

Princeton Plasma Physics Laboratory

Worker Safety and Health Program

Revision 1c

January 2017

ORIGINAL SIGNED BY J. LEVINE

Jerry D. Levine, Head, Environment, Safety & Health (ES&H) – PPPL

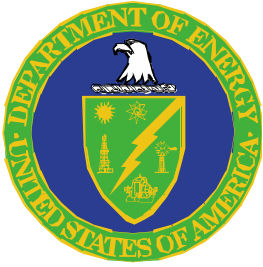
ORIGINAL SIGNED BY S. ZELICK

Stacia A. Zelick, Interim Deputy Director for Operations - PPPL

Worker Safety & Health Program

January 2017 Revision 1c

Revision	Date	Approved By	Description of Revision
1	January 2014	Jerry Levine Adam Cohen DOE-PSO	Revision to incorporate changes to Rev. 0 communicated by letters to DOE-PSO from 2008-13.
1a	January 2015	Jerry Levine Adam Cohen	Minor changes and additions associated with several revised or new PPPL implementing documents. Affected pages are 10, 11, 12, 14, 16, 18, 20, 23, 24, & 28-31.
1b	January 2016	Jerry Levine John DeLooper	Minor changes and additions associated with three (3) revised and one new PPPL implementing documents. Affected pages are 6, 10, 14, 16, 20, 24, 25, 27, 34, 35, 38 & 42.
1c	January 2017	Jerry Levine Stacia Zelick	Minor changes and additions associated with three (3) revised and four (4) new PPPL implementing documents. Affected pages are 6, 9-15, 19, 22, 23, 25-27, 33, 34, 39, 40, 41, 43-45 & 48.



Contents

	<u>Page</u>
1. Introduction and Executive Summary	3
2. PPPL Implementation Processes	5
2.1. Crosswalk between Sections of the Rule and the PPPL Implementing Mechanisms	6
2.2. Summaries of PPPL Implementing Documents for 10CFR851, Subpart C	20
2.3. Listing of Applicable Workplace Safety and Health Requirements Contained or Referenced in §851.23 and §851.27	46
2.4. PPPL Process for Developing Equivalencies Where Allowed by Codes and Standards	48

1. Introduction and Executive Summary

About PPPL

The Princeton Plasma Physics Laboratory (PPPL) is dedicated to developing the scientific and technological knowledge base for fusion energy as a safe, economical, and environmentally attractive energy source for the world's long-term energy requirements.

Princeton University manages PPPL, which is part of the national laboratory system funded by the U.S. Department of Energy through the Office of Science. The number of full-time employees and graduate students is approximately 500, and there are some additional subcontractors and visiting research staff. The Laboratory is sited on 90 acres of Princeton University's James Forrestal Campus, about three miles from the main campus.

Through its efforts to build and operate magnetic fusion devices, PPPL has gained extensive capabilities in a host of disciplines including advanced computational simulations, vacuum technology, mechanics, materials science, electronics, computer technology, and high-voltage power systems. In addition, PPPL scientists and engineers are applying knowledge gained in fusion research to other theoretical and experimental areas, including the development of plasma thrusters and the propagation of intense beams of ions. The Laboratory's Office of Technology Transfer assists industry, other universities, and state and local government in transferring these technologies to the commercial sector.

The Laboratory's graduate education and science education programs provide educational opportunities for students and teachers from elementary school through postgraduate studies.

Purpose

This Worker Safety and Health Program (WSHP) describes an integrated system that complies with the applicable requirements of 10 CFR Part 851, ensures effective implementation of Integrated Safety Management (ISM), and helps to make PPPL a place of employment that is free from recognized hazards that are causing or have the potential to cause death or serious physical harm to workers. The ultimate goal of the program is to provide the management systems that preclude injuries from taking place at the Laboratory. This document is PPPL's written worker safety and health program required by §851.11 to provide the methods for implementing the applicable requirements of Subpart C of 10 CFR 851.

Scope

10 CFR Part 851, Subpart C provides the following essential elements of a Worker Safety and Health Program:

- Defined management and employee safety and health responsibilities;
- Accountability for employee safety and health at all levels of the organization;
- Workers rights and involvement in the safety and health system;
- Hazard assessment processes and hazard identification;
- Hazard prevention and abatement processes;
- Implementation and conformance with applicable safety and health standards;
- Implementation and conformance with policies, procedures and directives developed around specific functional areas (e.g., Construction Safety, Industrial Hygiene, Fire Protection, etc.);
- Training and information to enable the success of employees at all levels in safety and health;
- and
- Reporting and recordkeeping.

To demonstrate compliance with the above elements, this written PPPL Worker Safety and Health Program includes:

- A crosswalk between the mechanisms (policies, procedures, charters, plans and directives) of the PPPL Integrated Safety Management System (ISMS) and the sections of 10 CFR Part 851, Subpart C.
- Summaries of the implementing documents identified in the crosswalk.
- A listing of applicable workplace safety and health requirements contained or referenced in §851.23 and §851.27.
- A description of the PPPL process for developing equivalencies where allowed by Codes and Standards.

2. PPPL Implementation Processes

The requirements in 10 CFR Part 851, §851.10-§851.27, are implemented through the formal documented mechanisms (policies, procedures, charters, plans and directives) of the PPPL Integrated Safety Management System (ISMS). Processes to verify that these requirements are being implemented (and the relevant PPPL documents) include work planning and control policies and procedures (P-001, P-010, ENG-032), line management and safety organization evaluations of the workplace (O-027, O-042, P-084), a formal audit program to evaluate ES&H program implementation (QA-002), and regular senior management review of ES&H systems effectiveness (O-021).

All those conducting work on-site, including employees, students, collaborators and subcontractors, are subject to the requirements of the PPPL ISMS. Subcontractors having responsibilities for performing work at PPPL in furtherance of a DOE mission will be required to conduct such work in compliance with the relevant portions of this Worker Safety and Health Program. This applies to subcontractors that have contracts to perform services (as opposed to merely providing supplies) that have been authorized by DOE at the PPPL site, and excludes vendors, delivery persons and others who do not have such service contracts. Construction contractors will be required to prepare construction project safety and health plans to implement the requirements in §851.24 and 10 CFR Part 851 Appendix A for construction safety, and to have these plans approved by the PPPL Construction Manager.

2.1. Crosswalk between Sections of the Rule and the PPPL Implementing Mechanisms

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.20(a)	Management responsibilities	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • P-003 EHS Policy 	Documents state that line management is responsible and accountable for the safety and health of their workforce. Worker rights and responsibilities are addressed.
851.20(a)(1)	Policy, goals, objectives.	<ul style="list-style-type: none"> • O-021 ES&H Executive Board Charter • O-027 Line Management Safety Organization • P-003 EHS Policy 	These documents contain the policies, goals & objectives, as well as responsibility for their establishment and review.
851.20(a)(2)	Qualified staff.	<ul style="list-style-type: none"> • P-008 Staff Training and Development • O-014 Human Resources Charter • O-042 Environment, Safety & Health Department Charter 	Qualified worker safety & health staff and processes for assuring training and qualifications are addressed.
851.20(a)(3)	Accountability	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • P-084 Management Safety Walkthroughs • P-008 Staff Training and Development 	Program responsibilities and accountabilities, as well as safety performance evaluations are indicated.
851.20(a)(4)	Employee involvement	<ul style="list-style-type: none"> • ESH-004 Job Hazard Analysis • P-083 Lessons Learned and Their Promulgation • P-012 Stop Work Authority • GEN-011 ES&H Deficiency Reporting • P-084 Management Safety Walkthroughs • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • O-022 Safety Review Committee Charter • O-023 Environmental Review Committee Charter • O-024 ALARA Review Committee Charter • O-025 Electrical Safety Committee Charter • O-027 Line Management Safety Organization 	The numerous mechanisms in which workers are involved in the Program are addressed in these documents.

		<ul style="list-style-type: none"> • O-045 Lithium Experts Committee Charter • O-046 Safety Champions Committee Charter 	
851.20(a)(5)	Access to information	<ul style="list-style-type: none"> • P-076 Internal Communications • P-032 Hierarchy of Documents 	These documents define the actions, responsibilities, and forms for employee access to information, including that which is relevant to the worker safety & health program.
851.20(a)(6)	Report events and hazards	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • GEN-011 ES&H Deficiency Reporting • P-012 Stop Work Authority • QA-012 Corrective Action Request 	The indicated policy and procedures address methods by which workers can report job related injuries, illnesses, hazards, etc., including suggestions for improvement, without fear of reprisal.
851.20(a)(7)	Prompt response to reports	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • GEN-011 ES&H Deficiency Reporting 	These documents address providing prompt responses to the reporting in 851.20(a)(6).
851.20(a)(8)	Regular Communication	<ul style="list-style-type: none"> • P-076 Internal Communications • O-027 Line Management Safety Organization 	Regular staff communications on workplace safety and health are covered in these documents.
851.20(a)(9)	Stop work authority	<ul style="list-style-type: none"> • P-012 Stop Work Authority 	This document provides the process by which any employee, subcontractor, visitor or other individual at PPPL can stop work.
851.20(a)(10)	Inform worker of rights	<ul style="list-style-type: none"> • P-003 EHS Policy 	This policy addresses informing workers of their rights and responsibilities, including posting a DOE–designated worker protection poster in the workplace.
851.20(b)	Worker rights and responsibilities	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • P-003 EHS Policy • P-012 Stop Work Authority 	Worker rights and responsibilities are addressed in these documents.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.20(b)(1)	Participate on official time	<ul style="list-style-type: none"> • GEN-011 ES&H Deficiency Reporting • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • ESH-004 Job Hazard Analysis • P-012 Stop Work Authority 	These documents provide for worker participation in Program activities on official time.
851.20(b)(2)	Access to information	<ul style="list-style-type: none"> • P-032 Hierarchy of Documents • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • P-076 Internal Communications • OMO-001 Medical Services Policy • Personal Practices Manual 	Worker access to information cited in §851.20(b)(2)(i)-(vi) are addressed in these documents.
851.20(b)(3)	Notification of monitoring results	<ul style="list-style-type: none"> • ES&HD 5008 Section 8, Chapter 3 Chemicals in Laboratories • ES&HD 5008 Section 8, Chapter 8 Noise Control and Hearing Conservation 	Worker notification of chemical and noise monitoring results are addressed in these ES&H Manual chapters.
851.20(b)(4)	Observe monitoring	<ul style="list-style-type: none"> • ES&HD 5008 Section 8, Chapter 1 Chemicals 	Worker observation of monitoring is covered in this document.
851.20(b)(5)	Accompany inspections	<ul style="list-style-type: none"> • P-003 EHS Policy 	Worker participation in DOE enforcement inspections is covered in this document.
851.20(b)(6)	Results of inspections and investigations	<ul style="list-style-type: none"> • P-003 EHS Policy 	This document addresses worker requests for results of inspections and accident investigations.
851.20(b)(7)	Express concerns	<ul style="list-style-type: none"> • GEN-011 ES&H Deficiency Reporting • O-027 Line Management Safety Organization 	The process for worker's to express concerns related to safety and health are covered in these documents.
851.20(b)(8)	Decline to perform in imminent risk	<ul style="list-style-type: none"> • P-012 Stop Work Authority 	P-012 indicates the process for stopping work that is believed to pose imminent risk to any worker, including the individual that would perform the work.
851.20(b)(9)	Stop work	<ul style="list-style-type: none"> • P-012 Stop Work Authority 	P-012 indicates the process for stopping work that exposes any worker to imminent danger or serious hazards.
851.21(a)	Identify and assess	<ul style="list-style-type: none"> • P-001 Graded Approach 	The processes and

