01.

1.1.4 Policy

It is Glenn policy to operate in a manner that provides a safe and healthful workplace and that complies with all laws and regulations pertaining to occupational safety and health. Glenn administers its operations so as to reduce or eliminate all potential safety and health hazards, thereby avoiding undue risk and accidents that can result in loss of life, injury or illness, damage to property, loss of research operating time and effectiveness. Using the dictates of sound engineering judgment, Glenn follows recognized safety codes and standards in all operations, including the modification or construction of facilities. In many cases, the programs and policies of the Glenn Safety and Health Management System exceed minimum industry standards in an effort to assure mission success.

1.1.5 General Considerations

The Glenn Safety and Health Management System consider both the Glenn safety and health environment and basic safety and health management.

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The Glenn safety and health environment: Safety and health considerations at the Center are many and complex as a result of the following:

- a. The diversity of research and development (R&D) operations in propulsion, power, and energy-related research;
- b. The potentially hazardous character of the materials, fluids, test equipment, and processes involved;
- c. The continual turnover of experiments and the constantly changing nature of research test operations;
- d. The range and depth of the technical competence that is required to manage a safety program in such an environment.

Basic safety and health management: For effective operation, Center safety and health management must provide:

- a. The means of identifying, locating, and eliminating or controlling all potential hazards known to exist at Glenn;
- b. The means of establishing and maintaining such employee safety and health data as specific hazard exposure, training, medical examinations, accident reports, etc.;
- c. General compliance with "OSHA Standards" (29 CFR) and other applicable consensus standards;
- d. The means for integrating all of these into a coordinated Center-wide operations plan.

1.2 Safety & Health Goals and Objectives

Each Glenn directorate develops an annual safety and health management plan. This plan defines the organization's mission, goals, objectives, metrics, and resources for the Safety and Health Management System, along with special activities and processes for that fiscal year. The plan is communicated to the organization's employees periodically. Progress against the metrics is reported semi-annually to the Center Director.

1.3 Safety & Health Organization

1.3.1 Glenn Research Center Management

The GRC Director is responsible for establishing a Safety and Health Management System in accordance with federal regulations; NPR 8715.3, NASA Safety Manual; NPR 8715.1, NASA Safety and Health Handbook - Occupational Safety and Health Programs; NPR 8715.2, NASA Emergency Preparedness Plan Procedural Requirements; and other related requirements established by NASA Headquarters.

All organization supervisors have prime responsibility for compliance with pertinent safety requirements (including those related to housekeeping and shop safety) and for

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ensuring the effectiveness of the Glenn Safety and Health Management System as it affects the specific activities of their organization. This responsibility includes, but is not limited to, the following:

- a. Knowing Glenn safety and health requirements and communicating these requirements to subordinate personnel.
- b. Mandating compliance with safety and health requirements and monitoring this compliance.
- c. Reviewing the work proposals of subordinates and contractors to ensure that all potential safety and health hazards are properly identified and evaluated, that procedures for safe operation and effective emergency rescue have been developed, and that the cognizant Area Safety Committee evaluation is obtained, where appropriate.
- d. Personally surveying their work areas and recognizing potential hazards therein; analyzing statistics on accidents and near accidents in these areas; and initiating or recommending corrective action where required.
- e. Notifying the Occupational Health Branch (OHB) whenever there is a change in the potential exposure of any of their employees to hazardous substances or conditions.
- f. Soliciting technical input from the Safety Branch (SB) and the OHB for the development of safe operating procedures, emergency rescue procedures, or any other safety and health documentation.
- g. Providing direction for continuing safety and health education and training for subordinate personnel in accordance with the standards and criteria established by the SB and the OHB.
- h. Reporting all mishaps and close calls to the SB within 24 hours of occurrence.

1.3.2 Glenn Research Center Employees

Each civil servant employee or support service contract employee is responsible for:

- a. Exercising reasonable care and caution in the safe performance of his or her work assignments and in the conduct of any activity at the Center.
- b. Possessing knowledge of Glenn safety and health regulations, safe operating procedures, and emergency rescue procedures affecting his or her individual work area and work assignments and complying therewith.
- c. Reporting the development or appearance of any potentially hazardous condition to his or her supervisor, to the Directorate Point of Contact (POC), to the SB, or to the Area Safety Committee Chair.
- d. Attending and participating in training as required.
- e. Maintaining high standards of personal hygiene, health, and physical fitness.

No employee will be subject to restraint, interference, coercion, discrimination or reprisal for filing a report of an unsafe or unhealthful working condition. No employee will be prevented from participating in Center occupational safety and health program activities.

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1.3.3 Safety, Health, and Environmental Board

The Safety, Health and Environmental Board (SHEB) serves as GRC's safety, health and environmental policy and decision-making board. The Board is responsible for the overall direction of the Center's safety, health, and environmental programs, providing top management leadership and oversight for the Center's Safety and Health Management System.

The SHEB reports to and is chaired by the Center Director. Board members include the Director of Center Operations, the Director of Programs and Projects, the Director of Research and Technology, the Director of Engineering and Technical Services, the Director of Safety and Mission Assurance, the Director of External Programs, the Chief Counsel, and the Presidents of the Lewis Engineers and Scientists Association (LESA) and American Federation of Government Employees (AFGE) unions. The Chief or Deputy Chief of the Safety, Health, and Environmental Division (SHED) serves as Executive Secretary.

