Integrated Safety Management Plan For The Physics Division May 06, 2021

Revised by :  date May 10, 2021

Ingrid B. Peterson, Physics Division Safety Coordinator

Approved by:  date May 6, 2021

Natalie Roe, Division Director

PHYSICS INTEGRATED SAFETY MANAGEMENT PLAN

Section 1 – Integrated Safety Management

ISM Guiding Principles

To achieve our safety goals and for continuous improvement or sustained excellence in the quality of all environment, health, and safety efforts, the Physics Division of LBNL has adopted this Integrated Safety Management (ISM) plan which is founded on the ISM principles below. This plan covers all Physics Division employees and affiliates in the management of their work activities. While these principles apply to all work, the exact implementation is flexible and can be tailored to the complexity of the work and the severity of the hazards and environmental risks.

- **Line Management Responsibility for Environment, Health, and Safety**.
- **Clear Roles and Responsibilities**.
- **Competence Commensurate with Responsibilities**.
- **Balanced Priorities.**
- **Identification of EH&S Standards and Requirements**.
- **Hazard Controls Tailored to Work Being Performed**.
- **Operations Authorization**.

ISM Core Functions

These guiding principles are implemented through the following core EH&S functions, which must become a part of every aspect of employee, contractor, and affiliate work at LBNL:

- **Work Planning –** What will I be doing?
- **Hazard and Risk Analysis** – What are the hazards (ergonomic, electrical, chemical exposure, cryogen, compressed gas, etc.) and what could go wrong?
- **Establishment of Controls** – Do I have everything I need to work safely including training, personal protective equipment (PPE), tools, time, and authorization?
- **Work Performance –** Am I doing the job safely and using established controls?
- **Feedback and Improvement –** What could I do better next time?

These core EH&S functions apply at all levels of the Laboratory – at the institutional level, at the division level, at the group level, and at the level of individual projects or work activities. All Physics workers are expected to recognize their responsibility for their own safety and the safety of co-workers.

The guiding principles and core EH&S functions are closely related. Each level of Physics management will be evaluated by determining (1) if each of the core EH&S functions is implemented at every level, and (2) by evaluating how well each of the guiding principles is incorporated in work.

Section 2 – Roles & Responsibilities

The principal activity of the Physics Division is research in theoretical and experimental high energy physics and astrophysics aimed at understanding the basic forces and constituents of matter and the universe. This section contains a summary of the safety roles and responsibilities for supervisors, work leads and workers in Physics. There are links to resources which provide more guidance. It is expected that activity leads and supervisors can use this section to help orient employees and affiliates to LBNL safety expectations and evaluate the safety performance of workers. In Physics, the activity lead is often, but not always, the same person as the supervisor. The activity lead is the person who oversees daily work and assigns the worker to the Work Planning & Control (WPC) activity. The activity lead generally serves as the Area Safety Leader for technical areas (non-office areas).

PHYSICS INTEGRATED SAFETY MANAGEMENT PLAN

Physics Division Management Responsibilities

- Perform annual walk-through of technical areas, including discussion of safety with staff.
- Appoint members to the Physics Safety Committee.
- Assure Division adheres to the principles and functions of Physics ISM Plan.
- Foster healthy safety awareness within Physics.
- Meet monthly with Division Safety Coordinator to discuss safety in division, including self-assessment topics.
- Charter investigations of safety incidents within division and oversee corrective actions to prevent future similar problems.

Supervisor Safety Responsibilities

- Perform safety walk-through of technical areas, including discussion of safety with staff.
- Appoint Area Safety Leader for technical areas (if not self).
- Approve WPC activities for direct reports.
- Oversee training completion for direct reports, including as needed for off-site work.
- Supply proper personal protective equipment (PPE) for direct reports and guests.
- Complete a Project Safety Questionnaire for any new or significantly modified project.
- Develop and maintain any formal work authorizations (WPC activities, radiation authorization) which are required.
- Determine if any of the work under supervisor's control requires a work alone prohibition, and include controls in the WPC activity to prevent working alone. Working alone is performing work when no one is within earshot or eyesight who can help rescue the worker. Work is too hazardous to work alone when:
  - If there is an accident, the worker could be unable to self-rescue due to the hazards of the work.
  - The worker is an undergraduate student. Undergraduate students are not allowed to work alone except for computer or office tasks.
  - The worker is using the machine tools in the machine shop. Personnel may not work alone using machine tools in the machine shop.
- Report work-related:
  - Injuries of direct reports (report to Safety Coordinator),
  - Ergonomic discomfort of direct reports (report to Safety Coordinator),
  - Near Hits (report to Safety Coordinator), and
  - Safety problems (report to Safety Coordinator).