	risk	<ul style="list-style-type: none"> • P-048 Safety Analysis and Review System Program • ESH-004 Job Hazard Analysis • ESH-014 NEPA Review System • P-084 Management Safety Walkthroughs • ENG-032 Work Planning Procedure • ESH-025 Operations Hazard Classification Criteria and Safety Certification System 	procedures for identifying and assessing safety risks are addressed in the listed documents.
851.21(a)(1)	Assess workers exposures	<ul style="list-style-type: none"> • ES&HD 5008 Section 8, Chapter 1 Chemicals • ES&HD 5008 Section 8, Chapter 2 Carcinogens, Mutagens, and Teratogens • ES&HD 5008 Section 8, Chapter 3 Chemicals in Laboratories • ES&HD 5008 Section 8, Chapter 8 Noise Control and Hearing Conservation 	Processes for assessing worker exposures to workplace hazards at PPPL are developed in these Safety Manual chapters.
851.21(a)(2)	Document hazard assessment	<ul style="list-style-type: none"> • ES&HD 5008 Section 8 Industrial Hygiene 	This section of the Safety Manual addresses documenting hazard assessments.
851.21(a)(3)	Record results	<ul style="list-style-type: none"> • ES&HD 5008 Section 8, Chapter 3 Chemicals in Laboratories • ES&HD 5008 Section 8, Chapter 8 Noise Control and Hearing Conservation 	Recording of observations, testing and monitoring results can be found in these Safety Manual chapters.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.21(a)(4)	Analyze designs for potential hazards	<ul style="list-style-type: none"> • ENG-032 Work Planning Procedure • ESH-014 NEPA Review System • P-048 Safety Analysis and Review System • ENG-008 Failure Modes and Effects Analysis • P-039 Hazard Analysis and Controls • ESH-025 Operations Hazard Classification Criteria and Safety Certification System • ES&HD 5008 Section 5, Chapter 4 Environmental and Public Protection • P-010 Design Reviews 	The indicated policies, procedures and Safety Manual chapters define processes for analyzing potential safety hazards of designs for new and modified facilities and equipment.
851.21(a)(5)	Evaluate operations, procedures, and facilities	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • O-042 Environment, Safety & Health Department Charter • ES&HD 5008 Section 5, Chapter 2 Management and Administration • ES&HD 5008 Section 5, Chapter 5 Fire Safety Assessments • QA-002 PPPL Audit Program • P-084 Management Safety Walkthroughs 	The processes for evaluation of existing operations, procedures and facilities for workplace hazards are addressed in these documents.
851.21(a)(6)	Job activity-level hazard analysis	<ul style="list-style-type: none"> • ESH-004 Job Hazard Analysis 	ESH-004 is the PPPL procedure for performing job and activity level hazards analyses.
851.21(a)(7)	Review safety and health experience	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • O-021 ES&H Executive Board Charter • QA-017 PPPL Issues Tracking System 	These documents address PPPL's systems for effectively analyzing safety and health (including accident experience) information, including regular reviews by senior Lab management.
851.21(a)(8)	Consider other hazards	<ul style="list-style-type: none"> • ESH-014 NEPA Review System • P-048 Safety Analysis and Review System • ENG-008 Failure Modes and Effects Analysis • ESH-025 Operations Hazard Classification Criteria and Safety Certification System • ESH-004 Job Hazard Analysis 	Implementation of the processes defined in these documents includes consideration of interactions among hazards relevant to PPPL.
851.21(b)	Closure facilities hazard identification	NOT APPLICABLE	There are no closure facilities at PPPL.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.21(c)	Hazard Identification Schedule	<ul style="list-style-type: none"> • ESH-025 Operations Hazard Classification Criteria and Safety Certification System • P-084 Management Safety Walkthroughs • QA-002 PPPL Audit Program 	Continuous hazard identification and assessment of operations and activities are addressed in the indicated documents.
851.22(a)	Hazard prevention and abatement	<ul style="list-style-type: none"> • QA-002 PPPL Audit Program • P-012 Stop Work Authority • QA-017 PPPL Issues Tracking System • GEN-011 ES&H Deficiency Reporting 	General hazard prevention and abatement processes are covered in these documents.
851.22(a)(1)	During design or procedure development	<ul style="list-style-type: none"> • ENG-032 Work Planning Procedure • P-013 Use of Procedures • P-010 Design Reviews • P-039 Hazard Analysis and Controls 	The indicated policies and procedure address the prevention and abatement of hazards identified during the design phase and during procedure development.
851.22(a)(2)	Existing hazards	<ul style="list-style-type: none"> • O-027 Line Management Safety Organization • P-001 Graded Approach 	Responsibilities for abatement of workplace hazards, as well as Lab policy for applying a graded approach to prioritization of hazards and their abatement, are covered.
851.22(b)	Hierarchy of controls	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls 	PPPL policy on the hierarchy of hazard controls selection is addressed in this policy document.
851.22(b)(1)	Substitution	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls 	See 851.22(b)
851.22(b)(2)	Engineering	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls 	See 851.22(b)
851.22(b)(3)	Work practices and administrative	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls 	See 851.22(b)
851.22(b)(4)	Personal protective equipment	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls • ES&HD 5008 Section 8, Chapter 6 Personal Protective Equipment 	See 851.22(b). The Safety Manual chapter covers specific requirements for various types of PPE.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.22c	Purchasing equipment, products, and services	<ul style="list-style-type: none"> • P-072 Procurement Assurance (ES&H, Quality and Technical Requirements) • ES&HD 5008 Section 8, Chapter 13 ES&H Review of Procurements 	Safety hazards, and the requirements for their mitigation, must be addressed when requesting procurement of services, chemicals, equipment, hardware or software, per the indicated documents.
851.23(a)(1)	10 CFR 850 Chronic Beryllium Disease Prevention Program	NOT APPLICABLE	No work is conducted at PPPL that could result in occupational exposures to Beryllium.
851.23(a)(2)	29 CFR 1904.4-1904.11, 1904.29-1904.33, 1904.44, and 1904.46	• ES&HD 5008 Section 9, Chapter 10 Accident Investigation	This Safety Manual chapter addresses OSHA's requirements for recordkeeping and reporting of occupational injuries and illnesses, as established by 29 CFR 1904.
851.23(a)(3)	29 CFR 1910 excluding 1910.1096 ionizing radiation	<ul style="list-style-type: none"> • ESHD 5008 Environment, Safety & Health Manual • ISMS • Emergency Preparedness Plan • ESH-004 Job Hazard Analysis • ENG-021 Hoisting and Rigging Program • ENG-023 Electrical Equipment Approval • OMO-003 Bloodborne Pathogens Exposure Control Plan • OMO-008 Hearing Conservation Program • P-073 Bloodborne Pathogens • P-107 Approval of Electrical Equipment and Electrical Installations • OMO-001 Medical Services Policy • Personal Practices Manual • ES-MECH-07 Hoisting and Rigging Engineering Standard • ES-MECH-016 Design, Construction, Determination & Inspection of Anchorages. 	Implementation of the OSHA general industry standards are covered in the PPPL Safety Manual, ISM System Description, and in the other documents shown.

