Lawrence Berkeley National Laboratory
Occurrence Reporting and Processing System (ORPS)

Performance Analysis and Identification of Recurring Occurrences (January 1, 2004 to December 31, 2004) Report No. 5

Office of Assessment and Assurance
Environment, Health and Safety Division
February 2005

LBNL ORPS Performance Analysis and Identification of Recurring Occurrences
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Executive Summary of Analysis Results

The ORPS performance analysis was conducted of all ORPS and/or PAAA events occurring from January 1, 2004 to December 31, 2004. Using the guidance provided in DOE G 231.1-1, *Occurrence Reporting and Performance Analysis Guide*, and DOE G 231.1-2, *Occurrence Reporting Causal Analysis Guide*, data elements and groupings were identified for each LBNL occurrence during this time period. The analysis addressed who was involved, what happened, where/when did it happen, and how did it happen to determine the major contributors for any given event. Based on this analysis, there is no statistical evidence that LBNL had any recurring events that warrant additional management action or the submission of an ORPS Category 2R report.

Background

This ORPS performance analysis is part of the quarterly analysis and trending requirements mandated by DOE O 231.1A, *Environment, Safety, and Health Reporting*, and DOE M 231.1-2, *Occurrence Reporting and Processing of Operations Information*. The goal of the analysis is to determine if there are recurring events that need to be addressed collectively in order to preclude these types of events from occurring in the future. LBNL reviewed its events that occurred during the past 12 months (January 1, 2004 to December 31, 2004). The events included ten ORPS-reportable occurrences and six non-ORPS occurrences identified in the Price Anderson Amendment Act Noncompliance Tracking System (PAAA/NTS). Per the DOE guidance, each of the sixteen events were broken down into data elements and element groupings to address who was involved, what happened, where/when did it happen, and how did it happen (see Attachment 1).

Analysis

A Pareto Analysis was conducted of the data elements to identify major contributors to the LBNL occurrences (see Attachment 2). Most of the data elements recurred infrequently for the sixteen analyzed events. In order to be statistically significant, a data element should have at least five (5) data points before a trend can be established (ref: TapRoot® performance trending training). Facilities (5) from the [division] data element, Less Than Adequate (LTA) Developed/Implemented Controls (6) from the [ISM function] data element, and Management Concern (6) from the [reporting criteria] data element were the major contributors that were statistically significant (i.e., occurred at least 5 times) during the past year. To determine any repetitive patterns or trends, each major contributor (boldface below) was analyzed by grouping with other data elements as follows:

- **Less than adequate [ISM function]** – resulting in [reporting criteria] – caused by [cause code] / [human performance code couplet] – involving [division]

- **[Division] less than adequate operation** – resulting in [reporting criteria] – caused by [cause code] / [human performance code couplet]
- **[Reporting criteria]** by [division] is caused by [cause code] / [human performance code couplet]

The detailed analysis is provided in Attachment 3.

Conclusion

In analyzing the various groupings of data elements based on the most significant contributors, no pattern emerged that supports a recurring problem or a trend from LBNL activities and operations.

For the repeat occurrences involving the Facilities Division, LTA controls, or management concerns, there are significant differences in event details, significance category, reporting criteria, and apparent/root causes to indicate that these were not recurring problems or trends. All have been or are currently being addressed with appropriate corrective actions. No additional management actions or submission of an ORPS Category 2R report is required for these events.

Attachment 1 – LBNL ORPS and PAAA Occurrences
January 1, 2004 to December 31, 2004