Activity Lead Safety Responsibilities

- Oversee training compliance for direct reports.
- Prevent direct reports from working until WPC activity is complete and accurate.
- Require direct reports to work with direct supervision for tasks where the required training is incomplete.
- Ensure workers understand scope, stop work and hazard controls on radiological work activities
- Provide On-the-Job Training (OJT) for direct reports.
- Oversee safety of matrixed workers in Physics space, including OJT as needed.
- Assign activity lead duties when away from Lab for an extended time.
- Along with supervisor, determine if any of the work under work lead's control requires a work alone prohibition, and include controls in the WPC activity to prevent working alone. Working alone is performing work when no one is within earshot or eyesight who can help rescue the worker. Work is too hazardous to work alone when:

  - If there is an accident, the worker could be unable to self-rescue due to the hazards of the work.
  - The worker is an undergraduate student. Undergraduate students are not allowed to work alone except for computer or office tasks.
  - The worker is using the machine tools in the machine shop. Personnel may not work alone using machine tools in the machine shop.
- Report work-related:
  - Injuries of direct reports (report to Safety Coordinator),
  - Ergonomic discomfort of direct reports (report to Safety Coordinator),
  - Near Hits (report to Safety Coordinator), and
  - Safety problems (report to Safety Coordinator)

Area Safety Leader Responsibilities

- Determine minimum PPE for technical area, and enforce requirements
- Maintain entrance signs with correct hazards, PPE requirements, and contacts
- Maintain chemical inventory up-to-date in the Chemical Management System (CMS) database and properly label and store chemicals
- Maintain good housekeeping in technical area

Worker Safety Responsibilities

- Complete required training.
- Use controls listed in work authorizations (WPC activities, radiation authorization), including PPE.
- Ask questions of your activity lead if you are unclear on your task and its associated hazard controls.
- Store hazardous materials properly in a laboratory, not an office.
- Refrain from work without proper authorization (WPC activity, radiation authorization).
- Stop work for any worker that poses an imminent danger.
- Participate in investigations of safety incidents within the division as directed by Division management.
- Follow safety requirements for LBL and host location when working off-site.
- Report work-related:
  - Injuries to self (report to Work Lead, Supervisor and Health Services),
  - Ergonomic discomfort (report to Work Lead, Supervisor and Safety Coordinator),
  - Near Hits (report to Safety Coordinator)
  - Safety problems (report to Supervisor and Safety Coordinator).

Other Division Staff Safety Responsibilities

- Requestor of onsite subcontractor non-construction work – Develop Subcontractor Job Hazard Analysis (SJHA).
- Physics Safety Committee member – participate in monthly meetings and serve as a conduit for safety information to and from co-workers.
- On-site meeting coordinator – arrange for safety briefing at start of meeting for visitors (discuss with Safety Coordinator).
- Safety Advisory Council member – participate in the LBNL Safety Advisory Council and find a substitute when unable to attend. Report to Division Safety Committee on issues which will affect the division.

Section 3 – Resources

Except in special circumstances, all EH&S costs are covered by the staff member's project and are integrated into the project budget. Personal Protective Equipment (PPE) is to be furnished by the project.

This section shows the resources made available to staff in Physics at no cost to the project for help with safety issues.

Physics Safety Coordinator

The Physics Division Safety Coordinator is the programmatic lead for EH&S with responsibilities including:

- Creating and implementing systems, programs and procedures in the areas of
  - Work Planning & Control
  - Self-assessment and Corrective Action Tracking
  - EHS documentation
- Contact for Near Hits, EHS questions, work-related injuries (including ergonomic discomfort)
- Communication of lessons learned
- Chair of the Physics Safety Committee
- Promotes the functions and principles of the Division ISM plan
- Update the Physics ISM plan as needed
- Checks technical area signs for accuracy at least once a year.

Physics EH&S Liaison

The Physics Division EH&S Liaison is the liaison between Physics and the EH&S division with responsibilities including:

- EHS lead for developing WPC activities
- Contact for EHS issues
- Member of the Physics Safety Committee
- Communication of pending EH&S program changes
- Backup for Safety Coordinator
- Promotes the functions and principles of the Division ISM plan.

