



LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST) Safety Policy

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LPM-18

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Table of Contents

- Change Record i
- Summary iii
- Acronyms and Definitions of Terms..... iii
- 1 Introduction 1
- 2 Objective 1
- 3 Overview 2
 - 3.1 Safety, Health, and Environmental (SHE) Plans 2
 - 3.2 Safety Reviews and Hazard Analysis 2
 - 3.3 Safety Manager and Safety Council 2
 - 3.4 Design for Safe Development and Operation 3
- 4 LSST Safety, Health and Environmental (SHE) Plans 3
 - 4.1 Compliance to Regulations, Codes and Standards 3
 - 4.2 Safety Health and Environmental Plan Responsibilities 3
 - 4.3 SHE Plan Expectations 3
 - 4.4 Contractor Safety and Health Plans 4
 - 4.5 SHE Plan Availability to Personnel 4
- 5 Safety Reviews and Hazard Analysis 5
 - 5.1 Safety Reviews 5
 - 5.2 Hazard Analysis and Hazard Register 5
- 6 Safety Policy Management and Responsibilities 6
 - 6.1 LSST Safety Manager 6
 - 6.2 LSST Director 6
 - 6.3 LSST Project Manager 7
 - 6.4 LSST Project Safety Council 7
 - 6.5 LSST Team Members 7
- 7 Design for Safe Development and Operation 8

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The LSST Safety Policy

Summary

This document provides the description of the LSST Safety Policy. This Policy focuses on personnel and equipment safety throughout the design, construction, and operations phases of the project. The Policy addresses working conditions and procedures, as well as the management structure and design features that impact safety throughout the LSST Project.

Acronyms and Definitions of Terms

- Glossary of Abbreviations ([Document-11921](#))
- Glossary of Definitions ([Document-14412](#))



The LSST Safety Policy

1 Introduction

The Large Synoptic Survey Telescope (LSST) Project is committed to achieving the highest performance in safety, health, and environmental management practices with the aim of creating and maintaining a safe and healthy working and operating environment. The Safety Policy focuses on personnel and equipment safety throughout the design, construction, and operations phases of the project. The Policy addresses working conditions and procedures, as well as the management structure and design features that impact safety throughout the LSST Project.

The LSST Project is centrally managed but executed by several teams in distributed locations and with different funding sponsors. This LSST Safety Policy covers all LSST Project efforts while recognizing and relying on existing Safety, Health and Environmental policies in place at participating institutions.

This document provides the program description and references other project documents for additional details.

2 Objective

This Policy establishes and defines Safety, Health and Environmental (SHE) procedures and requirements for the LSST Project consistent with all United States and Chilean laws and regulations. The objective of the policy is to make safety, health and environmental management an integral part of the effort from initial planning and design, to construction, commissioning, and finally throughout the operation of LSST.

In addition to the stated policies and requirements, this policy lays out a foundation for project development and operations intended to establish a culture where the safety and health of personnel and equipment is a paramount concern, and that individuals are empowered and management is structured to encourage and promote safety in all elements of the project. In particular, LSST is committed to

- Promote a work environment based on continuous improvement, employee involvement, ownership, teamwork, education, and leadership;
- Reinforce the need for people to care about the people they work with;
- Promote the philosophy that safety is not a priority that can be reordered, it is a value associated with everything we do;
- Recognize, reward, and reinforce our safety, health and environmental achievements, innovations, and behaviors;
- Address all known risks to people, property, and the environment;
- Exercise vigilance to ensure compliance with all applicable, laws, regulations, and management best practices;



- Integrate safety, health, and environmental considerations into project planning, design, construction, and operations to minimize loss; and
- Conduct sustainable programs to minimize pollution to the environment, to protect material resources, to honor cultural resources, and to minimize our impact to biota.

3 Overview

To realize these commitments, the LSST Project has established this Policy on the basis of clear lines of communication, clear procedures, critical review, personal responsibility, and accountability for safe design and conduct. This section provides an overview of the four major elements in the LSST Safety Policy. Each of these is further described later in this document and specifically addressed in detailed implementation documents.

3.1 Safety, Health, and Environmental (SHE) Plans

The detailed guidelines for safe working conditions are found in site specific Safety, Health and Environmental (SHE) Plans. The SHE Plans at each site are a critical element in the Safety Policy, and LSST expects that each collaborating organization and contractor has established safety programs that will govern the specific activities at that location. LSST has a minimum expectation for the criteria established in these plans and expects all staff, whether permanent to the location or visiting, to follow these local procedures. When LSST specific sites are established, the project will issue specific SHE plans for those locations.