851.23(a)(4)	29 CFR 1915 Shipyard Employment	NOT APPLICABLE	No shipyards at PPPL
851.23(a)(5)	29 CFR 1917 Marine Terminals	NOT APPLICABLE	No marine terminals at PPPL
851.23(a)(6)	29 CFR 1918 Safety and Health Regulations for Longshoring	NOT APPLICABLE	No longshoring performed at PPPL
851.23(a)(7)	29 CFR 1926 safety and health regulations for construction	<ul style="list-style-type: none"> • ES&HD 5008 Section 1 Construction Safety • ES-MECH-016 Design, Construction, Determination & Inspection of Anchorages. 	The safety manual chapter includes the requirements of the OSHA construction safety regulations and the Engineering Standard covers requirements for fall arrest anchors.
851.23(a)(8)	29 CFR 1928 Occupational Safety and Health Standards for Agriculture	NOT APPLICABLE	No agriculture activities performed at PPPL
851.23(a)(9)	American Conference of Governmental Industrial Hygienists "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (2005)	<ul style="list-style-type: none"> • ES&HD 5008 Section 8 Industrial Hygiene • ES&HD 5008 Section 9, Chapter 4 Manual Lifting 	ACGIH TLVs are referenced throughout relevant chapters of ESHD 5008 Section 8. The Safety Manual chapter on Manual Lifting requires using the ACGIH TLV tables for repetitive mono-lifting.
851.23(a)(10)	ANSI Z88.2 "Respiratory Protection" (1992)	• ES&HD 5008 Section 8, Chapter 7 Respiratory Protection	The PPPL respiratory protection program described in the Safety Manual chapter complies with and references ANSI Z88.2-1992.
851.23(a)(11)	ANSI Z136.1 "Safe Use of Lasers" (2000)	• ES&HD 5008 Section 3 Laser Safety	The laser safety program described in this Safety Manual chapter is based on ANSI Z136.1-2000.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.23(a)(12)	ANSI Z49.1 "Safety in Welding, Cutting, and Allied Processes" sections 4.3 and E4.3 (1999)	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 15 Welding, Cutting and other Hot Work 	This Safety Manual chapter establishes compliance with ANSI Z49.1, "Safety in Welding, Cutting and Allied Processes," (1999).
851.23(a)(13)	NFPA 70 "National Electric Code" (2005)	<ul style="list-style-type: none"> • ES&HD 5008 Section 2 Electrical Safety • P-107 Approval of Electrical Equipment and Electrical Installations • ENG-023 Electrical Equipment Approval 	Section 2 of the Safety Manual codifies the Laboratory's electrical safety requirements in accordance with NFPA 70 and 70E. The policy and procedure provide the criteria and process for approving electrical equipment and installations.
851.23(a)(14)	NFPA 70E "Standard for Electrical Safety in the Workplace" (2004)	<ul style="list-style-type: none"> • ES&HD 5008 Section 2 Electrical Safety • P-107 Approval of Electrical Equipment and Electrical Installations • ENG-023 Electrical Equipment Approval 	Section 2 of the Safety Manual codifies the Laboratory's electrical safety requirements in accordance with NFPA 70 and 70E. The policy and procedure provide the criteria and process for approving electrical equipment and installations.
851.23(b)	Additional safety & health requirements	<ul style="list-style-type: none"> • P-039 Hazard Analysis and Controls • P-048 Safety Analysis and Review System Program • P-108 Safe Use of Cellular Phones & Other Mobile Electronic Devices • O-042 Environment, Safety & Health Department Charter • ESH-004 Job Hazard Analysis • ESH-014 NEPA Review System • ESH-025 Operations Hazard Classification Criteria and Safety Certification System • ENG-032 Work Planning Procedure • ES&HD 5008 Environment, Safety & Health Manual 	These documents address the establishment and maintenance of requirements and controls to protect the safety and health of workers from hazards in the workplace. These requirements and controls include both those derived from the standards indicated in §851.23(a), and others determined to be relevant and necessary by PPPL.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.24	Functional Areas: (Appendix A)		
	1. Construction Safety	<ul style="list-style-type: none"> • ES&HD 5008 Section 1 Construction Safety • P-072 Procurement Assurance (ES&H, Quality and Technical Requirements) • ENG-006 Preparation, Review & Approval of Specifications & Statements of Work 	Section 1 of the Safety Manual includes the requirements in the construction safety area of Appendix A that must be implemented by construction contractors. These requirements are implemented for construction contractors per P-072 and ENG-006.
	2. Fire Protection	<ul style="list-style-type: none"> • ES&HD 5008 Section 5 Fire Protection 	This Safety Manual chapter describes the PPPL Fire Protection Program that complies with applicable building codes and National Fire Protection Association (NFPA) codes and standards. This program consists of both fixed fire protection systems and a full time onsite Emergency Services Unit.
	3. Explosives Safety	NOT APPLICABLE	Explosive materials are not used at PPPL.
	4. Pressure Safety	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 11 Pressure Systems • ES-MECH-015 Pressure Systems Program 	This Safety Manual chapter outlines the policy and procedures for the safe design, specification, assembly, testing, installation, inspection, maintenance, repair and operation of pressure vessels, containments and systems. The Engineering Standard specifies requirements for pressure systems and pressure relief devices.
	5. Firearms Safety	NOT APPLICABLE	Firearms are not used at PPPL.
	6. Industrial Hygiene	<ul style="list-style-type: none"> • ES&HD 5008 Section 8 Industrial Hygiene 	PPPL's comprehensive Industrial Hygiene Program is found in Section 8 of the PPPL Safety Manual.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.24	Functional Areas: (Appendix A)		
	7. Biological Safety	NOT APPLICABLE	Work with biological etiological agents and biological select agents is not conducted at PPPL.
	8. Occupational Medicine	<ul style="list-style-type: none"> • OMO Procedures • PPPL Personal Practices Manual, Benefits Section • O-021, ES&H Executive Board Charter 	These documents address the PPPL occupational medicine program, including inclusion of the Occupational Medicine Head as a resource member of the ES&H Executive Board.
	9. Motor Vehicle Safety	<ul style="list-style-type: none"> • PPPL Parking and Traffic Regulations • P-108 Safe Use of Cellular Phones & Other Mobile Electronic Devices • ES&HD 5008 Section 9, Chapter 8 Forklifts, Work Platforms, and Special Purpose Vehicular Requirements • ES-MECH-010 Forklifts and Walkies • ES-MECH-011 Special Purpose Vehicles and Equipment • ES-MECH-010 Manlifts • ENG-021 Program for Hoisting and Rigging, Forklifts, Manlifts, Special Purpose Vehicles, Utility Vehicles and Portable Equipment 	The PPPL motor vehicle safety requirements, including those for powered industrial equipment, are addressed by the indicated documents. The engineering standards (ES-MECH-XXX) provide more details on equipment inspection, testing, maintenance and the training of operators.
	10. Electrical Safety	<ul style="list-style-type: none"> • ES&HD 5008 Section 2 Electrical Safety • P-049 Authorization for Work on Electrical Systems • P-107 Approval of Electrical Equipment and Electrical Installations • ENG-023 Electrical Equipment Approval 	The Safety Manual section covers regulations, practices, and procedures to control and minimize the hazards associated with electrical systems and equipment. The policies and procedures provide information on qualified electrical personnel, and the criteria and process for approving electrical equipment and installations.
851.25(a) 851.25(b) 851.25(c)	Training and Information	<ul style="list-style-type: none"> • P-008 Staff Training and Development • ES&HD 5008 Section 8, Chapter 10 Training 	These documents address provision of worker safety and health training and information commensurate with the hazards involved with their work activities and responsibilities.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.26(a)(1)	Recordkeeping and reporting of hazard inventory, hazard assessments, exposure measurement, and exposure controls	<ul style="list-style-type: none"> • ES&HD 5008 Section 8 Industrial Hygiene 	Employee exposure assessments and documentation are addressed in various chapters of the Safety Manual section.
851.26(a)(2)	Accurate Recordkeeping and reporting of work-related injuries and illnesses	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • OMO-014 Work Related Injuries and Illnesses 	These documents address recording and reporting of work related injuries and illnesses in accordance with 29 CFR 1904 and DOE Manual 231.1-1A.
851.26(a)(3)	Recordkeeping and reporting compliant with applicable occupational injury and illness recordkeeping standards	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • OMO-014 Work Related Injuries and Illnesses 	These documents address recording and reporting of work related injuries and illnesses in accordance with 29 CFR 1904 and DOE Manual 231.1-1A.
851.26(a)(4)	Record Retention	<ul style="list-style-type: none"> • GEN-023 Records Management • ES&HD 5008 Section 9, Chapter 10 Accident Investigation 	Records retention in general, and with regards to injury/illness recordkeeping and reporting in particular, are addressed in these documents.
851.26(b)(1)	Report and Investigate injuries and illnesses	<ul style="list-style-type: none"> • GEN-006 Investigation and Follow-up of Adverse Events and Conditions • ES&HD 5008 Section 9, Chapter 10 Accident Investigation • OMO-014 Work Related Injuries and Illnesses 	Reporting and investigation of accidents, injuries and illnesses are addressed in these documents.

Rule Section		PPPL Worker Safety and Health Program	
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.26(b)(2)	Analyze related data for trends and lessons learned	<ul style="list-style-type: none"> • P-083 Lessons Learned and Their Promulgation • GEN-006 Investigation and Follow-up of Adverse Events and Conditions 	These policies and procedures address analysis of data from accidents and incidents for trends and lessons learned that could be used to improve operations.
851.27(b)(1)	ANSI Z88.2 "Respiratory Protection" (1992)	<ul style="list-style-type: none"> • ES&HD 5008 Section 8, Chapter 7 Respiratory Protection 	This Safety Manual chapter establishes a Respiratory Protection Program per ANSI Z88.2-1992.
851.27(b)(2)	ANSI Z136.1 "Safe Use of Lasers" (2000)	<ul style="list-style-type: none"> • ES&HD 5008 Section 3 Laser Safety 	This Safety Manual section establishes PPPL's laser safety program, which is based on ANSI Z136.1-2000.
851.27(b)(3)	ANSI Z49.1 "Safety in Welding, Cutting, and Allied Processes" sects 4.3 & E4.3 (1999)	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 15 Welding, Cutting and other Hot Work 	This Safety Manual chapter establishes guidelines and responsibilities for the elimination or control of health and safety hazards commonly associated with welding, cutting, and other hot work in compliance with ANSI Z49.1-1999.
851.27(b)(4)	NFPA 70 "National Electric Code" (2005)	<ul style="list-style-type: none"> • ES&HD 5008 Section 2 Electrical Safety • P-107 Approval of Electrical Equipment and Electrical Installations • ENG-023 Electrical Equipment Approval 	Section 2 of the Safety Manual codifies the Laboratory's electrical safety requirements in accordance with NFPA 70 and 70E. The policy and procedure provide the criteria and process for approving electrical equipment and installations.
851.27(b)(5)	NFPA 70E "Standard for Electrical Safety in the Workplace" (2004)	<ul style="list-style-type: none"> • ES&HD 5008 Section 2 Electrical Safety • P-107 Approval of Electrical Equipment and Electrical Installations • ENG-023 Electrical Equipment Approval 	Section 2 of the Safety Manual codifies the Laboratory's electrical safety requirements in accordance with NFPA 70 and 70E. The policy and procedure provide the criteria and process for approving electrical equipment and installations.

Rule Section	PPPL Worker Safety and Health Program		Rule Section
Section Number	Section Subject	PPPL Implementation Mechanism(s)	Brief Summary (Details in Section 2.2)
851.27(b)(6)	American Conference of Governmental Industrial Hygienists "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" (2005)	<ul style="list-style-type: none"> • ES&HD 5008 Section 8 Industrial Hygiene • ES&HD 5008 Section 9, Chapter 4 Manual Lifting 	ACGIH TLVs are referenced in applicable chapters of Safety Manual Chapter 8. The Safety Manual chapter on Manual Lifting requires using the ACGIH TLV tables for repetitive mono-lifting.
851.27(b)(7)	ASME Boiler and Pressure Vessel Code, sections I through XII including applicable Code Cases (2004)	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 11 Pressure Systems • ES-MECH-015 Pressure Systems Program 	This Safety Manual chapter requires that all pressure vessels, boilers, air receivers, and supporting piping systems are to conform to relevant codes and standards, including applicable ASME Boiler and Pressure Vessel Code (2004) sections, applicable ASME B31 (Code for Pressure Piping) standards, and the strictest applicable state and local codes. The Engineering Standard specifies requirements for pressure systems and pressure relief devices, including compliance with applicable ASME codes.
851.27(b)(8)	ASME B31 (ASME Code for Pressure Piping)	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 11 Pressure Systems • ES-MECH-015 Pressure Systems Program 	See 851.27(b)(7).
851.27(b)(9)	DOE Manual 231.1-1A, Environment, Safety and Health Reporting Manual, September 9, 2004	<ul style="list-style-type: none"> • ES&HD 5008 Section 9, Chapter 10 Accident Investigation 	This documents addresses recording and reporting of work related injuries and illnesses in accordance with DOE Manual 231.1-1A.
851.27(b)(10)	DOE Manual 440.1-1A, DOE Explosives Safety Manual, CRD (Att 2), January 9, 2006	NOT APPLICABLE	Explosive materials are not used at PPPL.

2.2. Summaries of PPPL Implementing Documents for 10CFR851, Subpart C

P-001 Graded Approach to Work Planning and Control (851.21(a), 851.22(a)(2))

This policy makes each department responsible for applying the appropriate graded approach to its work on a case-by-case basis for specific activities and projects, and in accordance with the Work Planning and Control (WP&C) requirements specified in the policy. Once the potential hazards of the job or activity are identified, the graded approach will assist in assessing the risk of injury or illness to workers. The graded approach takes into consideration several factors including the relative importance of safety, safeguards, security, and quality, the magnitude of any hazard or risk involved, and the adequacy of existing safety documentation. Supervisors are responsible for assigning work consistent with the graded approach and WP&C requirements, and employees are responsible for performing work safely with sufficient activity work planning using the WP&C requirements to avoid mishaps and hazards.

P-003 Environmental, Health, and Safety Policy (851.20(a), 851.20(a)(1), 851.20(a)(10), 851.20(b), 851.20(b)(5), 851.20(b)(6))

This policy makes ES&H a line responsibility extending throughout the organization to all Laboratory management, employees, students, subcontractors, collaborators and visitors. Specific responsibilities are described in the PPPL Integrated Safety Management System description and defined in the following referenced documents:

- O-042 Environment, Safety & Health (ES&H) Department Charter
- O-027 Line Management Safety Organization

This policy also addresses worker rights and responsibilities, participation in DOE enforcement inspections, and requests for results of inspections and accident investigations.

