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LAWRENCE
BERKELEY
NATIONAL
LABORATORY

FACILITIES DIVISION SELF ASSESSMENT
PENETRATION PERMIT TECHNICAL ASSURANCE
PROGRAM



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Contents

Executive Summary.....	2
Introduction	6
Focus Area Description.....	7
Current Requirements.....	7
Assessment Scope.....	7
Assessment Results.....	8
Findings	16
Observations.....	16
Noteworthy	16
Recommended Corrective Actions	17
Conclusions	18
Supporting Documentation	19
Appendix A Lines of Inquiry.....	20
Appendix B Assessment Methodology	21



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Executive Summary

The LBNL Penetration Permit Program establishes work control processes and procedures to ensure the safe penetration of ground or existing surfaces of LBNL properties. Work controls include institutional requirements and oversight that must be completed prior to beginning any penetration action. Effective implementation of such work controls prevents injury and property damage while minimizing disruptions of essential services.

The Facilities Division used the Self Assessment process to conduct a Technical Assurance Program Review of the Penetration Permit program and determine if any improvements, noteworthy practices, or corrective actions are necessary.

Between October 1, 2010 and September 30, 2011, 443 Penetration Permits were issued. This assessment included a review of 346 draft Penetration Permits, and 117 Inspection checklists. Ten completed Penetration Permits were pulled for review from project files. The team interviewed the Utility Manager, Utility Coordinator, the Utility Locator, the Utility Inspector and 7 Responsible Individuals (RIs). PUB 3000, recent Occurrence Reports and the ADMN-053 were also reviewed.

The Facilities Division Utility team is highly regarded by all of the interviewed RIs. The RIs with 1 exception were well versed and able to answer detailed questions about the process. The RIs all stated that they would stop or halt work when necessary and in fact 5 of those interviewed has stopped/halted work because of a Penetration Permit Issue.

Of the 443 Penetration Permits issued during 2010-2011, the Utility Inspector documented 117 inspections (26%). Five % of these inspections noted some issue or finding. The most frequently observed finding is a lack of signature. EH&S further documented 1557 Penetration Permit observations with 2 low risk findings noted (less than 1%).

The Penetration Permit has, in bold lettering under Section F, a requirement that the RI must contact the Utility Inspector at least 24 hours prior to any drilling. The Utility Inspector states that this frequently does not occur. The Inspector receives notification that a permit has been issued but is not informed when the work is ready to proceed. The notifications have not been tracked to determine who, is or who does not inform the inspector.

The Utility Manager recently developed a new online Penetration Program refresher training in October 2011. FAC0074 will serve as a yearly reminder, reacquainting the RIs with this pertinent information.

A review of 80 Penetration Permit Applications revealed that the majority of the applications have either unclear responses to questions or the questions present clear opportunities for misinterpretation. While the issued permits are good documents this happenstance is a result of careful detective work by the Utility Locator and not always the result of a carefully filled out application. Despite the quality product

produced by the Utility team it is incumbent that the Penetration Permit Applications be revised to support the quality of the resulting permits and a non added value.

Facilities Procedure ADMN-053 Rev 4 does not reflect the current roles and responsibilities of the Utility Team and should be updated. Required steps have been left out of the document and requirement for the Utility Coordinator to attend all start up meetings is unrealistic.

Penetration Permit information in PUB3000 is scattered amongst various chapters. Efforts should be made to centralize this information into its own chapter for quick and easy reference.

Between October 1, 2010 and September 30, 2011, there were 2 Occurrence Reports involving Penetration Permit issues. Both of these Occurrence Reports issues involved active Penetration Permits under the responsibility of a RI.

Apparent Causes include:

- Less –than adequate communication between subcontractor home and field offices, and between LBNL and subcontractors.
- The Subcontractor Construction Superintendent did not thoroughly read the drawing and Request for Information (RFI) package. Thus, he did not realize that drilling into the concrete wall was part of the subcontractor’s scope of work.
- Due to work load and personal schedule issues, the LBNL CM forgot to verify and confirm contract requirement with the subcontractor and that the subcontractor was responsible for all anchors.

All Penetration Permit Corrective actions, resulting from Occurrence Reports have been completed.

There is no formal gathering or distribution of Lessons Learned concerning Penetration Permit issues, amongst the RIs for distribution to the subcontractors. Several of the RIs stated that they pass along some historical antidotes for the benefit of the subcontractors. It would be useful to develop and archive relevant lessons learned the RIs could distribute during their pre start meetings.

A number of observations were discovered during this review:

Findings

There were no findings identified in this assessment.

Observations

The following observations were derived from interviews and document reviews:

1. RIs do not always contact the Inspector as required by the Penetration Permit
2. The Inspector does not always mark on the inspection form findings that are immediately corrected

3. The Utility Inspector does not track RIs who are not performing the start of work phone notification
4. Year end inspection totals drop steeply due to the increased work load
5. The Compliance Observation forms appear to be infrequently signed by EH&S
6. The Penetration Permit Application and Safety Checklist contain questions that are misunderstood by the users
7. The Penetration Permit Application and Safety Checklist are frequently filled out incorrectly
8. There is no sign-in sheet for the Pre Start Checklist
9. Penetration Permit information is lacking in PUB 3000
10. Lessons Learned are not used as a reference with subcontractors
11. The Utility Locator and Utility Coordinator do not document visits to active Penetration Permit field sites
12. ADMN-053 contains information that needs updating:
 - Request for clarification of non-destructive means to dig around covered vs. uncovered utilities
 - The Roles and Responsibilities section does not include the Utility Inspector roles and responsibilities or the requirement to notify the Utility Locator 24 hours before work starts
 - Tasks currently performed by the Utility Locator listed as the responsibilities of the Utility Coordinator
 - The requirement that the pre-start meeting shall include the Utilities Coordinator should be removed
 - The depth triggering a Penetration Permit is incorrectly noted as 1-1/2 inches

Recommended Corrective Actions

The following recommended corrective actions have been entered into the Corrective Action Tracking System (CATS) database-CATS # 8958 1-12

- The Utility Inspector should identify those employees who do not comply with the pre-start notification
- Once the non notifying RIs are identified the Utility Manager will ensure that the RIs understand and comply with the calling requirement
- The Utility Inspector should mark on the inspection form all findings and immediate corrections to the findings
- The Utility Coordinator and Locator should document all field inspections performed at active work sites
- The Utility Manager should increase the percentage of inspections covered during year end
- The Utility Manager should work with EH&S Inspectors to review the use of the Observation Sign Off form
- The Penetration Permit Application and Safety Checklist should be revised:
 - Include an N/A column

- Reword some questions for clarity(#4, 7,8,9, 10)
- Marking “no” on questions should trigger a work control explanation
- Develop a sign in sheet for the Pre Start Safety Checklist
- Work with EH&S to develop a PUB 3000 Penetration Permit Chapter
- Develop a folder of Penetration Permit Lessons Learned for subcontractor distribution
- Update Facilities ADMN-053
 - Update roles and responsibilities to reflect current processes, excluding tasks no longer performed
 - Add process required steps to include 24 hour notification of the Utility Inspector
 - Clarify use of non-destructive means on occasions when the utility is completely uncovered vs. covered
 - Revise incorrect depth triggering a Penetration permit
 - Remove pre-start meeting requirements for the Utilities Coordinator

Introduction

The goal of this self assessment is to identify improvements, necessary corrective actions or noteworthy practices of the lab’s Penetration Permit Program. It is also intended to serve as the Division annual Technical Assurance Program.