3.2 Safety Reviews and Hazard Analysis

LSST will conduct periodic design and procedure reviews focused on compliance to safety regulations, this program, and good practice. The frequency of the reviews will be commensurate with the stage of the project as defined in the Project management plan. Reviews will be conducted by SHE professionals and will focus on specific subsystems of the observatory, the observatory as a whole, and this Safety Policy itself. Each subsystem will conduct periodic Hazard Analyses to be included in the reviews. Hazard Registers will be maintained in standard forms for cross project review.

3.3 Safety Manager and Safety Council

The LSST Project Management team is responsible and held accountable for incorporating the Safety Policies, standards, rules, and principles into the project work. To emphasize the commitment to safety, a single LSST Safety Manager manages, executes, and verifies compliance to the Safety Policy. This safety professional is part of the project team, reports to the Project Manager and has direct access to the LSST Director. A Safety Council also has been established with a complement of safety professionals and other team members from LSST collaborating institutions and outside affiliations. The LSST Safety Manager chairs this committee and organizes broad or targeted subject matter reviews consistent with the Project Execution Plan (LPM-54) or as necessary. For appropriate phases of the LSST construction activity, for example summit construction, Safety Inspectors will be employed to provide front line review of work in progress. The LSST also maintains a Safety Web Site to communicate with the large distributed LSST team and facilitate the dissemination of key information.



3.4 Design for Safe Development and Operation

The LSST will follow design, construction and operation best practices and comply with US and Chilean laws and regulations in all aspects of the LSST Observatory system, from the summit in Chile to the archive and data centers in the US. The Safety Manager and Safety Council work with the Project Managers and engineers to identify the US, Chilean, International and agency institution codes and standards that should be applied to the various elements of the LSST.

4 LSST Safety, Health and Environmental (SHE) Plans

All efforts to design, construct, commission, and operate the LSST are to be performed within the jurisdiction of an institution with established Safety, Health and Environmental (SHE) policies and procedures. The local SHE Plans provide the detailed definition of compliance standards, responsibilities, behavior and reporting. All personnel working on the LSST will follow the guidelines established in the SHE plan for that location. When traveling, personnel shall follow home institution travel policies. Personnel traveling on behalf of AURA shall refer to the LSST Travel web page for specific instructions (<https://project.lsst.org/travel>). Plans will be developed for new LSST facilities as they are put into place and custom plans are necessary. In all cases, the SHE plans cover the details that mandate and inspire people to incorporate safe designs, to define safe procedures, and to work safely and responsibly together.

4.1 Compliance to Regulations, Codes and Standards

LSST expects local SHE plans to comply with all applicable safety, health and environmental regulations and requirements in Title 29 of the U.S. Code of Federal Regulations (CFR) including part 1910, "OSHA Safety and Health Standards for General Industry", and Part 1926, "Safety and Health Regulations for Construction", 49 CFR Federal Motor Carrier Safety Administration, and 40 CFR Protection of Environment and others that may apply; LSST considers the above CFR's as minimum standards. Plans governing work in Chile will comply with the requirements of this document and other Chilean laws such as Safety Law No 16.744 and other Chilean Standards (*Normas Chilenas*).

4.2 Safety Health and Environmental Plan Responsibilities

Work conducted at participating organizations shall be governed by the local SHE plan. These plans include identification of the local Safety Manager/Coordinator and lines of authority to which all personnel working on LSST activities at that location shall adhere. There shall be no ambiguity about which plans govern activity for visiting staff. Local SHE plans take precedence over home institution regulations except where the employee is further restricted. Staff members who recognize inconsistencies in the local plans and their home institution policies shall identify the situation to the local safety authority, the home institution safety authority, and the LSST Safety Manager to resolve any conflicts.

4.3 SHE Plan Expectations

LSST has a set of guidelines expected from the local SHE plans. The LSST Safety Manager and project management will work with the collaborating institutions to insure that the local plans meet Project expectations. The LSST Safety Manager is charged with the review of the local plans to see that LSST expectations are met, that all elements (documentation) are available to the staff, and that issues of



nomenclature and document titles are reconciled where differences are identified. The following topics are expected to be addressed in local SHE plans:

- Local Safety Manager/Coordinator
- Staff Responsibilities
- Visitor and Access Policy
- Behavioral Policies
- Personal Protection Equipment
- Hazardous Material Management
- Emergency Contacts and Procedures
- Special Equipment Procedures (Laser etc.)
- Utility Use and Servicing (Cryogenics, gasses, power etc.)
- Lock-out processes
- Inspections
- Housekeeping
- Reporting and Records

4.4 Contractor Safety and Health Plans

All LSST institutions and contractors that perform LSST work are required to develop, submit, and implement a project and site-specific safety and health management plan. The plan must extend to its own employees, project employees, other workers, and members of the public. The contractor is also required to ensure compliance with the plan. The details of the contractor requirements are subject to specific policies from the specific LSST organization contracting the work but are expected to address the same information as described in Section 4.3 above.