EH&S Rep

s

- EH&S point of contact for consultation and/or resolution of technical issues in the areas of health and safety, including hazard identification, hazard evaluation, and the development of controls appropriate to the work being performed
- Member of the Physics Safety Committee
- Backup for EH&S Liaison

Physics Safety Committee

The Division Director appoints a Safety Committee which includes staff scientists, technical and administrative staff, the division Safety Coordinator, and the EH&S Liaison. The committee meets monthly and serves the following functions:

- Recommends policies and procedures to the Division Director
- Reviews new and significantly revised activities

- Communicates safety issues inside and outside the division
- Identifies safety inadequacies in Physics and at LBNL
- Participates in self-assessment activities
- Quarterly walk-arounds

EH&S Subject Matter Experts

In addition to the Safety Coordinator and EH&S Liaison, division staff has access to EH&S staff who are experts on EH&S subjects, including topics such as ergonomics, industrial hygiene, hazardous waste, cryogens, pressure systems, etc.
General Laboratory safety link:
https://sites.google.com/lbl.gov/labsafetyhub/home
Subject matter experts are listed at the following link: http://www.lbl.gov/ehs/html/subject_matter.shtml
Experts in radiation protection are listed at the following link:
https://ehs.lbl.gov/service/radiation-protection/
More useful resources can be found at the following links:
https://ehs.lbl.gov/resource/
Cryogen Safety site: https://sites.google.com/lbl.gov/cryosafety/home
OJT: https://sites.google.com/lbl.gov/ojt/home
More on Cryogen OJT: https://sites.google.com/lbl.gov/cryosafety/home/cryogenic-liquids-ojt)
Chemical safety:
https://sites.google.com/lbl.gov/chemical-safety/home

Section 4 – Controls and Identification of EHS Standards and Requirements

Off-site Safety and Requirements

Physics has adopted the off-site safety program developed in the 2016 Physics Self-Assessment, included as Appendix A. The off-site facilities where Physics staff go to work as of 2021 are included as Appendix B, along with any ratings which have been determined.

This process continues to be applied by the Physics Division going forward.

The Offsite Assessment of the Sanford Underground Facility (SURF) was first conducted in FY17 by the LBNL Physics Division, see Appendix B. This facility was ranked category 2; see description of rankings below.

1. DOE National Laboratories. These are institutions that follow ISM and have equivalent policies, processes and procedures to LBNL.
2. Institutions that LBNL has worked with for a long time and demonstrated to have equivalent policies, processes and procedures.
3. Institutions that are safe for the most part but have gaps in demonstrating equivalency to LBNL's policies, processes and procedures. The gaps require a mitigation plan.
4. Institutions where LBNL workers need to follow the LBNL safety program because the host safety program is not equivalent.

An LZ SURF Offsite Safety Re-Assessment was conducted in 2018 in response to the recommendation from the DOE Independent Project Review of Status of the LZ project which took place on January 9-11, 2018. The final report can be found in Appendix C.

SURF was re-ranked as a category 3. LZ staff will be able to work at SURF under SURF's EHS program except for the areas where additional controls beyond those in SURF's EHS policies and procedures are implemented. The identified areas where SURF's EHS program was considered in need of additional strengthening were primarily in electrical safety with minor issues with Job Hazard Analysis and documentation. The controls in place are as follows:

- LBNL electrical equipment inspector to travel to SURF regularly to perform NRTL inspections
- LZ collaborators are restricted to perform electrical work and LOTO
- LBNL Subject Matter Experts (SMEs) will review JHAs for selected critical LZ activities

These controls were successfully implemented. SURF has also closed the gaps in electrical safety recommended by the LBNL Electrical Safety Officer by hiring and training electrical safety personnel to the NFPA 70E standards.

EH&S Standards

The following EH&S standards are incorporated into the Physics ISM Plan by reference:

- EH&S Manual, PUB-3000 http://www.lbl.gov/ehs/pub3000/

Section 5 – Continuous Improvement

On June 7th, 2018, an incident involving on-the-job training (OJT) to use the fill station at building 70/70A took place. As a result of this incident, the Physics Division participated in the 2019 Multi-Division OJT Self-Assessment, see Appendix D. The recommendations were implemented by the Physics Division. In 2020, the Physics Division participated in the Effectiveness Review of the June 7, 2018, Liquid Nitrogen Injury Corrective Action Plan, see Appendix E. The effectiveness review focused on the corrective actions that could reasonably be expected to show observable results at the time of the review, and which were directly related to the root causes identified in the causal analysis.