ORPS and PAAA Events	**Where/when did it happen?** Date, facility, facility function, systems components keywords	**Who was involved?** Facility, Site, PSO, Contractor, work group keyword	**What happened?** Reporting criteria, significance category, additional detail keywords	**How did it happen?** Cause code, human performance code couplet, ISM function, additional detail keywords
Violation of LOTO procedures at B74 LBL-OPS-2004-0001	1. 1/13/2004 2. Building 74 3. Research labs 4. Electrical power distribution	1. Building 74 2. LBNL 3. Facilities Division 4. Subcontractors	1. Hazardous energy control (Group 2C.2) 2. Significance Category 3 3. Failure to follow LOTO procedures	1. [A3B1C03] Incorrect performance due to mental lapse 2. [A4B5C13] Accuracy / effectiveness of change not verified or not validated. 3. Perform work with controls LTA 4. Subcontractor did not completely follow their LOTO procedures
Air sample exceeded PEL for lead at 51B demolition LBL-OPS-2004-0002	1. 2/25/2004 2. Building 51B 3. External Proton Beam Hall 4. Demolition project	1. Building 51B 2. LBNL 3. Facilities Division 4. Subcontractors	1. Personnel exposure above PEL (Group 2A.5) 2. Significance Category 3 3. Air monitoring results above the PEL	1. [A1B2C07] Error in equipment or material selection 2. NA 3. Develop and implement controls LTA 4. Air sample result required increase in respiratory protection factor.
Regulatory notice of violation at B85 LBL-EHS-2004-0001	1. 3/17/2004 2. Building 85 3. Hazardous Waste Handling Facility 4. Waste management	1. Building 85 2. LBNL 3. EH&S Division 4. Waste Management Group	1. Noncompliance notification (Group 9.2) 2. Significance Category 4 3. DTSC inspection	NA (causes not determined for this Category 4 event)
PAAA/NTS program administration strengthening PAAA 2004-01	1. 5/11/2004 2. LBNL 3. PAAA Program 4. Program improvements	1. LBNL 2. LBNL 3. PAAA Program 4. LBNL PAAA Coordination Office	1. Management concern 2. Non-ORPS reportable 3. Programmatic improvements to PAAA Program	1. [A4B1C01] Management policy guidance/expectations not well-defined, understood, or enforced 2. NA 3. Feedback and improvements LTA 4. EH6 reviewers of LBNL PAAA Program identified PAAA issues which need improvement

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UCB subcontractor working without GERT at Donner PAAA 2004-02	1. 5/17/2004 2. Donnor Lab 3. Research lab 4. Radiation training	1. Donnor Lab 2. UCB 3. UCB Facilities Dept. 4. Subcontractor	1. Management concern 2. Non-ORPS reportable 3. Worker conducted work in controlled area without GERT	1. [A6B1C02] Training requirements not identified 2. NA 3. Scope of Work LTA 4. General Employee Radiation Training (GERT) was not provided.
Fire Truck Accident at Grizzly Peak Gate LBL-EHS-2004-0002	1. 5/18/2004 2. Grizzly Peak Gate 3. Traffic 4. Vehicular accident	1. Grizzly Peak Gate 2. LBNL 3. EH&S Division 4. Alameda County Fire Dept.	1. Near Miss (Group 10.3) 2. Significance Category 3 3. Fire truck brake failure	1. [A2B6C01] Defective or failed part 2. NA 3. Developed/implemented controls LTA 4. Fire truck brakes failed, but not due to design insufficiency, mechanical defect, or driver error.
Custodian disregards instructions and enters posted RMA at B88 PAAA 2004-03	1. 5/20/2004 2. B88 3. Research labs 4. Non-authorized entry into posted area	1. B88 2. LBNL 3. Facilities Division 4. Custodial staff	1. Management concern 2. Non-ORPS reportable 3. Custodian removed trash from controlled area contrary to specific supervisor instructions	1. [A3B1C06] Wrong action selected based on similarity with other actions 2. [A4B1C01] Management policy guidance/expectations not well-defined, understood, or enforced 3. Developed/implemented controls LTA 4. Custodian emptied trash in controlled area contrary to supervisor's instruction not to enter
Worker contamination from U238 spill in B70A lab PAAA 2004-04	1. 6/18/2004 2. B70A 3. Research lab 4. Incorrect chemistry operation resulted in minor contamination to worker	1. B70A 2. LBNL 3. Earth Sciences Division 4. Researcher	1. Personnel contamination 2. Non-ORPS reportable 3. Minor U238 contamination to employee working in RMA hood	1. [A3B1C03] Incorrect performance due to mental lapse 2. [A6B1C03] Work incorrectly considered "skill of the craft" 3. Performed work LTA 4. Incorrect chemistry operation in RMA hood resulted in minor contamination to worker with U238

Attachment 1 – LBNL ORPS and PAAA Occurrences
January 1, 2004 to December 31, 2004

