

# LESHC PROCEDURE 1.0

(FINAL Rev. 2)

Guidelines and R2A2s for the Laboratory Environment, Safety, and Health Committee, the Safety Assessment Subcommittee, and the Pressure & Cryogenic Safety Subcommittee



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## 1 Purpose and Scope

- 1.1 The Laboratory Environment, Safety and Health Committee (LESHC) is composed of the Safety Assessment Subcommittee (SAS) and the Pressure & Cryogenic Safety Subcommittee (PCSS).
- 1.2 This procedure provides instructions for the LESHC and its Subcommittees in carrying out the review of ESH issues defined in Section 3.

## 2 Membership

- 2.1 Appointed by: Assistant Laboratory Director (ALD) for ESH.
- 2.2 Term: Three years
- 2.3 Members: The membership includes the Chairperson, term members, Secretary and Alternate Secretary.
- 2.4 The charge of the Committee and the current membership are located in the Laboratory's Committee Handbook at <https://sbms.bnl.gov/SBMSearch/LD/ld16/ld16d231.htm>
- 2.5 SAS Member Qualifications – Technical competence for each subcommittee member shall be evidenced by 20 years of employment as a safety professional, scientist, or engineer. A Bachelor of Science degree or greater is required.
- 2.6 PCSS Member Qualifications - Technical competence for each subcommittee member shall be evidenced by 20 years of employment as a safety professional, physicist or mechanical engineer. A Bachelor of Science degree or greater is required. Completion of training in pressure-safety codes identified in 10CFR851 Appendix A is also required.

**NOTE:**

Given the importance of the proceedings of this Committee to Laboratory operations, every effort should be made by members to attend, including schedule/work adjustments by their supervisors.

## 3 Roles, Responsibilities, Accountabilities, and Authorities

### 3.1 Roles

- 3.1.1 The LESHC advises the operating organizations and the ALD for ESH on environmental impact, radiation, pressure safety, cryogenic safety, and general safety and health matters associated with all Laboratory operations.

- 3.1.2 The LESHC provides independent assurance to the ALD for ESH that an in-depth analysis commensurate with the hazards involved has been performed and that a project or facility can function without undue risk to the environment, public, or workers.
- 3.1.3 During the course of implementing its roles and responsibilities, the LESHC is responsible to notify the Laboratory Price Anderson Amendments Act (PAAA) Coordinator of any issue discovered that represents a noncompliance with the 10CFR851, Worker Safety & Health (WS&H) rule or referenced standard, and has a significant or potentially significant impact on worker safety & health. In addition, the Committee is expected to notify the PAAA Coordinator if it has knowledge of any recurring/repetitive lower level WS&H noncompliance that is, in the opinion of the Committee, the result of a deficiency in a Laboratory Safety & Health program or subject area.
- 3.1.4 The SAS reviews facility authorization basis documents.
  - 3.1.4.1 On the basis of this review, the LESHC makes a recommendation to the Deputy Director for Operations (DDO) in accordance with SBMS Subject Areas, such as the “Accelerator Safety” Subject Area.
- 3.1.5 The PCSS advises the operating organizations and the ALD for ESH on pressure safety and cryogenic safety.
  - 3.1.5.1 Pressure equipment is reviewed for compliance with the pressure-safety codes identified in 10CFR851 Appendix A.
- 3.2 Responsibilities
  - 3.2.1 The LESHC shall assist Department Chairs, Division Managers, Associate Laboratory Directors, ALDs, and Deputy Directors who may call upon the Committee to review a specific ESH-related issue.

NOTE:

The following are types of environmental and safety-related activities that the Committee may be called upon to review: audits or appraisals of Laboratory operations affecting safety (e.g., occupational safety and health, cryogenic safety, pressure safety, radiation safety, electrical safety, biosafety, etc.) or the environment and proposed corrective actions; safety-related operational event investigations; generic non-facility-specific unreviewed safety issues; criteria for environment, safety and health for the design and operations of facilities and equipment; plans for implementing operating safety limits; audit and inspection programs; training programs; plans for response to and recovery from major accidents in facilities; and proposed changes in the mode of operation or a facility modification that significantly increases either the probability or consequence of a bounding accident that was described in an authorization document.