Appendices

A: ***Report on Off-Site Safety, September, 2016***
B: ***Off-site Facilities Where Physics staff work***
C: ***LZ SURF Off-site Re-Assessment, September 2018***
D: ***2019 Multi-Division OJT Self-Assessment***

E: ***Effectiveness Review of the June 7, 2018, Liquid Nitrogen Injury Corrective Action Plan***

Appendix A – Report on Off-Site Safety, September, 2016

Executive Summary

Off-site safety continues to be a concern for workers in Physics. This report is a follow-up on the multi-division assessment done in 2014, discussed in detail below in "Background." For Physics, off-site safety concerns generally involve travel to and work at institutions where there is a safety program, but the safety program is not under the control of LBNL and may be quite different from the LBNL safety program. Examples include work at Gran Sasso (Italy), Daya Bay (China), CERN (Switzerland), Kitt Peak National Observatories (Arizona), SURF (South Dakota), SNOLab (Canada) and Brookhaven National Laboratory (New York). This report focuses on this narrow aspect of off-site safety and does not include computer work at home or field work where there is no other safety program which are covered by the ergonomic program and Work Planning and Control (WPC) respectively. Listed below are summaries of policies that guide safety at off-site locations:

- WPC is not used to authorize off-site work when there is a host institution authorization process (commonly part of the safety program).
- LBNL workers use the 5-step ISM process in their off-site work, but the controls, including training, are set by the host institution.
- LBNL workers are expected to follow the host institution's safety and training requirements.
- Division ISM plans need to address off-site safety expectations for their workers.

In general, there are 4 different types of institutions Physics members are working at:

1. DOE National Laboratories follow ISM and are equivalent to our system (Brookhaven for example).
2. Institutions that LBNL has worked with for a long time and are deemed safe (CERN for example), or can demonstrate equivalence to LBNL safety system (Kitt Peak National Observatories for example).
3. Institutions that are safe for the most part but there may be some issues (Gran Sasso for example).
4. Institutions where LBNL workers need to follow the LBNL safety program because the host safety program is not equivalent and has some very real safety challenges (Daya Bay during construction, for example).

In all cases, LBNL workers follow host institution policies and requirements, but may also be required to follow the LBNL safety program, or parts of the LBNL safety program. LBNL workers are expected to stop their own work and/or leave if they feel unsafe even if the host institution does not have a Stop Work Policy.

Attachment A is checklist of elements of good safety programs. This can be used to perform a preliminary assessment of a new off-site partner institution and can be incorporated into division ISM plans as needed.

Background

"Off-site" safety was voiced as a collective concern by several divisions from both science and operations during planning for the FY14 division self-assessments. In the third quarter of FY14, Computing Sciences Directorate, Environmental Energy Technologies, Genomics JGI, Information Technology, Lab Directorate/Operations, Nuclear Science and Physics partnered together with Environment, Health and Safety to perform a joint self-assessment of off-site safety. For the purpose of the 2014 assessment, the assessment team defined off-site as "any work that occurs outside the fenced boundary of the main hill location" including work at leased facilities, work from home, from a mobile workstation, on travel, in the field and at other institutions.

During the assessment period from April through June 2014, there were 9 injuries (2 OSHA recordable) at off-site locations. These injuries underscored the importance of safety at off-site work locations, and included injuries at:

- JGI
- JCAP
- OCFO in Emeryville
- Potter Street
- UCB, Gilman Hall
- UCB, Tan Hall
- Barrows, Alaska
- Rapid City, South Dakota

The 2014 assessment consisted of two parts; a survey of staff members within each participating division and subsequent data analysis to understand staff's safety concerns related to working off-site, and a gap assessment between the top 5 off-site safety concerns and LBNL policies and procedures relevant to those areas of concern.