P-008 Staff Training and Development (851.20(a)(2), 851.20(a)(3), 851.25(a), 851.25(b), 851.25(c))

PPPL's Staff Training and Development policy requires employees to have the knowledge, skills and abilities necessary to perform their jobs competently, efficiently, and safely with due regard for health concerns, the environment, and quality. The policy holds line management accountable for ensuring that workers complete required training in ES&H prior to performing affected work duties, and ensures that PPPL use qualified individuals to direct and manage the worker safety and health program. The PPPL staff includes Environment, Safety and Health (ES&H) professionals who support the safety and health efforts, a Fire Protection Engineer to ensure fire protection requirements are implemented to protect the

PPPL facilities, and trained security and emergency response personnel to ensure policies and procedures are in place and effective to protect the property and people from intruders and emergency situations. The Staff Training and Development policy holds the Office of Human Resources responsible for providing General Employee Training (GET) to inform workers of their rights and responsibilities. The policy makes employees responsible for participating in and completing training required for their assigned jobs, including qualification or certification where required.

P-010 Design Reviews (851.21(a)(4), 851.22(a)(1))

PPPL's Design Review policy assigns responsibility to line management to assure that appropriate design reviews are conducted to assure safety of systems. The ES&H requirements are identified in the earliest design review stage. All requirements are satisfied in the final design review to identify hazards either in the facility design or during the development of procedures and controls. Design Review Boards are established for design reviews, consisting of a Chairperson, cognizant person, and independent engineers, technicians, or physicists. When warranted, others are invited including ES&H, QA, and subject-matter experts from both inside and outside of the Laboratory.

P-012 Stop Work Authority (851.20(a)(4), 851.20(a)(6), 851.20(a)(9), 851.20(b), 851.20(b)(1), 851.20(b)(8), 851.20(b)(9), 851.22(a))

PPPL's Stop Work Authority policy states that in the event that any employee, subcontractor, visitor or other individual at PPPL becomes aware of an activity that creates an imminent danger to an individual, property and/or the environment (i.e., impending injury, hazard, accident, or damage to the environment), that employee, subcontractor, visitor or other individual has the authority and responsibility to require that the work which is creating the danger be immediately stopped. Individuals who receive a notification to stop work must comply with that request immediately. Employees or other individuals who are capable of doing so should place the system/hardware in a safe shutdown status as part of the stop work.

P-013 Use of Procedures (851.22(a)(1))

This PPPL policy establishes that procedures describing systems or methods to accomplish a specific task or work activity be developed using a graded approach considering:

- The work activities importance
- Possible hazards associated with the work activity involving personnel, facilities and the environment
- The cost of the work activity

When hazards are identified during the design or procedure development, procedures developed will be commensurate with the risk and eliminate or control the hazard.

P-032 Hierarchy of Documents (851.20(a)(5), 851.20(b)(2))

This policy describes the PPPL document hierarchy. Laws, regulations, standards, and contractual commitments are interpreted and incorporated into the Laboratory’s hierarchical system of documents. All employees have access to information relevant to the worker safety and health program. The Laboratory's policies, procedures, plans and department manuals, as well as relevant DOE Directives, are available to all employees in electronic format via the PPPL intranet web site.

P-039 Hazard Analysis and Controls (851.21(a)(4), 851.22(a)(1), 851.22(b), 851.22(b)(1), 851.22(b)(2), 851.22(b)(3), 851.22(b)(4))

As equipment used at PPPL may pose potential hazards to PPPL employees, visitors, property and the environment, if the potential hazards are not eliminated or controlled in some manner, this policy requires that the hazards be analyzed and the appropriate method of prevention be taken. The methods of prevention include:

- Engineering changes
- Energy barriers
- Safety barriers
- Warning devices
- Administrative controls

Using more than one method of prevention will enhance the level of protection from the potential hazards. The potential hazards are usually identified through the use of JHA’s (ESH-004) or other analyzing methods identified in PPPL procedure ESH-025, Operations Hazard Classification Criteria and Safety Certification System.

P-048 Safety Analysis and Review System Program (851.21(a), 851.21(a)(4), 851.21(a)(8))

This policy establishes the objectives of the Safety Analysis and Review System Program, which is designed to:

- Assure that potential hazards involved in the activities or new design are identified systematically.
- Assure potential consequences are analyzed.
- Assure that reasonable measures are taken to eliminate, control or mitigate the hazards identified.
- Assure there is documented management authorization of the activities.

The NEPA Review system (ESH-014) and the PPPL Operations Hazard Classification Criteria (ESH-025) are utilized to help assure that the requirements of this policy are met.

P-049 Authorization for Work on Electrical Systems (851.24 – Electrical Safety)

This policy establishes that the design, construction, installation, maintenance and decommissioning of electrical systems be completed and performed by qualified personnel in a manner to minimize hazards that could impact personnel safety or equipment damage. The requirements established in ESHD 5008 Section 2 on Electrical Safety must be followed.

P-072 Procurement Assurance (ES&H, Quality and Technical Requirements) (851.22c, 851.24 – Construction Safety)

This policy makes the individual (requisitioner) requesting procurement of any service, hardware, or software, regardless of procurement method (purchase order, subcontract, open order, basic ordering agreement (BOA) job orders, blanket purchase agreements (BPAs), or procurement card) responsible for assuring that the service, hardware, or software meets PPPL ES&H, quality and technical requirements. Responsibilities of the requisitioner and Princeton Technical Representative, when designated, include ensuring the ES&H, quality and technical requirements are specified, and overseeing subcontractor activities to ensure compliance with the requirements and assist in interpreting requirements of the work.

P-073 Bloodborne Pathogens Policy (851.23(a)(3))

This policy establishes that PPPL will comply with the requirements of 10CFR851 and OSHA 1910.1030 (Bloodborne Pathogens). Employees with the expected potential for exposure to bloodborne pathogens while doing all or portions of their jobs are included in the Bloodborne Pathogens Program. The policy objective is fulfilled by following the Occupational Medicine Procedure OMO-003, Bloodborne Pathogens Exposure Control Plan.

P-076 Internal Communications (851.20(a)(5), 851.20(a)(8), 851.20(b)(2))

PPPL's Internal Communications policy defines the actions and the responsibilities necessary to insure the open and frequent flow of information to and from employees at PPPL and to foster more effective and harmonious relationships. The policy emphasizes the importance of communication and establishes principles of regular communication, including on safety and health matters, through multiple methods including bulletin boards, safety meetings, PPPL documents, and information on the PPPL website.

P-083 Lessons Learned and Their Promulgation (851.20(a)(4), 851.26(a)(3))

This policy provides a mechanism to involve workers in the development of the worker safety and health program by encouraging them to identify opportunities to share lessons learned from their experiences. This PPPL policy also establishes a method to effectively communicate with all employees on safety, health and accident prevention through the lessons learned process. Employees may share lessons-learned information through the use of the PPPL publications, staff meetings, small group meetings, e-mail, or other means. The policy requires the PPPL Lessons Learned Program Coordinator (or designee) to direct lessons learned reports with safety (or other) issues relevant to the Laboratory to specific managers and supervisors, and assign action items for evaluation and/or other actions to these individuals with specific time periods for resolution.

P-084 Management Safety Walkthroughs (851.20(a)(3), 851.20(a)(4), 851.21(a), 851.21(a)(5), 851.21c)

PPPL's Management Safety Walkthroughs policy establishes a format to involve all levels of the organization in the identification and control of hazards in the workplace. This policy describes the program for Management Safety Walkthroughs, which are done periodically of all areas to evaluate safety conditions, to observe ongoing work practices and procedures, to identify and assess risk, and to follow up on previous safety violations. Corrective actions are developed for any issues identified, and the Actions are tracked until complete. Through this mechanism, employees and management are evaluated and held accountable for their safety and health performance.

P-107 Approval of Electrical Equipment and Electrical Installations (851.23(a)(3), 851.23(a)(13), 851.23(a)(14), 851.24 – Electrical Safety, 851.27(b)(4), 851.27(b)(5))

This policy establishes the requirement that electrical equipment and electrical installations must be approved prior to use at PPPL or on PPPL fabricated equipment for use at outside facilities. The policy specifies requirements associated with such approvals, including use of Nationally Recognized Testing Laboratory (NRTL) equipment and components whenever available, and processes for approving non-NRTL equipment and new construction and installations of electrical equipment (see also procedure ENG-023).

P-108 Safe Use of Cellular Phones & Other Mobile Electronic Devices (851.23(b), 851.24 – Motor Vehicle Safety)

This policy prohibits the use of cell phones and other mobile electronic devices (e.g., tablets) while operating non-automated machinery, while operating vehicles, or when assigned as a fire or confined space entry watch or fall protection safety monitor, except in the event of an emergency. The policy also reinforces the PPPL Parking, Traffic & Bicycle Regulations prohibition on use of hand-held cell phones and/or texting while driving.

O-014 Human Resource Charter (851.20(a)(2))

The Office of Human Resources provides the necessary Human Resource systems and tools to recruit, employ and retain the staff necessary to achieve the Laboratory's missions. This work involves developing policies, procedures, information, and training which help PPPL managers and supervisors provide fair, timely and consistent supervision, and ensure a positive and supportive work environment. The Office of Human Resources provides support for executive education, management development & supervisory training, as well as training administration and course development for safety & technical training.

O-021 Environmental, Health, and Safety Executive Board Charter (851.20(a)(1), 851.21(a)(7), 851.24 – Occupational Medicine)

The ES&H Executive Board, reporting to the Director, is the Laboratory's advisory committee for Environment, Safety and Health (ES&H) issues, and is the highest level policy and review committee for Laboratory ES&H functions. It is responsible for evaluating the effectiveness of the ES&H program. The ES&H Executive Board is made up of senior Laboratory managers, and is supported by Resource Members from various groups. The Board is also supported by six (6) resource subcommittees that review the programs that control Environment, Safety and Health issues. The subcommittee chairs attend and present at the ES&H Executive Board meetings.

The ES&H Executive Board fulfills these responsibilities by:

- Evaluating the effectiveness of ES&H systems as implemented by PPPL line management on an ongoing basis and conducting an annual review.
- Concurring with selected policies to ensure uniformity and consistency of ES&H activities throughout PPPL.
- Establishing and overseeing the Resource Subcommittees.
- Establishing ES&H goals on an annual basis.

- Evaluating effectiveness of ES&H activities by reviewing Audit Reports, Self Assessment Reports (internal and external), monthly Tracking/Trending Reports, Occurrence Reports, and any other investigations or information involving PPPL ES&H systems.
- Maintaining minutes of meetings, including approvals of any documentation.

O-022 Safety Review Committee Charter (851.20(a)(4))

The Safety Review Committee (SRC) is a resource subcommittee of the Environment, Safety, and Health (ES&H) Executive Board and is a source for expertise to Laboratory projects and departments. The SRC provides another mechanism for employee participation and communication. It is responsible for reviewing a variety of documentation, evaluating safety related data, and providing information, comments, and recommendations on Laboratory safety concerns to the ES&H Executive Board. Members are nominated for specific terms from among the various Departments around PPPL, including research, engineering and operations representatives with a goal of including a variety of staff levels and backgrounds.

O-023 Environmental Review Committee Charter (851.20(a)(4))

The Environmental Review Committee (ERC) is a resource subcommittee of the ES&H Executive Board and is a source for expertise to Laboratory projects and departments. The ERC provides another mechanism for employee participation and communication. The ERC is responsible for reviewing and approving various forms of documentation, including Environmental Assessments (EAs), and for providing information on Laboratory environmental issues, the Environmental Management System and ISO 14001 certification to the Board.

