ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

Necessary & Sufficient Process Leading to Work Smart Standards

Final Report

November 1996

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Work Smart Standards Set

Authorized for

Ernest O. Lawrence Berkeley National Laboratory

APPROVED:

CHARLES V. SHANK
DIRECTOR, BERKELEY LAB

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Prologue

Prologue

The Necessary and Sufficient Process leading to Work Smart Standards is a Department of Energy initiative to assure adequate protection for workers, the public, and the environment. The Department's specific goals for the initiative are to:

- enhance public and worker safety,
- build public trust and confidence,
- develop reference points for measuring excellence,
- provide for easier and more effective planning and implementation of work practices, and
- improve efficiency.

The Work Smart Standards concept was initially tested by several focused pilot programs, including a pilot at Berkeley Lab's National Tritium Labeling Facility (NTLF). Based on the success of the NTLF pilot, Dr. Martha Krebs, Director of the Office of Energy Research, selected Berkeley Lab to be the first multiprogram Lab in the Department to execute the program site-wide. The Laboratory received permission to implement the Work Smart Standards process on April 19, 1996, and the process commenced with a kickoff meeting at Berkeley Lab on May 31, 1996.

The Work Smart Standards initiative directs the Laboratory to develop a set of ES&H standards based on the work performed at the Laboratory and the hazards associated with the work. The process used by the Laboratory to develop the set of Work Smart Standards complied with DOE Manual M450.3, "The Department of Energy Closure Process for Necessary and Sufficient Sets of Standards." The basic steps of the process are to create teams of knowledgeable and experienced people to:

- define the work and hazards,
- identify the necessary and sufficient set of standards,
- confirm the set, and
- approve the set.

Berkeley Lab's set of Work Smart Standards includes required Federal, State and local laws and, additionally, national and international standards which represent the highest operating standards of industrial and commercial institutions. The Approval Authorities—Charles V. Shank, Director, LBNL and James Turner, Manager, DOE Oakland Operations Office—are authorized to approve the Work Smart Standards Set. Following approval, the standards set will serve as the agreed-upon-basis for operating Berkeley Lab in a safe, efficient, and cost effective manner. When implemented, the Work Smart Standards and derived safety practices will maintain the Laboratory in the upper quartile of ES&H performance, compared to similar DOE and external activities.

Introduction

Introduction

The Work Smart Standards set was chosen under the following ground rules.

“Necessary” Standards

In general, since Berkeley Lab is a federal instrumentality, it is subject to federal laws and regulations to mitigate and control the work-related hazards and provide protection of workers, the public, and the environment. Therefore these are included in the set. State laws and regulations and local ordinances are also included if the applicable federal law contains a waiver of federal sovereign immunity, making federal facilities subject to state and local laws to the same extent as nonfederal facilities.

“Sufficient” Standards

Other external or internal standards are included in the set where the Identification Team has determined that mere compliance with legal requirements is insufficient to assure adequate protection of workers, the public, and the environment. Selected external standards include consensus standards (e.g., American National Standards Institute [ANSI] standards), state laws and regulations and local ordinances where there is no sovereign immunity waiver in the applicable federal law, and internal standards (e.g., specific chapters of Berkeley Lab Health and Safety Manual, PUB-3000). These standards also include fire protection and electrical safety consensus standards to provide guidance for establishing performance standards for Berkeley Laboratory operations.

“Implementation” Assumptions

External or internal guidance documents are not included in the Work Smart Standards set. Documents of this nature which are deemed important to implementation of the Work Smart Standards set are included in the individual Identification Team documents and in the narrative section of the report. These documents are meant to supplement professional judgment in mitigating specific hazards, and are not intended as a set of requirements with which to determine compliance. This category may also include standards that are specifically applicable to the Department of Energy but not Berkeley Lab. They are included since Berkeley Lab provides support and assistance to the Department of Energy in carrying out its obligations.

The body of this report is an integral part of the agreement, and it places requirements on Berkeley Lab and the Oakland Operations Office. In particular, Berkeley Lab is required to implement the WSS set in general accord with the implementation guidance described in the narrative section. Both Berkeley Lab and the Oakland Operations Office are required to develop and approve an Integrated Safety Management System for Berkeley Lab which integrates environment, safety, and health into all levels of management so that work is planned and missions accomplished while protecting workers, the public, and the environment. Upon adoption of an Integrated Safety Management System, Berkeley Lab and the Oakland Operations Office will replace the ES&H management orders in the contract between the University of California and the Department of Energy with an appropriately revised set of performance-based integrated safety management principles created specifically to supplant the ES&H management provisions in existing DOE orders, and tailored to the approved Berkeley Lab management systems.

Report Contents

The Work Smart Standards set, to be placed in the contract between the University of California and the Department of Energy, follows this section. It is arranged with "Necessary" standards, first. As described above, these include all laws having jurisdiction over Berkeley Lab which pertain to the work and hazards at Berkeley Lab. Next come the "Sufficient" standards, which are standards selected over and above compliance with legal requirements, as described above.

A second list of standards, which includes the issues that are addressed by each standard, follows. This list provides the justification for the standards by linking them to the issues at Berkeley Lab.

After the WSS set is the Charter, which describes the organization and process followed to arrive at the standards set. The Charter includes a description of the teams used to survey the work and the associated hazards, and the team (and sub-teams) used to identify the standards. A description of the internal review teams and the independent confirmation team is also included.

The detailed justification and implementation narrative, provided by each standards identification sub-team, follows. This provides justification for the chosen standards, based upon the work and hazards at Berkeley Lab. It also describes the implementation assumptions, which are fundamental to the application of the WSS set at Berkeley Lab.

These sections are followed by a re-formatted list of issues, which includes the standards that apply to each issue. This section, along with the narrative, has proven to be extremely useful to the review and confirmation teams in their appraisal of the WSS set.

Finally, tables are provided which summarize the comments raised by the review teams, the confirmation team, and the stakeholders. The concerns are categorized as to their disposition, wholly incorporated, partially incorporated, or not incorporated in the report. Included remarks briefly describe how each comment was handled.

A supplement to the report is available. The supplement includes guidance sent out by the Convened Group, the steering committee of the process, as well as the set of hazard analyses prepared by the teams which surveyed the work and the associated hazards. The supplement also includes the set of Identification Team issue forms, including those prepared to address concerns of the review and confirmation teams and the stakeholders. The supplement is available, upon request, to others interested in pursuing the WSS process.

Work Smart Standards Set

Necessary Standards

Public Law 91-596, Section 5 (a) (1) Occupational Safety & Health Act. General Duty Clause
07 USC 2131-2157, Animal Welfare Act (Transportation, Sale, and Handling of Certain Animals)
07 CFR 355, Endangered Species Regulations Concerning Terrestrial Plants
09 CFR, Chapter I, Animal and Plant Inspection Service, Department of Agriculture
10 CFR 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements
10 CFR 745, Common rules for protection of human subjects
10 CFR 835
15 USC 2601-2692, Toxic Substances Control Act
16 USC 1531 et seq., Federal Endangered Species Act
21 CFR 1308, Controlled Substances
21 CFR 50, 60, 361, and Subchapters H and J, Protection of Human Subjects
29 USC 668 et seq., Occupational Safety and Health Act
29 CFR 1910, General Industry Safety Orders
29 CFR 1920.253, Oxygen-Fuel Cutting
29 CFR 1926 OSHA Construction Industry Standards
29 CFR 1940.1450, Occupational Exposure to Hazardous Chemicals in Laboratories
33 USC 1251 et seq., Clean Water Act
33 USC 1321 (b) (5), Clean Water Act
33 USC 1344 (Sections 301,401,404 and 506), Clean Water Act
33 CFR 320-323, 330 and 352, Corps of Engineers Regulations for Protection of Waters of the U.S. and Nationwide Permit Program
40 CFR 50-88, Chapter 1, Subchapter 2, Air Programs
40 CFR 61, Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon From DOE Facilities
40 CFR 61, Subpart M, National Emission Standard for Asbestos and Subpart F, Appendix A
40 CFR 68, Chemical Accident Prevention Provisions (CAA)
40 CFR 82, Protection of Stratospheric Ozone, Subparts A-G
40 CFR 110, Discharge of Oil
40 CFR 110.10, 117.21, Clean Water Regulations
40 CFR 112, Oil Pollution Prevention
40 CFR 122, NPDES System
40 CFR 136, Analysis Procedures
40 CFR 141, 142, 143, EPA Primary and Secondary Drinking Water Standards
40 CFR 170, 171, Subchapter E, Pesticide Programs
40 CFR 243-256, Federal Agency Recycling Programs
40 CFR 260-279, Hazardous Waste
40 CFR 280, Underground Storage Tanks
40 CFR 302.1 et seq., CERCLA
40 CFR 355, Emergency Planning and Notification (SARA Title III)
40 CFR 403, General Pretreatment Regulations
40 CFR 433, Metal Finishing Point Source Category
40 CFR 761, Polychlorinated Biphenyls (PCB)
42 USC 7401 et seq., Clean Air Act (CAA)
42 USC 7671 et seq., CAA Amendments of 1990
42 USC Section 6901 et seq., Resource Conservation and Recovery Act (RCRA)
42 USC Section 6992 et seq., Medical Waste Tracking Act of 1988, Subtitle J, Solids Waste Disposal Act (RCRA)
42 USC Section 9603, CERCLA
45 CFR 46, Common Rules for Protection of Human Subjects
48 CFR 970.7104-28, Construction and Architect – Engineer (A-E) contracts

49 USC 5110 (d), Hazardous Materials Transportation
 49 CFR 40, Procedures for Workplace Drug Testing Programs
 49 CFR 106-110, Transportation
 49 CFR 170-180, Hazardous Materials Regulation
 49 CFR 382, Controlled Substances and Alcohol Use and Testing
 49 CFR 397, Subpart D, Radioactive Materials Routing
 49 CFR, Research and Special Program Administration, Subchapter C (Hazardous Materials Regulations)
 50 CFR 17, ESA Rules
 Federal Facility Compliance Act (FFCA) and all orders pursuant
 13 CCR 1166(b), Hazardous Waste (except AEA materials)
 17 CCR Article 5, Waste Disposal, Section 30287, Disposal by Release into Sanitary Sewerage Systems
 17 CCR Division 18, Air Resources Board (stationary and mobile sources)
 22 CCR Division 4, Chapter 15, Article 5, Domestic Water Quality, Section 64443, Man-Made Radioactivity
 22 CCR Section 66260.1 et seq., and all permits pursuant
 23 CCR Division 3, Chapter 16, Underground Storage Tank Regulations
 23 CCR Division 3, Chapter 16, Article 5 (UST release abatement) and Article 11 (UST corrective actions)
 23 CCR 2250, 2251, 2260, to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)
 23 CCR 2650, 2652, Underground Storage Tanks
 40 CCR 280.34 (a) (2), 280.50, 280.53, 280.61, Underground Storage Tanks
 CAC Title 24, Part 9, California Fire Code, Article 79 and Article 80 (with respect to the control of water pollution)
 California Fish & Game Code, Sections 1601-1607
 California Health and Safety Code, Division 20, Chapter 6.67, Aboveground Storage of Petroleum (to the extent involving discharges to navigable waters)
 California Health and Safety Code, Section 25100 et seq., and all permits pursuant
 California Health and Safety Code 25295 (a) (1), Underground Storage Tanks
 California Health and Safety Code 25242, 25189(c), (d), 25189.2(c), 25189(f), 25359.4, 5411.5, Hazardous Waste (except AEA materials)
 California Health and Safety Code 25270.7, to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)
 California Health and Safety Code 25270.8, Clean Water Regulations
 California Health and Safety Code, Chapter 6.7, Underground Storage of Hazardous Substances
 California Health and Safety Code, Sections 25020.5 - 25090.6, California Medical Waste Management Act
 California Health and Safety Code 39000 et seq., Air Resources, Clean Air Act
 California Health and Safety Code Div. 20, Ch. 6.95, Art. 2, implementing OES regulations at Title 19 CCR, to the extent involving prevention of accidental releases to air.
 California Porter-Cologne Water Quality Control Act, CA Water Code Section 13000 et seq., and all permits pursuant (except AEA discharges)
 California Public Resources Code, Sections 2100-2178.1, California Environmental Policy Act (CEQA), 14 CCR Section 15000 et seq., State CEQA Guidelines
 California Public Resources Code, Section 4000 et seq., California Integrated Waste Management Act of 1989, 14 CCR, Section 17200 et seq.
 California Water Code 13271, 13272, 13050 (p) (2) (c), to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)
 California Vehicle Code and implementing CCR sections to the extent not preempted by DOT requirements
 BAAQMD Reg 1-431, 1-432, Air Releases

BAAQMD Regulations 1 through 12, BAAQMD Manual of Procedures (and all permits pursuant)
City of Berkeley Municipal Code, Chapter 11.52, Hazardous Materials Management (as applied to generator areas)
City of Berkeley Municipal Code, Chapter 11.52, Hazardous Materials Management (and all permits pursuant)
City of Berkeley Municipal Code 11.52.140(B) adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, to the extent involving prevention of accidental releases to air.
City of Berkeley Municipal Code 17.20, Reduction of Storm Water Pollution (except AEA discharges)
City of Berkeley Ordinance 5474, Provision Prohibiting Transportation on Specified Streets at Which Purge Chamber Openings Are Located
City of Berkeley Stormwater Ordinances, to the extent involving non-AEA materials
Oakland Municipal Ordinance 11590, Storm Water Management and Discharge Control (except AEA discharges)
Oakland C.M.S., Art. 12, CH 2, Adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, to the extent involving prevention of accidental releases to air.
Disposal Site Waste Acceptance Criteria
East Bay Municipal Utility District (EBMUD) Ordinance No. 311, and all permits pursuant (except AEA discharges). NOTE: Berkeley Lab annually accepts radiation discharge standards, but the district may not have been delegated AEA authority.
IATA Dangerous Goods Regulations (37th edition)
Alameda County, Measure D, Section 64, Waste Reduction and Recycling

Sufficient Standards

Work Smart Standards Set and Issues

Necessary Standards	
Standard	Issue
Public Law 91-596, Section 5 (a) (1), Occupational Safety & Health Act. General Duty Clause	Repetitive Motion; Ergonomics
07 USC 2131-2157, Animal Welfare Act (Transportation, Sale, and Handling of Certain Animals)	Biological, Animal Handling, Animal Experimentation
07 CFR 355, Endangered Species Regulations Concerning Terrestrial Plants	Endangered Species
09 CFR, Chapter I, Animal and Plant Inspection Service, Department of Agriculture	Biological, Animal Handling, Animal Experimentation
10 CFR 1022, Compliance with Floodplain/Wetlands Environmental Review Requirements	Floodplains and Wetlands
10 CFR 745 Common Rules for Protection of Human Subjects	Biological, Human Subjects Radiation Protection of Human Subjects
10 CFR 835	Accelerators—On-Site Exposure Control of Radioactive Sealed Sources Irradiators Using Radioactive Material Laboratory Airborne Radioactivity Monitoring Radiation Dose Limits and Dose Assessment Radiation Protection Program Radiation Safety Training Radiological Emergency Response Radiological Instrumentation Radiological Posting and Labeling Radiological Records Workplace Radiation Monitoring X-Ray Machines and Electron Microscopes (Non-Medical)
15 USC 2601-2692, Toxic Substances Control Act	PCB Containing Equipment
16 USC 1531 et seq., Federal Endangered Species Act	Endangered Species
21 CFR 1308, Controlled Substances	Controlled Substances
21 CFR 50, 60, 361, and Subchapters H and J, Protection of Human Subjects	Radiation Protection of Human Subjects
29 USC 668 et seq., Occupational Safety and Health Act	Asbestos—Worker and Environmental Protection

Standard	Issue
29 CFR 1910, General Industry Safety Orders	Aboveground Storage Tanks (includes non-PCB transformers) Asbestos—Worker and Environmental Protection Biological, Bloodborne Pathogens Chemical Carcinogens (laboratory-scale use) Compressed Gases Confined Space Construction Safety Corrosive Cryogenic Materials and Use Electrical Safety Emergency Preparedness Explosive Fast Acting Valves Fire Protection—Life Safety Flammable and Combustible Liquids Flammable gases Hazardous and Non-Radioactive Portion of Mixed Waste Hazardous Material Handling Health Hazard Gas Highly Toxic Materials Laser Systems Lead Exposure Lighting (Illumination) of Work Areas Linear Motion—Tensile Tester Local Exhaust Ventilation (includes HEPA filtration systems) Material Handling Mechanical Hazards—Tools, Equipment and Pressurized Containers Medical Waste Noise Levels Oxidizers Pesticide Application and Use