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Ge-68 source missing from Bldg. 55 PAAA-2004-05	1. 8/24/04 2. B55 3. Research labs 4. PET scanner 5. Radioactive material inventory	1. B55 2. LBNL 3. Physical Biosciences Div 4. Researcher	1. Loss of radioactive material 2. Non-ORPS reportable 3. Exempt 40 microcurie Ge-68 source (solid metallic rod used in PET scanner calibrations) was not located during annual inventory.	1. [A2B4C07] Marking/labeling LTA 2. NA 3. Analyzed hazard LTA 4. Ge-68 source should have been uniquely labeled to keep track of all 23 identical source rods used in the PET scanner.
Fire at Trailer 29B & 29C LBL-EHS-2004-0003	1. 9/5/2004 2. Trailers 29B & 29C 3. Abandoned facilities 4. Fire prevention	1. Trailers 29B & 29C 2. LBNL 3. EH&S Division 4. Alameda County Fire Dept.	1. Fire that activated sprinkler system (Group 2B.3) 2. Significance Category 3 3. Brush fire damaging picnic table, deck, & exterior walls of trailers	1. [A7B1C03] External fire or explosion 2. NA 3. Developed/implemented controls LTA 4. Brush was not sufficiently cleared to prevent grass fire that also damaged structures.
Penetration of Non-Energized Conduit at B76 LBL-OPS-2004-0003	1. 9/14/2004 2. B76 3. Facilities motor pool 4. Electrical safety	1. B76, room 109 2. LBNL 3. Facilities Division 4. Facilities workers	1. Management concern for electrical safety (Group 10.2) 2. Significance Category 3 3. Probing excavation for Environmental restoration project resulted in penetrating underground line	1. [A3B2C01] Strong rule incorrectly chosen over other rules; [A3B1C01] Check of work was LTA 2. [A4B4C03] Appropriate level of in-task supervision not determined prior to task; [A4B5C01] Problem identification methods did not identify need for change 3. Performed work LTA 4. Insufficient supervision and inadequate adherence to work procedures resulted in penetration of non-energized underground utility line.

Attachment 1 – LBNL ORPS and PAAA Occurrences
January 1, 2004 to December 31, 2004

ORPS and PAAA Events	**Where/when did it happen?** Date, facility, facility function, systems components keywords	**Who was involved?** Facility, Site, PSO, Contractor, work group keyword	**What happened?** Reporting criteria, significance category, additional detail keywords	**How did it happen?** Cause code, human performance code couplet, ISM function, additional detail keywords
Worker without correct training, supervision and authorization approval PAAA-2004-06	1. 10/12/2004 2. Donner Lab 3. Research labs 4. Radiation training	1. Donner Lab 2. LBNL/UCB 3. Life Sciences Division 4, Researcher	1. Management concern for radiation training 2. Non-ORPS reportable 3. Worker without correct training, supervision & authorization approval	1. [A3B1C01] Check of work was LTA 2. [A4B1C04] Management follow-up or monitoring of activities did not identify problems. 3. Developed/implemented controls LTA 4. Although the worker completed the Job Hazard Questionnaire properly, a clerical error in the data entry caused the training requirements to be missed. The non-identification of training requirements altered the supervision and authorization requirements. The supervisor should have checked the accuracy of the information after data entry.
Residual Waste on Ground LBL-PSF-2004-0001	1. 11/1/2004 2. Production Sequencing Facility (PSF) 3. Research labs 4. Waste management	1. PSF 2. Off-site, Walnut Creek 3. Genomics Division 4. Researcher	1. Written notification of violation (NOV) by regulatory agency (Group 9.2) 2. Significance Category 4 3. Contra Costa Sanitary District issued NOV for not cleaning small stain from autoclave waste that leaked from dumpster.	1. [A2B4C02] Material storage LTA 2. NA 3. Developed/implemented controls LTA 4. Waste was stored in a less than adequate dumpster that leaked, creating the potential for some waste to enter the storm drains. The stain that leaked onto the ground was in violation of the sanitary district's requirements.
PCB Spill at B71 LBL-OPS-2004-0004	1. 11/8/2004 2. Building 71 3. Electrical equipment maintenance and upgrade 4. Hazardous material spill	1. Building 71 2. LBNL 3. Facilities Division 4. Facilities electricians	1. Release of hazardous substance that is above permitted levels (Group 5A.1) 2. Significance Category 2 3. PCB containing capacitor oil spilled onto the ground and was above permitted levels.	1. [A4B2C06] Means not provided to assure procedures/documents/records were of adequate quality and up-to-date. 2. NA 3. Scope of work LTA 4. Standard procedures did not incorporate the requirement that electrical components removed from service must be reclassified to PCB or non-PCB status.