The SHEB:

- a. Establishes safety and health policy and direction for the Center.
- b. Establishes guidelines to determine, accept, and manage the risks of all operations at GRC to ensure a safe and healthful workplace for all employees.
- c. Serves as an appeal board for unresolved safety and health issues.
- d. Ensures that information about existing or potential safety and health problems is made available to all levels of GRC management and all GRC employees (civil servant and/or contractor), as appropriate.
- e. Establishes and reviews safety and health objectives and targets.

Any member of the SHEB has the authority to stop or forbid any operation with an unmediated safety and health concern until an appropriate review and determination can be made. Exercise of this authority requires immediate notification to the Chair of the SHEB. The SHEB has the authority to overrule any subordinate GRC safety or health organization element except where the Federal, state, or local regulatory requirements are involved.

1.3.4 Safety, Health and Environmental Division

The SHED is responsible for the overall management, coordination and documentation of the Glenn Safety and Health Management System. It is comprised of three branches that cover safety, occupational health, and environmental management. The Chief of the Division reports on the overall safety and health management system to the SHEB.

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Safety Branch

The SB is responsible for the overall management, coordination and documentation of the occupational safety portion of the Glenn Safety and Health Management System. The SB serves as consultant to the Glenn staff on matters of safety and assesses Center compliance in this area.

The Chief of the SB provides technical support, as required, to Occupational Medicine Services (OMS) and coordinates with the Glenn Medical Director to provide professional services.

The Safety Branch:

- a. Performs those safety functions required by the Glenn Safety Manual (GSM) and other applicable regulations and directives.
- b. Manages and coordinates emergency responses to Center accidents and mishaps.
- c. Serves as a consultant on safety matters to Glenn management and employees.
- d. Keeps abreast of developments and requirements in the safety field.
- e. Maintains the contents of the GSM.
- f. Recommends, subject to SHEB review and approval, minimum acceptable safety standards for Center operations.
- g. Keeps illness and injury records in accordance with OSHA regulations and prepares quarterly and annual reports for submittal to the Department of Labor and other relevant government agencies.
- h. Collects and analyzes safety data and reports results to Center management.
- i. Maintains a safety information library containing codes, manuals, handbooks, the hazards inventory, information files, records, and references.
- j. Monitors Center activities to ensure compliance with all applicable safety standards and regulations.
- k. Monitors contractor activities to ensure compliance with all applicable safety standards and regulations.

The Chief of the SB is authorized to terminate any operation on which there is a question of safety hazard pending an appropriate review. Exercise of this authority requires immediate notification to the Chief of the SHED, the chair of the SHEB and the chair of the appropriate Area Safety Committee. The Chief of the SB delegates the same authority and notification requirements to the Plum Brook Station Officer (PBSO) for operations and activities at PBS. The PBSO must also notify the Chief of the SB.

Occupational Health Branch

The OHB is responsible for the evaluation and measurement of exposure hazards in the work environment that can cause long-term or latent illness and disease. OHB serves as

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consultant to the Glenn staff on matters of industrial hygiene, ionizing and non-ionizing radiation safety, laser safety, and assesses Center compliance in these areas.

The Chief of the OHB manages and coordinates Occupational Medicine Services (OMS), as required.

The OHB:

- a. Performs those health functions required by the Environmental Programs Manual (EPM) and other applicable regulations and directives.
- b. Serves as a consultant on occupational health matters to Glenn management and employees.
- c. Keeps abreast of developments and requirements in the fields of industrial hygiene and health physics.
- d. Maintains the contents of the EPM.
- e. Recommends, subject to SHEB review and approval, minimum acceptable occupational health standards for Center operations.
- f. Performs hazard exposure assessments of work activities involving the use of materials and sources which represent potential occupational health hazards.
- g. Maintains appropriate handbooks, information files, and references.
- h. Monitors Center activities to ensure compliance with all applicable occupational health standards and regulations.
- i. Reviews and accepts written health and safety plans submitted by contractors to ensure their specified activities, precautions and controls adequately address applicable occupational health regulations and Center policies.

The Chief of the OHB is authorized to shut down any operation on which there is a question of health hazard pending an appropriate review. Exercise of this authority requires immediate notification to the Chief of the SHED; the Chair of the SHEB; and the appropriate Area Safety Committee Chair.

Occupational Medicine Services

For the protection of employees, Glenn maintains a comprehensive occupational medicine program under the direction of the Glenn Medical Director, who reports to the Chief of the OHB. Services provided under the program include investigation of the medical aspects of personal injury cases, medical diagnosis and treatment of occupational injuries, first aid, a physical fitness program, and the Health Screening Clinic.