Standard	Issue
29 CFR 1910, General Industry Safety Orders (cont.)	Pressure Equipment—Compressed Gas Cylinders Pressure Equipment—Glass or Other Brittle Components Pressure Equipment—Pressure Vessels Pyrophoric Gas, Solid or Liquid Reactive or Explosive Chemicals Reproductive Toxin Rotating Equipment—Centrifuges Toxic Materials Traffic Hazards Vacuum Equipment—Back-Filled From Pressure Source Working at Heights, Slips, Trips and Falls, Housekeeping Workplace Ventilation
29 CFR 1920.253, Oxygen-Fuel Cutting	Flammable Gases
29 CFR 1926, OSHA Construction Industry Standards	Asbestos—Worker and Environmental Protection Compressed Gases Confined Space Construction Safety Fire Protection—Life Safety Flammable and Combustible Liquids Flammable Gases Hazardous Material Handling Laser Systems Lead Exposure Lighting (Illumination) of Work Areas Local Exhaust Ventilation (includes HEPA filtration systems) Mechanical Hazards—Tools, Equipment and Pressurized Containers Noise Levels Pressure Equipment—Compressed Gas Cylinders Pressure Equipment—Glass or Other Brittle Components Traffic Hazards Working at Heights, Slips, Trips and Falls, Housekeeping Workplace Ventilation

Standard	Issue
29 CFR 1940.1450, Occupational Exposure to Hazardous Chemicals in Laboratories	Hazardous Material Handling
33 USC 1251 et seq., Clean Water Act	Aboveground Storage Tanks (includes non-PCB transformers) Sanitary Sewer Discharges Site Restoration Surface/Storm Water
33 USC 1321 (b) (5), Clean Water Act	Accidental Release Reporting
33 USC 1344 (Sections 301, 401, 404 and 506), Clean Water Act	Floodplains and Wetlands
33 CFR 320-323, 330 and 352, Corps of Engineers Regulations for Protection of Waters of the U.S. and Nationwide Permit Program	Floodplains and Wetlands
40 CFR 50-88, Chapter 1, Subchapter 2, Air Programs	Air Emissions
40 CFR 61, Subpart H, National Emission Standards for Emissions of Radionuclides Other Than Radon From DOE Facilities	Air Emissions
40 CFR 61, Subpart M, National Emission Standard for Asbestos and Subpart F, Appendix A	Asbestos—Worker and Environmental Protection
40 CFR 68, Chemical Accident Prevention Provisions (CAA)	Emergency Preparedness
40 CFR 82, Protection of Stratospheric Ozone, Subparts A-G	Ozone Depleting Substances
40 CFR 110, Discharge of Oil	Aboveground Storage Tanks (includes non-PCB transformers)
40 CFR 110.10, 117.21 Clean Water Regulations	Accidental Release Reporting
40 CFR 112, Oil Pollution Prevention	Aboveground Storage Tanks (includes non-PCB transformers)
40 CFR 122, NPDES System	Surface/Storm Water
40 CFR 136, Analysis Procedures	Sanitary Sewer Discharges
	Surface/Storm Water
40 CFR 141, 142, 143 EPA Primary and Secondary Drinking Water Standards	Drinking Water
40 CFR 170, 171, Subchapter E, Pesticide Programs	Pesticide Application and Use
40 CFR 243-256, Federal Agency Recycling Programs	Nonhazardous Waste—Including Pollution Prevention, Waste Minimization

Standard	Issue
40 CFR 260-279, Hazardous Waste	Site Restoration Air Emissions Hazardous and Non-Radioactive Portion of Mixed Waste
40 CFR 280, Underground Storage Tanks	Underground Storage Tanks
40 CFR 302.1 et seq., CERCLA	Accidental Release Reporting
40 CFR 355, Emergency Planning and Notification (SARA Title III)	Emergency Preparedness
40 CFR 403, General Pretreatment Regulations	Sanitary Sewer Discharges
40 CFR 433, Metal Finishing Point Source Category	Sanitary Sewer Discharges
40 CFR 761, Polychlorinated Biphenyls (PCB)	Hazardous and Non-Radioactive Portion of Mixed Waste PCB Containing Equipment Accidental release reporting
42 USC 7401 et seq., Clean Air Act	Air Emissions Asbestos—Worker and Environmental Protection
42 USC 7671 et seq., CAA Amendments of 1990	Ozone Depleting Substances
42 USC Section 6901 et. seq., Resource Conservation and Recovery Act (RCRA)	Hazardous and Non-Radioactive Portion of Mixed Waste Nonhazardous Waste—Including Pollution Prevention, Waste Minimization Site Restoration Underground Storage Tanks
42 USC Section 6992 et seq. (Medical Waste Tracking Act of 1988, Subtitle J), Solids Waste Disposal Act (RCRA)	Medical Waste
42 USC Section 9603, CERCLA	Accidental Release Reporting
45 CFR 46, Common Rules for Protection of Human Subjects	Biological, Human Subjects Radiation Protection of Human Subjects
48 CFR 970.7104-28, Construction and Architect—Engineer (A-E) contracts	Facilities Design
49 USC 5110 (d), Hazardous Materials Transportation	Accidental Release Reporting
49 CFR 40, Procedures for Workplace Drug Testing Programs	Traffic Hazards
49 CFR 106-110, Transportation	Hazardous Material Transportation—Offsite

Standard	Issue
49 CFR 170-180, Hazardous Materials Regulation	Hazardous Material Transportation—Offsite Radioactive and Non-Hazardous Portion of Mixed Waste Compressed Gases Explosive Fast Acting Valves
49 CFR 382, Controlled Substances and Alcohol Use and Testing	Traffic Hazards
49 CFR 397, Subpart D, Radioactive Materials Routing	Hazardous Material Transportation—Offsite Transportation of Radioactive Materials
49 CFR, Research and Special Program Administration, Subchapter C (Hazardous Materials Regulations)	Transportation of Radioactive Materials
50 CFR 17, ESA Rules	Endangered Species
Federal Facility Compliance Act (FFCA) and all orders pursuant	Hazardous and Non-Radioactive Portion of Mixed Waste Air Emissions
13 CCR 1166(b), Hazardous Waste (except AEA materials)	Accidental Release Reporting
17 CCR Article 5, Waste Disposal, Section 30287, Disposal by Release into Sanitary Sewerage Systems	Sanitary Sewer Discharges
17 CCR Division 18, Air Resources Board (stationary and mobile sources)	Air Emissions
22 CCR Division 4, Chapter 15, Article 5, Domestic Water Quality, Section 64443, Man-Made Radioactivity	Environmental Radiation Protection
22 CCR Section 66260.1 et seq.—and all permits pursuant	Hazardous and Non-Radioactive Portion of Mixed Waste Accidental Release Reporting
23 CCR Division 3, Chapter 16, Underground Storage Tank Regulations	Underground Storage Tanks
23 CCR Division 3, Chapter 16, Article 5 (UST release abatement) and Article 11 (UST corrective actions)	Site Restoration
23 CCR 2250, 2251, 2260; to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)	Accidental Release Reporting
23 CCR 2650, 2652, Underground Storage Tanks	Accidental Release Reporting
40 CCR 280.34 (a) (2), 280.50, 280.53, 280.61, Underground Storage Tanks	Accidental Release Reporting
CAC Title 24, Part 9, California Fire Code, Article 79 and Article 80 (with respect to the control of water pollution)	Aboveground Storage Tanks (includes non-PCB transformers)

Standard	Issue
California Fish & Game Code, Sections 1601-1607	Floodplains and Wetlands
California Health and Safety Code, Division 20, Chapter 6.67, Aboveground Storage of Petroleum (to the extent involving discharges to navigable waters)	Aboveground Storage Tanks (includes non-PCB transformers)
California Health and Safety Code, Section 25100 et seq.—and all permits pursuant	Hazardous and Non-Radioactive Portion of Mixed Waste Accidental Release Reporting
California Health and Safety Code 25295 (a) (1), Underground Storage Tanks	Accidental Release Reporting
California Health and Safety Code 25242, 25189(c), (d), 25189.2(c), 25189(f), 25359.4, 5411.5, Hazardous Waste (except AEA materials)	Accidental Release Reporting
California Health and Safety Code 25270.7, to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)	Accidental Release Reporting
California Health and Safety Code 25270.8, Clean Water Regulations	Accidental Release Reporting
California Health and Safety Code, Chapter 6.7, Underground Storage of Hazardous Substances	Underground Storage Tanks
California Health and Safety Code, Sections 25020.5 - 25090.6 (California Medical Waste Management Act)	Medical Waste
California Health and Safety Code 39000 et seq. (Air Resources), Clean Air Act	Air Emissions
California Health and Safety Code Div. 20, Ch. 6.95, Art. 2, implementing OES regulations at Title 19CCR, to the extent involving prevention of accidental releases to air.	Emergency Preparedness
California Porter-Cologne Water Quality Control Act, CA Water Code Section 13000 et seq.—and all permits pursuant (except AEA discharges)	Sanitary Sewer Discharges Site Restoration (to the extent involving discharges of pollutants to navigable waters) Surface/storm Water
California Public Resources Code, Sections 2100-2178.1, California Environmental Policy Act (CEQA), 14 CCR Section 15000 et seq. (State CEQA Guidelines)	Environmental Protection Planning

Standard	Issue
California Public Resources Code, Section 4000 et seq., California Integrated Waste Management Act of 1989, 14 CCR, Section 17200 et seq.	Nonhazardous Waste—Including Pollution Prevention, Waste Minimization
California Water Code 13271, 13272, 13050 (p) (2) (c), to the extent involving discharges of pollutants (non-AEA materials) to navigable waters (which do not include groundwaters)	Accidental Release Reporting
California Vehicle Code and implementing CCR sections to the extent not preempted by DOT requirements	Accidental Release Reporting Hazardous Material Transportation - Offsite Traffic Hazards
BAAQMD Reg 1-431, 1-432, Air Releases	Accidental Release Reporting
BAAQMD Regulations 1 through 12, BAAQMD Manual of Procedures — and all permits pursuant	Asbestos—Worker and Environmental Protection Air Emissions Ozone Depleting Substances
City of Berkeley Municipal Code, Chapter 11.52, Hazardous Materials Management as Applied to Generator Areas	Hazardous and Non-Radioactive Portion of Mixed Waste
City of Berkeley Municipal Code, Chapter 11.52, Hazardous Materials Management—and all permits pursuant	Underground Storage Tanks
City of Berkeley Municipal Code 11.52.140(B), Adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, to the extent involving prevention of accidental releases to air.	Emergency Preparedness
City of Berkeley Municipal Code 17.20, Reduction of Storm Water Pollution (except AEA discharges)	Surface/Storm Water
City of Berkeley Ordinance 5474, Provision Prohibiting Transportation on Specified Streets at Which Purge Chamber Openings Are Located	Hazardous Material Transportation—Off Site
City of Berkeley Stormwater Ordinances, to the extent involving non-AEA materials	Accidental release Reporting
Oakland Municipal Ordinance 11590, Storm Water Management and Discharge Control (except AEA discharges)	Surface/Storm Water
Oakland C.M.S., Art. 12, Ch. 2, adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, to the extent involving prevention of accidental releases to air	Emergency Preparedness

Standard	Issue
Disposal Site Waste Acceptance Criteria	Hazardous and Non-Radioactive Portion of Mixed Waste Radioactive and Non-Hazardous Portion of Mixed Waste
East Bay Municipal Utility District (EBMUD) Ordinance No. 311 - and all permits pursuant (except AEA discharges). NOTE: Berkeley Lab annually accepts radiation discharge standards, but the district may not have been delegated AEA authority. IATA Dangerous Goods Regulations (37th edition) Alameda County, Measure D, Section 64, Waste Reduction and Recycling	Site Restoration Sanitary Sewer Discharges Transportation of Radioactive Materials Nonhazardous Waste—Including Pollution Prevention, Waste Minimization

Sufficient Standards	
Standard	Issue
10 CFR 20 Subpart J, Precautionary Procedures	Radiological Posting and Labeling
10 CFR 20 Subparts L and M, Records and Reports (for tritium, only)	Radiological Records
10 CFR 20, Subpart K, Section 20.2003, Disposal by Release into Sanitary Sewerage	Sanitary Sewer Discharges
10 CFR 20.1101, Radiation Protection Programs	Radiation Protection Program
California Health and Safety Code Div. 20, Ch. 6.95, Art. 2, Implementing OES Regulations at Title 19 CCR, even if not involving prevention of accidental releases to air.	Emergency Preparedness
City of Berkeley M.C. 11.52.140(B), Adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, even if not involving prevention of accidental releases to air.	Emergency Preparedness
Oakland C.M.S., Art. 12, Ch. 2, Adopting Health & Safety Code Div. 20, Ch. 6.95, Art. 2, even if not involving prevention of accidental releases to air.	Emergency Preparedness
ACGIH Threshold Limit Values for Heat/Cold Stress	Heat/Cold Stress
ACGIH Threshold Limit Values for Physical Agents: Static Magnetic Fields	Static Magnetic Field > 5 gauss
ACGIH Threshold Limit Values for Physical Agents: Ultraviolet Radiation	Ultraviolet (UV) Source
ACGIH Threshold Limit Values (TLVs) for Chemical Substances	Hazardous Material Handling
ANSI N43.2 Sections 5.2.1.1, 5.2.1.2, 5.2.2.3, 5.2.2.1.4, 6.5, 7.1	X-Ray Machines and Electron Microscopes (non-medical)
ANSI N43.3, Definitions, Sections 4.1, 5.1.1, 5.1.2, 5.1.4, 5.1.6.3, 5.1.5.2, 5.1.5, 7, 9.1, 9.2, 9.4, Annex 3	Irradiators Using Radioactive Material
ANSI Z136.1 - 1993, American National Standard for the Safe Use of Lasers (except Section 3.4.1)	Laser Systems
ANSI Z136.2, American National Standard for the Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources	Laser Systems
CAC Title 8, Part 1, Chapter 4, Subchapter 1, Unfired Pressure Vessel Safety Orders	Pressure Equipment—Pressure Vessels
CAC Title 24 Building Standards, For Facilities Design, Only	Facilities Design
CAC Title 24 Part 2 California Building Code, For Fire Protection—Life Safety	Fire Protection—Life Safety

Standard	Issue
CAC Title 24 Part 9 California Fire Code, For Fire Protection—Life Safety	Fire Protection—Life Safety
CAC Title 24, Part 9, California Fire Code, Article 49, Welding & Cutting	Compressed Gases
CAC Title 24, Part 9, California Fire Code, Article 51, Semiconductor fabrication	Compressed Gases
CAC Title 24, Part 9, California Fire Code Article 62, Industrial Baking and Drying Ovens	Ovens (includes laboratory furnaces)
CAC Title 24, Part 9, California Fire Code, Article 74, Compressed Gases	Compressed Gases
CAC Title 24, Part 9, California Fire Code Article 75, Cryogenics	Cryogenic Materials and Use
CAC Title 24, Part 9, California Fire Code Article 79, Flammable & Combustible Liquids	Flammable and Combustible Liquids
CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials	Chemical Carcinogens (laboratory-scale use) Compressed Gases Corrosive Cryogenic Materials and Use Flammable gases Hazardous Material Handling Health Hazard Gas Highly Toxic Materials Oxidizers Pressure Equipment—Compressed Gas Cylinders Pyrophoric Gas, Solid or Liquid Reactive or Explosive Chemicals Reproductive Toxin Toxic Materials Pressure Equipment—Compressed Gas Cylinders
CAC Title 24, Part 9, California Fire Code, Article 82, Liquified Petroleum Gas	Compressed Gases