This review examined all five ISM core values as they pertain to the management of the Penetration Permit Program.

- Define the Work—The questions on the penetration permit application were reviewed for clarity and correctness. The process of drafting the Penetration Permit was reviewed.
- Analyze the Hazards-Responsible Individuals were interviewed concerning their responsibilities in conjunction with oversight and hazard assessment in the Penetration Process.
- Develop Controls-A Penetration Permit is a control that must be developed and maintained in accordance with ADMIN-053. This document was reviewed for content.
- Perform the Work-Inspections are a crucial component of the Penetration Permit Process. Documentation must be maintained and fully filled out. Work performed must adhere to the scope outlined in the penetration permit. All documented inspections for the year were reviewed.
- Obtain Feedback-Feedback was gained during the interviews. A sampling of the Responsible Persons, the Utility Inspector, Utility Coordinator, Utility Locator, and the Utility Manager were interviewed during this self assessment. One component discussed during the self assessment was lessons learned and their distribution.

Definitions

Responsible Person (RI)-The RI is the Laboratory representative requesting the permit and shall ensure that subcontractors/craft workers are informed about LBNL Penetration Permit requirements.

Draft Penetration Permit-Once the Draft Penetration Permit is issued, the subcontractor/ RI is implicitly granted control of the site.

Focus Area Description

The key objective of this self assessment is to examine the Facilities Penetration Permit Program to determine that all five ISM core values are present. The assessment team worked with the Subject Matter Experts and the Responsible Individuals to determine if the process is working as intended. The team reviewed all of the available draft penetration permits dating from October 1, 2010 through September 30, 2011. The team interviewed the Utility Manager, Utility Coordinator, the Utility Locator, the Utility Inspector and 7 Responsible Individuals. The team reviewed 10 completed Penetration Permits. The team further examined all inspection reports dating from October 1, 2010 through September 30, 2011. ADMAN - 053 Rev 4 was examined to ensure the current content meets the requirements for a comprehensive penetration permit program.

Current Requirements

All of the steps necessary for the safe penetration of ground, walls, or other existing surfaces of LBNL properties and the instructional requirements prior to beginning any penetration actions are defined in ADMAN-53 Rev. 4

Assessment Scope

Facilities reviewed the Penetration Permit practices to assure the process is functioning as intended. Documents reviewed and individuals interviewed include:

- 347 draft penetration permits, with their attached applications
- 117 completed safety checklists
- Because Penetration Permits are stored in their project files only a small number of these were reviewed (10).
- ADMN-053 Rev.4
- Interview Utility Manager
- Interview Utility Coordinator
- Interview Utility Locator
- Interview Utility Inspector
- Interview 7 Responsible Individuals
- PUB 3000 Chapters 6,8, 10, 11, and 25
- Reviewed on- line training course FAC0074

Assessment Results

Inspections

A total of 117 Penetration Permit Observations dated October 2010 through September 2011 were reviewed (Attachment A). These inspections were performed by the Facilities Division Penetration Permit Inspector. The inspector was interviewed during this self assessment. The observations contained 6 immediately corrected findings:

- 1 LOTO permit not attached
- 4 permits were missing a required signature
- 1 expired Penetration Permit

The Facilities Division Utility Inspector has been performing penetration permit inspections since March 2010. During his interview the Inspector stated that he works to keep projects moving and generally corrects findings on the spot. These corrections include gathering signatures, requesting permit extensions, and informing the RIs of any deficiencies. The Inspector does not always mark on the inspection form findings that are immediately corrected. The Facilities Division inspector stated that he has been directed to concentrate on subcontractors.

Location: SUA - 1126

Penetration Permit Observation Items for DB02:

	Penetration Permit	Comply	Not Comply	Comments/Observations:
1	Surface Penetration Activities Have Permit	/		
2	Permit Signed By RI & Utility Coordinator (UC)	/		
3	Permit Not Expired	/		
4	Extension Signed By UC & Utility Manager			Not needed
5	Permit Posted (Canary color)	X/		
6	Pre-start Briefing Held	X		[Redacted] Signature
7	Pre-start Signed By RI	X		
8	Permit Signed By Sub Emp On Site	/		
9	Penetration Area Matches Map	/		
10	Penetration Area Boundary Marked	/		
11	Scanning Area Marked	/		
12	Scanning Completed	/		
13	As-built drawing attached			Not needed
14	Surf Penet Method Per Approved Permit	/		
15	Tools used Per Approved Permit	/		

Inspection Checklist Showing Marks for Missing Signatures

The Inspector stated that he has stopped work on occasion for various reasons including getting a better tool or when a GFCI is needed for work near a sprinkler head.

Under Section F of the Hazards, Controls, and Limiting Conditions section of the Penetration Permit is the following notice. **“RI must contact the Inspector at least 24 hours prior to any drilling”** The inspector stated that he is frequently not called prior to work starting and in some cases never gets a call. One Facilities supervisor stated that he prefers his craft workers (many of whom are RIs) to call when they are out in the field. The inspector receives notification when a permit has been issued however he will not know when the work will actually start on any project without telephone or verbal notification. During the interviews, all of the RIs indicated that it is difficult to plan ahead and they often do not know 24 hours in advance when the authorized work will begin. The inspector often receives notifications at times when he is unavailable. During those times he will cover the checklist with the RI over the phone. There is currently no method to determine which RIs are calling for inspections and which RIs are not calling.

