Self-Assessment Report
July 1, 1999 – June 30, 2000

Earth Sciences Division

July 2000

Sally M. Benson
Division Director

Norman E. Goldstein
Division Safety Coordinator

I. Executive Summary

Division Overview

Earth Sciences Division (ESD) has a staff of approximately 200 employees and 55 guests, including 15 employees matrixed from the Administrative Services Department. Scientific and technical staff conduct a mix of applied and fundamental research related to energy resource development, environmental remediation, nuclear waste disposal, carbon management and climate change.

Department Heads and Program Leads are responsible and accountable to the Division Director for understanding the Berkeley Lab's ES&H policies and for assuring that the Division's ISMP (the Safety Plan) is understood and is being implemented by their line managers (Principal Investigators and Program Managers). PIs and other supervisors are responsible and accountable to their Program Leads and Department Heads for assuring that all research receives a Safety Analysis Review, that work hazards are identified and controlled, that safety documentation is prepared and approved, that personnel are trained and have the proper PPE.

The division has a Safety Committee composed of personnel from each sector of the division, the Division Safety Coordinator (DSC) and the Division's EH&S Liaison. The committee, chaired by the DSC, meets quarterly to review all aspects of the division's EHS program, to review and update the Division ISM Plan, and to provide feedback and suggestions on improvement. The DSC distributes written minutes and a Quarterly EHS Report, the latter is submitted to the Division Director, with copies to the Safety Committee and to all Department Heads and Program Leads.

Most of the division's work is theoretical and/or computational and is conducted in offices in Building 90, and the 90G, 90P, 90C trailers. A growing percentage of the division's research, such as geochemical/ geophysical/geomechanical properties measurements, are conducted in laboratories and at various field (off-site) locations.

Laboratory research is conducted in approximately 19 wet and instrument labs (located in buildings 14, 31, 51, 51F, 70, and 70A) and one mobile lab trailer parked in the 51 Bay. ESD's major lab facilities are the Center for Isotope Geochemistry (CIG) in 70A-fourth floor, the Environmental Measurements Laboratory (70-first floor), the Rock and Soil Laboratory (51-007 and 51F), and the Geosciences Measurement Center (31, 31A, 31B). In addition, ESD has administrative responsibilities for the Center for Environmental Bioremediation (70A) for which it shares space and EH&S responsibilities with Life Sciences Division.

During the reporting period, ESD continued its temporary occupancy of wet lab 70-173 used by several researchers in the Environmental Remediation Program. Close to $20K in project funds was spent to reduce hazards and improve lighting in one end of the lab. During the period, the newly renovated dry labs 51F-101 and 102, part of our Rock Physics Laboratory, came on line and experiments began with the CT-scanner and the NMR. Also during the period, a major renovation of 70A-4429 took place to convert an existing wet lab into a new facility for a

Magnetic-Sector Mass Spectrometer. During the renovation, EH&S Division paid the unexpected cost to have a hood and the ductwork removed due to the build-up of perchloric crystals. This lab is not yet operational due to a variety of reasons. Work began in April to renovate newly acquired labs in 70A-4403 and 4405 for the ocean carbon and terrestrial carbon activities. Renovations are scheduled for completion on or around October 1, 2000.

ESD is different from other divisions in that we conduct a relatively large number of off-site, or field, projects each year at other DOE sites, such as Yucca Mountain (Nevada Test Site), and on private lands owned and operated by oil and geothermal companies. The number and duration of off-site projects vary from year to year, but typically encompasses activities such as (1) water and rock sampling, (2) hydrogeological testing, and (3) geophysical imaging measurements. A total of three new and revised "Off-Site Safety and Environmental Protection Plans" (OSSEPP) were completed in FY2000. A fourth OSSEPP, a revision for the Yucca Mountain Project, is in preparation. An offsite plan is prepared by the LBNL PI or his/her designee, and reviewed and approved by the Division Safety Coordinator. Depending on the site-specific safety and health plan, ESD workers may be required to take special training given at the site. Where exposure to hazardous wastes and toxic chemicals may occur, workers are required to complete special health and safety courses, such as the 8-, 16-, 24-and 40-hr OSHA Hazardous Waste Courses.

A small amount of research is conducted in Appendix J space on the UC Berkeley campus. Included among the ESD staff are 12 UC faculty members and over 20 GSRAs and post-docs who work entirely on the campus.

Typical of other research divisions at the Berkeley Lab, ESD has a relatively high rate of personnel turn-over because the core career staff is supplemented by a large number of temporary or term employees such as summer students, GSRAs, post-docs, and non-career scientists. In this regard, 50% of the ESD scientific/technical staff have worked less than two years at the lab. The high turnover rate, estimated to be on the order of 30-40% per annum, puts a heavy demand on the division's abilities to make sure new employees satisfy required training.

Division ES&H Goals

Our basic goal is to maintain relevance and excellence in our research, but always in a manner that ensures protectiveness of employees, the public, Lab assets, and the environment.

II. Effectiveness of Division ES&H Program

Accomplishments and Noteworthy Practices

1. The ESD *ISM Plan* was revised in June 2000, approved, and posted on the ESD web site.
2. Current ES&H issues, such as the ISM system and training course schedules, are brought to the attention of the ESD staff by the Division Safety Coordinator by means of: a) monthly

ESD Level 1 emails, b) a "Safety News" section that is included in every issue of the *ESD Bull*, the Division's "house organ", and c) town-hall division meetings.