Standard	Issue
CCR Title 8 California Construction Safety Orders (solely for construction safety where more strict than 29 CFR 1926)	Construction Safety
CCR Title 17 Section 30275	Control of Radioactive Sealed Sources
CCR Title 17 Sections 30330-30337	Radiography—Equipment and Parts
CCR Title 17 Subchapters 4.5 and 4.6, Training Requirements for Technologists Administering Radiation to Human Subjects	Radiation Protection of Human Subjects
CCR Title 22, Division 2, Part 12000 (c), Chemicals Known to the State to Cause Reproductive Toxicity (consensus listing solely referenced to define reproductive toxins)	Reproductive Toxin
CCR, Title 22, Part 7 (Retail Food Facilities), Chapter 4 (Retail Food Practices—California Uniform Retail Food Facilities Law [CURFFL])	Food Sanitation
City of Berkeley Municipal Code 16. 12.30-32-34), Monitoring Well Ordinance—And All Permits Pursuant (except AEA materials)	Site Restoration
SWRCB Model Well Ordinance, Water Code Section 801c (except AEA materials)	Site Restoration
CDC/NIH—Biosafety in Microbiological & Biomedical Labs (Berkeley Lab will develop internal standards to address the issues covered by the external standards. After those standards have been developed, the external standards will be used only as implementation guidance.)	Biological, Infectious Agents
CGA pamphlet S-1.2-1963, Pressure Relief	Vacuum Equipment—Back-Filled From Pressure Source
CGA pamphlet S-11-1963 and 1965 addenda	Vacuum Equipment—Back-Filled From Pressure Source
DOE 231.1, paragraph 5.d.2 (to the extent that it requires compliance)	Site Environmental Report
DOE 420.1, Facility Safety	Facilities Design
DOE 430.1, Life Cycle Asset Management (LCAM)	Facilities Design
DOE 440.2, Aviation	Mechanical Hazards—Aviation
DOE 5400.1, Chapter IV, paragraphs 1.a, 3, 4, 5 (not including 5.a.2.d), 6, and 10.c	Environmental Radiation Protection
DOE 5400.5, Chapter II, Paragraph 5 and Chapter IV	Site Restoration
DOE 5400.5, Chapter II, Paragraphs 1 (not including 1.a.3.c and 1.c), 2, 6 (not including 6.a), 7, and 8.a	Environmental Radiation Protection

Standard	Issue
DOE 5400.5, Chapter II, Paragraph 5 and Chapter IV	Release of Potentially Radioactive Contaminated Material and Property
DOE 5400.5, Chapter II, 5.C, Chapter IV, 5.A	Release of Potentially Volume-Activated Material
Application of DOE 5400.5 Requirements for Release and Control of Property Containing Residual Radioactive Material (memo, dated 11/17/95)	Release of Potentially Radioactive Contaminated Material and Property Release of Potentially Volume-Activated Material
DOE 5820.2A, Chapter II, Transuranic Waste excluding 3.j (QA); Chapter III, Low-Level Waste excluding 3.i (QA); Chapter IV, Accelerator Produced Radioactive Material excluding 3.b (QA), Chapter V, Decommissioning Facilities Excluding 3.e (QA)	Radioactive and Non-Hazardous Portion of Mixed Waste
DOE Manual 231.1-1, Chapter 1, Paragraph 1.a and 1.b	Site Environmental Report
IEEE Standard C95.1-1991, Safety Levels with Respect to Human Exposure to Radiofrequency Electromagnetic Fields, 1992	Radio Frequency (RF) Source
NFPA 1, Fire Prevention Code (for fire protection, life safety)	Fire Protection—Life Safety
NFPA 101, Life Safety Code (for facility design, and fire protection, life safety)	Facilities Design Fire Protection—Life Safety
NFPA 1600, Disaster Management	Emergency Preparedness
NFPA 30, Flammable and Combustible Liquid Code	Flammable and Combustible Liquids
NFPA 70, National Electrical Code	Electrical Safety
NFPA 70E, Electrical Safety Requirements for Employee Workplaces	Electrical Safety
NFPA 86, Standard for Ovens and Furnaces	Ovens (includes laboratory furnaces)
NIH—Guidelines for Research Involving DNA Molecules (Berkeley Lab will develop internal standards to address the issues covered by the external standards. After those standards have been developed, the external standards will be used only as implementation guidance.)	Biological, Infectious Agents
LBNL Design Management Procedures Manual, RD 3.22, Lateral Force Design (Seismic Safety)	Facilities Design
LBNL PUB-3000 and other internal EH&S procedures	Transportation of Radioactive Materials—Onsite
LBNL PUB-3000, Chapter 21 (X-ray safety sections)	X-Ray Machines and Electron Microscopes (Non-Medical)

Standard	Issue
LBNL PUB-3000, Chapter 5, Part VIII, Section 13	Hazardous Material Transportation—Onsite
LBNL Standard on the Issue of Peroxidizable Chemicals (to be developed)	Peroxidizable Chemicals
LBNL Standard for Hazard Communication on the Issue of Radio Frequency (RF) Source (to be developed)	Radio Frequency (RF) Source
LBNL Standard to Minimize and Control Ergonomic Risks (to be developed)	Repetitive Motion; Ergonomics
LBNL Standard for Unrestricted Release for Volume-Activated Material (to be developed)	Release of Potentially Volume-Activated Material
LBNL Standard for Hazard Communication on Static Magnetic Fields to be developed	Static Magnetic Field > 5 gauss
LBNL Standard for Hazard Communication on Ultraviolet Radiation (to be developed)	Ultraviolet (UV) Source

Charter for the Work Smart Standards Process

Table of Contents

SECTION 1	5-3
1. Objectives and Expectations for This N&S Process	5-3

SECTION 2	5-5
2. Identification of Participants in This N&S Process	5-5
2.1 Agreement Parties	5-5
2.2 Resource Authorities	5-5
2.3 Customer Organizations	5-5
2.4 Responsible Organization	5-5
2.5 Convened Group	5-5
2.6 Executive Team (ET)	5-6
2.7 Advisory Team	5-6
2.8 Process Leader	5-6
2.9 Integrated Functional Analysis Team (IFA)	5-6
2.10 Operational and Technical Experts	5-7
2.11 Identification Team (IT)	5-7
2.12 Internal Review Teams	5-10
2.13 Confirmation Team (CT)	5-10
2.14 Stakeholders	5-11

SECTION 3	5-13
3. Protocols	5-13
3.1 Approval of Standards Set	5-13
3.2 Instructions to the Identification Team	5-13
3.3 Scope of Standards Set	5-13
3.4 Documentation of Standards Set	5-13
3.5 Review of the Standards Set	5-13
3.6 Confirmation of the Standards Set	5-14

3.7	Interactions Between Convened Group and Identification Team	5-14
3.8	Stakeholders	5-14
3.9	Consensus	5-15
3.10	Contract Modification	5-15

SECTION 1

1. Objectives and Expectations for This N&S Process

This document outlines the plans and protocols for conducting the Department of Energy's Necessary & Sufficient (N&S) Process (Attachment A) at Lawrence Berkeley National Laboratory (LBNL) in Berkeley, California. The Necessary and Sufficient Process will examine the work performed by LBNL, identify the hazards, and specify a N&S set of Environment, Safety and Health (ES&H) standards. The N&S set of standards will serve as the agreed-upon basis for operating LBNL in a safe, efficient, and cost-effective manner with low risk to staff, the public, and the environment.

This process will seek out and emulate practices which have been proven successful both in terms of safety performance and cost-effectiveness in industry and other comparable laboratories. When implemented, these N&S standards and safety practices will maintain the Laboratory in the upper quartile of ES&H performance as compared to similar activities both internal and external to DOE.

This charter has been developed as a partnership effort by the parties to this agreement (see "Responsibilities" below), and is considered to be a living document. This charter provides a basis for agreement that all parties who must agree with the set of standards will participate in the process planning, that stakeholder contributions will be incorporated into the process, and that confirmation of the standards will be conducted by highly trained and experienced experts and will reflect agreement between all the parties.

SECTION 2

2. Identification of Participants in this N&S Process

2.1 Agreement Parties

The Agreement Parties are the authorities that must approve the Set of Standards. The Convened Group has agreed that the following individuals have approval authority for the LBNL Set of Standards:

Department of Energy /Oakland Operations Office - James Turner

Lawrence Berkeley National Laboratory - Charles V. Shank

2.2 Resource Authorities

Resource Authorities are organizations or individuals who have control over the equipment, facilities, personnel, and budget necessary to accomplish the work. Such authorities include the line management of LBNL, UC, and the DOE, and other public and private institutions. DOE, UC, and LBNL line management are responsible for providing adequate resources to support the execution of the N&S process.

2.3 Customer Organizations

The work performed at Lawrence Berkeley National Laboratory is performed for the Department of Energy and the University of California, and for other public and private institutions.

2.4 Responsible Organization

Lawrence Berkeley National Laboratory has direct responsibility, accountability, and authority for performing the work subject to the agreed-upon set of standards.

2.5 Convened Group

The Convened Group's responsibilities are defined in Process Elements 2 and 3 of Attachment A, The DOE Necessary & Sufficient Process Manual (DOE M 450.3-1). This group also has ownership of this charter document. The Convened Group is responsible for resolving issues that the Identification Team is unable to reach consensus on. This group is a combination of the Executive Team, the Advisory Team, the Process Leader, and the Deputy Process Leader, as defined below.

2.6 Executive Team (ET)

The Executive Team's responsibilities, as part of the Convened Group, are defined in Process Elements 2 and 3 of Attachment A. Its role is to provide DOE, UC, and LBNL management input into the N&S process. This team includes:

Klaus Berkner — Deputy Director for Operations, LBNL
Howard Hatayama — Director ES&H for Laboratory Administration, UCOP
Phillip Hill — Waste Management Division, OAK, DOE
David C. McGraw — Director, EH&S Division, LBNL
Richard H. Nolan — Director, Berkeley Site Office, DOE
Philip Roebuck — Berkeley Site Office, OAK, DOE

2.7 Advisory Team

The Advisory Team's responsibilities, as part of the Convened Group, are defined in Process Elements 2 and 3 of Attachment A. Its role is to provide advice from persons familiar with the N&S process. This team includes:

Larry Coulson — Fermilab Pilot N&S Process Leader, Ass't. Director, FNAL
DeVaughn Nelson — ES&H, Office of Energy Research, DOE
Charles Simkins — DOE/OAK Alternate Representative to the Department of Energy Standards Committee
David Short — DOE Department Standards Committee Member, N&S Initiative developer, LLNL
Phil Williams — NTLF Pilot N&S Process Leader, LBNL

2.8 Process Leader

The Process Leader's responsibilities are defined in Process Elements 1, 2, and 3 of Attachment A. Ben Feinberg, the Operations Head of the Advanced Light Source Center, LBNL, has this responsibility. The Process Leader is a member of all N&S teams and tracks overall costs of the project. Jack Bartley, the Deputy Director of the EH&S Division, LBNL, is the Deputy Process Leader. Charles Simkins, the DOE/OAK Alternate Representative to the Department of Energy Standards Committee, is the advisor to the process leaders.

2.9 Integrated Functional Analysis Team (IFA)

An inventory and analysis of the work performed by the Laboratory and the associated hazards will be performed by the IFA. The IFA is charged with following the N&S process.

Team members will be of the highest level of expertise to assure a quality analysis. Criteria for selecting the team and its members will be set by the Convened Group. The IFA Team will include members of the Identification Team to ensure sufficient overlap between defining the work and hazards and identifying the set of standards. Comments on the work hazards inventory may be submitted by anyone; any issues will be addressed in the weekly IFA Team meetings.

The IFA will also work with the Laboratory division safety coordinators, division directors and principal investigators (PIs) to verify and understand work processes and associated hazards. The associated responsibilities of the Process Leader and the Convened Group are set out in Process Element 1 of Attachment A.

2.10 Operational and Technical Experts

Operational Experts are individuals with knowledge and expertise relevant to the work, the site, the facility, and the activities addressed by the necessary and sufficient set of standards.

Technical Experts are individuals with knowledge and expertise relevant to a particular environment, safety and health discipline (for example, industrial hygiene or industrial safety).

2.11 Identification Team (IT)

This group's responsibilities for identifying and confirming the set of standards are defined in Process Elements 3 and 4 of Attachment A. Its membership is determined by the Convened Group. The Identification Team will consist of LBNL representatives, DOE representatives, and other parties and subject matter experts as needed.

The Identification Team will be divided into the Core Team and four Activity Teams. The Core Team will identify the standards and requirements applicable site wide, will minimize duplication among the sets identified by the Activity Teams, and will provide a venue for technical issues resolution among the Activity Teams. The Core Team will consist of the Leaders of the Activity Teams, and includes:

Core Team:

Jack Bartley — Core Team Leader

Alan Jackson — Accelerator Activity Team Leader

Ron Pauer — Environmental Protection Team Leader

Bert Schleifer — Facilities and Infrastructure Team Leader

Phil Williams — Laboratory Safety Team Leader

Chester Chang — Facilities and Infrastructure Team DOE Representative
James Chwang — DOE/OAK ES&H Support Coordinator
Joanne Lorence — Accelerator Activity Team DOE Representative
Carl Schwab — Environmental Protection Team DOE Representative
Jeff Chung — Deputy Director, EH&S Division, LBNL
Tanya Goldman — Waste Management Division, DOE Representative
Bruce King — Industrial Hygiene Team Leader, EH&S Division, LBNL
Mike Schoonover — Health Physicist, EH&S Division, LBNL
Dave Tudor — Process Hazards Review and NEPA/CEQA Support, EH&S Division, LBNL
Dean Decker — Laboratory Safety Team, DOE Representative
Jack Sims or Jim Johnson — DSC/LLNL Advisor for N&S Process

The Accelerator & Fixed Radiation Sources Activity Team will identify standards in the areas of radiation protection, including fixed sources, fixed source dosimetry and shielding, radiofrequency safety, high voltage electrical safety, and waste management/minimization unique to accelerators. The Accelerator Activity Team includes:

Accelerator & Fixed Radiation Sources Activity Team:

Alan Jackson — Team Leader, Accelerator Group Leader, Advanced Light Source Center, LBNL
Rob Connelly — Industrial Hygienist, EH&S Division, LBNL
Keith Gershon — Electrical Engineer, EH&S Division, LBNL
Roger Kloepping — Health Physicist, EH&S Division, LBNL
Mark Lasartemay — Waste Management and Generator Support, EH&S Division, LBNL
Joanne Lorence — DOE Berkeley Site Office
Edwin Njoku — ESH Division, DOE/OAK
Peggy McMahan — NSD Researcher, LBNL

The Environmental Protection Team will identify standards in the areas of water protection, including sanitary sewer, surface, and ground water, air protection, monitoring and surveillance, site wide waste management, and NEPA/CEQA. The Environmental Protection Team includes:

Environmental Protection Team:

Ron Pauer — Team Leader, Group Leader, EH&S Division, LBNL
Carol Kielusiak — NEPA/CEQA Coordinator, Office of Planning, LBNL

Carl Schwab — ESH Division, DOE
Tim Wan — Waste Management, EH&S Division, LBNL
Tanya Goldman — Waste Management Division, DOE/OAK
Peter Persoff — Earth Science Division Researcher, LBNL
Stan Terusaki — Waste Management, LLNL

The Facilities and Infrastructure Team will identify standards in the areas of safety design, construction safety, maintenance, occupational safety (including cranes and hoists and ergonomics), fire and building codes, vehicular and pedestrian traffic, and waste management/minimization associated with construction and design. The Facilities and Infrastructure Team includes:

Facilities and Infrastructure Team:

Bert Schleifer — Team Leader, Deputy Facilities Manager, Facilities Division, LBNL
Chester Chang — DOE Berkeley Site Office
Paul Davis — Industrial Hygienist, EH&S Division, LBNL
Paul Johnson — Safety Engineer, EH&S Division, LBNL
Karl Olson — Operations, Researcher, LBNL
Pat Thorson — Environmental Engineer, Air Quality, EH&S Division, LBNL
James Chwang — ESH Division, DOE/OAK
Steve McConnell — Safety Engineer, LLNL
John Bowerman — Facilities/Operations Researcher, LBNL

The Laboratory Safety Team will identify standards in the areas of occupational safety, chemical hygiene, biohazard/medical safety, radiation protection (including sealed sources and unconfined radioactivity and dosimetry), waste management/minimization associated with laboratories, and local environmental issues, including permits and emission sources. The Laboratory Safety Team includes:

Laboratory Safety Team:

Phil Williams — Team Leader, Co-PI NTLF, Structural Biology Division, LBNL
Paul Blodgett — Industrial Hygienist, EH&S Division, LBNL
Chris Donahue — Health Physicist, EH&S Division, LBNL
Nancy Rothermich — Waste Certification Specialist, EH&S Division, LBNL
Jack Salazar — Field Support Department Group Leader, EH&S Division, LBNL
Dean Decker — ESH Division, DOE/OAK

Richard Haddock — ESH Division, DOE/OAK
Rick Schwarz — LSD Researcher, LBNL
Rick Kelly — Radiation Protection, LLNL
Michele Sundsmo — Radiation Protection, LLNL

2.12 Internal Review Teams

These groups are responsible for reviewing the draft set of N&S standards prior to confirmation. The membership is determined by the Convened Group. The Internal Review Teams will consist of the LBNL Safety Review Committee and the DOE / OAK ES&H Policy Committee.

2.13 Confirmation Team (CT)

This group's responsibilities for reviewing and confirming the set of standards are defined in Process Element 4 of Attachment A, as follows:

- [1] Review the information available to and used by the Identification Team.
- [2] Confirm that the set of standards is necessary and sufficient to satisfy the performance expectations and objectives of the work.
- [3] Confirm that implementation of the set of standards will be feasible.