O-024 ALARA Review Committee Charter (851.20(a)(4))

PPPL’s ALARA Review Committee (ALARARC) is a resource subcommittee of the ES&H Executive Board and is a source for expertise to Laboratory projects and departments. The multi-disciplined committee provides a mechanism for employee participation and communication. The ALARARC is responsible overseeing the processes to ensure radiation exposures are as low as reasonably achievable and for making recommendations to the Board to improve progress toward minimizing radiation exposure and radiological releases. Line organizations are ultimately responsible for ALARA activities, and this subcommittee provides a link to the work force with respect to radiological work being planned and performed.

O-025 Electrical Safety Committee Charter (851.20(a)(4))

PPPL’s Electrical Safety Committee is a resource subcommittee of the ES&H Executive Board and is a source for expertise to Laboratory projects and departments. The Electrical Safety Committee provides

another mechanism for employee participation and communication. The Electrical Safety Committee is responsible for providing information on Laboratory electrical safety concerns to the ES&H Executive Board, providing periodic assessments of the effectiveness of the PPPL electrical safety program elements, recommending approval of Engineering Standards that pertain to electrical safety, and reviewing various forms of documentation pertaining to electrical safety as requested by the ES&H Executive Board or Responsible Line Managers.

O-027 Line Management Safety Organization (851.20(a), 851.20(a)(1), 851.20(a)(3), 851.20(a)(4), 851.20(a)(7), 851.20(a)(8), 851.20(b), 851.20(b)(7), 851.21(a)(5), 851.22(a)(2))

This mission statement makes clear that PPPL line management is responsible and accountable for the safety and health of their workforce. The Laboratory Director has the ultimate responsibility for the safe operation of PPPL facilities. The line organization within PPPL, which includes all employees, is responsible for implementing the systems established to comply with Environment, Safety, and Health (ES&H) requirements. Specific responsibilities are outlined for all PPPL Employees, Department and Division Heads, Supervisors, Area Coordinators, Facility Managers and the ES&H Department (responsibilities of the latter are covered in more detail in O-042).

The PPPL Line Management Safety Organization mission statement establishes worker rights and responsibilities and ensures employee involvement in ES&H issues. Employees are encouraged and have a right to express their concerns or recommendations related to worker safety and health, without reprisal, via the supervisory chain, all the way to the Director if necessary. Facility Managers are responsible for responding promptly to ES&H concerns expressed by employees. Supervisors and Facility Managers are responsible for regularly communicating safety and health matters to employees.

The PPPL Line Management Safety Organization mission statement establishes manager and employee responsibilities for identifying and assessing hazards. Specific responsibilities and tasks are outlined for management and employees in evaluating current and existing operations, procedures, and facilities to identify workplace hazards.

O-042 Environment, Safety & Health Department Charter (851.20(a)(2), 851.21(a)(5), 851.23(b))

The role of the Environment, Safety & Health (ES&H) Department includes providing active leadership of the Laboratory's ES&H Programs (including application of Integrated Safety Management, ISM) for preventing occupational injuries and illnesses and minimizing worker exposure to workplace hazards. The Safety Division, which is part of the ES&H Department, provides independent oversight of line management activities related to the PPPL ES&H program; provides industrial hygiene and industrial safety support, construction safety reviews, electrical safety reviews, laser and other non-ionizing safety

reviews, coordination of management safety walkthroughs, and performance of safety analyses; establishes, recommends and maintains ES&H policy, procedures, guidance, and interpretations; promotes an understanding and implementation of sound ES&H principles and management systems in engineering and scientific activities; provides lessons learned reports to staff on injuries, illnesses and safety events that occur at PPPL and other facilities, and assigns action items to individuals for follow up, where necessary; provides safety related training in cooperation with the Office of Human Resources; and analyzes safety data for trends and works with line organizations to promote positive trends and develop proposed corrective actions for negative safety trends.

O-045 Lithium Experts Committee Charter (851.20(a)(4))

PPPL's Lithium Experts Committee is a resource subcommittee of the ES&H Executive Board and is a source for expertise to Laboratory projects and departments. The Lithium Experts Committee provides another mechanism for employee participation and communication. It is responsible for advising the ES&H Executive Board on safe aspects of using lithium in support of PPPL experiments and overall fusion energy development. Its responsibilities include providing expertise for reviewing safety aspects of PPPL lithium activities, and for evaluating improved approaches for safe lithium handling; reviewing the safety aspects of proposed new experiments using lithium, and significant modifications to existing lithium experiments; and promoting the development of improved approaches to lithium handling.

O-046 Safety Champions Committee Charter (851.20(a)(4))

The Safety Champions Committee is a resource subcommittee of the ES&H Executive Board. The Committee advises the Board on ES&H program implementation in the field and suggests actions for improvement. In addition, the individual committee members provide feedback at their Department meetings. Members are chosen from among non-supervisors in various Departments around PPPL, including research, engineering and operations representatives. Meetings are also attended by a "Safety Champion" appointed from the ES&H Executive Board. This Committee serves as an additional conduit for engaging workers and learning of safety issues, implementation concerns or opportunities for improvement from the perspective of those conducting the work in the field. The committee will provide expertise/input on ways to implement programs and actions at PPPL; promote the development of improved ES&H programs; and review feedback on issues raised, results of surveys and other indicators of the strength of the PPPL safety culture.

O-048 Emergency Management Review Committee Charter (851.20(a)(4))

The Emergency Management Review Committee is a resource subcommittee of the ES&H Executive Board that focuses on the Emergency Management program at PPPL and compliance with DOE O 151.1C. The EMRC is a resource for emergency management program expertise to Laboratory projects

and departments. The Committee assesses and makes recommendations for improving emergency management program performance, including assessing and adopting "best" industry practices; reviews emergency management plans and procedures; and reviews key facets of performance including trends, findings, and recommendations.

GEN-006 ES&H Deficiency Reporting (851.26(b)(1), 851.26(b)(2))

This procedure is used to report, investigate, analyze and develop corrective actions for adverse events and conditions that occur as a result of Laboratory operations. PPPL employees, subcontractors, visitors or other individuals are responsible for identifying issues that may require correction, improvement, or management attention; and for reporting any adverse event or condition. The Laboratory conducts investigations and causal analysis of adverse events and conditions to: prevent recurrence; improve safety, health, and environmental protection systems; and promote efficiency, compliance, and effectiveness of Laboratory operations. The depth and formality of investigations and analysis is based on the categorization of the severity or potential severity of an event or condition. Individuals who lead investigations or perform formal causal analyses must be appropriately trained.

GEN-011 ES&H Deficiency Reporting (851.20(a)(4), 851.20(a)(6), 851.20(a)(7), 851.20(b)(1), 851.20(b)(7), 851.22(a))

PPPL's ES&H Deficiency Reporting procedure provides a mechanism to involve workers and management in the worker safety and health program through identifying hazards in the workplace during normal day-to-day operations, safety walkthroughs or safety meetings. The policy stresses that all lab employees and subcontractors have the right and responsibility to report ES&H hazards. Reporting of environment, safety, and health hazards allows the Laboratory to take appropriate and timely corrective and preventative actions. The methods for reporting include direct notification of the employee, supervisor or Facility Manager performing or responsible for the activity or location where the hazard exists; completing and submitting the deficiency reporting forms; or identifying the issue by telephone, email, or via the web-based Safety Or Suggestions (SOS) box (anonymously if desired).

GEN-023 Records Management (851.26(a)(4))

The PPPL Records Management procedure provides record retention requirements for laboratory activities including accident reporting (e.g., for injury and illness events). The records management procedure also establishes consequences for individuals that willfully and unlawfully destroy, remove or obliterate PPPL records. PPPL implements a distributed system for records management, and this procedure establishes that each department or project head is responsible for appointing an individual who will be the records coordinator for that group.

QA-002 PPPL Audit Program (851.21(a)(5), 851.21c, 851.22(a))

PPPL's Audit Program establishes a procedure to formally evaluate systems or programs throughout the entire laboratory including ES&H programs, policies, and procedures. The deficient audit findings are tracked until completion.

QA-012 Corrective Action Request (851.20(a)(6))

PPPL's Corrective Action Request (CAR) procedure provides an additional mechanism to involve workers and enable workers to request corrective actions be taken for deficiencies that were:

- Not corrected through the deficiency reporting process.
- Due to a breakdown in implementation of a program.
- Repetitive in nature.

The procedure details the responsibilities and actions of employees and managers in issuing CARs.

QA-017 PPPL Issues Tracking System (851.21(a)(7), 851.22(a))

This procedure is used by PPPL to track information related to environment, safety and health, and quality issues identified by Laboratory processes or programs (e.g., assessments, event investigations, management safety walkthroughs, etc.), or by external audits or assessments performed upon PPPL. The issues being tracked are presented to management to help determine if the areas are assigned the necessary priorities to ensure that issues are being resolved in a timely and effective manner.

ENG-006 Preparation, Review & Approval of Specifications & Statements of Work (851.24 – Construction Safety)

This procedure provides requirements and guidance for the development, review and approval of specifications and Statements of Work (SOWs), which are typically used for on-site and off-site work including collaborations, work for others, subcontracted work, and purchased items and services. These documents must include applicable environment, safety and health (ES&H) requirements, including specific requirements cited in ESHD 5008 Section 1 (based on §851.24-Construction Safety) for construction contractors.

ENG-008 Failure Modes and Effects Analysis (851.21(a)(4), 851.21(a)(8))

PPPL's Failure Modes and Effects Analysis (FMEA) procedure establishes methods to analyze designs of new facilities and modifications of existing facilities and equipment for potential workplace hazards. FMEA's consider the interaction between workplace hazards and other hazards such as radiological hazards. FMEA's can be used as part of the Safety Analysis Review System. The procedure assigns responsibilities for completing the FMEA and provides performance guidelines.

ENG-021 Program for Hoisting and Rigging, Forklifts, Manlifts, Special Purpose Vehicles, Utility Vehicles and Portable Equipment, and ES-MECH-07 Hoisting and Rigging Standard (851.23(a)(3), 851.24 – Motor Vehicle Safety (ENG-021))

This procedure and Standard describe the requirements for mechanical hoisting operation where rigging is required on the PPPL site, lift equipment inspection testing and maintenance, training and qualification for operating/using any lift equipment and procurement of rigging equipment or services. ENG-021 also describes the responsibilities and authorities for Forklifts, Manlifts, Special Purpose Vehicles, Utility Vehicles and Portable Equipment.

ENG-023 Electrical Equipment Approval (851.23(a)(3), 851.23(a)(13), 851.23(a)(14), 851.24 – Electrical Safety, 851.27(b)(4), 851.27(b)(5))

This procedure, which implements Policy P-107, provides the criteria and the process for the evaluation, review, and acceptance of electrical equipment and installations at PPPL and its collaborations where applicable. Electrical equipment and electrical installations rated at 50 Volts or higher or 1000 Watts or higher must be approved prior to use at PPPL or on PPPL fabricated equipment for use at outside facilities per Nationally Recognized Testing Laboratory (NRTL) labels or listings, or by the approval of the Authority Having Jurisdiction (AHJ) at PPPL. This procedure includes inspection, approval, and labeling steps and documentation for electrical equipment and installations that must be approved by the AHJ.