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Activated Legacy Material in Cask Discovered at B903 LBL-EHS-2004-0004	1. 11/16/2004 2. Building 903 3. warehouse 4. Legacy material	1. Building 903 2. Off-site LBNL facility 3. EH&S Division 4. Radiation protection personnel	1. Identification of legacy radioactive contamination found outside of a controlled area (Group 6B.4) 2. Significance Category 4 3. Activated cask found unexpectedly in storage/salvage facility	1. [A7B2C01] Legacy contamination 2. NA 3. Analyzed hazards LTA 4. Activated cask found unexpectedly in storage/salvage facility.
Improper Disposal of California Hazardous Waste LBL-EED-2004-0001	1. 12/10/2004 2. Building 70 3. Research labs 4. Waste management	1. Building 70 2. LBNL 3. EETD 4. Researchers	1. Management concern (Group 10.2) 2. Significance Category 4 3. Two reagent bottles found in dumpster	1. [A3B2C05] Situation incorrectly identified or represented resulting in wrong rule used. 2. [A4B1C01] Management policy guidance/expectations not well-defined, understood or enforced. 3. Performed work within controls LTA 4. Failure to recognize reagent bottles were considered hazardous waste or to seek guidance on disposal of chemicals.

Attachment 2 – Major Contributors to LBNL Occurrences
January 1, 2004 to December 31, 2004

Major Contributors	
	frequency
Cause code	
A1B2C07 Error in equipment or material selection	1
A2B4C02 Material storage LTA	1
A2B4C07 Marking/labeling LTA	1
A2B6C01 Defective or failed part	1
A3B1C01 Check of work LTA	2
A3B1C03 Incorrect performance due to mental lapse	2
A3B1C06 Wrong action selected based on similarity with other actions	1
A3B2C01 Strong rule incorrectly chosen over other rules	1
A3B2C05 Situation incorrectly identified or represented resulting in wrong rule used	1
A4B1C01 Management policy guidance/expectations not well defined, understood, or enforced	1
A4B2C06 Means not provided to assure procedures/documents/records were of adequate quality and up-to-date	1
A6B1C02 Training requirements not identified	1
A7B2C01 Legacy contamination	1
A7B1C03 External fire or explosion	1
Human performance code couplet	
A3B1C01 coupled with A4B1C04 Management follow-up or monitoring of activities did not identify problems	1
A3B1C01 coupled with A4B5C01 Problem identification methods did not identify need for change	1
A3B1C03 coupled with A4B5C13 Accuracy/effectiveness of change not verified or not validated	1
A3B1C03 coupled with A6B1C03 Work incorrectly considered "skill of the craft"	1
A3B1C06 coupled with A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	1
A3B2C01 coupled with A4B4C03 Appropriate level of in-task supervision not determined prior to task	1
A3B2C05 coupled with A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	1
Facility	
B51B	1
B55	1
B70	1
B70A	1
B71	1
B74	1
B76	1
B85	1
B88	1
B903	1
LBNL grounds	1
PSF	1
UCB	2
trailers 29	1

Attachment 2 – Major Contributors to LBNL Occurrences
January 1, 2004 to December 31, 2004

Division	
Earth Sciences	1
Environment, Health and Safety (EHS)	4
Environmental Energy Technologies	1
Facilities	5
Facilities (UCB)	1
Genomics	1
Life Sciences	1
Operations/Directorate	1
Physical Biosciences	1
Reporting Criteria	
Legacy material	1
Loss of radioactive material	1
Management concern	6
Near miss	1
Fire	1
Personnel contamination	1
Hazardous energy control	1
Hazardous materials release	1
Exposure above PEL	1
Notice of violation	2
ISM function	
Scope of work LTA	2
Analyzed hazards LTA	2
Developed/implemented controls LTA	6
Performed work within controls LTA	4
Feedback/improvement LTA	1

Attachment 3 – Analysis of Element Groupings from Multiple Contributors
January 1, 2004 to December 31, 2004

Multiple Contributor: [ISM function] Developed/implemented controls LTA (6)