The Utility Inspector stated that he hopes to visit the work sites early in the process but it doesn’t always happen and visits can occur at any point. In addition to his Penetration Permit duties the Inspector works as a construction manager on utility projects. During year end as many as 10 Penetration Permits can be issued in a single day. In September 2011 the Inspector was completing a large water line project, working 9 Saturdays in a row and had little available time for inspections during the busiest Penetration Permit time of the year. During the month of September the Inspector was able to document only 2 inspections however he believes that he performed a number of undocumented spot checks and telephone checklist approvals. There are indications that improvements in work planning would improve this process. A review of all documented inspections found missing signatures the most recurring issue. The Utility Coordinator and the Utility Locator also visit and review the more complex sites but these inspections are not documented.

A summary report was generated in the DBO2 inspection documentation system for Penetration Permit inspections covering the period of October 1, 2010 through October 1, 2011 (Attachment B). There was 1507 Penetration Permit safety observations filed under Construction Inspections (Appendix B). The category of 1 low at risk finding was identified. The finding was noted as an unsigned Penetration Permit.

4 Penetration Permit safety inspections were filed under Penetration Permit TAPP in the DBO2 system. These 4 inspections included 50 observations with 1 finding involving an unsigned permit (Appendix E).

Yearly Permits Issued vs. Inspections Chart

Month	Permits Issued	Inspections
October 2010	24	8
November 2010	29	16
December 2010	18	5
January 2011	24	13
February 2011	30	15
March 2011	32	12
April 2011	24	5
May 2011	35	10

June 2011	29	8
July 2011	24	8
August 2011	44	15
September 2011	34	2
Yearly Totals	347	117

All RIs were asked if EH&S inspected their Penetration Permit work sites. Most stated yes with one RI (craft projects) stating “not that he was aware of.” The types of Penetration Permits that are the least inspected are those associated with craft workers performing quickly finished penetrations involving tasks, such as mounting cabinets, anchoring, and installing white boards.

Each RI stated that the Compliance Observation Sign-off form (Appendix D) is rarely signed when sites are visited by LBNL personnel. The relevance of this form should be reviewed with EH&S in conjunction with using DBO2.

10 Active and Retired Penetration Permits were reviewed for signatures:

- Four had no signature on the Compliance Observation Sign-Off form
- Three contained the Utility Inspectors signature
- Two contained RI and Utility Inspector signatures
- One contained RI signatures
- None contained EH&S signatures

Training

The Penetration Permit training course FAC0070 until October 2011 did not have any refresher training. A total of 160 LBNL employees have taken this training. This class is taught on request by the Utilities Manager. The Utilities Manager stated during his interview that he doesn’t fail attendees if they are unable to answer all of the questions correctly. The utility manager goes over every question in the test with the class and makes sure all of the individuals understand the questions and get a correct answer.

History of Penetration Permit Training Sessions

Year	Number of Responsible Individuals Trained
2006	36
2007	14
2008	36
2009	34
2010	26
2011	14
	Total 160

Because this training has traditionally not included refresher training, 36 individuals have not taken updated training in 5 years, 14 individuals in 4 years, another 36 individuals in 3 years etc.

During the self assessment Responsible Individual interviews, questions were asked to gauge the RIs overall penetration permit knowledge and the effectiveness of the training. Seven RIs were included in the interview process. Six of the Responsible Individuals exhibited a good grasp of crucial penetration process information. “One Responsible Individual struggled with the questions stating that all the necessary information is available on the Penetration Permit form.

The issue of refresher training has been recently resolved in response to the Occurrence report 2011-0010 Penetration Permit Violation Management Concern-No Injuries corrective action # 8763-2 which stated: “Facilities management should develop an online penetration permit training to facilitate easy-access to current penetration permit requirements for LBNL staff”. The corrective action was closed on October 12, 2011. The newly developed training FAC0074 is a yearly on line refresher course that will be entered into the Responsible Individuals JHAs as required training. The refresher training takes one-half hour to complete.

Penetration Permit Application

During interviews one employee stated a belief that some persons were just automatically filling out the permit application with little thought, hurrying through the process. After reviewing 347 permit applications there are indications that some individuals are either hurrying through or are not understanding the permit application questions. It is clear that the Utility Locator develops the Penetration Permits primarily through verbal conversations, site walks, scanning and surveys. The inadequacies of the Penetration Permits applications appear to have not affected the Penetration Permits results.

Eighty applications were reviewed (Appendix C). Certain questions in the application were tagged as having either unclear responses or the questions present clear opportunities for misinterpretation. Often RIs mark “no” to questions that should clearly have a yes answer or an explanation of work control in order for the permit to be issued. It appears that in many cases because there is not a “Not Applies (NA)” column some individuals just mark “no”. A few of the RI’s record “ NA” in the notes section of the application. It was noticed that these same RI’s tend to be very good about adding pertinent information into the comments section of the application while the majority do not.

A review of 80 Applications found:

- 70% answered no to the question -“Have you identified utilities that need to be maintained during excavation?”

		Yes	No	Comments
1.	Have the excavation boundaries been marked with white paint?		X	
2.	Have program representatives and/or Building Manager been notified of the excavation?		X	
3.	Have you identified utilities that need to be maintained in operation during excavation?		X	

70% answered no to the Question: Have you Identified Utilities that need to be maintained?

- 59% answered no to the question- *“Will there be inspections of each surface site on an as-needed basis to check for evidence of hazardous atmosphere etc?”*
- 66% answered no to the question- *“ Will there be inspections after every rainstorm or other occurrence which may increase hazards? “*
- 50% answered no to the question- *“Have adequate precautionary measure been implemented to protect workers where there is evidence of a potential hazard in and around surface penetration site?”*

Inspections		Yes	No	Comments
7.	Will there be daily pre-start inspections of the surface penetration site by the RI and subcontractor and/or LBNL Construction Safety Engineer?		X	
8.	Will there be inspections of each surface penetration site documented on an as-needed basis to check for evidence of the failure of protective systems, or the accumulation of hazardous atmosphere and other hazardous conditions?		X	
9.	Will there be inspections of each surface penetration site documented after every rainstorm or other occurrence, which may increase hazards?		X	
10.	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard to employees working in and around a surface penetration site.		X	

50% answered no to the Question: Have Adequate Precautionary Measures Been Implemented to Protect Workers?

- 15% answered no to the question- *“Is there adequate ventilation?”*
- 13% answered no to the question- *“Is there adequate lighting?”*

Surface Penetration		Yes	No	Comments
12.	Will the working area require barricades? If yes, are they in place?		X	
13.	Will there be requirements for water dust control?		X	
14.	Is there adequate ventilation in the work area?		X	
15.	Is there adequate lighting in the work area?		X	
16.	Has the subcontractor's approved JHA addressed surface penetration scope of work in detail.	X		

Variance Request Approval

15% answered no to the Question: Is there Adequate Ventilation?