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The OMS:

- a. Provides professional services for examining, diagnosing, and treating employee illness or injury and maintains records needed in the operation of the program.
- b. Provides medical surveillance, both initial and periodic, to employees performing certain jobs as required by the GSM and the EPM.
- c. Provides a complete physical examination to civil servant employees once every three years and a partial examination in the intervening years.
- d. Furnishes medical information to and assists the Office of Human Resources and Workforce Planning, as required, to resolve questions about the placement and utilization of employees.
- e. Consults with appropriate supervisors regarding employees who, in the judgment of a physician, may be allowed to work only if limitations on their physical activity are observed. This applies to new employees with physical handicaps and to employees returning to work after an illness or injury. The judgment of the employee's physician is given full consideration in such situations.
- f. Keeps the Center Director informed, through the Chief of the OHP, of all cases of significant accidental injury to personnel, especially about the diagnosis, nature, and extent of injuries. This is done by direct and timely oral communication and includes subsequent follow-up medical reports. The severity of injuries (first aid, reportable, or lost time) is classified in accordance with OSHA recordkeeping requirements.
- g. Ensures that kitchens and cafeterias are periodically inspected for conformance with local, state, and Federal health regulations.
- h. Approves, prior to installation or introduction into the work areas, such items as footpaths, first aid kits, Automatic External Defibrillators (AED), salt tablets, air fresheners, and so forth.
- i. Establishes procedures in conjunction with local medical facilities for emergency referral and treatment of injuries and illnesses.
- j. Administers the Health Screening Program.
- k. Administers the Physical Fitness Program.

The Medical Director serves as the Medical Review Official for the Glenn Drug-Free Workplace and AED Programs.

1.3.5 Emergency Preparedness Coordinator

The Emergency Preparedness Coordinator (EPC) is responsible for the overall management, coordination and documentation of the Glenn EPP.

The EPC:

- a. Manages the Glenn Emergency Preparedness Program (EPP).
- b. Ensures that Center employees are aware of the EPP and Plan and that they understand their responsibilities as defined in the EPP.

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- c. Provides Emergency Preparedness planning and response capability.
- d. Coordinates emergency response activities.
- e. Conducts reviews of the EPP.
- f. Reviews emergency response capability.
- g. Performs damage assessment and recovery.

1.3.6 Area Safety Committees

In addition to the authority necessary to implement the Committee's assigned responsibilities, the chair of each Area Safety Committee listed below has the authority to shut down any operation or activity within its charter until an appropriate technical review can be conducted.

Area Safety Committees

The Area Safety Committees conduct third-party reviews of all proposed installations and operations in their assigned geographic areas to ensure that the proposed design and/or operation is consistent with the dictates of sound engineering judgment and acceptable health and safety standards.

Committee membership includes individuals with engineering and operational expertise, as appropriate for that area's activities, and representatives from the SB and other SHED personnel as required.

The Area Safety Committees:

- a. Review specific proposals for all research operations, for modifications or additions to facilities and equipment, or for any project that may affect safety within the assigned safety areas.
- b. Approve and issue Safety Permits for those proposals that meet Glenn safety requirements.
- c. Maintain technical surveillance of and keep informed of current activities in assigned area of responsibility to anticipate problems and minimize safety-related conflicts between organizational elements.
- d. Recommend, subject to the review and approval of the SHEB, minimum acceptable safety standards within the scope of their charters.
- e. Obtain comments and advice from advisory panels and the SHED concerning matters that fall within their areas of specialization.
- f. Ensure that activities presenting significant risk to persons or property have a formal readiness review by the requester's line management prior to issuing a Safety Permit.
- g. Notify the Electrical Applications Safety Committee or Process Systems Safety Committee when proposals are likely to impact the safety of electrical power or process systems.

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- h. Submit to the SHEB significant concerns or unresolved questions regarding the granting of permits and the assessment of major risks.
- i. Report, through the Area Committee Chair, to the SHEB at designated meetings.

Aviation Safety Committee

The Aviation Safety Committee reviews research operations, R&D modifications and experiments placed on Glenn aircraft. The Committee is the sole authority for issuing aircraft/flight experiment Safety Permits. The Committee also ensures that the proposed design or installation is consistent with the dictates of sound engineering practices and acceptable health and safety standards. When the Chair exercises their shutdown authority, they must also notify the Aviation Safety Officer.

The Aviation Safety Committee has a minimum composition of six members who have extensive experience in their field of expertise: Electrical Engineer, Mechanical Engineer, Fluid System Engineer, Laser Safety Officer (as required), a SB representative and the Aviation Safety Officer (ex-officio).

The Aviation Safety Committee:

- a. Reviews proposals for research flight activities involving R&D modification to aircraft and for any projects that may affect safety within the Aviation Safety Committee's area including hangar and facilities.
- b. Approves Safety Permits for those experiments or programs that meet Glenn safety requirements. The Chair is responsible for approval of Safety Permit Requests. The Chair may also approve changes or modifications to an existing Safety Permit or Flight Test Plan if there is no safety impact to the experiment, program or operation.
- c. Maintains technical surveillance and remains cognizant of activities involving aircraft operations and hangar activities.
- d. Obtains comments and advice from the Aviation Safety Officer, the Airworthiness Review Panel and the SHED concerning matters that may affect the Aviation Safety Program.
- e. Ensures that activities presenting significant risk to persons or property have a formal readiness review by senior management (Directorate Level) prior to issuing a Safety Permit.
- f. Submits to the SHEB significant concerns or unresolved questions regarding the granting of permits and the assessment of major risk.
- g. Reports findings or concerns, through the Aviation Safety Committee Chair, to the SHEB at designated meetings or sooner if necessary.