The Confirmation Team's membership is determined by the Convened Group. The Confirmation Team will consist of industry representatives, DOE representatives, and other parties and subject matter experts as needed. The selected members of the Confirmation Team are:

Confirmation Team:

Dr. Marty Blume — EH&S and Management Systems, Brookhaven Nat'l Lab.
Lewis Carroll — Accelerators (Cyclotrons), Carroll Ramsey Associates
Albert E. Evans — Accelerator Safety, DOE
Dr. Ross W. Fisher — Construction Safety, Bechtel International
Bill Freeman — Accelerator and Fixed Radiation Sources, Fermi
Jim Jackson — General Safety, Chemical, Safety Management, LLNL
Larry Jones — Quality Assurance, LANL

Joe Juetten — Fire Protection and Safety Management, DOE
Eugene Lau — Environment, U.C. San Francisco
Mike Lichtenstein — ES&H Program Management, Lichtenstein Associates
David Michlewicz — Infrastructure and Safety Management, DOE
John Neave — Waste Management and Environmental Protection, DOE
Ray Schwartz — Facility Operations and Safety Management, DOE
John Scott — Electrical Safety, LLNL
Leonard Smith — Radiation, E.I. DuPont de Nemours
Susan Spencer — General ES&H and Management Issues, U.C. Berkeley
Ara Tahmassian — Biohazards, U.C. San Francisco

2.14 Stakeholders

A Stakeholder is any party other than the Resource Authorities or the Agreement Parties that will be materially affected by, or can materially affect, the outcome of the work, either favorably or unfavorably (for example, representatives of state, local and federal governments, labor unions, and citizens' groups).

SECTION 3

3. Protocols

3.1 Approval of Standards Set

The Standards Set will be considered approved when it has been agreed to and signed by the following parties in the order listed:

Responsible Organization: Charles V. Shank, Director, LBNL.

Customer Organization: James Turner, Manager, DOE Oakland Operations Office.

3.2 Instructions to the Identification Team

The Convened Group will issue a charter letter to the Identification Team outlining its expectations for the conduct of this N&S process.

3.3 Scope of Standards Set

The Necessary and Sufficient Set of Standards will focus on standards in the area of Environment, Safety and Health (ES&H). Any decision to include areas beyond ES&H will be made by agreement of the Convened Group and included in the final instructions to the Identification Team.

3.4 Documentation of Standards Set

The specific format and level of detail with which the standards set will be documented will be decided by the Identification Team. The Convened Group expects that this document will include, at a minimum, a listing of the standards and a summary discussion sufficient to communicate an understanding of the relationship between the LBNL work, its associated hazards, and the standards selected.

3.5 Review of the Standards Set

Once the Identification Team has completed assembling the set of standards, it will be delivered to the Internal Review Teams for internal review. The Identification Team will address all comments of the Internal Review Teams.

3.6 Confirmation of the Standards Set

When the Identification Team has reached consensus that the set as a whole is adequate, the Convened Group shall present the set to a Confirmation Team for concurrence. This team will be expected to challenge the set and the Identification Team will be called upon to defend it (see Appendix C for details.)

The Standards Set will be considered confirmed when the Identification Team has successfully defended or modified it. At this point, the Convened Group will recommend it for approval.

Upon concurrence of the set by the Identification Team, Convened Group, Confirmation Team and response to stakeholder comments, the set will be presented to the approval parties.

3.7 Interactions between Convened Group and Identification Team

Throughout this process, the Process Leader will act as the liaison between the Identification Team and the Convened Group. The Convened Group and the Core Team will form the Extended Convened Group. Convened Group and Extended Convened Group meetings will be convened as necessary.

3.8 Stakeholders

In order to keep the Identification Team down to a workable size, it will not be possible to include stakeholders on the team. Therefore, a meeting will be held with the Stakeholders early in the process to receive suggestions on the actual process being followed at the Berkeley Laboratory. Following the meeting, the work and hazards information will be made available at reading rooms accessible to the public. Once the Work Smart Standards set has been identified, a draft set will be placed in the reading rooms as well. Following confirmation, the set will be sent to the Stakeholders, and a second meeting will be held to present the set and ask for comments.

All Stakeholder comments will be treated as "issues" for the Identification Team, and addressed in the same manner as issues raised by the IFA and the IT teams.

3.9 Consensus

The Standards Set should represent the consensus of the members of the Identification Team. Consensus is arrived at through a negotiation process that identifies the set of standards each team member considers adequate and acceptable. Conflict resolution should be based on the assumption that the Identification Team is composed of "reasonable people." Consequently, if one team member will not commit to support a decision, the team should recognize the team member as a reasonable person and empathetically listen and understand the team member's concerns. Once the team understands the concerns, satisfactory resolution of the concerns may follow. On the other hand, if the concerns are not fully resolved, the team member should recognize the other team members as "reasonable people," and consider supporting their recommendation as generally acceptable (but perhaps not ideal). If at any point, the Identification Team is unable to reach consensus on any issue, they may bring this issue for resolution to the Convened Group.

3.10 Contract Modification

The approved standard set will replace the EH&S Orders in Appendix G of LBNL's contract effective the date of approval.

Justification and Implementation Narrative

FACILITIES AND INFRASTRUCTURE IDENTIFICATION TEAM

Facilities and Infrastructure Identification Team Members:

Bert Schleifer – Facilities – Deputy Facilities Manager, Team Leader
John Bowerman – Facilities – Technical Services
Chester Chang – DOE/OAK – Berkeley Site Office
James Chwang – DOE/OAK – ES&H Division
Paul Davis – EH&S – Industrial Hygienist
Paul Johnson – EH&S – Safety Engineer
Steve McConnell – LLNL – Safety Engineer
Patrick Thorson – EH&S – Environmental Specialist

Subject Matter Experts:

Tony Yuen – EH&S – Fire Protection Engineer

Design and Review

Facilities Design

The standards identified for facilities design cover ES&H issues normally encountered in the course of designing new or modifying existing facilities at Berkeley Lab. The legal standard provides that architect-engineer services and construction contracts include specifications that are based on *General Design Criteria Manual* (DOE Order 6430.1 or successor version). The current successor version of DOE Order 6430.1 is *Life Cycle Asset Management* (DOE Order 430.1), and *Facility Safety* (DOE Order 420.1), which are included in the set. Because this standard is not sufficient to cover all issues related to facilities design, additional standards were identified that provide a comprehensive and adequate set of rules to follow. The additional standards include external and internal standards. The external standards include the appropriate parts of the *California Building Standards* (California Administrative Code, Title 24) and the Life Safety Code section of the *National Fire Protection Association* (NFPA 101) as related to such building design issues as structural, fire, electrical, mechanical, plumbing, and ventilation design. The internal standards include a design procedure, Berkeley Lab Design Management Procedure RD 3.22, *Lateral Force Design*, which addresses site-specific hazard issues related to the Laboratory's proximity to nearby potentially-dangerous seismic faults, and has been used in practice at the Laboratory for an extended period of time. Implementation of the seismic safety standards will be aided by guidance such as Berkeley Lab Design Management Procedure LBID-1662, and one chapter in PUB-3000 (Chapter 23, Seismic Safety) and *Seismic Safety Manual, A Practical Guide for Facilities Managers and Earthquake Engineers* (D. Eagling). Finally, other site-specific ES&H facilities design issues will be addressed on a case-by-case basis during the Hazard Assessments process.

Construction Safety

The standards identified for construction safety cover the hazards normally encountered in the course of constructing new, or modifying existing, institutional/industrial facilities. The legal standards selected by the Berkeley Laboratory include the Federal OSHA *General Industry Standards* (29 CFR 1910) and the Federal OSHA *Construction Industry Standards* (29 CFR 1926). In addition to the legal standards, the *California Construction Safety Orders* (CCR Title 8) has been selected as a standard because it is widely used by and familiar to the California construction industry. The use of the *California Construction Safety Orders* is applicable to subcontractors and is further justified by the fact that they supplement the requirements of the

Federal OSHA standards and would be applied where more stringent than the Federal OSHA standards. Use and implementation of the above standards will be guided by the appropriate ANSI standards and Berkeley Lab *Health and Safety Manual* (PUB-3000) Chapter 10.

Fire Protection

The standards identified for Fire Protection and Life Safety cover fire hazards normally encountered in the course of operating, constructing, and renovating laboratory facilities. The legal standards include the Federal OSHA *General Industry Standards* (29 CFR 1910) and the Federal OSHA *Construction Industry Standards* (29 CFR 1926). These standards were based on the previous editions of the *National Fire Codes* (NFC) published by the National Fire Protection Association (NFPA), which are now obsolete.

The External Necessary Standards include the current editions of NFPA 1, *Fire Prevention Code*, NFPA 101, *Life Safety Code*, the California Administrative Code (CAC) Title 24, Part 2, *California Building Code*, and Part 9, *California Fire Code*. These codes provide fundamental requirements for the construction and renovation of buildings and infrastructure. Furthermore, CAC Title 24 provides requirements for facility operations, including handling and storage of hazardous materials. The implementation of the Fire Protection - Life Safety standards follows DOE Order 440.1, Paragraph 2, which establishes the framework for an effective worker protection program in the area of fire safety. In addition, the Berkeley Lab *Health and Safety Manual*, PUB-3000, Chapters 12 & 13, provides further guidelines to implement the identified standards.

Hazardous Material Transportation

Hazardous Materials Transportation, On-Site

The standard identified for On-Site Hazardous Materials Transportation covers the hazards normally encountered in the transportation of hazardous materials inside Berkeley Lab. The selected standard is an internal standard, namely, the Berkeley Lab *Health and Safety Manual* (PUB-3000, Chapter 5, "Occupational Safety"). This standard establishes a comprehensive set of requirements that provide sufficient safety and health protection for the recognized hazards. The Department of Transportation (DOT) requirements were not selected because they apply to transportation of materials on public roads and for a commercial purpose. Berkeley Lab roads are not open to the public and transportation on them is for a non-commercial purpose; therefore, the DOT requirements are not applicable.

Hazardous Materials Transportation, Off-Site

The standards identified for Off-Site Hazardous Materials Transportation cover the hazards normally encountered in the transporting of hazardous materials away from Berkeley Lab. The legal standards include Department of Transportation (DOT) 49 CFR 106-110, *Transportation*, and DOT 49 CFR 170-180, *Hazardous Materials Regulation*, DOT 49 CFR 397, *Route Designations*, the California Vehicle Code (and implementing CCR sections to the extent not preempted by DOT requirements), and City of Berkeley requirements prohibiting transportation on specified streets containing purge chamber openings. These identified standards establish a comprehensive set of requirements that provide sufficient safety and health protection for the recognized hazards, while meeting requirements.

Material Handling

The standards identified for material handling cover the hazards normally encountered in the course of working with cranes and with hoisting and rigging activities. The legal standard includes the Federal OSHA *General Industry Standards* (29 CFR 1910). Use and implementation of the above standard will be guided by *California Safety Orders* (CCR Title 8), appropriate ANSI standards, and the California Labor Code. These identified standards and implementation documents establish a comprehensive set of requirements that provides sufficient safety and health protection for the recognized hazards, while meeting legal requirements.

Mechanical Hazards

Aviation

DOE 440.2 (Aviation) was selected as an external standard because it addresses procurement of chartered air services. There were no legal standards identified governing the procurement of chartered air services. Berkeley Lab does not own or operate any aircraft. Chartered air services are periodically procured to obtain overhead photography. Berkeley Lab has developed a written procedure to comply with DOE 440.2 requirements. No additional implementation measures are required.

Tools, Equipment and Pressurized Containers

The hazards associated with the use of tools, equipment and pressurized containers are addressed by the selected legal standards: 29 CFR 1910 (OSHA *General Industry Standards*) and 29 CFR 1926 (OSHA *Construction Industry Standards*). No additional internal or external standards are necessary to address these hazards. Berkeley Lab will use the appropriate sections of PUB-3000 to implement the selected standards. No additional implementation measures are required.

Other Personal Hazards

Working at Heights, Slip, Trips, and Falls, Housekeeping; Lead Exposure; Confined Space

The standards selected as sufficient for the above areas are the OSHA *General Industry Standards* (29 CFR 1910) and the OSHA *Construction Industry Standards* (29 CFR 1926). These standards meet legal requirements and adequately address the hazards encountered in the above areas. Publication 3000, Chapter 5, the Lead Compliance, and the Confined Space programs are based on these standards and are used to implement them at Berkeley Lab.

Drinking Water

The legal standards selected for ensuring safe drinking water are 40 CFR 141, 142, & 143, which are the EPA primary and secondary drinking water standards. These standards provide a comprehensive list of possible drinking water contaminants and their maximum acceptable levels. Acceptable levels are based on health considerations as well as consumer acceptance. The Berkeley Lab Drinking Water Program is used to implement these standards. The American Water Works Association "Standard for Disinfecting Water Mains" (ANSI/AWWA C651-86) is also used as an implementation guideline because it contains disinfecting procedures that aid in compliance with the above EPA regulations.

Lighting (Illumination) of Work Areas

The legal standards selected for ensuring adequate illumination of work areas are the OSHA *General Industry Standards* (29 CFR 1910) and the OSHA *Construction Industry Standards* (29 CFR 1926). These standards contain lighting requirements that will result in a safe work environment. Chapter 11, "Illuminance Values" in the IES *Lighting Handbook* (8th edition) contains a table of lighting values that cover a wider range of work situations than the above legal requirements. Using these as guidelines will aid in providing a more comfortable and productive work environment for employees. Standards for general facilities lighting requirements and exit lighting are identified under a separate N&S issue ("Design and Review—Facilities Design").

Pesticide Application and Use

OSHA *General Industry Standards* (29 CFR 1910) and 40 CFR 170, 171 Subchapter E "Pesticide Programs," were listed as legal standards because they contain relevant requirements that address hazards involving pesticide application and use. OSHA *General Industry Standards* contain exposure limits for certain pesticides while 40 CFR 170, 171 Subchapter E, contains a wide range of legal standards pertaining to pesticide use and worker protection. The Berkeley Lab Chemical Hygiene and Safety Plan and the Respiratory Protection Program are used to implement these worker protection standards.

Traffic Hazards

The legal standards for traffic hazards include the California *Vehicle Code* (and implementing CCR sections), OSHA *General Industry Standards* (29 CFR 1910) and OSHA *Construction Industry Standards* (29 CFR 1926). The California *Vehicle Code* (and implementing CCR sections) was selected as the governing standard for vehicular traffic both on Berkeley Lab roadways and public roadways. The OSHA *General Industry Standards* (29 CFR 1910) and the OSHA *Construction Industry Standards* (29 CFR 1926) were selected because sections in these regulations pertain to traffic hazards. In addition, legal requirements (i.e., 29 & 49 CFR) were included to cover drug and alcohol use as well as testing for drugs. Berkeley Lab PUB-2134 (*Drug and Alcohol Information Materials*) and PUB-3000, Chapter 5, are based on the above legal standards and are used to implement them.

Workplace Ventilation

The legal standards selected for workplace ventilation are the OSHA *General Industry Standards* (29 CFR 1910) and the OSHA *Construction Industry Standards* (29 CFR 1926). Both of these required standards have numerous sections that contain ventilation requirements for the mitigation of workplace hazards. To implement the above legal standards, Berkeley Lab uses ASHRAE 62-1989, the ACGIH *Industrial Ventilation Manual*, and ANSI/AIHA Z9.5, which have extensive guidelines for ventilation system design and ventilation system operation. In addition, Berkeley Lab *Health and Safety Manual* (PUB-3000) and *Chemical Hygiene and Safety Plan* (PUB-5341) are also followed in the implementation of these standards.

Radiography—Equipment and Parts

Radiographic operations, although only occasionally performed on-site by Berkeley Lab staff or subcontractors, will follow 17 CCR 30330 to 30337 inclusive, *Special Requirements for Radiographic Operations Other Than in the Healing Arts*. The legal requirement that is applicable for radiation protection of workers conducting such operations is the same as for all radiation issues, 10 CFR 835. The Laboratory's Radiation Protection Plan will cover facilities operations.

Electrical Safety

The standards identified for Electrical Safety cover electrical hazards normally encountered in the course of operating, constructing and renovating laboratory facilities. The legal standards include Federal OSHA *General Industry Standards* (29 CFR 1910) and *Construction Industry Standards* (29 CFR 1926). Since the above legal standards do not reflect current practices in all areas of electrical safety, the National Electrical Code (NFPA 70) and Electrical Safety Requirements (NFPA 70E) were selected as external necessary standard to supplement the legal requirements. The implementation of electrical safety requirements at Berkeley Lab is governed by the Berkeley Lab *Health and Safety Manual* (PUB-3000, Chapters 8 and 18).