- 59% answered no to the question – *“Have program representatives and or the Building Manager been notified?”*
- 78% answered no to the question- *“For excavation below the level of sidewalks, utilities, foundations etc will the excavation be adequately supported?”*
- 58% answered no to the question- *“will there be a daily prestart inspection by the RI, and subcontractor or LBNL construction safety engineer?”*
- 40% answered no to the question- *“Has the subcontractor approved JHA addressed surface penetration scope of work in detail?”*
- 33% answered no to each of the inspections reports including the start up meeting

The Penetration Permit Applications should be revised so that the documentation supports the efforts of the Utility Locator. For example, a document that states that an RI has not taken adequate precautionary measures to protect workers does not support a Penetration Permit that is issued with adequate precautionary measures. A revised application will clarify and require either a "NA" (not Applicable) or a description of alternative work controls. This clarification would benefit the RI's as well as the Utility Locator when preparing for penetrations. Applications are documents that should identify all of the known penetration related hazards and work controls. One question on the permit is worded "Will there be inspections after every rainstorm or other occurrence". Fifty nine % answered no to this question. This answer is incorrect. The correct answer is "Yes" there will be inspections after every rainstorm or other occurrence that may increase hazards. When the RIs were interviewed most stated that answering no to this question meant that there were no known hazards. Because there are always hazards associated with penetrations this and other questions should be clarified and revised.

During the RI interviews one employee suggested there should be a signature page for workers attached to the Pre-Start Checklist. This Pre-Start Checklist should be revised to reflect changes made in the Penetration Permit Application.

ADMN-053

Facilities operations procedure ADMN-53 Rev 4 was last updated on December 9, 2009. This self assessment reviewed the document to determine if the current content of ADMN meets the requirements for a comprehensive Penetration Permit Program. The review identified the following:

- The need for clarification concerning the use of non-destructive means using appropriate safe technology on occasions when the utility is completely uncovered vs. covered- Page 2 section 1.4 # 2
- Tasks currently performed by the Utility Locator is listed as the responsibilities of the Utility Coordinator
- The depth triggering a Penetration Permit is incorrectly noted as 1-1/2 inches-Page 8 section 2.0
- The document states that the pre-start meeting shall include the Utilities Coordinator, RI, workers who will be performing the work, the workers supervisor and representative from EH&S Environmental Services Group on sites that have been identified to be contaminated. All persons interviewed for this self-assessment agreed that the pre-start meeting seldom includes the Utility Coordinator. Upwards of 10 Penetration Permits are issued during the busiest time of the year and it would be nearly impossible for the Utility Coordinator to attend each start up meeting-Permit Process Step 6
- The requirement of a 24 hour notification of the Utility Inspector is not included in this document

Occurrence Reports/Corrective Actions

Between October 1, 2010 and September 30, 2011, there were 2 Occurrence Reports involving Penetration Permit issues.

1. Occurrence Report: SC-BSO-LBL-Operations 2011-0010 Penetration Permit Violation Management Concern-No Injuries

On 7/20/2011, while conducting routine construction project safety inspections, an LBNL EH&S safety engineer noticed that two new cabinets had been installed in Building 70 and a drill was on the floor. The safety engineer examined the Penetration Permit at the site and noticed that the subcontractor worker's signature was not on the Permit. The Permit was issued for a depth of up to 4" and the drill was set to 5". There was no evidence that a Pre-Start briefing was held. Three apparent causes were identified:

- Less –than adequate communication between subcontractor home and field offices, and between LBNL and subcontractors.
- The Subcontractor Construction Superintendent did not thoroughly read the drawing and Request for Information (RFI) package. Thus, he did not realize that drilling into the concrete wall was part of the subcontractor's scope of work.
- Due to work load and personal schedule issues, the LBNL CM forgot to verify and confirm contract requirement with the subcontractor and that the subcontractor was responsible for all anchors.

The corrective actions numbers 8763-1-5, have all been completed.

2. Occurrence Report: SC-BSO-LBL-Operations-2011-0011 Penetration Permit Violation During B50B UPS Project-No Injuries

On 7/29/2011, as part of the Uninterrupted Power Supply Installation project in Building 50B, a second-tier subcontractor drilled 1" into concrete within the 6" boundary. This is a violation of the constraints of the Penetration Permit. The subcontractor started to drill on the wrong drill mark, but caught his error at approximately 1" depth. There was no contact with a conduit nor a power source. All safety documentation, including the Job Hazard Analysis, Subcontractor Pre-Task Hazard Analysis, and the Penetration Permit, was in place and was checked that morning. No apparent causes were identified for this Occurrence Report. No corrective actions were required to be developed in response to this significance category 4 Occurrence Report.

The Corrective Action Tracking System indicates there are currently no open Penetration Permit corrective actions.

Once the draft Penetration Permit is issued the RI assumes responsibility, for adhering to the conditions, and boundaries of the Penetration Permit. Each of the 2011 Penetration Permit Occurrence Reports findings were issues associated with adhering to the Penetration Permit boundaries and communicating the conditions and boundaries.

The Utility Coordinator stated that his biggest concern is the communication between the subcontractor and the RI this concern is supported by the Occurrence Report: SC-BSO-LBL-Operations 2011-0010 Penetration Permit Violation.

Pub 3000

There are 5 separate locations in Pub3000 that reference the Penetration Permit Process.

- Chapter 6, Appendix A Line Management Authorizations
- Chapter 8, Electrical Safety-Reference to acquiring a Penetration Permit
- Chapter 10, A. 25.3 Dig Permit to Penetrate Ground or Existing Concrete Surfaces
- Chapter 11, Environmental Protection-Reference to surface penetrations (Permit Required)
- Chapter 25, Machine Safeguarding-reference to acquiring a Penetration Permit

The Chapter 10, A.25.3 Dig Permit to Penetrate Ground or Existing Concrete Surfaces has a brief statement “All work that will require excavating, drilling, or driving stakes or poles 1-5/8 inches or deeper into a surface requires a permit. A permit is also required to penetrate any depth into existing concrete surfaces such as floor slabs, walls, beams, or columns. The permit is issued by the LBNL Utilities Engineer. Subcontractors may obtain the permit through the Project Manager.

There is currently very limited reference material for this subject in Pub 3000. The Penetration Permit Process and the ADMN-053 requirements should be readily available and easy to locate. The vital information is located on the Facilities Division web page under Permits however Pub 3000 is considered the point of information concerning LBNL safety processes.