Electrical Applications Safety Committee

The Electrical Applications Safety Committee reviews all major electrical power systems leading to facility test cells or research setups and issues a Safety Permit to cover

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activities that cross safety area boundaries. The prime safety responsibility of the Committee is the high voltage systems, including all substations, power transformers, and switchgear rated above 600 volts. For systems rated at 600 volts or less that lead to facility test cells or research setups, the power system interface is at the main distribution panels. The Committee is charged by SHEB with reviewing novel electrical applications. It provides copies of Safety Permits to cognizant Area Safety Chair and ensures that the Area Safety Chair do not approve research operations exceeding authorized bounds. When the Chair exercises his/her shutdown authority, he/she must also notify the appropriate Area Safety Committee Chair.

Committee membership includes individuals with electrical engineering and operational expertise and representatives from the SB and the OHB.

The Electrical Applications Safety Committee:

- a. Reviews specific proposals for the design, construction, alteration, or removal of electrical power systems rated above 600 volts or special electrical applications, and approves and issues a Safety Permit for those proposals that meet Glenn safety requirements.
- b. Recommends, subject to review and approval of the SHEB, minimum acceptable safety standards within the scope of its charter.
- c. Advises Area Safety Committees, the Process Systems Safety Committee, and other organizational elements, upon request, on the safety aspects of specific proposals involving electrical applications.
- d. Maintains technical surveillance of and keeps informed of activities, in assigned area of responsibility, to anticipate problems and minimize safety-related conflicts between organizational elements.
- e. Submits to the SHEB significant concerns or unresolved questions regarding the granting of permits and the assessment of major risk.
- f. Reports, through the Area Safety Committee Chair, to the SHEB at its designated meetings.

Process Systems Safety Committee

The Process Systems Safety Committee ensures that the central service systems of the Center are designed and operated in a safe manner. Central service systems include the systems and equipment for conveying, supplying, generating, removing, distributing, or processing liquids and gases and the prime machinery for each process system leading to and terminating at the test cell or an area of a research setup.

NOTE: The following systems are specifically included: central air and exhaust systems, fire and domestic water systems, carbon dioxide systems, steam systems, natural gas systems, heating plants, cooling tower water systems, cooling towers, wet and dry coolers, industrial waste basins and the lines leading to them, general purpose and mobile

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cryogenic equipment, pressure vessels and related systems, and the Engine Component Research Laboratory (ECRL) underground fuel storage and distribution system.

When the Chair exercises his/her shutdown authority, he/she must also notify the appropriate Area Safety Committee Chair.

Committee membership includes individuals with process systems engineering and operational expertise and representatives from the SB and the OHB.

The Process Systems Safety Committee:

- a. Establishes acceptable safety standards and review specific proposals for modifications or additions to facilities, equipment, or operations involving process systems
- b. Oversees application of NPR 8715.4, "In-service Inspection of Ground-Based Pressure Vessels and Systems".
- c. Approves and issues the Safety Permit for those proposals that meet Glenn safety requirements.
- d. Supplies the cognizant Area Safety Committee chair with copies of the Safety Permits issued by the PSSC, calling attention to approved modes or levels of operation of the central systems so that Area Safety Committees do not approve research operations exceeding authorized bounds.
- e. Recommends, subject to the review and approval of the SHEB, minimum acceptable safety standards within the scope of its charter.
- f. Advises Area Safety Committees and other organizational elements, upon request, about the safety aspects of specific proposals involving process systems.
- g. Maintains technical surveillance of and keeps informed of current activities, in assigned area of responsibility, to anticipate problems and minimize safety-related conflicts between organizational elements.
- h. Submits to the SHEB significant concerns or unresolved questions regarding the granting of permits and the assessment of major risks.
- i. Reports, through the Committee chair, to the SHEB at its designated meetings.

Laser Safety Committee

The Laser Safety Committee conducts third- party reviews for all operations that use lasers at the Center. The committee ensures that all proposed installations and operations are consistent with the dictates of sound engineering judgment and acceptable health and safety standards.

Committee membership includes researchers, safety and health specialists, and the LSO.

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The Laser Safety Committee:

- a. Reviews specific proposals for all research operations that will require the use of lasers as a stand-alone unit or as part of another permitted operation. Approves and issues Safety Permits for those activities that meet Glenn safety requirements.
- b. Maintains technical surveillance of and keeps informed of current activities of laser operations in order to anticipate problems and minimize safety-related conflicts between organizational elements.
- c. Obtains comments and advice from advisory panels and the OHB concerning matters that fall within the area of laser operations.
- d. Ensures that activities presenting significant risk to persons or property have a formal readiness review by the requester's line management prior to issuing a Safety Permit.
- e. Submits to the SHEB significant concerns or unresolved questions regarding the granting of permits and the assessment of major risks.
- f. Reports, through the Committee chair, to the SHEB at designated meetings.