ACCELERATOR AND FIXED RADIATION SOURCES ACTIVITY TEAM

Accelerator and Fixed Radiation Sources Activity Team Members:

Alan Jackson – AFRD/ALS – Accelerator Physicist, Team Leader
Rob Connelly – EH&S – Industrial Hygienist
Keith Gershon – EH&S – Electrical Engineer
Roger Kloepping – EH&S – Health Physicist
Mark Lasartemay – EH&S – Waste Management and Generator Support
Joanne Lorence – DOE Berkeley Site Office
Edwin Njoku – DOE/OAK – ES&H Division
Peggy McMahan – NSD – Researcher

In order to meet the timeline for the work smart process set by the process leader, the Accelerator and Fixed Radiation Sources Activity Team (hereafter called the Accelerator Team) decided to take a pre-emptive look at the issues associated with accelerators. This was done through the Analysis of Hazards Documents (AHDs) that are current for the Advanced Light Source and 88-inch Cyclotron. This was truly a “from the ground up” exercise, with the issues being identified by the researchers. These issues were later combined with the issues developed by the Integrated Functional Appraisal Team, which included appraisal of the isotope-production cyclotron. The full list is given below. Through this process we believe that we covered all aspects of hazards associated with accelerators and fixed radiation sources. In general, much of the worker-protection issues associated with hazards at accelerators and from fixed radiation sources are identical to those found in non-radiation producing laboratories (e.g., high voltage, gas handling, and lasers). The standards identified for such issues are contained mainly in the Codes of Federal Regulations, which are implemented with guidance given in standards from professional organizations like IEEE and ACGIH.

The set of issues associated with work unique to accelerators were identified as: radiation protection of on-site personnel; source irradiators and non-medical X-ray machines; unrestricted release of potentially volume activated material; and air activation. The legal requirement that is applicable for radiation protection of the worker, in all radiation issues, is 10 CFR 835. The Laboratory's Radiation Protection Plan will cover accelerators and will include the requirements of 10 CFR 835. The requirements will be addressed, however, in a manner similar to the way non-DOE institutions implement NRC and other external regulations (see Laboratory Safety Identification Team narrative). Safety systems that affect worker protection and are unique to accelerators will be implemented via guidelines included in LBNL Publication 3000, Chapter 21, and supplemented by applicable sections of NCRP 51 and 88, and SLAC Publication 327. Environmental standards are addressed by the Environmental ID Team. No legal standards are available for volume activation and, therefore, short term implementation will be in accordance with DOE Order 5400.5 Chapter II, 5.C and Chapter IV, 5.A, until an appropriate standard can be written. The DOE Office of Environmental Policy and Assistance has issued a memo “Application of DOE 5400.5 Requirements for Release and Control of Property Containing Residual Radioactive Material.” This was selected as a standard because it contains provisions relevant to obtaining DOE approval for release of volume activated property. In addition to 10 CFR 835, PUB-3000 Chapter 21 is an internal standard for X-ray requirements. PUB-3000 X-ray requirements are supplemented by specific sections from ANSI *Consensus Standard* N43.2. In the case of gamma source irradiators, 10 CFR 835 was supplemented by selecting appropriate sections of ANSI 43.3. Sealed source control is addressed by the Laboratory Identification Team. These sets of requirements and supplemental standards will provide a workable and auditable work radiation protection environment.

Issues Associated with Accelerators and Fixed Radiation Sources

Prompt Ionizing Radiation
Radioactive Materials
Non-Ionizing Radiation (RF/Microwave)
Component Activation
Air Activation
Fire
Hazardous Materials/ Chemical Exposure
Electrical
Rotating Machinery
Crane Operation
Pressurized Water
Confined Spaces
Compressed Gases
Gas Explosion
Cryogenics
Industrial (Fork Lifts, Hand Tools, etc.)
Materials Handling and Storage
Lasers
Ozone
Seismic
Vacuum
Noise
Hazardous Waste Disposal
Radiation Waste Disposal
Decommissioning
Oxygen Deficiency
Heat Tapes
Electrical Maintenance (Grounding, Rubber Mats , etc.)
Pressure Vessels
Magnetic Fields
Explosive Fast Acting Valves

LABORATORY SAFETY IDENTIFICATION TEAM

Laboratory Safety Team Members:

Phil Williams – Structural Biology Division – Researcher, Co-PI NTLF, Team Leader
Paul Blodgett – EH&S – Industrial Hygienist
Dean Decker – DOE/OAK – ES&H Division
Chris Donahue – EH&S – Health Physicist
Richard Haddock – DOE/OAK – ES&H Division
Rick Kelly – LLNL – Radiation Protection
Nancy Rothermich – EH&S – Waste Certification Specialist
Jack Salazar – EH&S – Field Support Department Group Leader
Rick Schwarz – Life Sciences Division – Researcher
Michele Sundsmo – LLNL – Radiation Protection

Worker Protection Issues

The Laboratory Safety Team considered a wide range of research activities at the Berkeley Lab. These activities fall into several very broad categories, and many of the issues overlap with those of other Identification Teams.

Very general worker protection coverage for research activities is provided by adherence to the basic OSHA regulations, 29 CFR 1910, *Occupational Safety & Health* and 29 CFR 1926, *Safety & Health for Construction*.

Industrial Hygiene

Many of the issues under this category are related to general chemical safety and the provision of adequate ventilation. To provide adequate protection, a range of standards will need to be implemented under a comprehensive Chemical Hygiene and Safety Plan, e.g., PUB-5341. Overall coverage will be provided by the use of both general and specific provisions of the OSHA standards (29 CFR 1910 and 29 CFR 1926), and by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) for Chemical Substances. The ACGIH TLVs for chemical substances are chosen to supplement the OSHA Permissible Exposure Limits (PELs) because: 1) the TLVs are routinely updated and the PELs have not been updated in many years, and 2) the TLVs cover roughly one-third more chemicals than the PELs. Berkeley Lab will use the TLVs to assist in determining when additional employee protection is needed. ACGIH states that the TLVs are "...recommendations or guidelines... to be interpreted and applied only by a person trained in this discipline..." (i.e., industrial hygiene), and the ACGIH "...does not advocate..." the use of TLVs "...as legal standards."

These standards are supplemented by relevant portions of the California Building Code and California Fire Code (especially for building design and material storage considerations). Some of the CFC and CBC Articles are very specific and relevant to work done at LLNL, and these passages have been identified. In addition to these widely used and recognized standards, there are some specialty uses of chemicals, or relevant areas where standard coverage is incomplete. An example is "Peroxidizable Chemicals," where the standards are still evolving but some very good preliminary data are available as to advisable practices. In this small number of cases, it was noted that internal standards should be developed. In addition to the standards noted above, a comprehensive chemical safety program must include reference to a wide range of guidance, including ACGIH, National Institute of Occupational Safety and Health (NIOSH), and American Industrial Hygiene Association (AIHA) documents. Other ANSI and NFPA documents give

solid guidance on personal protective equipment (PPE) for chemical use. These latter documents, providing widely recognized guidelines on the shape and extent of the chemical hygiene and safety plan, were regarded as implementation documents. The transportation and disposal of chemicals was addressed by other Identification Teams, with input from Laboratory Safety.

Biological research at LBNL requires the application of a number of standards. Animal and human subject research is adequately covered under federal regulations. The OSHA Standard (specifically, 29 CFR 1910.1030) addresses work practices, controls, and training in a laboratory environment for employees working with bloodborne pathogens. More general research with infectious agents and recombinant DNA is not covered under established codes, and a number of National Institutes of Health (NIH) and Center for Disease Control (CDC) guidelines were adopted to address these needs. Since these are guidelines, Berkeley Lab will develop internal standards to address these issues. After those standards have been developed, the external standards will be used only as implementation guidance.

Food sanitation is addressed by the Retail Food Facilities Practices in Title 22 CCR, which provides comprehensive and adequate coverage for the standard food facility operation in place at the Berkeley Lab. The requirements are currently implemented at the state level for pertinent Berkeley Lab operations through an informal arrangement for inspections and consultation with food facility staff by the UC Berkeley EH&S Office Registered Environmental Health Specialist (REHS). This service is provided by the UCB REHS on a semiannual basis, and records of on-site activities are available for review by Berkeley Lab EH&S personnel. All interpretations of CURFFL requirements are consistent with those used to govern similar UCB food facility operations.

The issue of repetitive motion requires special mention. Although this is a category where there are a lot of lost time injuries, both at LBNL and elsewhere, this issue is bereft of established standards. Many partial standards and guidance documents were considered, and the California OSHA *Proposed State Standard* (7/96 Draft) should be used as a primary example of fairly fundamental performance-oriented requirements to help in developing an internal standard.

The selected standards for heat/cold stress from the ACGIH are uniquely discrete, widely recognized, and stand alone in the absence of other standards/requirements on the subject(s). The types of potential exposures, especially those related to field activities, that are most likely for Berkeley Lab employees match very well with the referenced standard(s). Note that ACGIH states that the TLVs are "...recommendations or guidelines... to be interpreted and applied only by a person trained in this discipline..." (i.e., industrial hygiene), and the ACGIH "...does not advocate..." the use of TLVs "...as legal standards."

Federal OSHA regulations provide integrated requirements for noise exposure limits, implementation of controls when noise exposure limits are exceeded, and maintenance of a hearing conservation program, and therefore adequately address noise exposure to employees at LBNL. Standards for local community noise levels generated by Berkeley Lab are addressed by the City of Berkeley Noise Ordinance (Chapter 13.40). Berkeley Lab will use this ordinance as guidance to control environmental noise on site.

There are a variety of pressure and vacuum usage issues addressed in the Standards Set. The coverage provided by specific sections of 29 CFR 1910 requires supplementing with some California Administrative Code, and by CGA information on pressure relief. The standards are implemented in one case by using ASME *Boiler & Pressure Vessel Code*, Section VIII, Divisions 1 & 2 as guidance, and in a number of cases by using LBNL PUB-3000 as guidance.

Use of compressed gases and gas cylinders covers both industrial and laboratory types of uses at LBNL. In addition to the general OSHA requirements, the CFC has specific relevant articles. Additional CGA, ANSI, CFC, and NFPA documents are used as implementation guidance to provide comprehensive and accepted coverage of the subject.

Occupational Safety

Electrical safety was considered in many different applications, ranging from the storage of energy in batteries and capacitors to the construction or modification of unique equipment for experimental studies (including electrophoresis units and lasers). With the adoption of the appropriate National Fire Protection Association (NFPA 70, *National Electrical Code*, and NFPA 70E) standards, and the use of some external documents by Underwriters Laboratory (UL), and American National Standards Institute (ANSI), as well as DOE (DOE *Electrical Safety Guidelines*, Section 10, "Research and Development") and internal documents (LBNL PUB-3000) for implementation, research workers at LBNL will be well protected for electrical safety. The basic OSHA regulation was written for commercial application and some parts are not appropriate for unique laboratory applications and custom-built equipment. Occupational safety codes/regulations are to be applied where appropriate as determined by the LBNL Authorities Having Jurisdiction (AHJ), using an electrical safety committee to provide advice.

A small number of other occupational safety issues were addressed. Ovens, kilns, and furnaces are used for a variety of purposes, and adequate safety protection should be provided by use of a specific NFPA code and a *California Fire Code* article relevant to ovens. The unique use of tensile testing equipment on a laboratory scale has been adequately covered under the general conditions of 29 CFR 1910. The laboratory use of rotating equipment, mainly centrifuges, may require the application of some specific sections of an ANSI/UL standard, for implementation guidance, in addition to the general coverage of 29 CFR 1910.

Radiation Protection—Ionizing Radiation

LBNL will integrate the Radiological Protection activities relevant to worker protection, public protection and environmental protection into an overall Radiation Protection Program (RPP). The current RPP will be revised and will use the method by which non-DOE institutions are required to document their Radiation Protection Programs (regulatory basis: 10 CFR 20). The scope of such a program covers, but exceeds that of the legally mandated DOE *Radiation Worker Standard*, 10 CFR 835.

LBNL conducts a broad range of radiological activities, including biological and chemical reactions, use of sealed sources and radiation producing machines, and use of accelerators. In general, the worker protection aspects of these activities are adequately addressed by the DOE Radiation Worker standard, 10 CFR 835, which will be implemented in a manner consistent with 10 CFR 20 and other applicable external regulations. Since LBNL is a user institution, it is important that our programs be consistent with those at non-DOE institutions as much as possible. In assessing the full range of radiological hazards and issues at LBNL, a number of other standards were deemed appropriate to supplement and extend the protection provided by 10 CFR 835. These included some specific sections of 10 CFR 20, Title 17 CCR, and ANSI standards, and the International Air Transport Association (IATA) *Dangerous Goods Regulations* to supplement 49 CFR, *Research and Special Programs Administration* (hazardous materials regulations), and 49 CFR Part 397, Subpart D (radioactive materials routing). For instance, sealed source control is not addressed in 10 CFR 835, but is covered in CCR 17, applicable to California external facilities. The appropriate portion of the latter standard was selected so sealed source control at LBNL could be consistent with programs at external institutions. In some cases, external standards provide a more flexible means of implementing a risk-based Radiation Protection Program that meets the spirit of the DOE regulation, 10 CFR

835, yet is tailored to the LBNL workplace. Accelerator, irradiator, and X-ray safety issues were developed by the Accelerator Identification Team, in consultation with the Laboratory Safety Team.

Radiation protection of human subjects requires additional standards of review, informed consent, and training. These are provided by federal and state regulations and implemented using guidance issued by the National Council for Radiation Protection (NCRP).

Radiation Protection–Non-Ionizing Radiation

The Berkeley Laboratory conducts research work involving such agents as lasers, static magnetic fields, ultraviolet (UV) and radiofrequency radiation sources. The research use of these agents is usually not addressed in federal codes, and a number of consensus standards were deemed necessary to address the potential hazards. In particular, ANSI standards address laser issues, IEEE standards are appropriate for RF fields, and ACGIH TLVs should be used for static magnetic field and UV source standards. ACGIH states that the TLVs are "...recommendations or guidelines... to be interpreted and applied only by a person trained in this discipline..." (i.e., industrial hygiene), and the ACGIH "...does not advocate..." the use of TLVs "...as legal standards." In addition, the Safety Identification Team felt that hazards communication for physical agents such as these is not as well developed as for chemical issues. The Laboratory should develop an internal standard for this area, and implement it following the guidance of the section of DOE 440.1 dealing with hazards communication.

ENVIRONMENTAL PROTECTION IDENTIFICATION TEAM

<i>ISSUES</i>	<i>ID TEAM LEAD</i>	<i>SUBJECT MATTER EXPERT(S)</i>
Above Ground Storage Tanks and Transformers	Ron Pauer	Robert Fox
Accidental Release Reporting	Ron Pauer	Nancy Shepard
Air Emissions	Ron Pauer	Pat Thorson, Henry Tran, Steve Lasell
Asbestos	Ron Pauer	Pat Thorson, Paul Davis
Cultural Resources	Carol Kielusiak	
Emergency Preparedness	Ron Pauer	Don Bell
Endangered Species	Carol Kielusiak	
Environmental Protection Planning (CEQA)	Carol Kielusiak	
Environmental Radiation Protection	Ron Pauer	Steve Lasell
Equipment Containing Polychlorinated Biphenyls	Ron Pauer	Charles Smith
Floodplains and Wetlands	Carol Kielusiak	
Hazardous Material Management	Ron Pauer	Jack Salazar, Dave Tudor, Nancy Shepard
Hazardous Waste and Mixed (nonrad)	Tim Wan	Stan Terusaki
Medical Waste	Tim Wan	
Ozone Depleting Substances	Carl Schwab	Gary Lavagnino
Radioactive Waste and Mixed (rad)	Mike Schoonover	Stan Terusaki
Release of Potentially Rad Material to the Public	Ron Pauer	Henry Tran, Steve Lasell
Sanitary Sewer Discharges	Carl Schwab	Steve Black, Henry Tran, Steve Lasell
Site Environmental Report	Ron Pauer	Steve Black
Site Restoration	Carl Schwab	Susan Fields
Soil and Groundwater Protection	Carl Schwab	Steve Black
Surface and Storm Water Discharges	Ron Pauer	Ginny Lackner, Henry Tran, Steve Lasell
Underground Storage Tanks	Carl Schwab	Trang Ha
Waste/Nonhazardous	Tim Wan	June Schwabe

Introduction

The Berkeley Lab conducts its activities with the highest regard for protection of the environment and the health of the surrounding community. Since these activities often involve the use of hazardous materials, a strong link between potential hazards and the appropriate set of standards must be maintained. As a result, a team of experts in various aspects of environmental protection has been assembled to establish the appropriate set of standards for each hazard.