Lessons Learned

The Lessons Learned and Best Practices database was searched for any briefings created during the review period:

- LL-11-0007 Natural Gas Line Severed During Excavation Activity-Oak Ridge National Laboratory
- LL 11-0026 Recognizing Changing Conditions-Hanford

The RI's were asked if they shared Lessons Learned with their subcontractors during pre start meetings or plan of the day meetings. Four RI's stated “no” and three RIs stated “yes, they share stories of previous events” during these meetings. One of those that stated “yes” further said that he reads the Occurrence reports and relays the highlights of the lessons learned from those incidents.

There was no evidence of LBNL Penetration Permit Lessons learned entered into the Lessons Learned database during the review period.

Findings

There were no findings:

Observations

The following observations were derived from interviews and document reviews:

1. RIs do not always contact the Inspector as required by the Penetration Permit
2. The Inspector does not always document on the inspection form findings that are immediately corrected
3. The Utility Inspector does not track RIs who are not performing the start of work phone notification
4. Year end inspection totals drop steeply due to the increased work load
5. Compliance Observation forms appear to be infrequently signed by EH&S
6. The Penetration Permit Application and Safety Checklist contain questions that are misunderstood by the users
7. The Penetration Permit Application and Safety Checklist are frequently filled out incorrectly
8. There is no sign-in sheet for the Pre Start Checklist
9. Penetration Permit information is lacking in PUB 3000
10. Lessons Learned are not used as a reference with subcontractors
11. The Utility Locator and Utility Coordinator do not document visits to active Penetration Permit field sites
12. ADMN-053 contains information that needs updating:
 - Request for clarification of non-destructive means to dig around covered vs. uncovered utilities
 - The Roles and Responsibilities section does not include the Utility Inspector or the requirement to notify the Utility Inspector 24hours before work starts
 - Tasks currently performed by Utility Locator are listed as the responsibilities of the Utility Coordinator
 - The requirement that the pre-start meeting shall include the Utilities Coordinator should be removed
 - The depth triggering a Penetration Permit is incorrectly noted as 1-1/2 inches

Noteworthy

1. The photos attached to the Penetration Permits are very detailed and precise.



2. The Facilities Division ensures a higher level of caution by use of non-destructive means of excavation within a 30 inch radius of a marked or exposed utility. The industry standard is 24 inches.

Recommended Corrective Actions

The following recommended corrective actions have been entered into the Corrective Action Tracking System (CATS) database-CATS # 8958 1-12

- The Utility Inspector should identify those employees who do not comply with the pre-start notification
- Once the non notifying RIs are identified the Utility Manager will ensure that the RIs understand and comply with the calling requirement
- The Utility Inspector should mark on the inspection form all findings and immediate corrections to the findings
- The Utility Coordinator and Locator should document all field inspections performed at active work sites
- The Utility Manager should increase the percentage of inspections covered during year end
- The Utility Manager should work with EH&S Inspectors to review the use of the Observation Sign Off form
- The Penetration Permit Application and Safety Checklist should be revised:
 - Include an N/A column
 - Reword some questions for clarity (#4, 7,8,9, 10)
 - Marking “no” on questions should trigger a work control explanation

- Develop a sign in sheet for the Pre Start Safety Checklist
- Work with EH&S to develop a PUB 3000 Penetration Permit Chapter
- Develop a folder of Penetration Permit Lessons Learned for subcontractor distribution
- Update Facilities ADMN-053
 - Update roles and responsibilities to reflect current processes excluding tasks no longer performed
 - Add process required steps to include 24 hour notification of the Utility Inspector
 - Clarify use of non-destructive means on occasions when the utility is completely uncovered vs. covered
 - Revise incorrect depth triggering a Penetration permit
 - Remove pre-start meeting requirements for the Utilities Coordinator

Conclusions

The Facilities Division Penetration Permit program is a well-functioning process, due in large part to the dedicated members of its team. During interviews each RI commended the Penetration Permit Team for their accessibility, response, and an acknowledgement of the teams tremendous work load. The Penetration Permit Teams meets weekly to discuss current Penetration Permit issues. The Utility Locator, Inspector, and Coordinator work in close physical proximity to each other, so the discussions occur as needed. The team processed over 443 Penetration Permits in 2010-2011, and as many as 10 daily during year end. Over 347 draft Penetration Permits and 117 inspections were reviewed for this self-assessment. The completed and active Penetration Permits are less available for review; however 10 were pulled from project files and reviewed. The Utility team and 7 Responsible Individuals were interviewed.

All but one of the RIs was knowledgeable about details of the Penetration process. The RI who was less knowledgeable works primarily with mounting cabinets and anchoring therefore not working on a daily basis with the more hazardous aspects of excavating or drilling. Until October 2011 the Penetration Permit Training, (EH&S0070) did not include refresher training. The newly developed training FAC0074 is a yearly on line refresher that will remind and replenish RIs skill sets.

None of the RIs expressed any reservations about performing a “Stop Work”. In fact most of the RIs discussed times when they had halted work due to a Penetration Permit Issue.

There is no formal development, gathering, and distribution process for lessons learned. Most of the RIs stated that they share informal lessons learned with their subcontractors.

All but 1 of the RIs stated that EH&S inspects their penetration permits, excavations, and drilling on a regular basis. The 1 RI stated that he has no idea if EH&S is inspecting his work sites. All of the RIs stated that usually the EH&S inspectors do not sign the Compliance Observation Sign Off form. Because the inspection data is gathered in DB02, this page should be removed from the permit as redundant.

The Utility Inspector performed 117 documented inspections over the 2010-2011 fiscal year. About 5 % of these inspections noted findings. Once the draft Penetration Permit is issued the permit and associated work becomes the responsibility of the RI. The only quality assurance monitoring is performed through the inspection process. This is a vital component for eliminating mistakes. During the busiest time of the year when the Penetration Permit numbers climb dramatically, the Utility Inspector was committed to “other” work.

The document ADMN-53 Roles and Responsibilities section is outdated and should be updated.

The Penetration Permit information in Pub 3000 is not centralized making queries frustrating and time consuming. This information should be collected to its own chapter.

The Penetration Permit Application is often misunderstood or incorrectly filled out by the applicants. The resulting permits outline the hazards and controls required by the Penetration Permit Team. Development of the hazard controls is not a result of the application but is a result of site walks and investigation by the Utility Locator. Despite the quality product produced by the Utility team it is incumbent that the Penetration Permit Applications be revised to support the quality of the resulting permits.

All Occurrence reports corrective actions have currently been closed in the corrective actions tracking system.

