

Notable Event Worksheet

(See [ES&H Manual Chapter 5200 Appendix T1 Event Investigation and Causal Analysis](#) for Instructions)

Click
For Word Doc

Title of Event			
Event Title:	Access Allowed into FEL Vault under Laser-Bypass mode without proper Training and PPE		
Date and Time of Occurrence:	02/14/2012 – 13:51	Notable Event Number:	FEL-12-0214
Event Location:	FEL Vault	Date Notable Event Report is Due*:	03/29/2012

*The Notable Event Report is due to the ESH&Q Reporting Officer with 30 days of the Initial Fact Finding Meeting unless an extension is requested.

Categorization and Reporting
 (To be completed by ESH&Q Reporting Officer within two hours – unless essential information is still pending)

ORPS Determination:	Date:	02/28/2012	Time:	11:50 am
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Subject **FEL Vault Event Notification/ORPS Determination** 2/28/2012 11:50 AM

To Steve Neilson ✨

Cc Mary Logue ✨, Harry Fanning ✨ Other Actions ▾

Steve,

Good Morning! On February 14, 2012 there was an event at the FEL vault that involved the SSO allowing 3 RadCon technicians permission to enter the vault while the vault was in Controlled Access/ Laser Alignment mode. The 3 RadCon technicians did not have the appropriate training or PPE (laser safety goggles). The SSO realized the mistake and asked the Technicians to leave the vault immediately. Once they exited, the SSO told them why they were asked to leave, and apologized for allowing them entry into the vault.

An initial meeting was convened on the same day to discuss if this event met the requirements of ES&H Manual Chapter 5200. Harry Fanning, Dick Owen, Gwyn Williams, Noel Okay, Steve Benson, and myself discussed the event and concluded at that time, it was not a notable event and that we would handle it as a lessons learned only.

As additional information has become available, we feel that this event should be processed as a Notable Event and we will plan to hold the official Fact Finding meeting this afternoon or first thing in the morning. Based on information obtained so far, this event **does not** meets ORPS reportable criteria.

If you have any questions or concerns, feel free to contact me.

Thank you,
 Tina

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 Tina Johnson
 Reporting Officer/
 Administrative Assistant
 JSA/Jefferson Lab
 12050 Jefferson Ave
 Suite 602
 Newport News, VA 23606
 757-269-7611

Categorization and Reporting

(To be completed by ESH&Q Reporting Officer within two hours – unless essential information is still pending)

ORPS Determination: **Date:** 02/28/2012 **Time:** 11:50 am

10 CFR 851 Screen: **Date:** 02/28/2012 **Time:** 11:52 am

Negative: This incident does not meet the voluntary reporting criteria either as a discreet event or as a programmatic weakness_

Unless otherwise specified the following is to be completed by the Lead Investigator.

Step 1 Initial Fact-Finding Meeting			
Date:	02/29/2012	Time:	13:00
Location:		FEL Break Room	
Required Attendees:		Optional Attendees:	√ if Present
Lead Investigator:		Associate Director:	
(Print Name): Harry Fanning		(Print Name): Andrew Hutton	
ESH&Q Representative:		TJSO Observer:	
(Print Name): Tina Johnson		(Print Name): David Luke, Patty Hunt	
Supervisor of involved persons(s):		Subject Matter Expert(s), Facility/Equipment Owner as applicable:	
(Print Name): I. Carlino, D.Hamlette		(Print Name): Vashek Vylet (Radcon)	
Involved or impacted person(s):		(Print Name): Steve Benson (FEL Laser Safety)	
(Print Name): (SSO)		(Print Name): Bob May (ESH&Q)	
(Print Name): (RadTech1)		(Print Name):	
(Print Name): (RadTech2)		(Print Name):	
(Print Name): (RadTech3)		(Print Name):	
Witness(es):		(Print Name):	
(Print Name):		(Print Name):	