For work contracted at LSST specific locations, the contractor's safety record and ongoing safety program will be an important element in the selection criteria. All contractors are required to complete the "Safety and Health Questionnaire for Contractors" (as maintained by AURA procurement) that will be used to evaluate potential contract employers. All general contractors shall require subcontractors to comply with the Contractor's Safety and Health Specification. The Safety and Health Questionnaire for contractors will be provided to potential contractors during the proposal process and shall be completed and submitted with the contractor proposal documents. The questionnaire will be used by LSST to assess contractors' safety performance and programs and will be used during the selection process.

4.5 SHE Plan Availability to Personnel

The LSST project maintains a Safety Program Website (<https://project.lsst.org/safety/home>) that includes links to all applicable local SHE plans and policies to facilitate convenient access to the information to everyone working on LSST tasks. This is particularly important for staff who visit and work at other institutions where access to the information is not routine. The LSST Safety Manager is charged with establishing the links to the appropriate and applicable information for each participating



institution.

5 Safety Reviews and Hazard Analysis

Formal safety reviews and hazard analyses will be the principal elements of the LSST system safety engineering and analysis methodology.

5.1 Safety Reviews

LSST will conduct periodic design and procedure reviews focused on compliance to the Safety Policy and applicable standards. The frequency of the reviews will be commensurate with the stage of the project as defined in the Project management plan. Reviews will be led by the LSST Safety Manager with support from other safety professionals. They will focus on specific subsystems of the observatory, contracted efforts, the observatory as a whole, and the Safety Policy itself. Each subsystem will conduct periodic risk assessment and hazard analyses to be included in the reviews. Contractor hazard analysis will also be reviewed consistent with deliverables established in contract documents. A Project-level safety review will be conducted at a minimum of yearly, while other reviews and their scope will be determined by the Project Manager and LSST Safety Manager during the project period.

A key element of the safety review process is the assessment of hardware designs, construction and operational processes, hazard analysis results and the interaction with the LSST Risk Management Plan (see LPM-20). There are three types of risk associated with the project: 1) Technical Risk, consisting of the risk of not meeting performance requirements; 2) Programmatic Risk, which consists of the risk of project failure due to cost or schedule overruns; and 3) Risk of Harm, personnel and equipment safety. LSST Risk Management focuses on items 1 and 2 and this Safety Policy focuses on item 3. There are interdependencies that are managed within system engineering and the safety review process.

5.2 Hazard Analysis and Hazard Register

LSST utilizes a formal hazard analysis process to identify, analyze, and determine the resolution of hazards throughout the project. This hazard resolution method for LSST consists of the series of analytic steps summarized below and described fully in the LSST Hazard Analysis Plan (LPM-49).

- Define the physical and functional characteristics of the proposed telescope, camera, and facilities by employing the information available (design documents, operating procedures, etc.), and relating the interaction between people, procedures, equipment, and the environment.
- Identify known hazards related to all aspects of the LSST project and determine their causes.
- Assess the hazards to determine severity and probability, and to recommend means for their elimination or control.
- Implement corrective measures to eliminate or control the individual hazards, or accept the corresponding risks.
- Conduct follow-up analyses to determine the effectiveness of preventive measures, address new or unexpected hazards, and issue additional recommendations if necessary.



6 Safety Policy Management and Responsibilities

The LSST safety program requires a clear line of responsibility and authority to ensure proper implementation and verification. The Project will appoint a single Safety Manager for the project to manage all aspects of the program. The Safety Manager is assisted by a standing council, comprised of safety professionals and other team members, to provide the review and assessment required within the program and to support the Safety Manager as needed during the project. This section provides the roles and responsibilities for the key LSST staff regarding the safety program.

6.1 LSST Safety Manager

The Safety Manager is responsible for the LSST Safety Policy, its implementation and helping management to ensure compliance. The Safety Manager reports directly to the LSST Project Manager and works closely with LSST subsystem managers, systems engineers, and the local safety managers/coordinators at each participating organization responsible for the implementation of local Safety, Health, and Environmental Program (SHE) plans. The LSST Safety Manager has the authority and responsibility to report safety, health, and environmental issues and to make recommendations to the Project Manager, the Project Safety Council, and other leadership of the LSST Project, reporting directly to the LSST Director if necessary. The Safety Manager inspires the project team to value safety and manage all risks in their area of responsibility.