This Self-Assessment subject (Penetration Permit) has been tagged going forward as requiring a yearly review. The next assessment will include field observations with a comparison of Penetration Permit dictates vs. actual field conditions. Based on the results of this report there are indications that room for improvement in the work planning aspects of this process may exist. The next assessment will include an examination of the work planning processes for possible improvement. This will enable the Facilities Division to continuously refine the process.

Supporting Documentation

The following documentation was reviewed as part of the self assessment.

- Reviewed Pub 3000 Chapters 10, 6, 25, 8, and 11
- Reviewed ADMN-053
- Reviewed 117 completed safety checklists
- Reviewed 347 draft Penetration Permits
- Reviewed 10 completed active and filed Penetration Permits
- Reviewed DBO2 inspections

Appendix A-Lines of Inquiry

Lines of inquiry for the self assessment include:

1. Does the current content of ADMN-053 meet the requirements for a comprehensive penetration permit program?
2. Does the training provided for the penetration permit Responsible Individuals meet the needs of those requiring penetration permit program training?
3. During field work, are penetration permit program implementation and programmatic issues adequately identified?
4. During field work, are penetration permit program implementation issues properly controlled?
5. When unsafe or non-compliant conditions are identified are they corrected promptly and are the corrections adequate to prevent recurrence of the non-compliance or unsafe situation?
6. Through field work inspections, are construction contractors, LBNL Facilities personnel, non-construction subcontractors, service vendors, visiting scientists, engineers, participating guests and students determined to be properly trained in the penetration permit program?
7. Are unsafe conditions that were identified through internal or external assessments documented in the DBO2 database?
8. Are issues that cannot be immediately corrected that were identified through internal or external assessments documented in the CATS database?
9. Are issues managed through resolution in a timely manner?
10. Are corrective actions effective?
11. Are Lessons Learned and Best Practices developed and disseminated to appropriate staff?
12. Is feedback from staff received and addressed?
13. Are Lessons Learned and Best Practices incorporated into work planning and control processes?

Appendix B- Assessment Methodology

The Self-Assessment Methodology:

A. Persons conducting assessment

This assessment was performed by Janice Sexson and Gene Tucker.

B. Methodology

This review is currently in progress.

Documentation reviewed will include:

1. Penetration Permit Review Observation Checklist
2. Penetration Permit Variance requests
3. Third party utility locator service pre-job scanning and utilities location verification
4. Field inspection and attendance verification at pre-job safety meetings prior to issuance of Penetration Permits by the Utilities Coordinator and RI
5. Worksite Penetration Permit program inspections by the Facilities Penetration Permit Inspector
6. Monitoring of training and authorization of Responsible Individuals by the Utilities Manager
7. Worksite evaluations to validate continuance of permit conditions by the Utilities Coordinator
8. Penetration Permit training effectiveness evaluations conducted by the Facilities Safety Coordinator
9. Occurrence Reports
 - Reports submitted by LBNL specifically addressing Penetration Permits
 - Including existing and reports issued during the review period
10. Review CATS database entries including:
 - All existing reports
 - Reports issued during the review

Attachment A**Penetration Permits with Facilities Completed Inspections**

Inspection Date	RI	Findings	All Signatures	Permit #	# of Inspections	Loto permit attached
10/11/2010	Elizalde	0	Yes	2043		
10/12/2010	Tully	0	Yes	2037		
10/19/2010	Javandel	0	Yes	2176		
10/21/2010	Kemper	0	Yes	2187		
10/26/2010	Bennett	0	Yes	2167		
10/26/2010	Javandel	0	Yes	2193		
11/4/2010	Ross	0	Yes	2180		
11/9/2010	Reese	0	Yes	2206		
11/10/2010	Brunkow	0	Yes	2178		
11/11/2010	Doty	0	Yes	2207		
11/15/2010	Brunkow	1	Yes	2223		No
11/16/2010	Elizalde	0	Yes	2179		
11/16/2010	Huebschle	0	Yes	2201		
11/21/2010	Elizalde	0	Yes	2209		
11/22/2010	Elizalde	0	Yes	2220		
11/24/2010	Cota	0	Yes	2171		
12/9/2010	Patterson	0	Yes	2203		
12/15/2010	Edgar	0	Yes	2226		
12/15/2010	Dovich	0	Yes	2241		
12/15/2010	Reese	0	Yes	2244		
1/3/2011	Brunkow	0	Yes	2216		
1/4/2011	Elizalde	0	Yes	2252		
1/7/2011	Brunkow	0	Yes	2250		
1/13/2011	Ross	0	Yes	2267		
1/18/2011	Doty	0	Yes	2243		
1/18/2011	Estrada	0	Yes	2256		
1/20/2011	Galvez	0	Yes	2255		
1/20/2011	Samatua	0	Yes	2266		
1/20/2011	Patterson	0	Yes	2269		
1/20/2011	Brunkow	0	Yes	2270		
1/21/2011	Kemper	0	Yes	2278		
2/1/2011	Patterson	0	Yes	2272		
2/2/2011	Brunkow	0	Yes	2271		
2/2/2011	Brunkow	0	Yes	2275		
2/3/2011	Beaton	0	Yes	2276		
2/3/2011	Kemper	0	Yes	2297		

Inspection Date	RI	Findings	All Signatures	Permit #	# of Inspections	Loto permit attached
2/8/2011	Reese	0	Yes	2281		
2/8/2011	Samatua	0	Yes	2287		
2/16/2011	Doty	0	Yes	2300		
2/17/2011	Catalano	0	Yes	2313		
2/23/2011	Galvez	0	Yes	2286		
2/23/2011	Dovich	0	Yes	2315		
2/24/2011	Huebschle	0	Yes	2309		
3/1/2011	Tully	0	Yes	2304		
3/1/2011	Dovich	0	Yes	2326		
3/15/2011	Lipton	0	Yes	2307		
3/22/2011	Galvez	1	No	2328		
3/22/2011	Galvez	1	No	2338		
3/22/2011	Samatua	0	Yes	2349		
3/22/2011	Bennett	0	Yes	2353		
3/23/2011	Estrada	0	Yes	2314		
3/31/2011	Bennett	0	Yes	2341		
4/5/2011	Reese	0	Yes	2367		
4/6/2011	Beaton	0	Yes	2357		
4/9/2011	Elizalde	0	Yes	2320		
4/11/2011	Edgar	1	No	2335		
4/13/2011	Beedle	0	Yes	2362		
5/2/2011	Doty	0	Yes	2344		
5/2/2011	Doty	0	Yes	2384		
5/3/2011	McPherson	0	Yes	2376		
5/3/2011	Brunkow	0	Yes	2380		
5/9/2011	Kemper	0	Yes	2360		
5/11/2011	Beaton	0	Yes	2361		
5/11/2011	Dovich	0	Yes	2404		
5/18/2011	Black	0	Yes	2412		
5/19/2011	Estrada	0	Yes	2408		
5/24/2011	Patterson	0	Yes	2413		
6/6/2011	Brunkow	0	Yes	2380		
6/6/2011	Tully	0	Yes	2399		
6/6/2011	Torres	0	Yes	2419		
6/9/2011	Estrada	0	Yes	2434		
6/20/2011	Brunkow	0	Yes	2388		
7/12/2011	Bennett	0	Yes	2441		
7/22/2011	Beaton	0	Yes	2469		
7/25/2011	Samatua	0	Yes	2457		