- 3.2.2 The LESHHC shall review and make recommendations to the ALD for ESH on proposed changes or modifications to existing facilities significantly affecting safety and environmental protection.
- 3.2.3 Unless senior manager concurrence to do otherwise, the LESHHC shall ensure the traditional laboratory control levels listed in Table 1 are applied in the review of new or modified facilities. For pressure issues, DOE has designated the Lab Director as the ultimate authority for the Committee; for all else, the designated senior manager for the Committee is the ALD ESH.
- 3.2.4 The LESHHC shall review all proposed equivalences to control levels identified in Table 1
- 3.2.5 Should equivalence not be accepted, and a potential variance from regulatory standards (i.e., 10CFR851) is necessary, the LESHHC will follow the procedures in the Worker Safety and Health Program Description for submitting a variance.
- 3.2.6 The SAS shall review and, with the concurrence of the ALD for ESH, make recommendations to the DDO on new projects or facilities for which formal safety analyses are required.
  - 3.2.6.1 The SAS shall review and recommend for approval all new or significantly revised facility authorization basis documents such as: Basis for Interim Operations, Safety Analysis Reports (SARs), Unreviewed Safety Issues, Unreviewed Safety Questions, Safety Assessment Documents (SADs), Accelerator Safety Envelopes (ASEs), or Operational Safety Limits.
- 3.2.7 The PCSS shall review documented designs of cryogenic systems and pressure systems.
  - 3.2.7.1 The PCSS shall review 10CFR851 Appendix A equivalence requests. A minimum of 3 qualified PCSS members will be required to approve or decline approval of the proposed equivalent design.
- 3.2.8 The LESHHC members shall attend meetings, perform independent, in-depth analysis of items presented related to their expertise and carry out site inspections, when appropriate.
- 3.2.9 The LESHHC Secretary shall notify the ALD for ESH and the DDO about LESHHC meetings and recommendations.
- 3.3 Accountabilities
  - 3.3.1 The LESHHC is accountable to the ALD for ESH to provide technical review of ESH issues on new projects or facilities.
  - 3.3.2 The LESHHC is accountable to Deputy Directors, ALDs, Department Chairs, and Division Managers who call upon the Committee to provide technical review of ESH issues.

3.3.3 The LESHC is accountable to the science and support communities to assist them to achieve BSA and organizational ESH expectations in the design of their new or modified research facilities..

#### 3.4 Authorities

3.4.1 The SAS shall recommend for approval Authorization Basis Documents.

3.4.2 The SAS shall recommend for approval Limiting Conditions for Operations and Accelerator Safety Envelopes.

3.4.3 The PCSS shall approve testing, commissioning, operations, and equivalences for pressure and cryogenic systems.

3.4.4 The LESHC, through the ALD for ESH, will advise and act on the Director's behalf in the evaluation of issues and to determine equivalences.

#### 4 Review Procedure

4.1 The LESHC Chairperson shall schedule meetings and convene the LESHC when appropriate.

4.2 The Chairperson may convene the full Committee, the SAS, or the PCSS, as dictated by the subject matter.

4.3 The Chairperson shall decide if the members participating in the review comprise the appropriate technical core for the matter to be deliberated. The Chairperson has the authority to appoint voting ad hoc members to the full committee or either subcommittee when specialized expertise is required.

4.4 ALDs, Department Chairs, or Division Managers can make requests for LESHC reviews via the Project Manager or similar designee.

4.4.1 The role of a [Project Manager](#) is defined in the "R2A2 Profile Titles" Exhibit in the R2A2 Subject Area.

4.4.2 The Project Manager shall forward requests for LESHC evaluations to the Chairperson and provide any necessary documentation to aid in this evaluation.

4.4.3 If the request is appropriate for Committee review, the Chairperson of the LESHC shall contact the Project Manager and schedule a meeting date.

#### 5 Document Submittals

5.1 All documents shall be submitted to the LESHC Chairperson with a copy to the Secretary, preferably 2 weeks prior to the date of the meeting.