Through the survey, the assessment team found that for the divisions participating in this assessment and the employees targeted for the survey off-site work is ubiquitous. 91% of respondents reported working off-site. 35% reported working at least in part at home, and 96% reported using a computer, tablet or smart phone for work outside of their main office. The top 5 off-site safety concerns voiced in the survey were:

1. Ergonomics
2. Driving/Travel safety (combined into one in this report because of similarities)
3. Emergency response
4. Personal safety/security
5. Unclear LBNL safety policies and procedures related to off-site work

There were no findings from the 2014 self-assessment, primarily because there were few, if any, policies specifically related to off-site safety to violate. However, based on the gap analysis the assessment team concluded that the policies and procedures that address safety for off-site work do not adequately address all of the safety needs of workers working off-site. The assessment team had the following recommendations for travel/driving, all at the institutional level, to enhance off-site safety:

1. Safety while Traveling
   - Consolidate travel safety information in one prominent place. This should include:
     - Information on preparing for and responding to travel emergencies.
   - Initiate a communications campaign to educate LBNL staff on resources available to help them during travel.
2. Unclear LBNL safety policies and expectations for off-site safety
   - Establish a cross-functional team to review LBNL safety policies and procedures applied to off-site work; identify requirements that do not seem to adequately address the needs of off-site workers or are ambiguous or unclear, and recommend revisions to address the deficiencies. The team should also recommend policy regarding what to do when LBNL policy conflicts with policy at non-LBNL off-site location or when non-LBNL off-site location safety policy is deemed inadequate.
   - Develop a centralized resource with requirements and guidance for safety at off-site locations. This may include consolidating information on work authorization, reporting injuries, travel safety, personal safety, ergonomics, emergency response, and hazmat transportation. Consideration should be given to designating a single point-of-contact to address off-site safety questions and policy issues.
   - Develop a communication strategy to raise awareness of LBNL requirements and expectations for off-site safety.
   - Continue efforts to build off-site safety into WPC system.

In addition to these concerns found by the 2014 self-assessment, in FY16 an incident at Gran Sasso emphasized to upper management and DOE the need to address the concerns. A change in the support of a staircase in a technical area of Gran Sasso made the staircase feel unstable and unsafe to affiliates of NSD. Although Gran Sasso does not have a Stop Work policy, these NSD affiliates stopped work for LBNL/UCB workers until this stairwell was investigated and found to be acceptable as long as workers used it one at a time, and avoided carrying equipment with them. The concerns were communicated to Gran Sasso management, and improved staircase supports were designed and implemented.

Current Requirements

Policy and Procedures – Safety while Traveling

Following the 2014 assessment the Travel Policy was moved into the RPM "Travel Policy" which addresses insurance and accident/illness/injury reporting:

> ***Accident Reporting***
>
> *All vehicle accidents, whether involving property damage and/or personal injury should be reported pursuant to the Vehicle Accident Reporting policy in the RPM.*
>
> ***Injury or Illness While On Travel***

- *Illness or injury requiring hospitalization while on official travel status* ***must be reported promptly to Health Services****.*
- *In addition, all Berkeley Lab employees are provided with workers' compensation coverage for work-related injury or illness that occurs during a Berkeley Lab-approved and -funded business trip.*

The information sent to the traveler after booking continues to be very good and includes Health Insurance Cards to print. Even more information is now available on the travel website (http://travel.lbl.gov/) which includes links to the travel policy and the Health Insurance Cards.

Unclear LBNL safety policies and expectations for off-site safety

Unclear policies and procedures were identified as another top safety concern in the 2014 assessment. Less than half of the survey respondents rated the Lab policies covering off-site safety as good or excellent. 22% stated that they didn't know LBNL had specific policies for off-site work and that they didn't know where to find this information. There has not been an information campaign to educate LBNL workers about travel safety, but divisions have been educating their personnel about safety during travel and off-site work.

Policy

LBNL maintains an **Off-Site Work Authorization Policy** documented in the RPM. This policy defines off-site as "*all work performed at sites located away from the Berkeley Lab main site and satellite locations, which include Donner Hall, Potter Street, the Joint BioEnergy Institute (JBEI), and the Joint Genome Institute (JGI).*" This policy only addresses work authorization, and basically requires that "*to authorize work at off-site locations, Berkeley Lab Divisions must develop a process to plan for the safety of workers and the environment in the off-site location.*" The expectation is that divisions document how they manage off-site work in their division-specific ISM Implementation Plans. Each division is left on their own to determine what is appropriate and effective.