Agenda (Ensure the pace of the meeting allows time for accurate note taking.)		√ if Complete
1. Introduction – Provide Event Title, Date and Time of Occurrence, and Location:		√
2. Attendance - Are Required Attendees present.		√
3. Purpose of Initial Fact-Finding meeting.		√
4. Event Reconstruction – Use information to complete Section 3. <u>Summary of Event and/or Injuries</u> below.		√
a. Personnel and organizations involved in the event.		√
b. Conditions and actions preceding the event.		√
c. Chronology (timeline) of the event; and		√

d. Immediate actions taken in response to the event.	√
5. Clarify information – <u>Subject-Matter Expert</u> (SME) confirms work conditions.	√
6. <u>Stop Work</u> or the <u>Tag Out</u> Required? If “Yes” – establish the restart criteria and inform the affected Management chain.	n/a
7. Compensatory Actions Required? If “Yes” determine responsibility and include confirmation documentation.	n/a
8. Records or documentation required to confirm, clarify, or complete information (i.e., work plans, work control documents, photos, etc).	√
9. Other Questions or Concerns: Ask attendees if there are any other questions, concerns, or information that they wish to provide.	√
10. Obtain TJSO Observer feedback on conduct of fact finding meeting and potential improvements.	√

Step 2 Investigation Team:		Date Convened: (Within 24 hours of Fact Finding Meeting.)	03/01/2012
Role	Name	Department/Group	Phone
Lead Investigator	Harry Fanning	ACCMGT	7619
	Dick Owen	ESHDIV	6381
	Steve Benson	FEL & CTO	5026
	John Jefferson	ESHDIV	7087
	Terry Carlino	OPSMCC	5827
	Tina Johnson	ESHDIV	7611
TJSO Observer	Patty Hunt, David Luke (Not in Attendance)	TJSO	

Step 3 Summary of Event and / or Injuries, including Initial Fact Finding Meeting information: determine the chain of events and timeline. Use attachment as necessary.

Summary:
 On February 14th, 2012 at 13:52, three personnel (Radiation Protection Technicians or RadTechs) without proper laser safety training or laser PPE were allowed access into the FEL vault when it was under a special laser alignment mode (or Laser By-pass Mode) during a Controlled Access. The RadTechs were to repost the FEL with radiological posting so that FEL operations could commence. The Safety System Operator (SSO) who granted access to the RadTechs after a short period of time realized the error and notified the Crew Chief and then made an all-call announcement over the FEL speaker system for the RadTechs to return to the Access room. The Crew Chief contacted the FEL Control room to ascertain the status of the Laser Shutter. If the Laser Shutter was open, the Crew Chief would have crashed the FEL PSS state via the FEL PSS Crash button located in the MCC Control Room. The RadTechs were asked to leave the FEL Vault as they did not have proper laser safety training or PPE. The time stamp in the PSS electronic log read 13:55. The total amount of time was 3 minutes from initial entry to exit of the FEL Vault.

Background:
 The FEL has an Access Room where door and access controls are located within the CEBAF Accelerator Control Room. The Laser safety warning beacon (operational and functioning at the time of the event) is located above the second door within the Access Room along with Laser Safety postings attached on the second door.
 During FEL Laser Bypass mode the following must occur (as described in Laser Standard Operating Procedure: FEL-10-012-LSOP) to enable Laser Permit while in Controlled Access. The Laser Bypass key needs to be inserted into the LASER BYPASS SWITCH panel and switched from NORMAL to BYPASS. The LASER BYPASS SWITCH panel is located in the FEL Laser Alcove located between the inner and outer laser room doors (which are upstairs across the hall from the FEL Control Room.) The Laser Bypass key is housed in the CEBAF Control Room in a KeyWatcher® electronic lockbox. This key is then taken from the CEBAF Control Room (sometimes through the CEBAF Crew Chief) over to the FEL for the Laser Bypass operations.
 Next, the FEL PSS Master Key (located downstairs in the FEL Access Room) must be removed from the Master Key box. Door control and PSS Master Key release control is controlled by the CEBAF SSO through a dead-man switch located in the CEBAF Control Room. Laser permit is achieved when the FEL LASER BYPASS SWITCH is in BYPASS mode and the PSS Master Key has been removed

Step 3 Summary of Event and / or Injuries, including Initial Fact Finding Meeting information: determine the chain of events and timeline. Use attachment as necessary.

from the Master Key Holder while in Controlled Access. At the time of the event, the FEL was not in Laser Permit until the RadTechs pulled the PSS Master Key out of the Master Key holder.