Decommissioning Safety Committee

The Decommissioning Safety Committee conducts reviews of all matters with safety implications relative to decommissioning activities at the Plum Brook Reactor Facility (PBRF), and provides an executive level overview of PBRF activities. The Decommissioning Safety Committee has the authority to review any and all programs, plans, and procedures that may have an impact on the safety and health of workers and the public to ensure compliance with all applicable federal, state, and local regulations. The Decommissioning Safety Committee is available to provide advice, technical expertise, and guidance to minimize health hazards associated with PBRF activities.

Committee membership includes the Decommissioning Program Manager; the GRC Radiation Safety Officer; the Chief, Construction Management Branch; the GRC Safety Officer; the Chief, Occupational Health Branch; and two GRC engineers (with expertise in at least of one of the following areas: Nuclear, Environmental, Safety, Civil, Structural, Mechanical, or Electrical).

1.3.7 Aviation Safety Officer

The Aviation Safety Officer implements the general Glenn safety program concerned with airworthiness and flight safety. The Area Safety Officer participates with the Aviation Safety Committee in the review of Safety Permit Requests for proposed operations involving flight research and program support aircraft assigned to Glenn. The Area Safety Officer also serves as an ex-officio member of the Aviation Safety Committee.

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The Area Safety Officer:

- a. Reviews and evaluates proposed modifications to Glenn aircraft and the aircraft assigned to support Glenn programs. Modification refers to any alteration, addition, or removal of aircraft structure, components, equipment, or instrumentation, including equipment or instrumentation used for research purposes.
- b. Reviews and evaluates operating procedures, performance requirements, and restrictions for missions on Glenn aircraft and the aircraft assigned to support Glenn programs. Mission refers to any flight of Glenn aircraft or aircraft assigned to support Glenn programs.
- c. Provides technical guidance on safety aspects of flight programs.
- d. Maintains surveillance of aviation activities for conformance with prescribed directives, standards, procedures, and Safety Permit restrictions and initiates corrective action when required.
- e. Reviews aviation training and assesses personnel qualifications to ensure safety of operations.
- f. Reviews and approves Flight Work Order forms (NASA Form C-9976) as required.
- g. Reports to the SHEB at designated meetings.

The Area Safety Officer has the authority to shut down any operation or activity for which there is a question of aircraft flight safety until an appropriate technical review can be conducted. Exercise of this authority requires immediate notification to the chair of the SHEB, the chair of the Aviation Safety Committee, and the Chief of the Safety Branch. Should the need arise, the Area Safety Officer has unrestricted access to the Center Director on matters of flight safety.

1.3.8 Airworthiness Review Panel

The Airworthiness Review Panel (ARP) is activated at the discretion of the Aviation Safety Committee Chair to bring expertise in specific disciplines to the safety process and to assure management that an independent review team can be called upon, should the need arise. The ARP is used to assess the impact of:

- a. R&D modifications to Glenn operated aircraft.
- b. Installation of research hardware.
- c. Changes to the flight envelope or aircraft limitations.
- d. Operational procedures.
- e. Mission profiles of these aircraft.

The ARP reports its findings to the Aviation Safety Committee. Members of the Airworthiness Review Panel are nominated by the Chair of the Aviation Safety Committee and appointed by the SHEB.

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1.3.9 Contractor Safety Council

The Center Director through the SHEB chartered the Contractor Safety Council to include all contractors that have personnel located on-site. The Contractor Safety Council provides a mechanism to facilitate, promote and improve safety performance in the GRC contractor workforce and the products they produce. It will:

The Contractor Safety Council:

- a. Provides a means for GRC contractors to become familiar with the GRC safety program.
- b. Provides a forum to discuss and develop GRC contractor related safety issues.
- c. Facilitates effective GRC contractor safety programs.
- d. Benchmarks and continually improves the GRC contractor safety program excellence.
- e. Serves as a conduit for information exchange and interface with the GRC safety function.
- f. Exchanges and evaluates GRC contractor safety best practices.
- g. Shares safety program metrics regarding incident rates and property loss.
- h. Actively supports GRC in its pursuit of OSHA Voluntary Protection Program STAR Recognition.
- i. Assesses GRC safety regulation implementation and impact.

The Contractor Safety Council is chaired by the GRC Director, Safety and Mission Assurance Technologies, and an Executive Secretary is chosen from the contractor membership to serve for a period of two years. Meetings are held at least quarterly and formal minutes are generated.

1.4 Glenn Safety and Environmental Programs Manual

The specific operating responsibilities, procedures and related requirements for the implementation of the Safety and Health Management System are reflected in the chapters of the Glenn Safety Manual and selected chapters of the Environmental Programs Manual. The Safety Branch and the OHB maintain configuration control of these manuals as required by GRC-P3.7.2, Business Management System Document and Data Control. Both Manuals are available electronically to all Center employees.

Any proposed tasks or activities at GRC which do not comply with the Glenn Safety Manual require a Safety Variance. The specific requirements for obtaining approval for a variance depend upon many factors, with the major ones being;

- The requirement or regulation which is not being complied with.
- A quantified risk assessment performed by someone with expertise in the specific hazards associated with the task or activity.
- Identified risk reduction measures

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- Signature authority for program at risk

A detailed discussion, including a worked example, is included in Section 1.9 of this chapter.