ENG-032 Work Planning Procedure (851.21(a), 851.21(a)(4), 851.22(a)(1))

PPPL's Work Planning Procedure provides criteria by which work planning will proceed by:

- integrating safety into all work planning
- organizing the avenues by which changes will be planned, prepared, reviewed, implemented, and documented into a systematic whole
- providing activity level work planning and control
- providing key cross references to other lab procedures to expedite the planning process.

This procedure is used to plan the anticipated requirements of a job, to define the scope of work, to perform hazards analysis, to provide for all environment, safety, health and security issues as part of the work planning and review process, to establish procedural and testing requirements, to make other determinations as necessary, and to provide clear approvals indicating ownership of the work. The Work Planning Form and system is implemented electronically and is available via the PPPL Employee Website. A graded approach is used to assess the level of risk, which is managed with ascending levels

of required approval based on a standard, serious, or major category of risk as it pertains to mission and programmatic impact, ES&H, Cost, and Compliance factors.

ES-MECH-010 Forklifts and Walkies (Functional Area---Motor Vehicle Safety) (851.24 – Motor Vehicle Safety)

This Engineering Standard covers the requirements for the operation of material handling equipment defined as forklifts and walkies (Powered Industrial Trucks per OSHA), equipment inspection, testing, maintenance, procurement and the training of forklift operators. Only properly trained and qualified operators are permitted to operate forklifts or walkies at PPPL. This standard addresses the reduction of the hazards of operating this equipment through the use of defined controls such as proper design, maintenance, and use of mechanical devices; care and common sense; proper training and supervision; and the careful adherence to approved work and safety procedures. The standard includes the use of Operator's Daily Check Lists (ODCLs) to verify that equipment can be safely operated prior to use.

ES-MECH-011 Special Purpose Vehicles and Equipment (Functional Area---Motor Vehicle Safety) (851.24 – Motor Vehicle Safety)

This Engineering Standard covers the requirements for the operation of Special Purpose Vehicles (Skid Steer and Backhoe), Utility Vehicles and Special Purpose Equipment (Ditch Witch, Vehicle Attachments and Portable Equipment), equipment inspection, testing, maintenance and the training of operators of these types of equipment. Only trained qualified operators are permitted to operate Special Purpose Equipment at PPPL. This standard addresses the reduction of the hazards of operating special purpose vehicles and equipment through the use of defined controls such as proper design, periodic inspection, maintenance, and use of mechanical devices; care and common sense; proper training and supervision; and the careful adherence to approved work and safety procedures. The standard includes the use of Operator's Daily Check Lists (ODCLs) to verify that equipment can be safely operated prior to use.

ES-MECH-012 Manlifts (Functional Area---Motor Vehicle Safety) (851.24 – Motor Vehicle Safety)

This Engineering Standard covers the requirements for the safe operation of powered and manually operated manlifts, as well as equipment inspection, testing, maintenance, procurement and the training of operators for this type of equipment. Only qualified operators are permitted to operate manlifts at PPPL. This standard addresses the reduction of the hazards of operating manlifts through the use of defined controls such as proper design, periodic inspection, maintenance, and use of mechanical devices; care and common sense; proper training and supervision; and the careful adherence to approved work

and safety procedures. The standard includes the use of Operator's Daily Check Lists (ODCLs) to verify that equipment can be safely operated prior to use.

ES-MECH-015 Pressure Systems Program (Functional Area—Pressure Safety) (851.24 – Pressure Safety, 851.27(b)(7), 851.27(b)(8))

This Engineering Standard specifies an inspection and testing program for all pressure relief systems that are required under the provisions of the PPPL ES&H Manual Section 9, Chapter 11 "Pressure Systems". This standard also provides minimum requirements for design, installation, inspection, testing, maintenance and repair of pressure systems, including compliance with applicable ASME codes.

ES-MECH-016 Design, Construction, Determination and Inspection of Anchorages (851.23(a)(3), 851.23(a)(7))

This Engineering Standard provides the criteria for designing, constructing, inspecting and maintaining anchorages to support people that use personal fall arrest or fall restraint systems, specifically body harnesses. It applies to both outdoor and indoor installations for compliance with OSHA requirements (29CFR1910 and 29CFR1926), as well as relevant ANSI standards for personal fall arrest systems. This Engineering Standard also addresses anchorage posting requirements, and required training for anchor users.

ESH-004 Job Hazard Analysis (851.20(a)(4), 851.20(b)(1), 851.21(a), 851.21(a)(6), 851.21(a)(8))

This procedure on Job Hazard Analyzes (JHAs) provides for a formal approach to identify the steps of a task, the hazards of each step in the task, and the actions necessary (e.g., engineering, administrative, or personal protective equipment (PPE)) to mitigate or control each potential hazard identified. The JHA's provide a mechanism to involve workers in the analysis of task level jobs.. This procedure provides direction on when JHA's are required, who reviews them, where they are maintained, and how to perform a JHA. While NEPA reviews (see section below on procedure ESH-014) identify general ES&H issues and control measures in the early stages of proposed activities, the JHA is performed at the task level when the activity has matured to the point where detailed steps and procedures have been identified.

ESH-014 NEPA Review System (851.21(a), 851.21(a)(4), 851.21(a)(8))

PPPL's NEPA Review System procedure provides a system to identify potential environment and safety hazards involved in new or continuing activities, the potential consequences and the appropriate measures to control or eliminate the hazards. The procedure assigns responsibilities and actions to personnel to assure compliance with the National Environmental Policy Act of 1969. The procedure provides a NEPA planning form (which includes a checklist) that facilitates employees to consider

planned unique (one time) and generic (continuing) activities for ES&H impacts such as radiological waste, fire safety, hazardous waste, etc. at an early stage of development, and to plan for their elimination or control.

ESH-025 Operations Hazard Classification Criteria and Safety Certification System (851.21(a), 851.21(a)(4), 851.21(a)(8), 851.21(c), 851.23(b))

This procedure establishes the process for classifying new operations (i.e., projects or experimental devices) as to their hazard level, thereby indicating the required control actions to be performed and to specify the approval level required to commence the operation. This classification process is a key component of our Graded Approach as it determines the analysis methods used to identify existing and potential workplace hazards, assess the risk of associated worker's injuries and illnesses, and analyze designs of new facilities and modifications to existing facilities and equipment for potential workplace hazards. PPPL uses job hazard analyses (JHAs) for low hazard operations, Project Hazard Analyses or Safety Assessment Documents (SADs) for moderate hazard operations, and SADs for high hazard operations. High hazard operations must be reviewed and approved by the ES&H Executive Board (including issuance of a Safety Certificate) prior to commencement of operation, and this procedure also establishes a system to require, issue, review, and control Safety Certificates.

OMO-001 Medical Services Policy (851.20(b)(2), 851.23(a)(3), 851.24 – Occupational Medicine)

This document addresses the policies of the Laboratory on Occupational Medicine services, maintenance and availability of medical records, and the qualifications of medical staff members. It provides reference to OSHA 29 CFR 1910.1020, Employee Access to Exposure and Medical Records, which informs the employees of their rights to review and receive a copy of their personal medical records and exposure records that are representative of their personal workplace exposures. Per this reference, the Occupational Medicine Office (OMO) will maintain records pertaining to personal injury and illness in compliance with OSHA standard 29 CFR 1910.1020. The OMO also affects the non-work related side of employee health by providing information to laboratory employees to promote an awareness of well-being and a healthful life-cycle.

OMO-002 Occupational Medicine Plan (851.24 – Occupational Medicine)

This plan outlines the objectives of the Occupational Medicine Office (OMO); OMO services offered to employees, non-employees and management; and communications and interactions among the OMO, ES&H Department, and the Office of Human Resources.

OMO-003 Bloodborne Pathogens Exposure Control (851.23(a)(3), 851.24 – Occupational Medicine)

The purpose of the Exposure Control Plan is to eliminate or minimize the occupational exposure to Bloodborne Pathogens in accordance with OSHA 1910.1030, Occupational Exposure to Bloodborne Pathogens. The plan identifies the job titles that have the expected potential exposure to Bloodborne Pathogens. The plan accounts for methods to control exposures (work practices, personal protective equipment, etc), a Hepatitis B Vaccination Program, post exposure evaluation procedure, post exposure investigations, training, and recordkeeping.

OMO-004 Crane Operator Annual Physical (851.24 – Occupational Medicine)

This document outlines the required medical testing of crane operators, in accordance with DOE standards.

OMO-005 Employee Termination Procedures (851.24 – Occupational Medicine)

This document describes the procedural steps for medical testing of terminating employees.

OMO-006 Emergency Services Preplacement (851.24 – Occupational Medicine)

This document outlines the required pre-placement and annual medical testing of firefighters, in accordance with NFPA and DOE standards.

OMO-007 Hazwoper Clearance (851.24 – Occupational Medicine)

This document outlines the required medical testing of hazardous waste operators, in accordance with OSHA regulations for Hazardous Waste Operations.

OMO-008 Hearing Conservation Program (851.23(a)(3), 851.24 – Occupational Medicine)

This occupational medicine program is a supplement to ESHD 5008 Section 8, Chapter 8 (Noise Control and Hearing Conservation). This program defines the responsibilities and the procedures for implementing and maintaining the PPPL audiometric testing program.

OMO-009 Laser Operation Eye Examination (851.24 – Occupational Medicine)

This procedure describes the required steps for medical examinations to establish and document the condition of a worker's eyes at the commencement of laser use assignment and to document the status following incidents of possible or obvious exposure and again at termination of potential exposure at PPPL. The procedure applies to persons who operate or who are to be present during operation of class IIIB or class IV laser devices and laser systems, or any laser / laser system which requires a written laser safe operating procedure (LSOP). It applies also to persons who may perform maintenance and/ or repair procedures on these systems.

OMO-010 Lead Surveillance (851.24 – Occupational Medicine)

This document outlines the requirements for medical testing of workers who have been or may be exposed to lead during their work activities, in accordance with pertinent OSHA regulations.

OMO-011 Respirator Clearance Physical (851.24 – Occupational Medicine)

This document outlines the required medical testing for wearers of respirators, in accordance with OSHA regulations for Respiratory Protection.

OMO-012 Substance Abuse Random Urine Testing Procedure (851.24 – Occupational Medicine)

This document outlines the steps required for random drug testing of personnel in the Substance Abuse Program Testing Designated Positions (TDP). The procedure also contains relevant recordkeeping and confidentiality requirements.

OMO-013 Tuberculosis Prevention/ Control (851.24 – Occupational Medicine)

The purpose of this procedure is to educate the OMO and Emergency Services Unit (ESU) staff on Tuberculosis (TB), and to implement effective work practices and test screen persons at higher risk of exposure to TB on a pre-placement and an annual basis. PPPL is considered to be a low risk facility for TB infection.

OMO-014 Work Related Injuries and Illnesses (851.24 – Occupational Medicine, 851.26(a)(2), 851.26(a)(3), 851.26(b)(1))

When an injured person reports to the Occupational Medicine Office for evaluation and treatment, this procedure establishes responsibilities for the OMO professional in regards to the injury report form, notifying the insurance carrier, notifying the employee supervisor of work status and notifying the ES&H Department so recordkeeping requirements under 29 CFR 1904 and DOE M 231.1-1A can be completed as necessary.