Inspection Date	RI	Findings	All Signatures	Permit #	# of Inspections	Loto permit attached
7/27/2011	Karaski	0	Yes	2470		
7/28/2011	Crofoot	0	Yes	2484		
8/1/2011	Samatua	0	Yes	2462		
8/8/2011	Brunkow	0	Yes	2378		
8/8/2011	Doty	0	Yes	2493		
8/8/2011	Doty	0	Yes	2496		
8/9/2011	Beaton	0	Yes	2443		
8/13/2011	Elizalde	0	Yes	2483		
8/16/2011	Karaski	0	Yes	2471		
8/24/2011	Beaton	0	Yes	2500		
8/30/2011	Huebschle	0	Yes	2527		
8/31/2011	Tully	0	Yes	2480		
8/31/2011	Kemper	0	Yes	2523		
9/21/2011	Samatua	0	Yes	2541		
9/21/2011	Elizalde	0	Yes	2551		
10/22/2010-11-4-2010-10/29/2010-11/10/2010	Brunkow	0	Yes	2152	4	
11/19/2010-11/23/2010	Kemper	0	Yes	2202	2	
11/24/2010-11/4/2010	Brunkow	0	Yes	2159	2	
12/8/2010-1/20/2011	Ross	0	Yes	2230	2	
2/2/2011-3/23/2011	Brunkow	0	Yes	2277	2	
2/7/2011-1/24/2011	Kemper	0	Yes	2258	2	
3/22/2011-2/16/2011	Brunkow	0	Yes	2248	2	
6/1/2011-3/11/2011	Elizalde	0	Yes	2332	2	
6/23/2011-8/1/2011	Brunkow	0	Yes	2432	2	
6/7/2011-7/25/2011	Cotta	2	No	2377	2	Permit expired
7/28/2011-8/4/2011	Brunkow	0	Yes	2465	2	

Inspection Date	RI	Findings	All Signatures	Permit #	# of Inspections	Loto permit attached
8/22/2011- 7/28/2011- 8/17/2011	Schaefer	0	Yes	2474	3	

Attachment B

DBO2 Penetration Permit Inspection Data October 1, 2010-September 30, 2011

Summary

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Inspection Type	Inspections	Observations	At-Risk Conditions	% Safe	At-Risk Conditions - Severity			
					De Minimis	Low	Medium	High
Construction Safety	316	1507	1	99.9%	0	1	0	0

Details

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
Penetration Permit	Summary	1507	1	1506	99.9%	0	1	0	0
	Pen. Activities Have Permit	330	0	330	100.0%	0	0	0	0
	Permit Posted (Yellow)	258	0	258	100.0%	0	0	0	0

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
	Permit Not Expired	121	0	121	100.0%	0	0	0	0
	Extension Signed By UC	7	0	7	100.0%	0	0	0	0
	Permit Signed By RI & UC	79	0	79	100.0%	0	0	0	0
	Permit Signed By EEs On Site	39	0	39	100.0%	0	0	0	0
	Pre-start Briefing Held	88	0	88	100.0%	0	0	0	0
	Pre-start Signed By RI	70	0	70	100.0%	0	0	0	0
	Pen. Area Matches Map	55	0	55	100.0%	0	0	0	0
	Pen. Area Boundary Marked	62	0	62	100.0%	0	0	0	0
	Scanning Area Marked	80	0	80	100.0%	0	0	0	0
	Scanning Completed	78	0	78	100.0%	0	0	0	0
	Any Variance Approved	10	0	10	100.0%	0	0	0	0
	Dig Method Per Signed Permit	61	1	60	98.4%	0	1	0	0

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
	Dig Tools Per Signed Permit	59	0	59	100.0%	0	0	0	0
	PPE Used	76	0	76	100.0%	0	0	0	0
	LOTO Used If Permit Requires	14	0	14	100.0%	0	0	0	0
	Permit Removed After Job	20	0	20	100.0%	0	0	0	0

Inspection Type:	Construction Safety
Category:	Penetration Permit
Begin Date:	10/01/2010
End Date:	09/30/2011
Show	Category
Ordered By	Inspection Type: : Ascending
Show Chart By:	Count and Percentage

Appendix C

Penetration Permit Question Sampler

Have program representatives and or BM been notified	Have you identified utilities that need to be maintained in operation during excavation	For excavation below the level of sidewalks, utilities foundations etc will the excavation be adequately supported	Will there be a daily prestart inspection by the RI, and subcontractor or LBNL construction safety engineer	Will there be inspections of each surface site documented on an as-needed basis to check for evidence of hazardous atmospheres etc	Inspections after every rainstorm or other occurrence which may increase hazards	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard to employees in and around surface penetration site	is there adequate ventilation	Is there adequate lighting	Has the subcontractor approved JHA addressed surface penetration scope of work in detail
No	No	No	no	No	no	No	No	No	No
No	No	No	Yes	No	no	No	yes	yes	No
No	No	No	Yes	Yes	no	Yes	Yes	Yes	Yes
No	No	No	no	no	no	no	Yes	Yes	NA
No	No	No	No	Yes	No	No	Yes	Yes	NA
No	No	No	Yes	No	No	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	No	No	No
No	No	No	No	No	No	No	Yes	Yes	Yes
Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	Yes
Yes	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes
Yes	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	No	No	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No