- 5.2 The Project Manager shall ensure all applicable departmental level ESH reviews are completed or in process prior to bringing the review to the LESHHC.
- 5.3 For projects that do not require a SAD or SAR, it is recommended that the Project Manager complete the BNL Hazard Identification Tool (HIT) at [http://www.bnl.gov/sbms\\_office/hid/](http://www.bnl.gov/sbms_office/hid/) and forward it to the LESHHC Secretary.
- 5.3.1 For projects that do not require a SAD or SAR, the LESHHC Chairperson shall request document submissions based upon the responses indicated in the BNL HIT that was completed by the Project Manager.
- 5.4 If a PCSS review is required, then the vessels must meet ASME Boiler & Pressure Vessel code and piping code requirements. Submissions to the Subcommittee shall normally consist of the following:
- Physical layout
  - Piping and instrumentation drawings
  - Design parameters including:
    - Maximum design/Allowable working pressures
    - Pressure vessel, piping and component ratings
    - Total quantity of cryogenics
  - Maximum release rate
  - Heat flux
  - Pressure relief capabilities
  - Quench protection description, if appropriate
  - Stress analyses which are appropriate for the particular shape and materials used for custom made equipment
  - Materials used and their suitability for cryogenic temperatures or pressure application
  - Oxygen deficiency hazard classification calculations as per the SBMS Subject Area
  - Test plans and results, if any
  - Operating procedures
  - Emergency procedures
  - Experimental Safety Review(s), draft or final as available
  - Administrative controls of documents that contain stress calculations
  - Documented QA program for the fabrication facility
  - Written fabrication procedures
  - Documented welding procedures and evidence that welding personnel were trained to those procedures
  - Records retention system for all documents pertaining to the pressure vessel's design and construction.
- 5.4.1 When national consensus codes are not applicable because of pressure range, vessel geometry, use of special materials, etc., the Project Manager must implement measures to provide equivalent protection and ensure a level of safety greater than or equal to the level of protection afforded by the ASME or applicable state or local code. In this case,

documentation submittals shall include the following:

- (1) Design drawings, sketches, and calculations that were reviewed and approved by a qualified independent design professional. A documented peer review by a Departmental level committee is acceptable.
- (2) A listing of the qualifications of personnel used to perform examinations and inspections of materials, in-process fabrications, nondestructive tests, and acceptance tests.
- (3) Documents related to traceability and accountability for each pressure vessel or system, including narrative descriptions of design, pressure conditions, testing, inspection, operation, repair, and maintenance (e.g., procedures).

5.5 The LESHHC Chairperson shall ensure that adequate time is allocated for Committee review.

5.6 The Project Manager shall make a presentation to the full LESHHC or the appropriate Subcommittee and submit any additional requested documents for review.

## 6 Decision Making Process

6.1 A quorum shall consist of at least 5 members of the impaneled Committee or Subcommittee, including any impaneled ad hoc members (not including the Secretary or Alternate Secretary,).

6.2 A decision shall consist of a simple majority vote of the Committee members in attendance, including any impaneled ad hoc members. However, for pressure vessel or piping Equivalence Rulings, a minimum of 3 qualified PCSS members are required to approve or decline approval.

6.3 Decisions can be made using an email voting system.

6.4 Committee members shall abstain from voting if there is a real or apparent conflict of interest.

6.5 If there are any dissenting votes, then a minority statement may be recorded by the LESHHC Secretary, along with the decision.

## 7 Documentation

7.1 The LESHHC Secretary or designate shall prepare meeting minutes and publish them as the minutes to be signed by the LESHHC Chairperson and the ALD for ESH, with copies to the LESHHC members, the meeting requestor, and the ALD for ESH.

7.2 The written minutes and materials used during the presentations shall be kept in a dedicated file under the control of the LESHHC Secretary. (Document retention periods will conform to the requirements of the "Records Management" Subject Area.) Copies may be kept on the internet.

