

# The USI Process at LLNL

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Oak Ridge National Laboratory

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# LLNL Mission

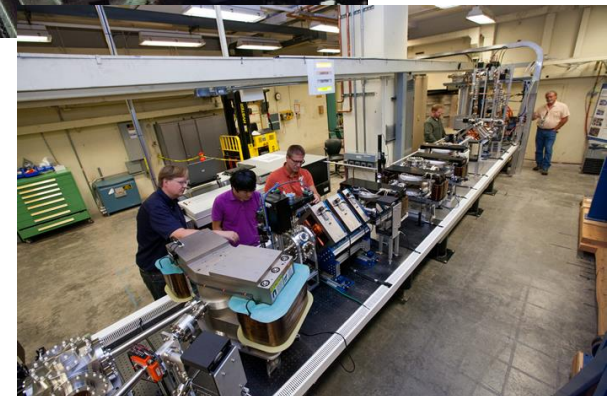
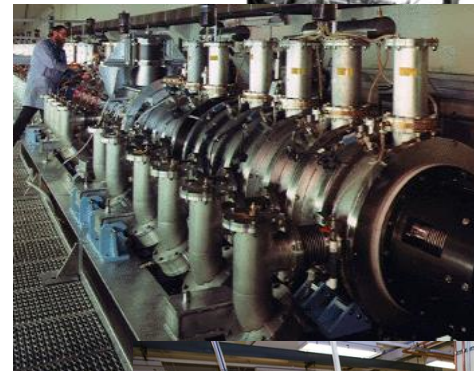
- Biosecurity and advanced biodefense capabilities.
- Counterterrorism, preventing and mitigating incidents involving chemical, biological, radiological, nuclear or high-explosive materials.
- Supporting the Department of Defense with innovative science and technology.
- Energy resources and technology development of while understanding and reducing their environmental impacts.
- Intelligence support to a wide range of sponsors.
- Nonproliferation technical solutions.
- Science to solve pressing national security challenges.
- Safety, security and reliability of the nuclear deterrent stockpile.

LLNL accelerators play key roles in science and stockpile stewardship



# LLNL Accelerators

- Center for Accelerator Mass Spectrometry
  - Pelletron 1.7 MeV
  - Tandem Van de Graaff 10 MV
- Building 235 Materials Science
  - 4 MV Single-Ended Van de Graaff
- Site 300
  - FXR: 18 MeV Flash X-Ray
- Building 194
  - 250 MV LINAC
  - MEGa-Ray Test Station 100 MeV
  - PRISM: Photonuclear Reactions for Isotopic Signature Measurements 60 MeV photon source



# LLNL Accelerator Safety Framework

- ES&H Manual Document 20.1, Occupational Radiation Protection
  - 10 CFR 835 Radiation Protection Program general aspects
  - ALARA review of facility design and individual operations
  - Access control for areas
- ES&H Manual Document 20.3, *LLNL Radiation Safety Program for Radiation Generating Devices*
  - Implements 10 CFR 835 Radiation Protection Program aspects for accelerator facilities and RGDs
  - Facility and device design criteria and access control features
  - Determination of DOE 420.2C applicability
- PRO-0228, *Accelerator Readiness Review Program*
- ES&H Manual Document 3.1, *Nonnuclear Safety Basis Program*
  - Less than DOE Category 3 Facilities and Accelerator Facilities
  - Accelerator Safety Basis – SAD and ASE
  - Change control and Unreviewed Safety Issues

UCRL-AM-133867-VOL-I-PT-3.1-2015

## ES&H manual Environment, Safety, and Health

Volume I

Part 3: Safety Analysis and Work Plans and Procedures



Revisions to this document must go through the Unreviewed Safety Question (USQ) review process before they are approved for implementation and posted on the web.

### Document 3.1 Nonnuclear Safety Basis Program



# LLNL Unresolved Safety Issue Framework

- ES&H Manual Document 3.1, Appendix J, *Change Control Form for Accelerator Facilities*
- Sequential record of USI on an individual building basis.
- Triggered by planned or discovered change to DOE 420.2C accelerator facility structures, systems, components or operations.
  - Individual facilities capture configuration changes, evaluate impacts, and trigger USI as described in their SAD and procedures.
  - Impact to SAD/ASE features and operations will trigger USI.
  - Changes to non-SAD/ASE aspects may trigger USI if
    - Facility personnel conclude they could potentially affect or challenge a credited feature or operation in the SAD/ASE
    - Other changes will be managed by ISM implementation.

Document 3.1

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## Part I Introduction

An unresolved safety issue has been identified resulting from:

- A proposed change of inventory or operations.
- A newly noted potential safety hazard.
- A discovery that previous safety analyses were inadequate.

This evaluation of the safety issue is summarized in the following Parts II through V.

- See attachment for details of analysis and supporting documentation.
- No attachments.

### 1. Issue:

*Describe the information being evaluated and the operation that it affects.*

### 2. References used to perform the safety evaluation:

[Add or remove references as appropriate.]

LLNL EIS/EIR	optional
FSPs, OSPs	
Existing Safety Assessment	

## Part II Impact on the Existing Operation

### 1. Controls and equipment that are affected:

*List existing controls and equipment that are affected by the new information. Identify any of these structures, systems, or components (SSCs) that are essential for protection of the public (required to protect the public or prevent adverse environmental effects) or workers (required to prevent acute worker fatality or serious injuries to workers).*

### 2. New SSC failure modes:

*Describe how the new information changes understanding of the ways in which the existing controls and equipment might fail.*

### 3. List the accidents in the existing safety basis that are controlled by affected SSCs:

*Identify any previously analyzed or considered accidents that are affected by the changed failure modes.*



# LLNL Unresolved Safety Issue Determination

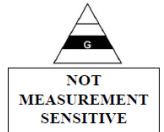
- USI determination is performed by those trained to perform facility safety analysis and is reviewed by facility management.
- USI determination based on analysis of six aspects:
  - Probability of a safety system malfunction increased?
  - Probability or consequences of a previously analyzed accident increased?
  - New type of accident?
  - Safety of operation decreased?
  - New ASEs needed?
  - Changes to the ASEs needed?
- If all six aspects are negative, the facility manager concurs for continued operation.
  - Individual facilities may include specific screening criteria in their approved SAD for significant changes to probability or consequence resulting in positive USI, e.g. dose criteria for shielding changes.
- If any aspect is positive, the authorizing management chain must
  - Approve proceeding with the change
  - Take actions to update the SAD/ASE consistent with the change
  - Ensure readiness prior to implementing the change during operation

# Future Directions

DOE G 420.2-1A:

*“...The contractor’s design review process **should have procedures** that require the lead scientist or the accelerator project manager to ensure that safety reviews are complete for new projects or new experiments, and to ensure that changes to existing accelerator facilities or experiments are reviewed against the assumptions in the SAD...”*

- The LLNL institutional USI process is basic.
- Detailed USI processes are left to individual LLNL accelerator facilities; the facility process may only be documented in the safety analysis.
- An institutional USI procedure or agreed standards for facility USI procedures would fulfill the DOE recommendation and ensure a consistent USI approach.



DOE G 420.2-1A  
8-1-2014

## Accelerator Facility Safety Implementation Guide for DOE O 420.2C, SAFETY OF ACCELERATOR FACILITIES

[This Guide describes suggested nonmandatory approaches for meeting requirements. Guides are not requirements documents and are not to be construed as requirements in any audit or appraisal for compliance with the parent Policy, Order, Notice, or Manual.]



US Department of Energy  
Office of Science

# Questions?







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