The drive laser controls are located within the FEL Control Room and must be activated through a sequence of timed events in order to turn ON the FEL drive laser. The drive laser was ON at the time of the event.

Within the FEL Vault, there is a shroud covering a foot and a half open space between vacuum enclosures. The shroud is removed during alignment to allow measurement of the laser position and access to manual steering mirrors. The shroud is located back behind the FEL Gun tank and a large pillar and is not easily accessed. At the time of the event, this shroud was in place, so the laser posed no hazard to personnel within the vault.

There are two Drive Laser Shutters which allow one to send beam from the upstairs laser room down into the tunnel and into the open space where the shroud is. Direct control of the PSS shutter is provided via a key switch located on a pillar next to the shroud. This control is to protect personnel when they are performing alignment tasks. The second shutter is controlled in the FEL control room. At the time of the event, the latter shutter was in the CLOSED position presenting no hazard to the personnel within the FEL vault even if the shroud cover was removed. The laser was delivering approximately 50 mW of average laser power to the vault during the alignment (this is a typical value during alignment).

Timeline:

February 14th, 2012

11:56 – FEL Went from Restricted Access to Sweep Mode

12:15 – FEL in Controlled Access (no mention of Controlled Access Laser Permit mode)

12:38 – 13:00 – FEL Alignment Operator works under Controlled Access Laser Permit (Enter and Exit times listed)

13:08 – 13:44 – FEL Alignment Operator works under Controlled Access Laser Permit

13:52 – RadTechs enter FEL Vault.

13:53 – SSO realizes the mistake and notifies the Crew Chief.

13:53 – Crew Chief contacts FEL to assess status of FEL Laser Shutter. It was not open and the FEL PSS Crash button was not pressed.

13:53 – SSO contact the RadTechs via Intercom system to leave the FEL Vault

13:55 – RadTechs leave and are signed out of the FEL Vault.

14:02 – PSS e-log is made of event by SSO

14:02 – 15:00 – SSO informs the OPS Group leader of the incident after the OPS Group leader walks into the CEBAF Control Room. The OPS Group Leader then asks the SSO to write an official e-mail to him regarding what happened. (The SSO was not certain of the time but was narrowed between this time periods.)

15:06 – SSO sends the official e-mail to OPS Group Leader.

15:21 – Crew Chief contacts Accelerator Division Safety Officer (DSO). DSO goes to the CEBAF Control Room and does a local evaluation of situation talking with Crew Chief and SSO.

16:31 – DSO contacts Jefferson Lab Reporting Officer to advise of the situation.

February 15th, 2012

Preliminary fact finding meeting is held with Operations, FEL representatives, ESH representatives, Laser Safety SME with DoE observing. Facts behind the event were discussed and all automatic triggers (as defined in Chapter 5200) for a Notable Event Investigation were discussed and no immediate trigger was seen. The event was going to be handled as a Lesson's Learned event for that point on.

February 28th, 2012, 11:50

After several inquiries were made into this event, new information from additional sources (RadCon Techs) as well as a feeling from both the Division Safety Officer (also the Investigation Team Leader) and Jefferson Lab Reporting Officer, this investigation was upgraded from a Lesson's Learned into a Notable Event.

February 29th, 2012, 13:00

A new fact finding meeting was held which included RadCon techs involved in the incident as well as their supervision. Additional personnel included RadCon supervision, OPS supervision, the SSO involved and DOE representation.

It was determined and accepted that at the time of the event, no one was exposed to any danger from the FEL laser system nor was anyone injured.

Notable Event Report

Emergency Notifications Made (Subsequent to the Event):	Date	Time
Fire, Rescue & Emergency Medical: (9-911)		
Guard Post: x4444; 269-5822		
Occupational Medicine 269-7539		
ESH&Q Reporting Officer: 876-1750	2/14/2012	16:31
Crew Chief 630-7050	2/14/2012	13:53
Industrial Hygiene: 269-7863:		
Other: OPS Group Leader (Was notified verbally between 14:00-15:00 + official e-mail @ 15:06)	2/14/2012	15:06

Witness Accounts: (Use attachments as necessary. Box will expand as necessary)

RadTech2 Account of events via Reporting Officer:

Spoke to RadTech2 in reference to the FEL Vault event that occurred on 02/14/2012.