3. ESD Management is kept abreast of ES&H issues, trends and deficiencies by means of a "Quarterly Safety Report" prepared by the ESD Safety Coordinator and by participating in monthly inspections of ESD spaces.
4. The division has made significant efforts to reduce the amount of chemical wastes picked up by the Waste Management Group. The adjusted percentage reductions are as follows: 27% reduction in routine hazardous, 96% reduction in low-level radioactive, and a 100% reduction in mixed wastes being generated. The use of bench-top treatment has greatly reduced the amount of acid waste. The significant reductions in low-level radioactive and mixed wastes are due to changes in the research being done.
5. Satellite Accumulation Area (SSA) compliance was 95 and 100% for the two inspections made during this SA reporting period.
6. There were no Occurrence Reports and no NCARs during the SA period, compared to one NCAR last year.
7. Monthly management inspections were formalized.
8. ESD has created a document "Guidelines for New Employees" which includes important information on ESH issues.

Areas that Need Attention

1. The division has a low illness rate, but an unacceptable injury rate. The injury rate (total reportable cases or TRC) jumped from around 3.0 per 200,000 hours- worked in FY1998 to 3.5 per 200,000 hours in FY1999, and to 4.2 during the current reporting period. This is significantly higher than the site-wide average of 3.3 cases and the DOE Laboratory average of 3.2 cases per 200,000 hours. Of the five injury accidents, two were ergonomic and resulted in no lost work time. The most serious injury accident involved a scientist who was rear-ended while returning from Stanford University. The scientist suffered back pains which did result in a Workers Comp claim and lost and restricted work-days.

2. As was the case last year, there was one QA exception report for the inaccurate characterization of waste. Because ESD waste generators contribute only 1.5% of the total waste generated at the lab, only 12 tests were made on ESD-generated waste. The ESD QA failure rate of 8.3% is above the lab average of 3.6% for the period October 1999 through May 30, 2000

Recurring ES&H Issues

High turnover rates present an on-going problem for the division to maintain high percentages in the completion of JHQs and the completion of required training.

1. Completion of the Job Hazards Questionnaire. The Building 90 HR Unit notifies the Safety Coordinator of all personnel actions. This allows the Safety Coordinator to meet and discuss basic ESH policies with new employees. The percentage of employees with a JHQ on file in

June was 86% on the date of record in June, the same percentage we reported for the previous Self-Assessment period.

2. Completion of Required EH&S Training. The completion rate for required courses has significantly improved to 86% compared to around 60% in FY1998, and 80% in FY1999. The marked improvement is due to several factors: 1) supervisors made an effort to get people trained, 2) errors in the training database were corrected and, 3) training videos and other increased training opportunities were offered by the Training Unit of EH&S Division.
3. Injury Rate. Worker safety is one area where we are striving to improve. After a period of 30 months (1997-1999) where the injury accident rate was between 3.0 and 3.5 reportable cases per 200,000 hours worked, the rate of injury accidents in ESD increased to 4.2 during the current reporting period. The only explanation for this increase is that while the number of injury accidents per year has remained fairly constant, the number of FTEs has declined during the current reporting period.

Plans for FY2001

1. The Division EH&S program will continue to stress safety training and attempt to involve supervisors more in safety training and accident prevention. In addition, the FY2001 plan is to continue regular workplace inspections and to implement Safety Analysis Reviews of new and continuing projects.
2. During FY2001, several new laboratory spaces are expected to become operational and each of these will require hazards evaluations, safety inspections, and hazards controls. The principal spaces are as follows:

    a. The Geosciences Measurements Center will relocate from B31 and adjacent trailers to parts of the B64 and B51 high-bay areas
    b. The Center for Isotope Geochemistry (CIG) will be acquiring renovated labs in 70A-4403 and - 4405 for the Carbon Management Program.
    c. CIG laboratory 70A-4429, 4429A, 4429B under renovation for a new mass spectrometer is expected to become operational.

III. Measurement of Division ES&H Performance Against Laboratory FY1999 Self-Assessment Performance Criteria

The following points summarize corrective actions taken during the reporting period to improve the EHS performance in areas where ESD partially or marginally met the lab-wide performance goals last year.

1. All outstanding the Level 2, 3, and 4 deficiencies in the LSAD were corrected.
2. The division has instituted a policy of regular monthly manager's safety inspections of ESD space. All senior managers are expected to make a minimum of four inspections in a 12-month period.
3. Since issuing the ESD document "Guidelines to New Employees", we have seen JHQ completions increase to over 90% in CY2000 before dropping back to 86% in late June.

4. Emergency Team training increased to 71%. Restated, five out of the seven persons assigned to building teams are fully trained.
5. There were no NCARs

IV. Division Implementation Schedule and Plan for FY 2001 Self-Assessment

Q1. July-December 2000.

1. Review and revise Safety Documentation, such as Off-Site Safety Plans (OSSEPPs) and Radioactive Work Authorizations.
2. Complete Safety Analysis Reviews for all new and continuing projects.
3. Inspect all SAAs and laboratory safety conditions and safety documentation.
4. Inspect all new ESD laboratory spaces under renovation.
5. Update LSAD.

Q2. January-March 2001

1. Conduct complete assessment of JHQ completion and training statuses.
2. Inspect all SAAs, laboratory safety conditions and safety documentation.
3. Inspect all new laboratory spaces that are being renovated for ESD, including B64 high-bay area.

Q3. April-June 2001

1. Supervisors review employees JHQ and training at time of the P^2R process.
2. Inspect hazards controls in new laboratory facilities acquired by ESD; including new space for the Center for Isotope Geochemistry (70A-4th floor), the Center for Geosciences Measurements (B64/51 high bay areas).
3. Inspect of SAAs, laboratory safety conditions and safety documentation.
4. Emphasize training of summer students.
5. Inspect SAAs, laboratory safety conditions and safety documentation.
6. Review the Division's ISMP and revise it as necessary.
7. Update LSAD.