Planning for Protection

As a public agency, Berkeley Lab assists the University of California (UC) Regents in complying with the California Environmental Quality Act (CEQA). Approval authority has been formally delegated to the Berkeley Lab Director from the UC Regents for projects under \$5 million. Therefore, CEQA and its implementing regulations were determined to be necessary legal requirements. However, National Environmental Policy Act (NEPA) standards specifically state that compliance is the responsibility of federal agencies, such as DOE, and cannot be further delegated. The current practice is for the Lab to assist DOE to comply with NEPA requirements.

As a formal agreement between the Lab and DOE does not exist, the federal standards were not selected.

The federal laws and regulations regarding cultural resources require DOE to identify archaeological and historical resources present on their property, and to take proper steps to preserve or otherwise mitigate impacts to these resources. Additionally, DOE must consider the effects of their actions on archaeological and historical resources located on other lands. The current practice is for the Berkeley Lab to voluntarily assist DOE to meet these requirements. Because no formal agreement exists to assist DOE to comply with these standards, the National Historic Preservation Act, the Archaeological and Historic Preservation Act and their implementing regulations were not selected as required standards.

The federal Endangered Species Act was selected as a legal requirement because it requires the Lab to ensure that actions it authorizes, approves, and implements would not jeopardize the continued existence of threatened or endangered species and their habitat(s). The Lab contains potential habitat for listed endangered species and also contains an additional species proposed for listing by the state. In addition, work performed off-site may be impacted by this requirement. Since the federal Act has not waived its sovereign immunity for federal facilities, the state Endangered Species Act is not a legal requirement; however, DOE voluntarily complies and the Lab assists DOE in this practice. Since a agreement does not exist between the Lab and DOE regarding the state law, this standard was not determined to be a requirement for the Lab. As a matter of implementation, the Lab, however, will voluntarily continue to work with DOE to ensure compliance with the state Endangered Species Act.

In the federal Clean Water Act (CWA), there are provisions requiring DOE and Berkeley Lab to consider the effects of their projects on floodplains and wetlands. At Berkeley Lab, some on-site activities could affect wetlands in certain areas. In addition, Lab projects conducted off-site have the potential to impact floodplain or wetland areas. In some cases, DOE requires applicants for DOE financial assistance or other entitlements to submit a report on a proposed floodplain/wetlands action. Therefore, the floodplains and wetlands provisions of the CWA and the corresponding regulations in 10 and 33 CFR were selected as necessary legal requirements. Since sovereign immunity has been waived in the CWA, related provisions at the state level in the California *Fish and Game Code* were determined to be a necessary legal requirement. The *Executive Orders for Floodplain Management* (No. 11988) and *Protection of Wetlands* (No. 11990) were not selected since these represent requirements for DOE. However, the Lab will continue to voluntarily assist DOE to comply with the Executive Orders.

Potential Contamination Control

Emissions to the air from the Berkeley Lab and phase-out of ozone-depleting substances (ODS) are regulated by the Clean Air Act (CAA). Regulations for both radionuclide and non-radionuclide emissions and for ODS have been established in 40 CFR. Since sovereign immunity has been waived under the CAA, state and local regulations, not otherwise preempted by federal or state standards, were also determined to be necessary legal requirements. At the state level, requirements for non-radionuclide emissions have been established by the California Clean Air Act and its implementing regulations in Title 17. In addition, local air districts have been created by the state. The Bay Area Air Quality Management District has established a set of standards for implementing the federal and state requirements which apply to the Berkeley Lab. For radionuclide emissions, required standards are administered at the federal level by EPA. Since no formal agreement exists between the Lab and DOE, Executive Order (No. 12843, requiring DOE to implement procurement requirements and policies for federal agencies to handle ozone-depleting substances) was not selected as a necessary standard. However, the Lab will continue to voluntarily assist DOE to comply.

The environmental protection standard set for asbestos is consistent with that for non-radionuclide air emissions. For worker protection, asbestos standards have been prescribed in the Occupational Safety and Health Act (OSHA) and in its implementing regulations in 29 CFR.

The Clean Water Act (CWA), and its implementing regulations in 40 CFR, establish standards for discharges to surface/storm water and sanitary sewers. Since sovereign immunity was waived for the CWA, state and local standards apply to discharges to navigable waters. Therefore, the California Porter-Cologne Water Quality Control Act; ordinances by Berkeley, Oakland and East Bay Municipal Utility District; and appropriate implementing regulations were also selected as necessary legal requirements. However, these standards do not apply to radioactive materials, as these are regulated by the Atomic Energy Act (AEA). Standards for radioactive materials are discussed below.

The CWA was also selected as a necessary legal requirement for the storage of hazardous materials in aboveground tanks. Implementing regulations are found in both 40 and 29 CFR. At the state level, the California Aboveground Storage Act (to the extent involving discharges to navigable waters) and Articles 79 and 80 of the Fire Code were selected, since these standards contain requirements for the control of water pollution from aboveground tanks.

Requirements for the storage of hazardous materials in underground tanks have been established in the Resource Conservation and Recovery Act (RCRA) and its implementing regulations in 40 CFR. Since sovereign immunity has been waived with respect to RCRA, requirements in the California Health and Safety Code and in Title 23 apply. As the local implementing agency, the City of Berkeley's Ordinance for Hazardous Materials Management was also selected as a necessary legal requirement.

A hazardous materials inventory is legally required by the Emergency Planning and Community Right-to-Know Act (EPCRA) for facilities in SIC numbers 20-39. Since the primary SIC number for the Berkeley Lab is 8733, the preparation of a hazardous materials inventory is not a legal requirement. Executive Order (No. 12856) does require DOE to comply with EPCRA and Berkeley Lab voluntarily assists DOE to comply. However, since a formal agreement between the Lab and DOE does not exist, the EPCRA standards were not selected. Also not selected were the state and local requirements related to EPCRA because sovereign immunity has not been waived by EPCRA. However, the Lab will continue to voluntarily comply with state and local requirements (to the extent that the reporting thresholds are identical to the state levels) related to EPCRA.

Standards regarding equipment in use, containing polychlorinated biphenyl (PCB), have been established by the Toxic Substance Control Act (TSCA) and its implementing regulations in 40 CFR. At the Berkeley Lab, these standards apply to PCB-containing electrical equipment, such as capacitors. Administration of this standard is at the federal level, so no state or local standards apply. TSCA also contains requirements regarding the disposal of PCB equipment. Additional requirements for disposal have been established by RCRA and this issue is addressed in the Waste Management section below.

DOE currently has not finalized its regulations in the area of environmental radiation protection; however, draft regulations (10 CFR 834) are pending approval for final issue. Since 10 CFR 834 is pending, it was necessary to review the current DOE standards (Order 5400.1 and Order 5400.5) and guidance documents, and to select standards which provide an industry standard site program. Establishing standards which include all issues of an industry standard site program is important in assuring the protection of the public and environment. Also considered as part of the standard selecting process was the cost to both Berkeley Lab and DOE of implementing the selected standard and the pending approval of 10 CFR 834. In DOE Order 5400.1, specific paragraphs of Chapter IV were selected as necessary external standards to establish the

requirements for an environmental monitoring program. In DOE Order 5400.5, specific paragraphs of Chapter II were selected to establish the necessary external standards for public dose limits, determining reasonable emission reductions, release of property, performing dose evaluations, reporting and records management, and Chapter IV, for residual radioactive materials. In addition, the DOE implementation guidance, to the extent that it modifies the selected portions of Order 5400.5, was also selected as a necessary external standard. This guidance updates the level of tritium surface contamination with respect to releases of materials to the public and allows for DOE/OAK approval of Berkeley Lab release criteria with respect to materials with contamination above background levels. By not selecting entire DOE standards and guidance documents, many of the costly, non-value-added, prescriptive elements were eliminated. In addition to the DOE Orders, the domestic water quality standard in Title 22 was selected as an external standard because it establishes gross alpha and beta limits in drinking water which are used to evaluate environmental monitoring data.

Preparation of a site environmental report is not a legal requirement. However, it was determined that there is value added in the distribution of an annual report, similar in format and content to reports provided by private industry and by facilities regulated by the Nuclear Regulatory Commission. By selecting only portions of the DOE Manual, which is referenced by the DOE Order cited, the prescriptive format and content requirements provided in DOE Headquarters guidance documents are eliminated. This will allow the format and contents to be revised so that the report is appropriate for activities at Berkeley Lab. For example, selecting October 1 as the deadline each year has been determined to be reasonable. These requirements are consistent with those proposed in 10 CFR 834. Implementation of this standard should result in a more reasonable report requiring less cost to prepare and review, while providing useful information to the general public.

Waste Management

Hazardous, radioactive, mixed (hazardous and radioactive), and medical wastes are generated by a wide variety of research and support activities at the Berkeley Lab. These wastes are managed at its Hazardous Waste Handling Facility, waste and satellite accumulation areas, and fixed treatment units located throughout the site, and either treated on-site or shipped off-site for disposal.

The federal and state laws and regulations provide a comprehensive set of requirements for the management of hazardous waste and the hazardous components of mixed waste at the Berkeley Laboratory. Federal requirements have been established by the Resource Conservation and Recovery Act (RCRA) and related regulations in 40 and 29 CFR. The California Hazardous Waste Control Law and its implementing regulations in Title 22 and the Berkeley Municipal Code (to the extent applied to generator areas) were determined to be necessary legal requirements since sovereign immunity has been waived for federal facilities under the RCRA. In addition, the Lab has prepared a Site Treatment Plan for Mixed Waste, which has been approved by California EPA, that contains additional legal requirements. In addition, Waste Acceptance Criteria imposed by treatment, storage and disposal facilities are recognized as appropriate external standards.

Requirements for the management of radioactive wastes and the radioactive components of mixed waste are prescribed in DOE Order 5820.2A. Chapters II, III, IV, and V of the Order establish the standard set required by DOE for the Lab to comply and invoke the Waste Acceptance Criteria (WAC) of the disposal sites. These chapters cover transuranic, low-level, and accelerator-produced wastes, and wastes generated as a result of decommissioning facilities. The quality assurance references from this Order were not included because the level of hazard of Berkeley Lab waste does not warrant a standard developed for high risk operations. In addition, the WAC are important for protecting the public, worker safety and health, and the

environment at the disposal sites. Specifically, they create important limitations on waste composition and the packaging.

The Medical Waste Tracking Act contains requirements for medical waste, and was selected as a necessary legal requirement. Related regulations have been established in 29 CFR. In addition, the California Medical Waste Management Act was also selected because it contains additional necessary legal requirements.

Department of Transportation (DOT) requirements in 49 CFR, along with California Vehicle Code and implementing regulations (to the extent not preempted by DOT requirements), and 40 CFR and 22 CCR (hazardous waste transportation provisions), were selected for off-site transportation of hazardous, radioactive, and mixed wastes because they legally apply to transportation of materials on public roads and for a commercial purpose. Since on-site roads are not considered public roads and transportation by Berkeley Lab on such roads is not for commercial purpose, these standards were not selected for on-site transportation of wastes.

Site Restoration

The Resource Conservation and Recovery Act (RCRA) was selected because a Facility Assessment (FA) was conducted at the Berkeley Lab by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in 1991, and a report was prepared which summarized their findings. The Clean Water Act and its related state law (the California Porter-Cologne Water Quality Control Act) were also selected because these activities typically involve discharges of pollutants to navigable waters. As a result of the FA, DTSC determined that there have been releases of hazardous materials or wastes to the soil and groundwater. The FA identified potential Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs). RCRA and corresponding federal regulations in 40 CFR require that hazardous waste permits address corrective action of all releases. With respect to underground storage tanks, the requirements for corrective actions are prescribed by state regulations in Title 23. In May 1993, Berkeley Lab was issued an RCRA Hazardous Waste Facility Permit to operate its Hazardous Waste Handling Facility. The Permit requires Berkeley Lab to investigate and address problems associated with past releases at the Berkeley Lab site. Since the corrective action process includes the installation of monitoring wells, ordinances by the State Water Resources Control Board and the City of Berkeley were selected also.

Emergencies

Berkeley Lab's emergency preparedness program is based on a response to credible scenarios which include an earthquake on the Hayward Fault, wildland fire in the Oakland/Berkeley Hills, and small spills or releases of hazardous materials. The Lab is similar to a light industrial facility or university campus with comparable hazards. The Lab shares with the local jurisdictions the same hazards, response challenges, and resources; therefore, adopting similar standards allows the Lab to be consistent with the state and local emergency planning process. Lab emergency management staff participate in drills and exercises with the cities of Berkeley and Oakland, Alameda County, and the University. The Lab's Fire Department also participates in a state-wide mutual aid program. The Lab participates in the University of California system-wide emergency management council. The standards identified in Titles 29 and 40 of the Code of Federal Regulations are legally required and commonly used among all participating agencies. In addition, NFPA 1600 was chosen because it establishes disaster management criteria for the Lab's development and maintenance of a program for effective mitigation, preparedness, response, and recovery from the hazards identified during the hazards assessment. In addition, the California Health and Safety Code and local risk management prevention plan requirements are legally required to the extent involving prevention of accidental releases to air.

Standards for release reporting have been established in various federal laws, including the Comprehensive Environmental Recovery, Compensation and Liability Act (CERCLA), Clean Water Act (CWA) and Clean Air Act (CAA), all of which were selected as necessary legal requirements. Waivers of sovereign immunity in the CWA, CAA, and RCRA resulted in the selection of related state and local requirements as legal requirements. Berkeley Lab also voluntarily reports accidental releases where sovereign immunity has not been waived pursuant to state and local codes (to the extent that local reporting thresholds are consistent with those of the state).

Issues and Work Smart Standards

Facility Design and Construction Issues

Design and Review

Facilities Design

48 CFR 970.7104-28, Construction and Architect—Engineer (A-E) contracts.
DOE Order 430.1, Life Cycle Asset Management (LCAM)
DOE Order 420.1, Facility Safety
California Administrative Code (CAC), Title 24, Building Standards
NFPA 101, Life Safety Code
LBNL Design Management Procedures Manual, RD 3.22, Lateral Force Design
(Seismic Safety)

Construction

Construction Safety

29 CFR 1926, OSHA Construction Industry Standards
29 CFR 1910, General Industry Safety Orders
CCR Title 8, California Construction Safety Orders

See also the requirements listed under Worker Protection Issues, such as Fire Protection, Hazardous Materials Handling, Materials Handling, Industrial Hygiene, and Electrical Safety. These requirements also provide standards for Design and Construction.

Worker Protection Issues (Includes Infrastructure, Accelerator, and Laboratory Safety Issues)

Controlled Substances 21 CFR 1308

Explosives

Explosive Fast Acting Valves
29 CFR 1910.109, Explosive and Blasting Agents
49 CFR 172, Storage

Fire

Fire Protection, Life Safety
29 CFR 1910, OSHA General Industry Standards
29 CFR 1926, OSHA Construction Industry Standards
NFPA 101, Life Safety Code
NFPA 1, Fire Prevention Code
CAC Title 24 Part 9, California Fire Code
CAC Title 24 Part 2, California Building Code

Industrial Hygiene

Biological, Animal Handling, Animal Experimentation
9 CFR, Chapter I, Animal and Plant Inspection Service, Department of
Agriculture
7 USC 2131-2157, Animal Welfare Act (Transportation, Sale, and Handling of
Certain Animals)

Biological, Bloodborne Pathogens
29 CFR 1910.1030, Bloodborne Pathogens

Biological, Human Subjects

10 CFR 745, Protection of Human Subjects (DOE)

45 CFR 46, Common Rules for Protection of Human Subjects

Biological, Infectious Agents

NIH, Guidelines for Research Involving DNA Molecules

CDC/NIH, Biosafety in Microbiological & Biomedical Labs

Berkeley Lab will develop internal standards to address the issues covered by the external standards. After those standards have been developed, the external standards will be used only as implementation guidance.