1.5 Communications, Training and Awards

There are several mechanisms for communicating safety and health information to the GRC employees and support service contractors. The Center Safety Bulletin highlights a specific safety and health topic each week. All employees receive either an electronic or paper copy of this bulletin. Many line managers hold routine safety meetings with their staff. The topics vary depending on the local hazards and the group's interest.

Employees can contact the Safety Branch or the Occupational Health Branch to request information, advice or guidance on safety and health topics. They can report safety and health concerns to their immediate supervisor or to the Safety Branch or Occupational Health Branch. Employees may also report safety and health concerns to the NASA Safety Reporting System (NSRS). The NSRS is an anonymous, voluntary, and responsive reporting channel to notify NASA's upper management of employee concerns about hazards.

A Safety POC from the Safety Branch is assigned to each directorate and top level staff office. The Safety POC assists each organization with development of a safety and health management plan and with safety and health implementation.

Training requirements are defined in Chapter 2 of the Glenn Safety Manual. Glenn has established a Safety, Health and Environmental Training Committee (SHETC). SHETC is responsible for promoting training, awareness, and competence in the areas of safety, health, environmental, and security. It has developed a training questionnaire that supervisors and employees can use to identify training needs. It has also developed a matrix of required and recommended training that includes training frequency, target audience, and points of contact.

The Glenn Safety Awards Program was developed to recognize individuals and organizations for their efforts in making the Center a safe workplace for employees to achieve the goals of the Agency. This program covers all civil service employees and support service contractor organizations at Glenn Research Center. The organizational awards are Safest Division at GRC and Safest Contractor at GRC. The criteria for the selection include safety training attendance, involvement in safety programs, number of violations, and lost time rate.

There will be five individual awards given throughout the year. The individual awards are Safety Support Employee of the Quarter and Safety Support Employee of the Year. The criteria for individual awards are similar to the organizational awards. However, the

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most important criterion is a significant contribution to the safety programs or to a safe workplace at GRC.

1.6 Safety and Health Programs

The Glenn Safety Programs are used to comply with OSHA regulations and NASA safety policy and requirements. They also go beyond basic compliance by eliminating or reducing workplace hazards and providing the safest possible environment for Center employees and visitors. These programs are documented in the Glenn Safety Manual.

The Glenn Occupational Health Programs are used to comply with OSHA regulations and NASA safety policy and requirements. They also go beyond basic compliance by eliminating or reducing workplace health hazards and providing the healthiest possible environment for Center employees and visitors. These programs are documented in selected chapters of the Environmental Programs Manual.

The Glenn Occupational Medicine Programs are used to maintain, conserve, and improve the health of Glenn employees and to evaluate any physical, chemical, or bacteriological hazards that may be present in the employee's work environment. They provide several preventive programs, such as the Health Screening Clinic, the physical fitness facility, employee assistance, nutrition services, and immunizations.

The Employee Assistance Program (EAP) provides services for employees experiencing emotional stress, mental health disorders, family or relationship difficulties, financial and/or legal concerns, and alcohol or drug abuse problems. Participation is voluntary, although services may be provided following supervisor, medical, or other referral. All EAP providers are fully certified and credentialed, and are honor bound by law and professional ethics to protect confidentiality.

The Glenn Emergency Preparedness Program is used to anticipate potential emergencies and determine how to respond to them to minimize the potential for injury, illness, property damage, or negative operational impact. It is documented in the Emergency Preparedness Plan, which coordinates the efforts and resources that are tasked to respond in the event of an emergency.

1.7 Programmatic Assessments and Inspections

Members of the Safety Branch and the Occupational Health Branch perform periodic assessments of various safety and health programs. The purpose of these assessments is to identify any weakness in the program and implement improvement actions. Programmatic assessment requirements are defined in the Glenn Safety Manual and Environmental Programs Manual.

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In addition, members of the Safety Branch and the Occupational Health Branch conduct routine facility safety and health inspections in accordance with Chapter 24 of the Glenn Safety Manual. The purpose of these inspections is to identify hazardous conditions, unsafe or unhealthy work practices, and other occupational safety and health issues.

The results from the facility safety inspections and programmatic assessments are evaluated to identify trends or problem areas that should be addressed by the Center.

1.8 Safety and Health Management System Audits

Audits of the Glenn Safety and Health Management System are conducted by an internal audit team in accordance with GRC-P4.6, Internal Audits procedure. Correction of identified deficiencies or nonconformances is tracked through the GRC Corrective and Preventive Action Reporting System in accordance with GRC-P4.7. In addition, competent and qualified safety and health personnel through staff assistance visits, inspections, and process verification evaluations formally assess the Center's safety and health programs. These assessments perform the following:

- a. Evaluate the effectiveness of safety and health program management.
- b. Evaluate the implementation of Public Law 91-596, "The Occupational Safety and Health of 1970," as amended; E.O. 12196, "Occupational Safety and Health Programs for Federal Employees," as amended; OSHA Regulations at 29 CFR Part 1910, "Occupational Safety and Health Standards," and other pertinent Federally mandated requirements.
- c. Identify hazards and deficiencies in the safety and health program.
- d. Evaluate the effectiveness of the abatement process.
- e. Determine the adequacy of safety and health standards and procedures.
- f. Observe compliance with safety and health practices.
- g. Verify corrective actions from previous assessments.