PPPL Personnel Practices Manual, Benefits Section (851.20(b)(2), 851.23(a)(3), 851.24 – Occupational Medicine)

This section of the Laboratory's Personnel Practices Manual contains details on the OMO services; information on obtaining medical services; evaluations of the work relatedness of injuries and associated recordkeeping and reporting; return to work evaluations; physical examinations at employment termination; medical certification program; OMO involvement in new hires, employee job transfers and establishing job requirements; obtaining medical certifications when required by a job; medical surveillance programs; work site evaluations; employee notifications; placement of employees on physical limitations; treatment of non-occupational medicine problems; and maintenance of medical records.

Emergency Preparedness Plan (851.23(a)(3))

The PPPL Emergency Preparedness Plan (EPP) provides a description of the overall program to control and ameliorate emergency conditions at the Laboratory. The EPP includes information on the site and facilities, the PPPL emergency response organization, off-site response organizations, emergency classification levels, radiological emergencies, emergency facilities and equipment, and readiness assurance. In addition, the supplements to the EPP address details on call-ups and notifications, hazard surveys, emergency plan implementing procedures, emergency equipment and facilities, the readiness assurance plan, and the public information program.

ESHD 5008 Environment, Safety and Health (ES&H) Manual (851.23(a)(3))

Environment, Safety & Health Directive 5008 is PPPL's ES&H Manual. It provides detailed requirements for ES&H topics of relevance to PPPL, including those necessary to comply with applicable regulatory requirements such as those of OSHA (i.e., 29 CFR Parts 1910 and 1926). General areas covered that are relevant to 10CFR851 include: construction safety, electrical safety, laser safety, fire protection, industrial hygiene, occupational safety, and operations hazard criteria/safety certification.

ESHD 5008 Section 1 Construction Safety (Functional Area---Construction Safety) (851.23(a)(7), 851.24 – Construction Safety)

This section includes requirements for Construction Contractors to prepare construction project safety and health plans to implement the requirements in 10 CFR Part 851 Appendix A for construction safety, and to have these plans approved by the PPPL Construction Manager. These requirements include: preparing Job Hazard Analyses (per PPPL procedure ESH-004) and documentation of protective measures; identifying designated competent persons; ensuring workers are aware of foreseeable hazards and protective measures and are subject to disciplinary actions if safe work practices are not followed;

maintaining a designated representative on construction projects who performs inspections of the worksite and identifies/corrects non-compliances with health and safety requirements; and instructing workers to report hazards not previously identified or evaluated to the designated representative for correction, work stoppage, or other appropriate actions.

ESHD 5008 Section 2 Electrical Safety (Functional Area—Electrical Safety) (851.23(a)(13), 851.23(a)(14), 851.24 – Electrical Safety, 851.27(b)(4), 851.27(b)(5))

This section covers regulations, practices, and procedures to control and minimize the hazards associated with electrical systems and equipment. The section applies to all personnel directly engaged in work processes performed on electrical systems and equipment at the Laboratory during the life cycle of its facilities and projects. The PPPL Electrical Safety requirements meet the applicable electrical safety codes and standards including National Electrical Code (NEC)-National Fire Protection Association (NFPA) No. 70, Occupational Safety and Health Act (OSHA) standards, and NFPA 70E - Standard for Electrical Safety Requirements for Employee Workplaces.

ESHD 5008 Section 3 Laser Safety (851.23(a)(11), 851.27(b)(2))

This section establishes PPPL's laser safety program, which is based on the latest edition of the American National Standard Institute, Inc. (ANSI) Z136.1, "Safe Use of Lasers, (2000). The PPPL Laser Safety Program assigns responsibilities for employee laser safety to management, employees and the Laser Safety Officer with the responsibilities varying by class of lasers. The PPPL program provides guidance on safety training, medical surveillance, laser personal protective equipment, laser warning signs, safe work practices, and a standard format for laser safe operating procedures (LSOPs). In addition, a Laser Operations Permit, which provides written permission from the Laser Safety Officer, is required to operate any Class 3b or Class 4 laser system.

ESHD 5008 Section 5 Fire Protection Program (Functional Area—Fire Protection) (851.24 – Fire Protection)

This section describes PPPL's Fire Protection Program, which complies with applicable building codes and National Fire Protection Association (NFPA) codes and standards (as documented in ESHD 5008 Section 5). The objectives of the PPPL Fire Protection Program are to:

- Take all reasonable actions to prevent fires from occurring.
- Design and maintain all PPPL facilities in a manner that provides occupants with the earliest notification of an emergency and proper means of egress to safely exit.
- Design and maintain facilities to minimize the spread of fire.
- Provide manual fire fighting response capability through staffing of an onsite fire department.

- Train personnel working or visiting at PPPL in fire prevention techniques and actions to be taken in event of fire or other type of similar emergency.

PPPL's fire protection program includes fixed fire detection and suppression systems and a full time onsite Emergency Services Unit. Nearly 100% of the facility is protected by automatic fire suppression systems. The onsite Emergency Services Unit is staffed 24-7 and equipped based on the information gained by a needs assessment and an operation basis document.

The Facilities and Site Services Division and the Site Protection Division are responsible for the administration of the Fire Protection Program. Others with specific responsibilities for the Fire Protection Program include the Fire Protection Engineer (within the Facilities and Site Services Division), Line Management, the QA Division and Human Resources.

- Fire Protection Engineer is responsible for providing guidance for the Fire Protection Program by interpreting codes, standards, and DOE orders; reviewing designs that affect fire systems; Fire Hazard Analysis; performing inspections and tests; evaluating compliance with the Fire Protection Program; fire investigation; reviewing and processing exemption/equivalency proposals; participating in QA audits; and interfacing with external audits and assessments of the Program.
- Facilities and Site Services Division is responsible for the installation, maintenance, documentation, and inspection of fire protection systems. This includes ensuring that fire protection equipment (except that maintained by the Emergency Services Unit, ESU), is maintained in full operating condition, and for initiating corrective action when repairs or maintenance are required.
- Site Protection Division is responsible for the development and implementation of the PPPL Emergency Preparedness Plan; providing adequate resources to address fire, medical, and other emergencies and providing support to the Facilities and Site Services Division, via personnel, for testing and inspections; reviewing designs that affect fire systems; and maintaining fire fighting equipment.
- Line Management is responsible for providing and maintaining the necessary staff and resources for implementation and documentation of the fire protection program in accordance with applicable DOE, Federal, State, and Local requirements.
- QA Division is responsible for conducting assessments of the Fire Protection Program and for tracking and trending results of internal and external assessments.
- Human Resources (with subject matter expert support from Site Protection and/or Facilities and Site Services) is responsible for the development and implementation of training programs dealing with the fire protection program.

ESHD 5008 Section 5, Chapter 2 Management and Administration (851.21(a)(5))

The Management and Administration chapter of the PPPL ES&H Manual section on Fire Protection establishes the responsibilities for administration of the Fire Protection Program, and provides information on obtaining fire protection exemptions and equivalencies, as well as current listings of exemptions and equivalencies at PPPL. Responsibilities include evaluation of facilities, operations and activities to assure that fire risks are maintained at acceptable levels.

ESHD 5008 Section 5, Chapter 4 Environmental and Public Protection (851.21(a)(4))

PPPL's Environmental and Public Protection chapter of the PPPL ES&H Manual section on Fire Protection establishes that facility operating procedures and technical specifications must address the fire protection features of the facility that are required for safe operation. This chapter requires that Fire Hazard Analyses (FHAs), using a graded approach, must be conducted for all hazard category 1, 2, and 3 nuclear facilities, facilities that represent unique fire safety risks, and for new facilities or major modification to existing facilities with value greater than \$150 million, or when directed by the responsible DOE authority. The FHAs must identify the fire hazards and the fire protection features required for safe operation and mitigation of the potential fire hazards and resulting damage.

ESHD 5008 Section 5, Chapter 5 Fire Safety Assessments (851.21(a)(5))

PPPL's Fire Safety Assessments are done every two years. The assessments look at program related elements, facility related elements and a combination of the two elements. The assessments are done by professionals with the appropriate level of knowledge such as a fire protection engineer or fire department member. The objective of the fire safety assessments is to identify significant fire safety deficiencies and fire hazards.

ESHD 5008 Section 8 Industrial Hygiene (Functional Area---Industrial Hygiene) (851.21(a)(2), 851.23(a)(9), 851.24 – Industrial Hygiene, 851.26(a)(1), 851.27(b)(6))

Section 8 describes PPPL's Industrial Hygiene Program which aims to prevent occupational illnesses and preserve the health of site employees in accordance with Department of Energy Orders and the Occupational Safety and Health Administration. Employee exposure assessments and documentation are required in various chapters of the Industrial Hygiene section whose subjects include Chemicals (including working with nanomaterials, lithium and crystalline silica), Chemicals in Laboratories (chemical hygiene plan), Confined Spaces, and Noise Control and Hearing Conservation. Hazard control chapters that encompass ventilation, personal protective equipment (PPE) and respiratory protection control or reduce employee exposures to occupational hazards. Medical surveillances are addressed in appropriate chapters (e.g., chemicals, respiratory protection, noise control and hearing conservation).

Other chapters included in the Industrial Hygiene Section cover Carcinogens, Mutagen, and Teratogens; Housekeeping and Sanitation; Thermal Stress; Hazard Communications and Training.

ESHD 5008 Section 8, Chapter 1 Chemicals (851.20(b)(4), 851.21(a)(1))

This chapter provides employees with general guidance on the safe use, handling and storage of chemicals (including nanomaterials, lithium and crystalline silica) used at PPPL as well as emergency procedures. To ensure proper guidance is provided, the chapter assigns the Industrial Hygiene section within the Safety Division with the responsibility of assessing the employee's exposure to hazardous chemicals by the use of monitoring. During the monitoring, the employee being monitored has the right to act as or appoint an observer. The observer will be informed of the monitoring procedures, may observe all monitoring steps, and record all results. PPPL compares the employee chemical exposure levels against both the OSHA PEL's and ACGIH's TLV's. PPPL requires that all airborne chemical exposures be maintained below the more restrictive of the two standards, OSHA or ACGIH.

ESHD 5008 Section 8, Chapter 2 Carcinogens, Mutagens, and Teratogens (851.21(a)(1))

This chapter outlines guidelines for the use and handling of carcinogens, suspected carcinogens, mutagens, and teratogens at the Laboratory, including Asbestos. The Industrial Hygiene section within the Safety Division is responsible for periodically monitoring for air contaminants and making observations to ensure worker safety from the chemical, biological or physical hazards. Specific practices and procedures including general laboratory controls, personal protective equipment (PPE), medical surveillance requirements, and special requirements are provided under this chapter.

ESHD 5008 Section 8, Chapter 3 Chemicals in Laboratories (851.20(b)(3), 851.21(a)(1), 851.21(a)(3))

This chapter provides a mechanism to monitor for laboratory chemical exposures and notify affected employees of the monitoring results. Procedures are established to assess worker exposure to chemical, physical, biological, or safety workplace hazards through appropriate workplace monitoring. The Industrial Hygienists will measure employee exposure to any substance regulated by a standard which requires monitoring if there is reason to believe the exposure level to a substance routinely exceeds the action level or one half the permissible exposure level (PEL). The employees will be notified of the monitoring results in writing within 15 working days after receipt of any monitoring results.