Chemical Carcinogens (laboratory-scale use)

29 CFR 1910 Subpart Z (1910.1001, asbestos; .1003, 4, nitrobiphenyl; .1004, alpha-naphthylamine; .1006, methyl chloromethyl ether; .1007, 3,3 dichlorobenzidine; .1008, bis-chloromethyl ether; .1009, beta naphthylamine; .1010, benzidine; .1011, 4-aminodiphenyl; .1012, ethyleneimine; .1013, beta-propiolactone; .1014, 2-acetylaminofluorine; .1015, 4-dimethylaminoazobenzene; .1016, N-nitrosodimethylamine; .1017, vinyl chloride; .1018, arsenic; .1025, lead (carcinogenic compounds of lead); .1028, benzene; .1044, DBCP; .1045, acrylonitrile; .1047, ethylene oxide; .1048, formaldehyde; .1050, cadmium.)
CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Confined Space

29 CFR 1910.146, Permit Required Confined Spaces

29 CFR 1926.21, .352, .353, OSHA Construction Industry Standards

Corrosive

29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)

29 CFR 1910.151, Medical Services and First Aid

CAC Title 24, Part 9, California Fire Code Article 80 (Hazardous Materials)

Cryogenic Materials and Use

29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)

29 CFR 1910.103, Hydrogen

CAC Title 24, Part 9, California Fire Code Article 75, Cryogenics

CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Drinking Water

40 CFR 141, 142, 143, EPA Primary and Secondary Drinking Water Standards

Flammable and Combustible Liquids

29 CFR 1910.106, 144, 108, 114, 1200, 107, 115, 178

29 CFR 1926.152, 155

CAC Title 24, Part 9, California Fire Code Article 79, Flammable & Combustible Liquids

NFPA 30, Flammable and Combustible Liquid Code

Flammable gases

- 29 CFR 1910.110, LPG
- 29 CFR 1920.253, Oxygen-Fuel Cutting
- 29 CFR 1910.146, Confined Spaces
- 29 CFR 1910.103, Hydrogen
- 29 CFR 1910.252, Cutting and Welding
- 29 CFR 1910.178, Powered Industrial Trucks
- 29 CFR 1910.1000, Toxic Materials
- 29 CFR 1926.55, Gases, Vapors, Fumes, Dusts and Mists
- 29 CFR 1926.350, Gas Cutting and Welding
- 29 CFR 1926.153, LPG Storage
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Food Sanitation

- CCR, Title 22, Part 7 (Retail Food Facilities), Chapter 4 (Retail Food Practices—California Uniform Retail Food Facilities Law [CURFFL])

Hazardous Material Handling

- 29 CFR 1910.132 - 138, Personal Protective Equipment
- 29 CFR 1910.1000, OSHA Permissible Exposure Limits
- 29 CFR 1910.1200, Hazard Communication Standard
- 29 CFR 1910.1001 - 1050, OSHA Expanded Containment Standards (i.e., lead, arsenic, cadmium)
- 29 CFR 1940.1450, Occupational Exposure to Hazardous Chemicals in Laboratories
- 29 CFR 1926 Subpart D, Occupational Health and Environmental Controls
- 29 CFR 1926 Subpart E, Personal Protective and Life Saving Equipment
- 29 CFR 1926 Subpart Z, Toxic and Hazardous Substances
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) for Chemical Substances

Health Hazard Gas

- 29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Heat/Cold Stress

- The ACGIH Threshold Limit Values for Heat/Cold Stress

Highly Toxic Materials

- 29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)
- CCR Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Lead Exposure

- 29 CFR 1910.1025 & .1450, OSHA General Industry Standards
- 29 CFR 1926.62, OSHA Construction Industry Standards

Local Exhaust Ventilation (Includes HEPA Filtration Systems)

- 29 CFR 1910.94, Ventilation
- 29 CFR 1910.107, Spray Finishing Using Flammable or Combustible Liquids
- 29 CFR 1910.108, Dip Tanks Containing Flammable or Combustible Liquids
- 29 CFR 1910.1030, Bloodborne Pathogens
- 29 CFR 1926.57, Ventilation
- 29 CFR 1926.353, Ventilation and Protection in Welding, Cutting, and Heating

Noise Levels

- 29 CFR 1910.95, General Industry Noise Standards
- 29 CFR 1926.52, Construction Noise Standards

Oxidizers

- 29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)
- CCR Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Peroxidizable Chemicals

- LBNL will need to develop an internal standard based on the comprehensive review article, "Safe Handling of Peroxidizable Chemicals: A Critical Review of the Literature," by R.J. Kelly, Chemical Health & Safety, Sept./Oct. 1996.

Pesticide Application and Use

- 40 CFR 170, 171 Subchapter E, Pesticide Programs
- 29 CFR 1910, OSHA General Industry Standards

Pyrophoric Gas, Solid or Liquid

- 29 CFR 1910
- 29 CFR 1910.1029, Cadmium (applicable portions)
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Reactive or Explosive Chemicals

- 29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Repetitive Motion; Ergonomics

- Public Law 91-596, Section 5 (a) (1), Occupational Safety & Health Act, General Duty Clause)
- LBNL Standard to Minimize and Control Ergonomic Risks (to be developed)

Reproductive Toxin

- 29 CFR 1910
- CAC Title 24, Part 9, California Fire Code Article 80, Hazardous Materials
- CCR Title 22, Division 2, Part 12000 (c), Chemicals Known to the State to Cause Reproductive Toxicity (consensus listing solely referenced to define reproductive toxins)

Toxic Materials

- 29 CFR 1910.1000, Air Contaminants, Permissible Exposure Limits (PELs)
- CCR Title 24, Part 9, California Fire Code Article 80, Hazardous Materials

Workplace Ventilation

- 29 CFR 1910, OSHA General Industry Standards
- 29 CFR 1926, OSHA Construction Industry Standards

Occupational Safety

Electrical Safety

- 29 CFR 1910.301 - 399, Subpart S, Electrical
- 29 CFR 1910.147, Lockout/Tagout
- NFPA 70, National Electrical Code, as appropriate
- NFPA 70E, Electrical Safety Requirements for Employee Workplaces

Lighting (Illumination) of Work Areas

- 29 CFR 1910, OSHA General Industry Standards
- 29 CFR 1926.26 & .56, OSHA Construction Industry Standards

Linear Motion—Tensile Tester

- 29 CFR 1910

Material Handling

- 29 CFR 1910, General Industry Standards

Ovens (includes laboratory furnaces)

- NFPA 86, Standard for Ovens and Furnaces
- CAC Title 24, Part 9, CFC Article 62, Industrial Baking and Drying Ovens

Rotating Equipment—Centrifuges

- 29 CFR 1910

Working at Heights, Slips, Trips and Falls, Housekeeping

- 29 CFR 1910, OSHA General Industry Standards
- 29 CFR 1926, OSHA Construction Industry Standards

Pressure

Compressed Gases

- 29 CFR 1910.101, Compressed Gases—General Requirements
- 29 CFR 1910.102, Acetylene
- 29 CFR 1910.103, Hydrogen
- 29 CFR 1910.104, Oxygen
- 29 CFR 1910.110, Storage and Handling of Liquefied Petroleum Gases
- 29 CFR 1910.253, Oxygen Fuel Gas Welding & Cutting
- 29 CFR 1910.120(q), Emergency Response
- 29 CFR 1910 Subpart C, General Safety and Health Provisions
- 29 CFR 1910 Subpart I, Personal Protective Equipment
- 29 CFR 1926.350, Gas Welding & Cutting
- 29 CFR 1926.55, Gases, Vapors, etc.
- 29 CFR 1926.153, Liquefied Petroleum Gas
- 29 CFR 1926.306, Air Receivers
- 29 CFR 1926 Subpart C, General Safety and Health Provisions
- 49 CFR 171 - 179, Storage & Transportation Guidance
- CAC Title 24, Part 9, California Fire Code, Article 49, Welding & Cutting
- CAC Title 24, Part 9, California Fire Code, Article 74, Compressed Gases
- CAC Title 24, Part 9, California Fire Code, Article 80, Hazardous Materials
- CAC Title 24, Part 9, California Fire Code, Article 51, Semi-conductor fabrication
- CAC Title 24, Part 9, California Fire Code, Article 82, Liquefied Petroleum Gas

Mechanical Hazards—Tools, Equipment and Pressurized Containers
29 CFR 1910, OSHA General Industry Standards
29 CFR 1926, OSHA Construction Industry Standards

Pressure Equipment—Compressed Gas Cylinders
29 CFR 1910
29 CFR 1926
CFC Article 74, Compressed Gas
CFC Article 80, Hazardous Materials

Pressure Equipment—Glass or Other Brittle Components
29 CFR 1910
29 CFR 1926

Pressure Equipment—Pressure Vessels
29 CFR 1910.169, Air Receivers
29 CFR 1910.106 (b) (1) (v)
29 CFR 1910.217 (b) (12)
Title 8 Industrial Relations, State of California Admin. Code Part 1, Chapter 4,
Subchapter 1, Unfired Pressure Vessel Safety Orders

Vacuum Equipment—Back-Filled From Pressure Source
29 CFR 1910.101 (Compressed gases - general requirements) Pressure Relief
Device
CGA pamphlet S-11-1963 and 1965 addenda
CGA pamphlet S-1.2-1963, Pressure Relief

Radiation Protection—Ionizing

Accelerators—On Site Exposure
10 CFR 835

Control of Radioactive Sealed Sources
10 CFR 835
CCR 17 Section 30275

Laboratory Airborne Radioactivity Monitoring
10 CFR 835.403, Area Monitoring

Radiation Dose Limits and Dose Assessment
10 CFR 835 Subpart C

Radiation Protection of Human Subjects
21 CFR 50, 60, 361, and Subchapters H and J, Protection of Human Subjects,
Informed Consent, Standards for Clinical Review Boards for Clinical
Investigations, Medical Device Requirements, Human Subjects Committee
Requirements.
45 CFR 46 and 10 CFR 745, Common Rules for Protection of Human Subjects.
CCR17 Subchapters 4.5 and 4.6, Training Requirements for Technologists
Administering Radiation to Human Subjects

Radiation Protection Program
10 CFR 835—Subpart B, Radiation Protection Programs (835.101)
10 CFR 20.1101, Radiation Protection Programs

Radiography—Equipment and Parts
17 CCR 30330-30337

Radiation Safety Training
10 CFR 835, Occupational Radiation Protection (DOE)

Radiological Instrumentation
10 CFR 835.401, Section C, Occupational Radiation Protection

Radiological Posting and Labeling
10 CFR 835, Subparts F and G, Occupational Radiation Protection
10 CFR 20, Subpart J, Precautionary Procedures

Radiological Records
10 CFR 835 Subparts H and I, Records and Reports
10 CFR 20 Subparts L and M, Records and Reports (for tritium, only)

Transportation of Radioactive Materials
49 CFR, Research and Special Program Administration, Subchapter C, Hazardous Materials Regulations
49 CFR Part 397, Subpart D, Radioactive Materials Routing
IATA, Dangerous Goods Regulations (37th edition)
On-site transportation of radioactive materials is currently addressed by LBNL, in PUB-3000 and other internal EH&S procedures.

Workplace Radiation Monitoring
10 CFR 835, Occupational Radiation Protection

X-Ray/Gamma
X-Ray Machines and Electron Microscopes (Non-Medical)
10 CFR 835
ANSI N43.2, Sections 5.2.1.1, 5.2.1.2, 5.2.2.3, 5.2.2.1.4, 6.5, 7.1
LBNL PUB-3000, Chapter 21, X-Ray Safety Sections

Irradiators using radioactive material
10 CFR 835
ANSI N43.3, Definitions, Sections 4.1, 5.1.1, 5.1.2, 5.1.4, 5.1.6.3, 5.1.5.2, 5.1.5, 7, 9.1, 9.2, 9.4, Annex 3

Radiation Protection—Non-Ionizing

Laser Systems
29 CFR 1910, Occupational Safety & Health (various sections)
29 CFR 1926, Safety & Health for Construction (various sections)
ANSI Z136.1 - 1993, American National Standard for the Safe Use of Lasers, (except section 3.4.1)
ANSI Z136.2, American National Standard for the Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources

Radio Frequency (RF) Source
IEEE Standard C95.1-1991, Safety Levels with Respect to Human Exposure to Radiofrequency Electromagnetic Fields. 1992.
LBNL Standard for Hazard Communication on the Issue of RF Source (to be developed)

Static Magnetic Field > 5 gauss

The ACGIH Threshold Limit Values for Physical Agents: Static Magnetic Fields
LBNL Standard for Hazard Communication on Static Magnetic Fields (to be developed)

Ultraviolet (UV) Source

The ACGIH Threshold Limit Values for Physical Agents: Ultraviolet Radiation
LBNL Standard for Hazard Communication on Ultraviolet Radiation (to be developed)

Vehicular & Transportation

Hazardous Material Transportation—Offsite

49 CFR 106-110, Transportation

49 CFR 170-180, Hazardous Materials Regulation

49 CFR 397, Route Designations

Vehicle Code, State of California and implementing CCR sections to the extent not preempted by DOT requirements

City of Berkeley provision in Ordinance 5474 prohibiting transportation on specified streets at which purge chamber openings are located

Hazardous Material Transportation—Onsite

LBNL Health & Safety Manual (PUB-3000, Chapter 5, Part VIII, Section 13)

Mechanical Hazards—Aviation

DOE 440.2, Aviation

Traffic Hazards

Vehicle Code, State of California and implementing CCR sections

29 CFR 1910, OSHA General Industry Standards

29 CFR 1926, OSHA Construction Industry Standards

49 CFR 40, Procedures for Workplace Drug Testing Programs

49 CFR 382, Controlled Substances and Alcohol Use and Testing

Environmental and Public Protection Issues

Planning for Protection

Endangered Species

Federal Endangered Species Act, 16 U.S.C. 1531 et seq.
7 CFR 355, Endangered Species Regulations Concerning Terrestrial Plants
50 CFR 17, ESA Rules.

Environmental Protection Planning (CEQA)

California Public Resources Code Sections 2100-2178.1, California
Environmental Policy Act (CEQA)
14 CCR Section 15000 et seq., State CEQA Guidelines

Floodplains and Wetlands

33 U.S.C. 1344 (Sections 301, 401, 404 and 506), Clean Water Act
10 CFR 1022, Compliance with Floodplain/Wetlands Environmental Review
Requirements
33 CFR 320-323, 330 and 352 Corps of Engineers Regulations for Protection of
Waters of the U.S. and Nationwide Permit Program
California Fish & Game Code, Sections 1601-1607

Potential Contamination Control

Aboveground Storage Tanks (includes non-PCB transformers)

33 USC 1251 et seq., Clean Water Act
29 CFR 1910.106, Flammable and Combustible Liquids
40 CFR 110, Discharge of Oil; 112, Oil Pollution Prevention
CAC Title 24, Part 9, California Fire Code, Article 79 and Article 80 (with respect
to the control of water pollution)
California Health and Safety Code, Division 20, Chapter 6.67, Aboveground
Storage of Petroleum (to the extent involving discharges to navigable waters)

Air Emissions

42 USC 7401 et seq., Clean Air Act
40 CFR 61, Subpart H, National Emission Standards for Emissions of
Radionuclides Other Than Radon From DOE Facilities
40 CFR 50-88, Chapter 1, Subchapter 2, Air Programs
40 CFR 260-271, Subpart AA & CC (RCRA)
California Health and Safety Code 39000 et seq., Air Resources, Clean Air Act,
17 CCR, Division 18 Air Resources Board (stationary and mobile sources)
BAAQMD Regulations 1 through 12, BAAQMD Manual of Procedures (and all
permits pursuant)
NESHAP FFCA Stack Sampling Compliance Strategy (previously developed and
agreed upon by DOE and EPA)

Asbestos—Worker and Environmental Protection

42 U.S.C. 7401 et seq., Clean Air Act
40 CFR 61, Subpart M, National Emission Standard for Asbestos and Subpart F,
Appendix A
29 U.S.C. 668 et seq., Occupational Safety and Health Act
29 CFR 1910.1001, Asbestos (general industry)
29 CFR 1926.1101, Asbestos (construction activities)
BAAQMD Regulation 11, Rule 2, Asbestos

Environmental Radiation Protection

DOE Order 5400.1, Chapter IV, Paragraphs 1.a, 3, 4, 5 (not including 5.a.2.d), 6, and 10.c.

DOE Order 5400.5, Chapter II, Paragraphs 1 (not including 1.a.3.c and 1.c), 2, 6 (not including 6.a), 7, and 8.a.

Title 22, CCR, Division 4, Chapter 15, Article 5, Domestic Water Quality, Section 64443, Man-Made Radioactivity

Ozone Depleting Substances

42 U.S.C. Section 7671 et seq., CAA Amendments of 1990

40 CFR 82, Protection of Stratospheric Ozone, Subparts A-G

Bay Area Air Quality Management District (BAAQMD) Regulation 12, Rule 7, Motor Vehicle Air Conditioner Refrigerant

PCB Containing Equipment

15 U.S.C. 2601-2692, Toxic Substances Control Act

40 CFR 761, Polychlorinated Biphenyls (PCB)

Release of Potentially Radioactive Contaminated Material and Property

DOE Order 5400.5, Chapter II, Paragraph 5, and Chapter IV

Application of DOE 5400.5 requirements for Release and Control of Property Containing Residual Radioactive Material (memo, dated 11/17/95)

Release of Potentially Volume-Activated Material

DOE Order 5400.5 Chapter II, 5.C, Chapter IV, 5.A

Application of DOE 5400.5, Requirements for Release and Control of Property Containing Residual Radioactive Material (memo, dated 11/17/95)

A new standard is required for unrestricted release for volume-activated material.