1.9 Appendix A – GRC Safety Variance Procedure

1.9.1 Definitions

- Variance – Documented and approved permission to perform some act or operation contrary to established requirements. The established requirements could be from NASA Headquarters (NPR's, NPD's, etc) or GRC policy.
- Deviation – A documented variance that authorizes departure from a particular safety requirement that does not strictly apply or where the intent of the requirement is being met through alternate means that provide an equivalent level of safety with no additional risk. A deviation is another form of variance.
- Waiver – A variance that authorizes departure from a specific safety requirement where a special level of risk has been documented and accepted. A deviation is another form of variance

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- Risk Assessment Code (RAC) – The RAC is a numerical expression of comparative risk determined by an evaluation of both the potential severity of a condition and the probability of its occurrence. Refer to Section 1A.11 this manual and Section 3.6.1 of NPR 8715.3 for specific numerical definitions.
- Variance Requester (VR) – Any individual at GRC who is seeking approval via a NASA C-83 Form for a task or activity which involves safety issues not in compliance with the Glenn Safety Manual and/or other GRC Safety Requirements.

1.9.2 Objective

The objective of this procedure is to allow GRC and its program managers the freedom to accept risks necessary to accomplish their tasks.

1.9.3 Procedure

1.9.3.1 - Personnel responsible for implementing tasks or research related activities at GRC confirm compliance with all NASA and GRC Safety Requirements.

1.9.3.2 - Where compliance cannot be achieved, a Safety Variance Request (SVR) will need to be submitted via form NASA C-83.

1.9.3.3 - Variance Requester (VR) will determine a Risk Assessment Code (RAC) for the specific activity or task requiring a variance.

1.9.3.4 - VR determines if the Safety Variance Request is a Deviation or Waiver

1.9.3.4.1 - Deviations are variance requests with RAC's = 4, 5, 6 or 7.

1.9.3.4.2 - Waivers are variance requests with RAC's = 2 or 3.

1.9.3.4.3 - Variance requests with a RAC = 1 will not be processed.

1.9.3.5 - VR attaches all relevant supporting information to the Safety Variance Request form C-83.

1.9.3.6 - VR obtains appropriate level of authorization.

1.9.3.6.1 – Deviations require authorization from Program Manager and, where applicable, the relevant Area Safety Committee.

1.9.3.6.2 – Deviations involving Safety Permits may need to be routed through the Pressure Systems Office (PSO). Refer to Center Procedure No. GRC-P3.10.01 for exact requirements.

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1.9.3.6.3 – Waivers with RAC's = 3 require authorization from:

- Program Manager
- Pressure System Manager (if applicable)
- Director of E&TSD
- Director of SMAD

1.9.3.6.4 – Waivers with RAC's = 2 require authorization from:

- Program Manager
- Pressure System Manager (if applicable)
- Director of E&TSD
- Director of SMAD
- Center Director

1.9.3.7 – Three examples of a Safety Variance Requests with differences are provided for guidance.

GRC Safety Variance Request (GVR)		NO. 0001	DATE 01/01/2006
TITLE <i>(Brief reference to noncompliance)</i> Pressure Gauge Testing under high pressure helium		TYPE <i>(waiver or deviation)</i> Deviation	
IDENTIFICATION <i>(System/Equipment ID, Building, Test Cell, etc.)</i> Building 5 - Cell W-8 - Calibration Receiver (X-12)		EFFECTIVE DATES 2/1/06 through 4/1/06	
APPLICABLE NASA and/or GRC REQUIREMENT NOT MEETING COMPLIANCE NPR 8715.4, Glenn Safety Manual Chapter 1A, GRC-P3.10.01			
DESCRIPTION OF NONCOMPLIANCE <i>(Specify how the design or operation does not meet the safety requirements.)</i> PV/S Risk Assessment Code (RAC) = 2 for pressure vessel X12 due to insufficient documentation. Reference attached Risk Assessment Summary RAC-05-0032 dated 11/28/05.			
QUANTIFIED HAZARD <i>(Attach supporting documentation.)</i> Restricted Distance = 105 feet (Reference attached calculations utilizing Pneumatic Testing guidelines from Chapter 7 of Glenn Safety Manual). Although personnel will not be within restricted distance there are Solar Panels located approximately 50 feet from X12 which will likely be damaged should X12 burst. Total damage estimated at \$200,000 or a Severity = III (marginal) per Glenn Safety Manual Chapter 1A. Barricade, area clearance and traffic plans are attached. Restricted distance calculations also attached.			
REASON REQUIREMENT CANNOT BE FULFILLED Unable to relocate solar panels which are permanently anchored to limestone base. Cost to relocate is estimated at \$950,000			
QUANTIFIED ACCEPTANCE RATIONAL <i>(Attach supporting documentation.)</i> Likelihood of X12 failure is estimated as C (Occasional) per Pressure Systems Office (PSO) Severity of Failure = III (Marginal) as noted above		<u>RAC (Final)</u> Severity = <u> III </u> Likelihood = <u> C </u> Risk = <u> 4 </u>	
APPROVAL SIGNATURES			
Program Director	DATE	Glenn Safety Branch Yes	DATE
APPROVALS <i>(Where required)</i>			
Director, E&TSD No	DATE	PSM Manager Yes	DATE
Director, SMAD No	DATE	Center Director No	DATE

