LLE Safety Overview

• Quality people
• Training
• Procedures
• Audit

+ $C^3I^2$ and Discipline

• Safety
• Effectiveness
Summary

Safe and effective operations require attention to detail and a disciplined approach

- Quality people, written procedures, procedural compliance, and effective supervision/audits are the key to safe and effective operations.

- Safety is a mindset—all accidents are preventable.

- Responsibility for operations, safety, and maintenance must be internalized.

- Thorough incident investigation and follow-up are required to prevent recurrence.
Operating a large technical facility requires technical knowledge and expertise

• Managers must have a detailed technical knowledge.
  – It’s a myth that business management professionals having no technical knowledge can manage a technologically complex operation.

• Operations management is not a textbook acquired skill—it’s acquired through progressive levels of responsibility and mentoring.

• Training should be both theoretical and hands-on—understanding “reasons why” allows people to respond to unusual circumstances.
Operational philosophy must recognize the fallibility of people

- Even the best people make mistakes and have a retention half-life.

![Diagram showing the decline of knowledge, proficiency, or skill over time with retraining points.](image)

- Supervision is not a matter of mistrust; rather, it recognizes that people make mistakes and proficiency decays over time.

- When the consequences of failure are high (e.g., crashing, sinking, etc.), the use of a series of checks/safety features will reduce the probability of failure.
Safety is a mindset—all accidents are preventable

• Accidents are caused by people
  – when they rush or
  – when they are complacent.
  - Failure to engage brain increases the probability of an accident.

• Accident causes attributed to equipment, material, or procedure are really caused by people who
  – inadequately designed equipment, or
  – improperly selected materials for construction, or
  – improperly assembled and/or tested equipment, or
  – improperly operated equipment, or
  – improperly maintained equipment.

Safety is everyone’s business and compliance with safety procedures is MANDATORY.
LLE has a proactive safety program to ensure the safety of personnel and protection of equipment

- LLE’s safety organization has the active support and involvement of top management.
- Operational and safety procedures and training are emphasized.
- All laboratories are inspected every 6 months via monthly inspections by the four assigned safety officers.
- Compliance with safety procedures is mandatory.
- Safety is considered in design, and personal protection is provided through hardware, software, and/or procedures to the maximum extent practical.
- Incidents are investigated and actions taken to prevent reoccurrence.
Incidents must be thoroughly investigated and corrective actions taken to prevent recurrence

• An incident is any event that
  – causes or could have caused significant equipment damage,
  – results in exceeding environment-release limits, or
  – causes personnel to receive hospital emergency room treatment.

• Operations are halted until a determination by management that it is safe to continue.

• The incident is investigated to determine cause and corrective actions.

• An incident report documents the investigation and is used to track completion of corrective actions. The report outline is as follows:
  – description of incident
  – identification of apparent cause (personal, procedure, equipment, or material)
  – corrective actions (immediate, temporary, permanent)
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