The Safety Manager leads the effort to establish, plan, organize, and integrate this Safety Policy into the LSST Project as well as influence the design when necessary. The Safety Manager, working with the institutional Safety Managers/Coordinators, will be actively involved in many if not all aspects of the Project. They are responsible for

- Participating in design reviews;
- Preparing the Safety Program deliverable documents;
- Supporting the program level interface with NSF, DoE, and others;
- Developing and establishing safety design criteria and safety design requirements as needed;
- Reviewing and approving selected drawings, specifications, and procedures;
- Participating in hazardous testing if required;
- Evaluating design changes for their impact on safety, health, or the environment;
- Coordinating and verifying adequate emergency response systems and procedures that will be used during construction; and
- Coordinating safety, health, and environmental activities needed during the project.

The LSST Safety Manager and local safety managers/coordinators are all obligated to keep current with all laws, ordinances, statutes, rules, and regulations as they become promulgated.

6.2 LSST Director

The LSST Director has the overall responsibility for ensuring that SHE management practices are incorporated into the LSST Project. The LSST Director works with the Project Manager and Safety



Manager to implement the LSST Safety Program and SHE objectives by

- Ensuring the Safety Policy is established and integrated throughout the LSST Program;
- Ensuring that known risks are identified, eliminated, or controlled within established program risk acceptability parameters; and
- Ensuring that LSST operations are performed in accordance with applicable project safety requirements, and applicable Governmental safety regulations.

6.3 LSST Project Manager

The LSST Project Manager has the day-to-day responsibility for ensuring that SHE management practices are incorporated into the LSST Project. The LSST Project Manager will implement the LSST Safety Policy through the appointment of the LSST Safety Manager and will direct all subsystem managers to keep SHE issues a priority in all aspects of the project. Specifically the Project Manager and subsystem managers will

- Make SHE considerations a part of all planning processes by identifying known hazards, determining what standards apply, implementing controls, determining the competencies required to do the work safely, and finally the assurance that each of these elements are in place before work is authorized to proceed;
- Management focuses on safe accomplishments of the mission, understanding assignments, and carrying out the core safety management functions correctly and efficiently. These principles are dependent both upon management commitment and employee/individual involvement and accountability;
- Ensure the Safety Program is established and integrated throughout the LSST Project;
- Ensure that known hazards are identified, eliminated or controlled within established program risk acceptability parameters;
- Ensure that LSST operations are performed in accordance with applicable project safety requirements and applicable Governmental safety regulations;
- Review and approve safety analysis and safety program documents; and
- Ensure that necessary documents are submitted to Agencies that require them.

6.4 LSST Project Safety Council

A Project Safety Council will be established and will consist of LSST Institutional members as well as independent safety professionals determined by the LSST Director, Project Manager and Safety Manager. The purpose of this council is to consult on safety, health, and environmental issues, provide policy advice, evaluate program effectiveness, and make recommendations to the LSST Director. The Project Safety Council will meet at a minimum yearly, or at appropriate intervals as required and determined by the Council and Safety Manager.

6.5 LSST Team Members

Each member of the LSST team is responsible for integrating safety into their work and supporting the



SHE Plan as established for the work location. LSST staff are encouraged and empowered to understand the work environment and identify designs, procedures and conditions that they consider unsafe, whether specifically addressed in SHE plans or otherwise occurring. Every team member has the authority, without fear of reprimand or penalty, to stop work and seek technical assistance from the Safety Managers for guidance, resolution of safety issues or disputes involving the LSST activity.

7 Design for Safe Development and Operation

The LSST will follow design and construction best practices and comply with the appropriate laws and standards in all aspects of the LSST Observatory system, from the summit in Chile to the archive and data centers in the US. The LSST is a technically and geographically diverse observatory that falls under many categories and jurisdictions of safety standards. This diversity, and the one-of-a-kind nature of the facilities, requires that the Safety Manager, project managers, and engineers work closely to apply the correct safety standard to the different design elements. In all cases designs will be consistent with applicable standards from US, Chilean, International and agency institutions, including

- U.S. Occupational Safety and Health Administration (OSHA),
- Environmental Protection Agency (EPA),
- National Fire Protection Association (NFPA),
- International Code Council (ICC),
- Chilean Regulations, Codes and Standards,
- National Optical Astronomy Observatory Risk Management Policy, and
- Department of Energy National Laboratories.

The coordination between the Safety Manager and engineering staff will be driven by system requirements, the review and Hazard Analysis processes described in this document, and the project Risk Management process. One objective of these processes is to keep the Safety Manager and Council involved in the design process. The design for safety will include the intrinsic design, the manufacturing and construction process, and the resulting operational concepts. As operating procedures are developed for the observatory, job hazard analysis will be included to protect people, equipment, and processes from known hazards.