GRC Safety Variance Request (GVR)		NO. 0002	DATE 01/01/2006
TITLE <i>(Brief reference to noncompliance)</i> Pressure Gauge Testing under high pressure helium		TYPE <i>(waiver or deviation)</i> Waiver	
IDENTIFICATION <i>(System/Equipment ID, Building, Test Cell, etc.)</i> Building 5 - Cell W-8 - Calibration Receiver (X-12)		EFFECTIVE DATES 2/1/06 through 4/1/06	
APPLICABLE NASA and/or GRC REQUIREMENT NOT MEETING COMPLIANCE NPR 8715.4, Glenn Safety Manual Chapter 1A, GRC-P3.10.01			
DESCRIPTION OF NONCOMPLIANCE <i>(Specify how the design or operation does not meet the safety requirements.)</i> PV/S Risk Assessment Code (RAC) = 2 for pressure vessel X12 due to insufficient documentation. Reference attached Risk Assessment Summary RAC-05-0032 dated 11/28/05.			
QUANTIFIED HAZARD <i>(Attach supporting documentation.)</i> Restricted Distance = 105 feet (Reference attached calculations utilizing Pneumatic Testing guidelines from Chapter 7 of Glenn Safety Manual). Although personnel will not be within restricted distance there are Solar Panels located approximately 50 feet from X12 which will likely be damaged should X12 burst. Total damage estimated at \$300,000 or a Severity = II (Critical) per Glenn Safety Manual Chapter 1A. Barricade, area clearance and traffic plans are attached. Restricted distance calculations also attached.			
REASON REQUIREMENT CANNOT BE FULFILLED Unable to relocate solar panels which are permanently anchored to limestone base. Cost to relocate is estimated at \$950,000			
QUANTIFIED ACCEPTANCE RATIONAL <i>(Attach supporting documentation.)</i> Likelihood of X12 failure is estimated as C (Occasional) per Pressure Systems Office (PSO) Severity of Failure = II (Critical) as noted above		<u>RAC (Final)</u> Severity = <u>II</u> Likelihood = <u>C</u> Risk = <u>3</u>	
APPROVAL SIGNATURES			
Program Director	DATE	Glenn Safety Branch Yes	DATE
APPROVALS <i>(Where required)</i>			
Director, E&TSD Yes	DATE	PSM Manager Yes	DATE
Director, SMAD Yes	DATE	Center Director No	DATE

GRC Safety Variance Request (GVR)		NO. 0003	DATE 01/01/2006
TITLE <i>(Brief reference to noncompliance)</i> Pressure Gauge Testing under high pressure helium		TYPE <i>(waiver or deviation)</i> Waiver	
IDENTIFICATION <i>(System/Equipment ID, Building, Test Cell, etc.)</i> Building 5 - Cell W-8 - Calibration Receiver (X-12)		EFFECTIVE DATES 2/1/06 through 4/1/06	
APPLICABLE NASA and/or GRC REQUIREMENT NOT MEETING COMPLIANCE NPR 8715.4, Glenn Safety Manual Chapter 1A, GRC-P3.10.01			
DESCRIPTION OF NONCOMPLIANCE <i>(Specify how the design or operation does not meet the safety requirements.)</i> PV/S Risk Assessment Code (RAC) = 2 for pressure vessel X12 due to insufficient documentation. Reference attached Risk Assessment Summary RAC-05-0032 dated 11/28/05.			
QUANTIFIED HAZARD <i>(Attach supporting documentation.)</i> Restricted Distance = 105 feet (Reference attached calculations utilizing Pneumatic Testing guidelines from Chapter 7 of Glenn Safety Manual). Although personnel will not be within restricted distance there are Solar Panels located approximately 50 feet from X12 which will likely be damaged should X12 burst. Total damage estimated at \$3,000,000 or a Severity = I (Catastrophic) per Glenn Safety Manual Chapter 1A. Barricade, area clearance and traffic plans are attached. Restricted distance calculations also attached.			
REASON REQUIREMENT CANNOT BE FULFILLED Unable to relocate solar panels which are permanently anchored to limestone base. Cost to relocate is estimated at \$9,000,000			
QUANTIFIED ACCEPTANCE RATIONAL <i>(Attach supporting documentation.)</i> Likelihood of X12 failure is estimated as C (Occasional) per Pressure Systems Office (PSO) Severity of Failure = I (Catastrophic) as noted above		<u>RAC (Final)</u> Severity = <u> I </u> Likelihood = <u> C </u> Risk = <u> 2 </u>	
APPROVAL SIGNATURES			
Program Director	DATE	Glenn Safety Branch Yes	DATE
APPROVALS <i>(Where required)</i>			
Director, E&TSD Yes	DATE	PSM Manager Yes	DATE
Director, SMAD Yes	DATE	Center Director yes	DATE