- 7.3 Recommendations by the LESHHC that require response by BNL management or staff shall be defined as sequentially numbered Action Items in the meeting minutes.
- 7.4 The master list of Action Items and status shall be kept in a dedicated file under the control of the LESHHC Secretary or in ATS.
- 7.5 The Project Manager shall document the closure of open Action Items to the LESHHC Chairperson with a copy to the Secretary. Documentation of closure can be in a BNL Memorandum, email, or through entries in ATS.
- 7.6 The LESHHC Secretary shall forward the closure documentation to the Committee members for their information.

Table 1 List of Traditional BNL Control Levels Used by the LESHC

This table summarizes the control levels traditionally used by the Laboratory Environment, Safety and Health Committee in the review of designs, SARs, ASEs, or SADs related to new or modified facilities, or to pressure and cryogenic systems.

Control Level	Applicability	Source of Limit	Reason for Control Level
Less than 25 mrem in one year to individuals in BNL Departments or Divisions adjacent to an accelerator or nuclear facility.	New or modified facilities that emit radiation or radioactive airborne materials.	BNL LESHC records.	To ensure that non-trained personnel are kept below 100 mrem in one year from incidental exposure while working at BNL.
Less than 5 mrem per facility in one year to a person located at the site boundary.	New or modified facilities that emit radiation or radioactive airborne materials.	BNL LESHC records.	DOE established 25 mrem per year limit in the 1980s for the general public that requires DOE permission to exceed. The LESHC apportioned 5 mrem per new or modified BNL facility.
Groundwater concentration must not be greater than 5% of the Drinking Water Standard (DWS).	Facilities that cause radioactive liquids to enter or to be created directly in ground water.	SBMS Subject Area for Accelerator Safety.	EPA established rules that require offsite drinking water concentration to not result in 4 mrem or greater to an individual in one year. This BNL control level helps ensure the EPA rule can be met for multiple sources of groundwater contamination on site.
Airborne effluents from facilities shall not result in a dose that exceeds 0.1 mrem in one year to a person at the site boundary.	Facilities that emit airborne radioactive materials.	SBMS Subject Area for Radioactive Emissions.	EPA established rules that require airborne emissions to be continuously monitored if they exceed 0.1 mrem to an individual in one year. This LESHC control level helps ensure the EPA rule can be met.
Less than 500 mrem planned or designed in one year to a trained radiation worker.	New or modified facilities.	BNL RadCon Manual Paragraph 211.	The BNL limit to a trained BNL employee, guest, or user is less than 1250 mrem in one year. To help ensure this limit is not exceeded, the LESHC asks that facilities be planned or designed to 500 mrem per year or less to an individual.

Maximum radionuclide concentration less than 50% of the DWS and maximum tritium concentration less than 25% of the DWS at BNL sanitary sewer Outfall #1, caused by liquid discharges from a facility averaged over a 30-day interval.	All facilities that emit tritium liquid effluents to the sanitary sewer.	SBMS Subject Area for Liquid Effluents.	BNL has chosen to limit the tritium in the sanitary system below the DWS out of concern for stakeholders. Justifications are required if a facility cannot meet this control level.
No more than 20 mrem per fault at an accelerator facility to an individual in an uncontrolled area.	All new or modified accelerators	BNL LESHC records	This is guidance for the design of accelerator facilities since these facilities may be large and encompass areas such as roadways in uncontrolled areas.
Neutron quality factors shall be doubled for designs at new facilities when neutron energy is known. If energy is unknown, then a quality factor of 20 shall be used.	All facilities	BNL RadCon Manual Paragraph 125	Design analyses based on these neutron quality factors are intended to be used to estimate the additional construction cost that would result if the neutron quality factor was increased. The results of these analyses shall be used to ascertain the economic feasibility for incorporating such modifications in the final design.
When national consensus codes are not applicable because of pressure range, vessel geometry, use of special materials, etc., implement measures to provide equivalent protection.	All pressure systems	10CFR851	This is to ensure a level of safety greater than or equal to the level of protection afforded by the ASME or applicable state or local code.

References

BNL SBMS  
 Past LESHC Records  
 BNL RadCon Manual  
 10CFR851