RadTech2 stated that he and 2 other technicians were asked to come to the FEL vault to repost the area as a RMA/RCA in preparation to run. They arrived at the vault and called the SSO in order to receive permission to enter the vault under controlled access. The vault was in by-pass mode at the time. That means that the yellow beacon was flashing. (Lead Investigator Note: The yellow light does not activate until the system is in Laser Permit. This is accomplished when both the Laser Bypass switch is in Bypass Mode and the PSS Master Key is removed from the Master Key Box.)

They were not asked if they were donning their PPE (laser safety glasses) or if they had been properly trained on lasers. The SSO granted entry to the Technicians. They were in the vault for 3 minutes, per the logbook entry, when the SSO came over the intercom and asked that they leave the vault. Once they were out of the vault they were informed by the SSO as to why they were asked to leave the vault at this time and apologized for letting them in.

SSO Account of events:

----- Original Message -----
 Subject: access to FEL in laser mode without training/glasses
 From: <SSO>
 Date: Tue, February 14, 2012 3:06 pm
 To: <OPS Group Leader>

At 13:52, three people from radcon: RadTech1, RadTech2 and RadTech3 were allowed access to the FEL while in laser mode. None of these people had training or laser glasses. Immediately I realized my error, informed the crew chief and then called on the intercom for those people to exit. The crew chief called the FEL control room and was told that the laser shutter was already closed. At 13:55 the three exited.

SSO PSS e-Log of events (taken from logbook):

INFO LOG

USER: SSO DATE: 02/14/2012 TIME: 14:04
 AREA: SITE

Witness Accounts: (Use attachments as necessary. Box will expand as necessary)

COMMENTS:

Access made without glasses to FEL in laser mode

The SSO mistakenly allowed unqualified personnel into FEL also without glasses while in laser mode. They were immediately asked to leave and the FEL control room informed us that the shutter was closed during the time of access.

Environmental Aspects

Type of Material Released:

Quantity:

Source:

Time Flow was Halted or Controlled:

For Investigation Team (√ All That Apply):