Procedures

Several chapters in ES&H Manual specifically address off-site safety to various extents:

- Chapter 1 (General ES&H Requirements), Section 1.3 reiterates that the LBNL ES&H Manual applies to LBNL off-site locations.
  - *The requirements of the Berkeley Lab* ES&H Manual *apply to all Berkeley Lab employees, affiliates, contractors, and visitors to the Berkeley Lab main site, its off-site locations, and field operations.*
- Chapter 5 (Injury Response and Review) covers off-site work-related injuries and illnesses in various section.
  - Work Process B2(e) *For work-related injury, illness, or exposure that occurs while away from the Berkeley Lab site or at nearby off-site facilities, the injured employee or employee's supervisor must notify Health Services as soon as possible during regular business hours.*
- Chapter 6 (Work Planning and Control) discusses how work is authorized at LBNL
  - Section 6.4 Exceptions – *Those . . . who work only at a site not managed by Berkeley Lab and have existing work authorization process. Note that Berkeley*

Lab work planning and control covers Berkeley Lab personnel working at off-site locations that do not have existing authorization processes.

- Chapter 24 (Training) addresses training applicability to off-site workers and training at off-site locations.
    - Section 24.3 *This policy applies to LBNL employees, affiliates, students, visitors, contractors, subcontractors, and vendors whenever planning and performing work at LBNL and LBNL-controlled off-site user locations and facilities, including UC Berkeley–controlled spaces.*
        - **Work Process A8 -** Required Training for Personnel at Off-Site Locations

            a. *All LBNL workers working on LBNL projects at off-site locations, including UC Berkeley-controlled spaces, are required to adhere to training requirements as stipulated by the host institution or Partnership Agreement on ES&H. In the absence of a Partnership Agreement on ES&H or host institution requirements, LBNL requirements must be completed.*

The LBNL ISM plan requires that divisions address off-site safety:

Many LBNL personnel are assigned to or interact with a wide variety of outside organizations including other DOE sites, the U.S. Department of Health and Human Services, the Department of Defense, and other governmental agencies, as well as overseas organizations in various action and inspection capacities. This results in heavy travel traffic, with its own safety hazards and environmental impacts, during the course of Laboratory business. LBNL personnel in these situations have had training in the LBNL ISMS, both institutional and from their divisions, and are expected to appropriately use the process in the conduct of their official activities and assignments. Those at other DOE sites—e.g., DOE Headquarters, Brookhaven National Laboratory (BNL), Argonne National Laboratory—either visiting or on assignment, are expected to work according to the ISMS and any accompanying agreement structures with the organizations operating at those sites. The Division Implementation Plans and any succeeding documentation provide the specifics for their off-site personnel and connections.

Summarizing the current policies and procedures for off-site safety:

- Safety during travel is addressed and the information is easier to find since 2014.
- WPC is not used to authorize off-site work when there is a host institution authorization process (commonly part of the safety program).
- LBNL workers use the 5-step ISM process in their off-site work, but the controls, including training, are set by the host institution.
- LBNL workers are expected to follow the host institution's safety and training requirements.
- Division ISM plans need to address off-site safety expectations for their workers.

Discussion

ISM easily fits over other safety programs, and many safety programs include the steps of ISM even if they are not called Integrated Safety Management. Workers use ISM as follows at host institutions:

1. Define the work – ideally this should be written, but can be verbal. The LBNL worker must have a clear definition of the scope of work to be performed.
2. Analyze for hazards – LBNL workers need to think about how someone could get hurt, and what could go wrong.
3. Determine controls for identified hazards (set by host institution).
4. Work within controls – stop whenever the scope of work is exceeded and reanalyze hazards & controls.
5. Feedback and improvement – could it be improved next time?

One piece still seems to be missing and that is how to evaluate the safety programs at other institutions. In general, there are 4 different types of institutions Physics members are working at:

1. DOE National Laboratories follow ISM and are equivalent to our system (Brookhaven for example).
2. Institutions that LBNL has worked with for a long time and are deemed safe (CERN for example), or can demonstrate equivalence to LBNL safety system (Kitt Peak National Observatories for example).
3. Institutions that are safe for the most part but there may be some issues (Gran Sasso for example).
4. Institutions where LBNL workers need to follow the LBNL safety program because the host safety program is not equivalent and has some very real safety challenges (Daya Bay during construction, for example).

A checklist has been developed as a tool to help with the assessment of safety at institutions who are newly partnered with LBNL (Appendix A). To classify an institution into categories 2, 3 and 4 (above) the tool should be used to assess the program, either in person or on the phone. The results need to be discussed with the DSC, line management and other knowledgeable staff, and a consensus classification determined. EHS should be consulted as needed, especially on safety programs that seem to lacking.