Sanitary Sewer Discharges

33 USC 1251 et seq., Clean Water Act

40 CFR 136, Analysis Procedures; 403, General Pretreatment Regulations; 433,

Metal Finishing Point Source Category

Porter-Cologne Water Quality Control Act, CA Water Code Section 13000 et seq. [except AEA discharges])

East Bay Municipal Utility District (EBMUD) Ordinance No. 311 (and all permits pursuant [except AEA discharges])

10 CFR 20, Subpart K, Section 20.2003, Disposal by Release into Sanitary Sewerage

17 CCR, Article 5, Waste Disposal, Section 30287, Disposal by Release into Sanitary Sewerage Systems

NOTE: The District imposes radiation discharge standards through its waste water discharge permit, but may not have been delegated this authority from the Atomic Energy Act. However, Berkeley Lab annually accepts these standards through formal approval of the waste water discharge permits.

Site Environmental Report

DOE Order 231.1, Paragraph 5.d.2 (to the extent that it requires compliance)

DOE Manual 231.1-1, Chapter 1, Paragraph 1.a and 1.b

Surface/storm water

33 USC 1251 et seq., Clean Water Act
40 CFR 122, NPDES System; 136, Analysis Procedures
California Porter-Cologne Water Quality Control Act, California Water Code, Division 7, Section 13001, et seq. (and all permits pursuant [except AEA discharges])
City of Berkeley Municipal Code 17.20, Reduction of Storm water Pollution (except AEA discharges)
Oakland Municipal Ordinance 11590, Storm Water Management and Discharge Control (except AEA discharges)
For discharges of AEA materials, refer to the Environmental Radiation Protection Document

Underground Storage Tanks

42 U.S.C. Section 6901 et seq., Resource Conservation and Recovery Act
40 CFR 280, Underground Storage Tanks
California Health and Safety Code, Chapter 6.7, Underground Storage of Hazardous Substances
CCR Title 23, Division 3, Chapter 16, Underground Storage Tank Regulations
City of Berkeley Ordinance, Chapter 11.52, Hazardous Materials Management (and all permits pursuant)

Waste Management

Hazardous and Non-Radioactive Portion of Mixed Waste

42 U.S.C. 6901 et seq., Resource Conservation and Recovery Act (RCRA)
Federal Facility Compliance Act (FFCA)
40 CFR Sections 260-279, Hazardous Waste; 761.1, PCBs
29 CFR 1910.120, Training
29 CFR 1910.1001, Asbestos Hazardous Waste Control Law, Hazardous Waste Control Law,
California Health & Safety Code, Section 25100 et seq.
22CCR Section 66260.1 et seq. (and all permits pursuant)
Disposal Site Waste Acceptance Criteria
FFCA Order for LBNL HWCA 95/96-016, Site Treatment Plan for Mixed Waste
Berkeley Municipal Code, Chapter 11.52, Hazardous Materials Management as applied to generator areas

Medical Waste

42 U.S.C. Section 6992 et seq., Medical Waste Tracking Act of 1988, Subtitle J, Solids Waste Disposal Act (RCRA)
29 CFR 1910.1030, Bloodborne Pathogen Standard
California Health and Safety Code, Sections 25020.5 - 25090.6, California Medical Waste Management Act

Nonhazardous Waste—Including Pollution Prevention, Waste Minimization

42 USC, Section 6901 et seq., Solid Waste Disposal Act
40 CFR Part 243-256, Federal Agency Recycling Programs
California Public Resources Code, Section 4000 et seq., California Integrated Waste Management Act of 1989
14 CCR, Section 17200 et seq.
Measure D, Section 64, Alameda County Waste Reduction and Recycling

Radioactive and Non-Hazardous Portion of Mixed Waste

49 CFR 173, 177 (DOT), Packaging, Shipping, Carrier Loading

Disposal Site Waste Acceptance Criteria

DOE Order 5820.2A, Chapter II, Transuranic Waste excluding 3.j(QA); Chapter III, Low-Level Waste excluding 3.i (QA) ; Chapter IV, Accelerator Produced Radioactive Material excluding 3.b(QA), Chapter V, Decommissioning Facilities excluding 3.e (QA)

Site Restoration

Characterization and Remediation

42 USC 6901 et seq., Resource Conservation and Recovery Act (RCRA)

33 USC 1251 et seq., Federal Water Pollution Control Act (Clean Water Act)

40 CFR 260, 264 (Corrective Action for Solid Waste Management Units, Subpart S), 265, 268, 270, and 271

California Porter Cologne Water Quality Control Act (to the extent involving discharges of pollutants to navigable waters)

23 CCR Division 3, Chapter 16, Article 5 (UST release abatement) and Article 11 (UST corrective actions)

DOE Order 5400.5, Chapter IV (release of rad contaminated property and material)

East Bay Municipal Utility District Ordinance No. 311, Discharge of Treated Groundwater (except AEA materials)

City of Berkeley Municipal Code 16. 12.30-32-34), Monitoring Well Ordinance (and all permits pursuant except AEA materials)

SWRCB Model Well Ordinance, Water Code Section 801c (except AEA materials)

Emergencies

Accidental release reporting

CERCLA: 42 USC 9603, 40 CFR 302.1 et seq.

Clean Water Act : 33 USC 1321 (b) (5), 40 CFR 110.10, 117.21; California Health and Safety Code 25270.8.

California Water Code 13271, 13272, 13050 (p) (2) (c); 23 CCR §§ 2250, 2251, 2260; California Health and Safety Code 25270.7, to the extent the preceding involve discharges of "pollutants" (non-AEA materials) to "navigable waters" (which do not include groundwaters).

Hazardous Waste: 22 CCR 66262.34, 66264.56; 13 CCR 1166(b); LBL HWHF Permit reporting provisions; California Health and Safety Code 25242, California Health and Safety Code 25189(c), (d), 25189.2(c), 25189(f); California Health and Safety Code 25359.4 and California Health and Safety Code Section 5411.5 (except AEA materials).

Underground Storage Tanks : 40 CCR 280.34 (a) (2), 280.50, 280.53, 280.61; California Health and Safety Code 25295 (a) (1), 23 CCR 2650, 2652.

PCBs: 40 CFR 761.125 (a).

Air: BAAQMD Reg 1-431, 1-432.

Hazardous Materials Transportation 49 USC 5110 (d) and, assuming not preempted by DOT regs, California Vehicle Code 23112.5, 13 CCR 1166.

City of Berkeley Stormwater ordinances, to the extent involving non-AEA materials.

EPCRA: 42 USC California 11004 and 40 CFR 355, per Executive Order 12856.

Emergency Preparedness

29 CFR 1910.38, Employee Emergency Plans

29 CFR 1910.120, Hazardous Waste Operations and Emergency Response

29 CFR 1910.165, Employee Alarm Systems

40 CFR 68, Chemical Accident Prevention Provisions (CAA)

40 CFR 355, Emergency Planning and Notification (SARA Title III)

To the extent involving prevention of accidental releases to air: California Health & Safety Code Div. 20, Ch. 6.95, Art. 2, implementing OES regulations at Title 19 CCR and COB M.C. 11.52.140(B) and Oakland C.M.S. Art. 12, Ch. 2 adopting California Health & Safety Code Div. 20, Ch. 6.95, Art. 2.

NFPA 1600, Disaster Management

California Health & Safety Code Div. 20, Ch. 6.95, Art. 2, implementing OES regulations at Title 19 CCR, and COB M.C. 11.52.140(B) and Oakland C.M.S., Art. 12, Ch. 2, adopting California Health & Safety Code Div. 20, Ch. 6.95, Art. 2 even if not involving prevention of accidental releases to air, voluntary compliance.

Radiological Emergency Response

10 CFR 835.1301, Subpart N, Accidents and Emergencies

Review Team Summary Tables

DOE/OAK ES&H Policy Committee Comments

Date	Issue	Disposition*	Remarks	ID Dbase Ref
9/16/96	Aboveground Storage Tanks	W	Already addressed.	233
9/16/96	Repetitive motion	W	Internal standard to be developed.	188
9/16/96	Drinking water	P	Standards identified and ANSI added to implementation.	142
9/18/96	10 CFR 20 & CCR 17 not needed in set	P	Removed except specific sections.	164
9/18/96	ACGIH TLVs in set	P	Added for chemicals.	5
9/18/96	property protection from fire	W	Covered by environmental team, potential contamination control.	234
9/23/96	Accelerator Air Activation	W	Standards modified.	2
9/23/96	Accel. Release of Volume Activated Mat.	W	Standards modified.	183
10/7/96	Standard Revisions	N	Implementation issue.	260
10/7/96	Lack of ES&H management standards	N	Outside of WSS scope, implementation issue.	261
10/7/96	Future changes to standards	N	Implementation issue.	262
10/7/96	Document dissent	W	Convened Group included in charter as decision authority.	263
10/7/96	Validation and length of set	P	Length is greater, since no consolidation of many standards in a few DOE orders. Set is initially validated by the confirmation team.	264
*W = Wholly incorporated P = Partially incorporated N = Not incorporated				

Berkeley Lab Safety Review Committee Comments

Date	Issue	Disposition*	Remarks	ID Dbase Ref
9/25/96	Removal of PUB-3000 from Worker Prot.	P	Removed except specific sections.	77
9/25/96	Is 6430.1A applic. to Bldg. & Fac. Safety?	W	Removed from set.	41
9/25/96	PUB-3000 Ch. 23 re seismic safety	W	Moved to Implementation.	201
9/25/96	ANSI for Rotating Equip.	W	Moved to Implementation.	192
9/25/96	Order 440.1 for fire	W	Moved to Implementation.	69
9/25/96	6430.1A for Industrial Hygiene	W	Moved to Implementation.	187
9/25/96	Health Hzd Gas re PUB-3000	P	Moved to Implementation.	90
9/25/96	Pyrophoric Gas re DOE Handbook	W	Moved to Implementation.	159
9/25/96	Remove DOE Pressure Safety Manual, PUB-3000 Ch. 7 ARI Stds, APIS 620, CGA V-7	P	Moved to Implementation, along with ASME standards.	156
9/25/96	Laser Systems - remove PUB-3000 and NFPA 115	W	Moved to Implementation.	108
9/25/96	Remove Lab procedure for calibrating instruments	W	Removed from set.	177
9/25/96	Fixed Sources — X-ray/ Gamma, remove PUB-3000 Ch. 21	P	Moved to Implementation for Irradiators.	161
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Confirmation Team Comments

Date	Issue	Disposition*	Remarks	ID Dbase Ref
9/25/96	Recombinant DNA guidelines needed	W	Added to set as external regulation.	17
9/25/96	Contract employee liability	W	Already addressed in set.	110
9/25/96	ANSI (or CAL OSHA draft) in repetitive motion std?	P	Internal standard to be developed.	186
9/25/96	10 CFR 21 defects in products	N	Not applicable to Berkeley Lab.	180
10/8/96	Facility Design — consider DOE O 420	W	Added to set.	61
10/8/96	Construction— CCR Title 8	W	Wording added to set.	25
10/8/96	Fire—treat like electrical (AHJ)	W	Wording added to ID form.	66
10/8/96	Human Subjects	W	Already addressed in set.	100
10/8/96	Electrical Safety	W	ID form modified.	46
10/8/96	Pressure Compressed Gases	W	Already addressed in set.	157
10/8/96	Aviation	W	Already addressed in set.	11
10/8/96	Hzd. & Non-Rad. Waste — add site acceptance criteria	W	Added to set.	80
10/8/96	Emergency Preparedness	W	Already addressed in set.	53
10/8/96	Rad. Safety Training	W	Wording added to ID form.	167
10/8/96	Ctrl. of Radioactive Sealed Sources — DOE Nuc. Mat. Mgmt. Order	W	Already included in contract as Safeguards and Securities order.	29
10/8/96	Rad. Inst.— Add ANSI to implementation	W	ANSI standard added to implementation.	176
10/8/96	Cryogenic Mat. & Use	N	No effect on set.	33
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Confirmation Team Comments (continued)

Date	Issue	Disposition*	Remarks	ID Dbase Ref
10/8/96	Peroxidizable Chemicals	W	Already addressed in set.	149
10/8/96	Material Handling	W	Already addressed in set.	125
10/8/96	Traffic Hzds	W	Controlled substances added as issue.	216
10/8/96	Controlled Substances	W	Controlled substances added as issue.	30
10/8/96	Air Emissions (NESHAPS) in Implementation	W	Moved to implementation.	9
10/8/96	Hzd Mat. Inventory in Implementation	W	Moved to implementation.	86
10/8/96	Sanitary Sewer	W	Already addressed in set.	196
10/8/96	Reptng. Nuc. Mat. Trans & Inventory (NMMSS)	W	Already included in contract as Safeguards and Securities order.	140
10/8/96	Radiography of welds/ construction	W	Added to set.	173
10/8/96	Repetitive Motion	W	Already addressed in set.	185
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Stakeholder Comments

Date	Issue	Disposition*	Remarks	ID Dbase Ref
8/29/96	Safety video unnecessary	N	Implementation issue.	235
8/29/96	LOTO procedures	P	Standards will allow more efficient implementation.	236
8/29/96	Strobe lights/fire alarms	N	Implementation issue.	238
8/30/96	Gloves for cryogens	N	Implementation issue.	239
8/30/96	Chemical inventory	P	Standards will allow more efficient implementation.	21
9/2/96	Exempt values for sources	P	Standards will allow more efficient implementation.	171
9/3/96	General issues incl. remove interpretations	P	Standards will allow more efficient implementation.	88
9/4/96	Seismic restraints on equipment	P	Flexibility included in implementation.	237
9/4/96	Disposal of consumer chemicals	N	Implementation issue.	82
9/4/96	Access to rad areas	P	Standards will allow more efficient implementation.	170
9/5/96	Accel. Safety Order	P	Only management sections retained.	240
11/6/96	Notification of SH insufficient	P	Process will continue, with annual report available for stakeholders, allowing input.	241
11/6/96	Why do we choose laws?	W	Covered in report introduction.	242
11/6/96	Regulator inclusion	P	Regulators invited as stakeholders.	243
11/6/96	Don't do only minimum compliance	W	Set includes more than 50 standards above minimum compliance and many more guidance documents under implementation.	244
11/6/96	CA drinking water stds.	P	Already included in implementation.	245
11/6/96	Volume activation std. development	P	Independent experts will be solicited to develop standards.	246
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Stakeholder Comments (continued)

Date	Issue	Disposition*	Remarks	ID Dbase Ref
11/6/96	Discussion of accelerator issues not self-evident	W	Narrative has been corrected.	247
11/6/96	Endangered species protection	P	Narrative revised to clarify LBNL responsibilities.	248
11/6/96	Right to Know	P	Narrative revised to clarify LBNL responsibilities.	249
11/6/96	Accidental releases	W	LBNL voluntarily complies with state and local codes, to the extent that reporting thresholds are consistent with those of the state.	250
11/6/96	Pesticide runoff	W	Already included in set under local regulation of surface/storm water.	251
11/6/96	Storm water fees	W	Fees are paid to Berkeley Toxic Management Div. for services including time spent on inspections, meetings, report review and documentation efforts	252
11/6/96	Independent verification of radioactive emissions	P	Emissions are regulated by EBMUD, BAAQMD, and DTSC.	253
11/6/96	Hazardous material inventory	P	Narrative revised to clarify LBNL responsibilities.	249
11/6/96	On-site transportation of hazardous waste	P	Implementation in PUB-3000 provides for packaging to meet DOT standards, with the exception of providing a DOT manifest.	254
11/6/96	DOE 5820.2A Quality Assurance (QA) sections	P	QA is included in the contract between DOE and UC under the ES&H management orders.	255
11/6/96	NEPA	W	DOE will continue to comply with NEPA for Berkeley Lab activities.	256
11/6/96	Site Environmental Report	P	Narrative revised to clarify LBNL activities.	257
11/6/96	Independent Confirmation	W	Confirmation team included 7 of 17 members with no DOE or National Laboratory connection, and no financial interest in the standards selected.	258
11/6/96	Waste minimization	W	Waste minimization is included in the set, waste minimization experts and researchers have been in contact, and these interactions will be expanded during implementation.	259
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