Less than adequate [ISM function]	resulting in [reporting criteria]	caused by [cause code] / [human performance code couplet]	involving [division]	Event
Developed/implemented controls	Personnel exposure above PEL	A1B2C07 Error in equipment or material selection	Facilities	Air sample exceeded PEL for lead at 51B demolition LBL-OPS-2004-0002
Developed/implemented controls	Management concern	A3B1C06 Wrong action selected based on similarity with other actions A4B1C01 Management policy guidance/ expectations not well-defined, understood, or enforced	Facilities	Custodian disregards instructions and enters RMA at B88 PAAA 2004-03
Developed/implemented controls	Near miss	A2B6C01 Defective or failed part	Environment, Health and Safety (EHS)	Fire truck accident at Grizzly Peak Gate LBL-EHS-2004-0002
Developed/implemented controls	Fire that activated sprinkler system	A7B1C03 External fire or explosion	Environment, Health and Safety (EHS)	Fire at Trailer 29B & 29C LBL-EHS-2004-0003
Developed/implemented controls	Management concern	A3B1C01 Check of work was LTA A4B1C04 Management follow-up or monitoring activities did not identify problems	Life Sciences Division	Worker without correct training, supervision and authorization approval PAAA-2004-06
Developed/implemented controls	Written notification of violation (NOV) by regulatory agency	A2B4C02 Material storage LTA	Genomics Division	Residual Waste on Ground LBL-PSF-2004-0001

Analysis: For the six events with "less than adequate developed/implemented controls," differences in the reporting criteria, cause code, human performance code couplet, division and event details indicate that these are not recurring problems.

Multiple Contributor: [Division] Facilities (5)

[Division] less than adequate operation	resulting in [reporting criteria]	caused by [cause code] / [human performance code couplet]	Event
Facilities	hazardous energy control	A3B1C03 Incorrect performance due to mental lapse A4B5C13 Accuracy/effectiveness of change not verified or not validated	Violation of LOTO procedures at B74 LBL-OPS-2004-0001
Facilities	personnel exposure above PEL	A1B2C07 Error in equipment or material selection	Air sample exceeded PEL for lead at 51B demolition LBL-OPS-2004-0002
Facilities	management concern	A3B1C06 Wrong action selected based on similarity with other actions A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	Custodian disregards instructions and enters posted RMA at B88 PAAA 2004-03
Facilities	management concern	A3B2C01 Strong rule incorrectly chosen over other rules A3B1C01 Check of work was LTA A4B4C03 Appropriate level of in-task supervision not determined prior to task A4B5C01 Problem identification methods did not identify need for change	Penetration of non-energized conduit at B76 LBL-OPS-2004-0003
Facilities	release of hazardous substance that is above permitted levels	A4B2C06 Means not provided to assure procedures/documents/ records were of adequate quality and up-to-date	PCB spill at B71 LBL-OPS-2004-0004

Analysis: The five events originating from the Facilities Division are all sufficiently different in detail, significance, reporting criteria, and causes that a performance trend or evidence of a recurring event has not been established. There is also no evidence of any systemic managerial or programmatic deficiencies that may have resulted in these events.

Multiple Contributor: [Reporting criteria] Management concern (6)

[Reporting criteria]	by [Division]	is caused by [cause code] / [human performance code couplet]	Event
Management concern	Directorate	A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	PAAA/NTS program administration strengthening PAAA 2004-01
Management concern	UCB Facilities	A6B1C02 Training requirements not identified	UCB subcontractor working without GERT at Donner PAAA 2004-02
Management concern	Facilities	A3B1C06 Wrong action selected based on similarity with other actions A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	Custodian disregards instructions and enters posted RMA at B88 PAAA 2004-03
Management concern	Facilities	A3B2C01 Strong rule incorrectly chosen over other rules A3B1C01 Check of work was LTA A4B4C03 Appropriate level of in-task supervision not determined prior to task A4B5C01 Problem identification methods did not identify need for change	Penetration of non-energized conduit at B76 LBL-OPS-2004-0003
Management concern	Life Sciences	A3B1C01 Check of work was LTA A4B1C04 Management follow-up or monitoring of activities did not identify problems	Worker without correct training, supervision and authorization approval PAAA 2004-06
Management concern	Environmental Energy Technologies	A3B2C05 Situation incorrectly identified or represented resulting in wrong rule used A4B1C01 Management policy guidance/expectations not well-defined, understood, or enforced	Improper disposal of California hazardous waste LBL-EED-2004-0001

Analysis: The six management concerns are all sufficiently different in origin, detail, significance, and causes that a performance trend or evidence of a recurring event has not been established. There is also no evidence of any systemic managerial or programmatic deficiencies that may beresulting in similar management concerns.