If an off-site institution is categorized as a level 3 or 4 in the above scheme, then the division would be expected to use WPC to protect LBNL workers by setting controls above and beyond what the host requires. Specific WPC projects and activities would be written up for the off-site activities detailing the hazards and controls. For a level 3 institution, WPC activities would focus on the areas found to be lacking. For a level 4 institution, WPC would be used for all activities at the institution.

For all work situations LBNL workers can, and should, stop their own work if they feel unsafe. DOE national labs and some other host institutions have formal stop work policies, but even at those places that do not, any LBNL worker can stop their own work and/or leave. The LBNL

worker is expected to alert his LBNL supervisor to the unsafe situation and get help from LBNL personnel (DSC, EHS and line management) to address the issue.

Conclusions

Off-site safety in Physics has mainly involved travel to other places, often foreign, and working at other institutions. In 2014, a multi-division group looked at off-site safety, and progress has been made on the issues from that report, but it has not been well-publicized.
Listed below are summaries of policies that guide safety at off-site locations:

- WPC is not used to authorize off-site work when there is a host institution authorization process (commonly part of the safety program).
- LBNL workers use the 5-step ISM process in their off-site work, but the controls, including training, are set by the host institution.
- LBNL workers are expected to follow the host institution's safety and training requirements.
- Division ISM plans need to address off-site safety expectations for their workers.

In general, there are 4 different types of institutions Physics members are working at:

1. DOE National Laboratories follow ISM and are equivalent to our system (Brookhaven for example).
2. Institutions that LBNL has worked with for a long time and are deemed safe (CERN for example), or can demonstrate equivalence to LBNL safety system (Kitt Peak National Observatories for example).
3. Institutions that are safe for the most part but there may be some issues (Gran Sasso for example).
4. Institutions where LBNL workers need to follow the LBNL safety program because the host safety program is not equivalent and has some very real safety challenges (Daya Bay during construction, for example).

Attachment A is checklist of elements of good safety programs. This can be used to perform a preliminary assessment of a new off-site partner institution.

Attachments

Attachment A – Off-Site Safety Assessment Checklist

Attachment A - Off-Site Safety Assessment Checklist

Collaboration member:	**Y/N/NA**	**Comments**

Questions:

Is there an explicit ISM program?
- **If no, is scope of work defined before it is started? How?**
  - **Are hazards identified? How?**
  - **Are controls established? How?**
    - **Is PPE provided by the facility? Replaced by the facility?**
  - **How is it verified that work is performed within controls?**
  - **Is there feedback & improvement?**

Is there a stop work policy?

How is work authorized?

What are the major hazards at this facility (examples: electrical, oxygen deficiency, working at height, heavy machinery, radiation)?

How is the safety program communicated?

Does the safety program get reviewed?
- **Are there safety inspections?**

Are subcontractors protected? What are the requirements?

Is there quick access to medical aid?

Is the injury rate calculated?
- **If yes, what is it?**
- **Are leading causes of incidents identified?**
- **Are near hits, accidents and dangerous occurrences investigated?**

Is safety on performance reviews for everyone, including management?

For specific hazard situations as needed:

For underground work:
- **Are oxygen monitors available?**
- **Is there a communication system with above ground personnel?**
- **Are there AEDs?**
- **Are workers trained in CPR and First Aid?**
- **Is there an on-site Emergency Rescue Team?**
- **Are there Rescue Boxes with food and water?**
- **Are workers equipped with self-rescuers?**
- **Is worker underground entry & exit monitored?**
- **What PPE is required to access the underground?**

For electrical work:
- **Is there a LOTO program?**
- **What is the de minimus level for electrical work?**
- **Explain controls for electrical work.**

For ODH work:
- **Are oxygen level calculations done for cryogen work?**
- **Are there oxygen monitors available?**
- **Explain controls for ODH work.**

For working at heights:
- **Do workers have PPE equipment that keeps them from falling?**
- **Explain controls for working at heights.**

For working with heavy machinery:
- **Are crane operators certified?**
- **Is there a work alone prohibition?**
- **Are fork lift operators certified?**

For radioactive material work:
- **Is there a rad worker authorization program?**
- **Explain controls for radioactive material work.**

Appendix B – Off-site Facilities Where Physics staff work:

Off-site facility	
Fermi National Accelerator Laboratory	1
SLAC National Accelerator Laboratory	1
Kitt Peak Observatory (NOAO)	2
Sanford Underground Research Facility	2