Records of the industrial hygiene monitoring including sampling data (name, social security number, methods, results, etc.), observations (PPE worn), and written notifications to employees will be maintained in accordance with PPPL's record retention policy by the Industrial Hygiene section within the Safety Division.

ESHD 5008 Section 8, Chapter 6 Personal Protective Equipment (851.22(b)(4))

This chapter covers the selection, care, and use of personal protective equipment (PPE) at PPPL, and applies to all Laboratory workers. This chapter makes it clear that PPE is not a substitute for adequate engineering or administrative controls and should be used only if no other measures are adequate or feasible. Responsibilities of line managers, Industrial Hygiene and all employees regarding PPE are specified.

ESHD 5008 Section 8, Chapter 7 Respiratory Protection (851.23(a)(10), 851.27(b)(1))

This chapter establishes a program to ensure the proper and effective use of respiratory protection against exposures to hazardous air contaminants when substitution to a less toxic material and engineering controls are not feasible. The chapter establishes responsibilities at multiple levels of the organization to ensure the proper selection, fitting, use, and maintenance of respiratory protection. Requirements for medical surveillance and training contents and frequency are also addressed in this chapter.

ESHD 5008 Section 8, Chapter 8 Noise Control and Hearing Conservation (851.20(b)(3), 851.21(a)(1), 851.21(a)(3))

This chapter provides a mechanism to assist employees in preventing noise induced hearing loss due to injurious noise levels, to reduce noise levels wherever practical, and to comply with OSHA standards and ACGIH recommendations. The Industrial Hygiene section within the Safety Division is assigned the responsibility of determining the employee noise exposures, maintaining noise exposure documentation according to OMO-008 (Hearing Conservation Program), and determining the employees to be included in the hearing conservation program. The Occupational Medicine Office (OMO) is responsible for audiometric testing and the employee notification of hearing test results.

ESHD 5008 Section 8, Chapter 10 Training (851.25(a), 851.25(b), 851.25(c))

This chapter describes the required training on various aspects of Industrial Hygiene to eliminate unsafe acts and increase the employee's awareness of the hazards associated with their work. The chapter assigns responsibilities for determining training needed, frequency of training and retraining, and training delivery. Specific training programs are referenced in the chapter including: chemicals, confined space entry, high noise areas, respiratory protection, and other specialized safety training. Management is responsible for implementing all aspects of employee training. Laboratory employees are responsible for attending the training sessions.

ESHD 5008 Section 8, Chapter 13 ESH Review of Procurements (851.22c)

This chapter establishes the requirements for procurement of chemicals, non-chemicals, and contract services to ensure that hazards are addressed in their selection and purchase. The chapter provides responsibilities for the requisitioner, the responsible line managers, Industrial Hygiene, the Environmental Engineer, the Procurement Division, Material Control, Environmental Services and the Facilities and Site Services Division to ensure that these objectives are met.

ESHD 5008 Section 9, Chapter 4, Manual Lifting (851.23(a)(9), 851.27(b)(6))

This chapter addresses procedures for safe manual lifting and handling of material. It includes a section on manual lifting weight limits, which requires using the ACGIH Threshold Limit Values tables regarding repetitive mono-lifts.

ESHD 5008 Section 9, Chapter 8, Forklifts, Work Platforms, and Special Purpose Vehicular Requirements (Functional Area---Motor Vehicle Safety) (851.24 – Motor Vehicle Safety)

This chapter covers mobile equipment including Forklifts, Elevated and Rotating Work Platforms, and Special Purpose Vehicles and Equipment (special purpose vehicles include Skid Steers and Backhoes, and special purpose equipment include Ditch Witch, Vehicle Attachments and Portable Equipment). The chapter provides guidelines to ensure that operators meet licensing and training qualifications, the equipment is inspected and maintained at established frequencies, and that qualified operators know and follow safe practices during use of equipment including, but not limited to the use of safety devices (seat belts) and following of traffic rules. Additional details on the requirements for safe operation of this equipment is provided in PPPL Engineering Standards ES-MECH-010, 011 & 012.

ESHD 5008 Section 9, Chapter 10 Accident Investigation (851.20(a)(4), 851.20(a)(6), 851.20(b)(1), 851.20(b)(2), 851.21(a)(7), 851.23(a)(2), 851.26(a)(2), 851.26(a)(3), 851.26(a)(4), 851.26(b)(1), 851.27(b)(9))

This chapter addresses requirements for Recordkeeping and Reporting of Occupational Injuries and Illnesses, as established by 29 CFR 1904 and DOE Manual 231.1-1A. The procedure establishes responsibilities for employees, supervisors, occupational medicine providers and the ES&H Department. Employees are responsible for reporting injuries or illnesses to their immediate supervisors, for immediately seeking medical assistance for all work-related injuries or illnesses and for being involved in the incident investigation on company time. Supervisors are responsible for providing accurate information during accident investigations and ensuring injured employees get to the medical provider. The ES&H Department is responsible for the complete investigation, the reporting, recordability determination, record retention, and the completion and posting of the OSHA 300 and 300A forms.

ESHD 5008 Section 9, Chapter 11 Pressure Systems (Functional Area—Pressure Safety) (851.24 – Pressure Safety, 851.27(b)(7), 851.27(b)(8))

This chapter outlines the policy and procedures necessary for the safe design, specification, assembly, testing, installation, and inspection of high pressure vessels, containments and systems. All pressure systems are to be designed, fabricated, tested, inspected, maintained, repaired, and operated by trained and qualified personnel in accordance with applicable and sound engineering principles. All pressure vessels, boilers, air receivers, and supporting piping systems are to conform to relevant codes and standards, including applicable ASME Boiler and Pressure Vessel Code (2004) sections, applicable ASME B31 (Code for Pressure Piping) standards, and the strictest applicable state and local codes. When national consensus codes are not applicable (because of pressure range, vessel geometry, use of special materials, etc.), 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 must be implemented using measures that include:

- Design drawings, sketches and calculations reviewed and approved by qualified independent design professionals, and/or documented peer reviews;
- Qualified personnel used to perform examinations and inspections of material, in-process fabrications, non-destructive tests, and acceptance tests; and
- Documentation, traceability, and accountability maintained for each pressure vessel or system, including descriptions of design, pressure conditions, testing, inspection, operation, repair and maintenance.

ESHD 5008 Section 9, Chapter 15 Welding, Cutting and other Hot Work (851.23(a)(12), 851.27(b)(3))

This chapter establishes guidelines and responsibilities for the elimination or control of health and safety hazards commonly associated with welding, cutting, and other hot work. The guidelines include hot work procedures, proper handling and use of cylinders, eye and face protection, respiratory protection, protective clothing, ventilation, protection from shock, and general safety precautions to be taken during welding, cutting and other hot work inside or outside of confined spaces. The chapter establishes compliance with the American National Standards Institute Z49.1, “Safety in Welding, Cutting and Allied Processes,” (1999).

PPPL Parking ,Traffic & Bicycle Regulations (Functional Area---Motor Vehicle Safety) (851.24 – Motor Vehicle Safety)

This document, which in addition to being available electronically like all other documents is specifically provided to all people onsite who register vehicles, provides parking and traffic regulations for all private and government vehicles at PPPL. The document addresses requirements for licensing

requirements for motorists driving on the PPPL site, requirements for seat belt use, on-site speed limits, requirements for observing road signs and security gates and barriers, requirements for bicyclists, and enforcement of traffic and parking rules.

Integrated Safety Management System (ISMS) Description (All)

Integrated Safety Management (ISM) at PPPL is comprised of:

- The policy that safety be integrated into work management and work practices at all levels.
- The distinct policies, programs, procedures, and cultural beliefs that we have developed as the structure that our workers utilize in fulfilling our Laboratory's ISM responsibilities.

This document describes PPPL's framework for integrating environmental protection, safety, health, physical security, cyber security and emergency management considerations into the management and performance of all Laboratory work activities. At the heart of the PPPL ISM system is the policy that responsibility for environment, safety, health, and security resides with each individual and every line manager. The Laboratory is committed to applying the principles, functions, and controls of ISM as described in the ISMS Description.

2.3. Listing of Applicable Workplace Safety and Health Requirements Contained or Referenced in §851.23 and §851.27

The applicable safety and health standards listed below are implemented by individual PPPL documents as indicated in Section 2.1.

1. Title 29 CFR, Parts 1904.4 through 1904.11, 1904.29 through 1904.33; 1904.44, and 1904.46, “Recording and Reporting Occupational Injuries and Illnesses.”
2. Title 29 CFR, Part 1910, “Occupational Safety and Health Standards,” excluding 29 CFR 1910.1096, “Ionizing Radiation.”
3. Title 29 CFR, Part 1926, “Safety and Health Regulations for Construction.”
4. American Conference of Governmental Industrial Hygienists (ACGIH), “Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,” (2005).
5. American National Standards Institute (ANSI) Z88.2, “American National Standard for Respiratory Protection,” (1992).
6. ANSI Z136.1, “Safe Use of Lasers,” (2000).
7. ANSI Z49.1, “Safety in Welding, Cutting and Allied Processes,” sections 4.3 and E4.3 (1999).
8. NFPA 70, “National Electrical Code,” (2005).
9. NFPA 70E, “Standard for Electrical Safety in the Workplace,” (2004).
10. American Society of Mechanical Engineers (ASME) Boilers and Pressure Vessel Code, sections I through XII including applicable Code Cases, (2004).
11. ASME B31 (Code for Pressure Piping) standards as indicated below, where applicable:
 - (1) B31.1—2001—Power Piping, and B31.1a—2002—Addenda to ASME B31.1—2001;
 - (2) B31.2—1968—Fuel Gas Piping;
 - (3) B31.3—2002—Process Piping;
 - (4) B31.4—2002—Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids;
 - (5) B31.5—2001—Refrigeration Piping and Heat Transfer Components, and B31.5a—2004, Addenda to ASME B31.5—2001;
 - (6) B31.8—2003—Gas Transmission and Distribution Piping Systems;

(7) B31.8S—2001—Managing System Integrity of Gas Pipelines;

(8) B31.9—1996—Building Services Piping;

(9) B31.11—2002—Slurry Transportation Piping Systems; and

(10) B31G—1991—Manual for Determining Remaining Strength of Corroded Pipelines.

12. DOE Manual 231.1-1A, Environment, Safety and Health Reporting Manual, September 9, 2004.

2.4. PPPL Process for Developing Equivalencies Where Allowed by Codes and Standards

There have been no equivalencies granted to PPPL prior to promulgation of 10 CFR Part 851.

The PPPL process for developing equivalencies for fire protection codes and standards is included in the PPPL ES&H Manual (ES&HD 5008), Section 5 (Fire Protection), Chapter 2 (Management and Administration) as follows:

FIRE PROTECTION EQUIVALENCIES

When compliance with required DOE Orders, codes or standards cannot be achieved and an alternate method of compliance is needed or desired, the equivalency concept shall include the following information as a minimum and be processed in accordance with the criteria outlined below:

- A. Specification of the standard for which the equivalency is being requested.
- B. Detailed statements as to why compliance with the requirement cannot be achieved, and why an alternate method is needed or desired.
- C. A description of the alternate method, and an explanation of how this method provides protection that is equivalent to the original requirement.
- D. The equivalency concept shall be submitted through the DOE-Princeton Site Office to DOE-Headquarters for concurrence.
- E. The equivalency concept may be approved on a temporary or permanent basis.