Have program representatives and or BM been notified	Have you identified utilities that need to be maintained in operation during excavation	For excavation below the level of sidewalks, utilities foundations etc will the excavation be adequately supported	Will there be a daily prestart inspection by the RI, and subcontractor or LBNL construction safety engineer	Will there be inspections of each surface site documented on an as-needed basis to check for evidence of hazardous atmospheres etc	Inspections after every rainstorm or other occurrence which may increase hazards	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard to employees in and around surface penetration site	is there adequate ventilation	Is there adequate lighting	Has the subcontractor approved JHA addressed surface penetration scope of work in detail
Yes	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	No	Yes	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	No	No	No
Yes	No	No	Yes	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	No	No	No
Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	Yes	Yes	Yes	TBD	Yes	Yes	TBD
No	No	No	No	No	No	No	Yes	Yes	No
Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	Yes
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	No	Yes	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
Yes	Yes	No	Yes	Yes	NA	Yes	Yes	Yes	No
Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	No	Yes	Yes	Yes	Yes	No	No	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	NA	Yes	NA	NA	Yes	Yes	Yes	Yes
Yes	NA	NA	Yes	NA	NA	NA	Yes	Yes	Yes

Have program representatives and or BM been notified	Have you identified utilities that need to be maintained in operation during excavation	For excavation below the level of sidewalks, utilities foundations etc will the excavation be adequately supported	Will there be a daily prestart inspection by the RI, and subcontractor or LBNL construction safety engineer	Will there be inspections of each surface site documented on an as-needed basis to check for evidence of hazardous atmospheres etc	Inspections after every rainstorm or other occurrence which may increase hazards	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard to employees in and around surface penetration site	is there adequate ventilation	Is there adequate lighting	Has the subcontractor approved JHA addressed surface penetration scope of work in detail
Yes	NA	NA	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	NA	NA	NA	NA	NA	NA	Yes	Yes	NA
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	NA	No	Yes	NA	Yes	Yes	Yes	Yes
Yes	No	NA	No	Yes	No	Yes	Yes	Yes	Yes
No	No	NA	No	No	No	Yes	Yes	Yes	NA
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	Yes	Yes	Yes	Yes
Yes	NA	NA	Yes	No	No	Yes	Yes	Yes	NA
No	No	No	No	No	No	No	No	No	No
Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
NA	NA	NA	Yes	NA	NA	Yes	Yes	Yes	NA
No	No	No	Yes	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	Yes

Have program representatives and or BM been notified	Have you identified utilities that need to be maintained in operation during excavation	For excavation below the level of sidewalks, utilities foundations etc will the excavation be adequately supported	Will there be a daily prestart inspection by the RI, and subcontractor or LBNL construction safety engineer	Will there be inspections of each surface site documented on an as-needed basis to check for evidence of hazardous atmospheres etc	Inspections after every rainstorm or other occurrence which may increase hazards	Have adequate precautionary measures been implemented to protect workers where there is evidence of a potential hazard to employees in and around surface penetration site	is there adequate ventilation	Is there adequate lighting	Has the subcontractor approved JHA addressed surface penetration scope of work in detail
No	No	No	Yes	No	No	No	Yes	Yes	NA
No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	No	No	No	No	Yes	Yes	No
No	No	No	Yes	Yes	No	No	Yes	Yes	Yes
No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	Yes	Yes	No
Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	No	No	No	No	Yes	Yes	Yes	Yes
No	No	No	No	No	No	No	No	No	No
No	No	No	No	No	No	No	No	No	No
No	No	No	No	No	No	No	Yes	Yes	Yes
Yes	No	Yes	Yes	Yes	NA	Yes	Yes	Yes	Yes
No	No	No	Yes	Yes	No	Yes	No	No	Yes
NA	NA	NA	Yes	NA	NA	Yes	No	No	Yes

Appendix D

Example of Compliance Observation Sign-Off form

	FACILITIES DIVISION PERMIT TO PENETRATE EXISTING SURFACES OF LBNL PROPERTY	EMERGENCY NUMBERS LBNL On-Site Fire & Medical 7-011 LBNL On-Site Fire & Medical 9-011 Campus Fire & Medical 3-011 LBNL Security 510-486-4677 Facilities Division 24-hr 5486-5481
	VALID ONLY WHEN ALL APPROVAL SIGNATURES ON THE LAST PAGE HAVE BEEN OBTAINED	

Compliance observation sign-off when site is visited by LBNL personnel

LBNL Responsible Initials	TIME & DATE OF VISIT	COMPLIANCE YES OR NO	LBNL Safety Engineer	TIME & DATE OF VISIT	COMPLIANCE YES OR NO
			<i>Proctor, J. C. [Signature]</i>	3/24/2002	YES
			<i>[Signature]</i>	5/21/2001	YES

Off-site 24-hour or nighttime phone numbers are 510-486-5481.

Appendix E

DB02 TAPP Penetration Permit Inspections

Inspection Type	Inspections	Observations	At-Risk Conditions	% Safe	At-Risk Conditions - Severity			
					De Minimis	Low	Medium	High
Construction Safety	316	1507	1	99.9%	0	1	0	0

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
Penetration Permit	Summary	1507	1	1506	99.9%	0	1	0	0
	Pen. Activities Have Permit	330	0	330	100.0%	0	0	0	0
	Permit Posted (Yellow)	258	0	258	100.0%	0	0	0	0
	Permit Not Expired	121	0	121	100.0%	0	0	0	0
	Extension Signed By UC	7	0	7	100.0%	0	0	0	0
	Permit Signed By RI & UC	79	0	79	100.0%	0	0	0	0

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
	Permit Signed By EEs On Site	39	0	39	100.0%	0	0	0	0
	Pre-start Briefing Held	88	0	88	100.0%	0	0	0	0
	Pre-start Signed By RI	70	0	70	100.0%	0	0	0	0
	Pen. Area Matches Map	55	0	55	100.0%	0	0	0	0
	Pen. Area Boundary Marked	62	0	62	100.0%	0	0	0	0
	Scanning Area Marked	80	0	80	100.0%	0	0	0	0
	Scanning Completed	78	0	78	100.0%	0	0	0	0
	Any Variance Approved	10	0	10	100.0%	0	0	0	0
	Dig Method Per Signed Permit	61	1	60	98.4%	0	1	0	0
	Dig Tools Per Signed Permit	59	0	59	100.0%	0	0	0	0
	PPE Used	76	0	76	100.0%	0	0	0	0
	LOTO Used If Permit Requires	14	0	14	100.0%	0	0	0	0

Category	Sub-Category	Observations	Conditions		% Safe	At-Risk Conditions - Severity			
			At-Risk Conditions	Safe Conditions		De Minimis	Low	Medium	High
	Permit Removed After Job	20	0	20	100.0%	0	0	0	0

Criteria

Inspection Type:	Construction Safety
Category:	Penetration Permit
Begin Date:	10/01/2010
End Date:	09/30/2011
Show	Category
Ordered By	Inspection Type: : Ascending
Show Chart By:	Count and Percentage