Reportable Quantity

Impact Ground/Soil

Storm Water Channel/Drain

Sanitary Sewer

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

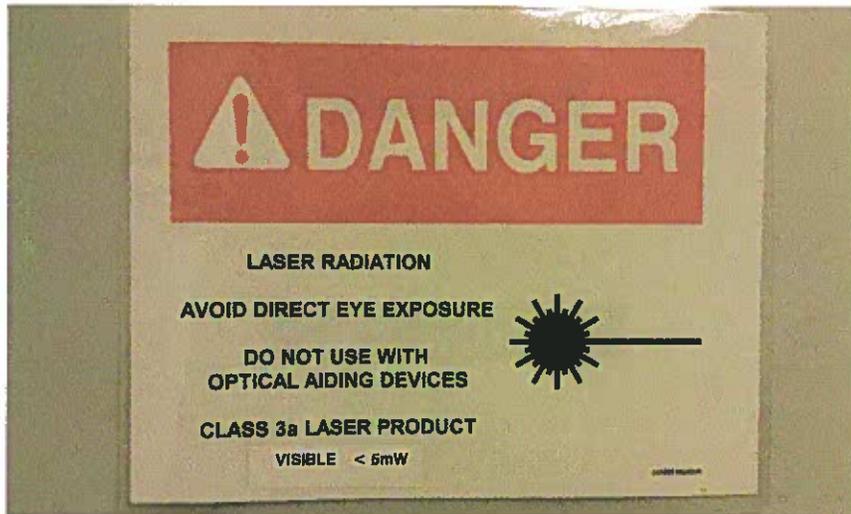


FEL Exterior Access Door (Door1) leading into FEL Access Room

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

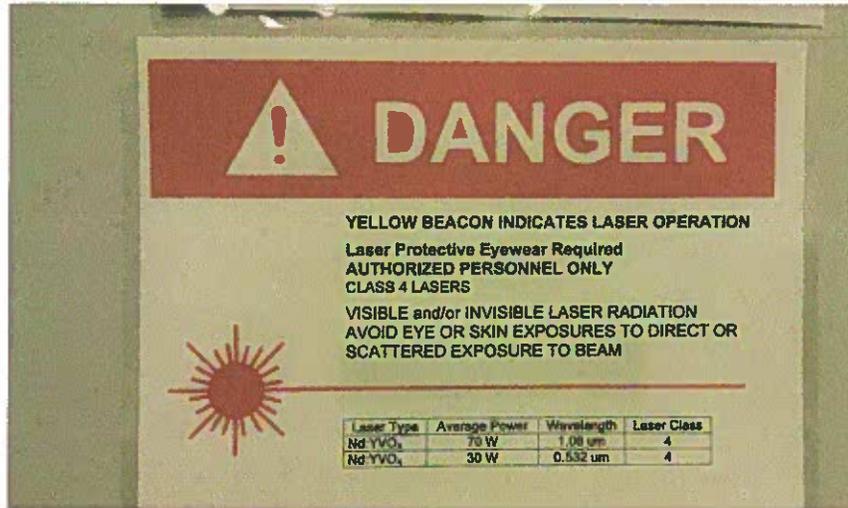


FEL Interior Access Door (Door2) within the FEL Access Room leading into the FEL Labyrinth

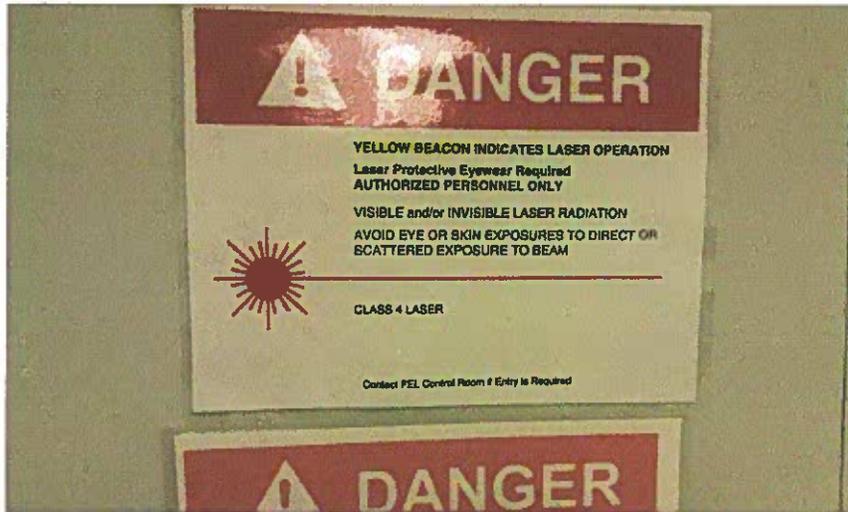


Original Posting (Left)

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

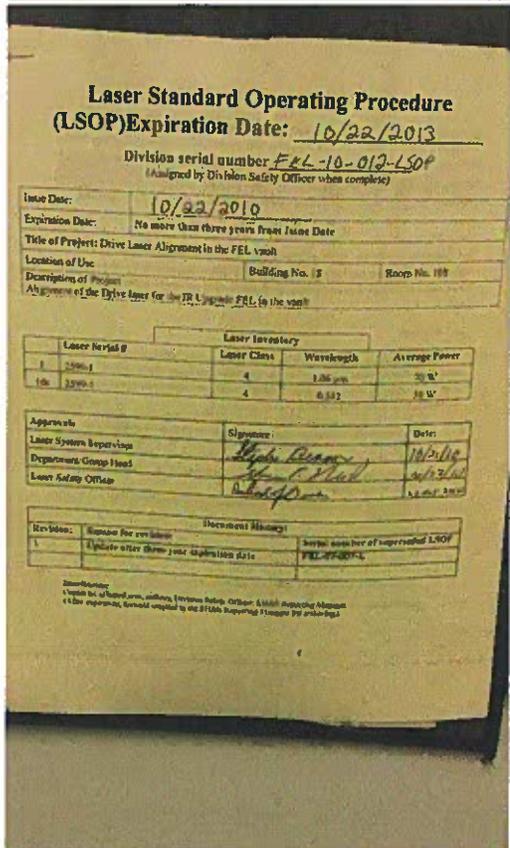


Original Posting (Right)



Additional Posting Added after Event

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

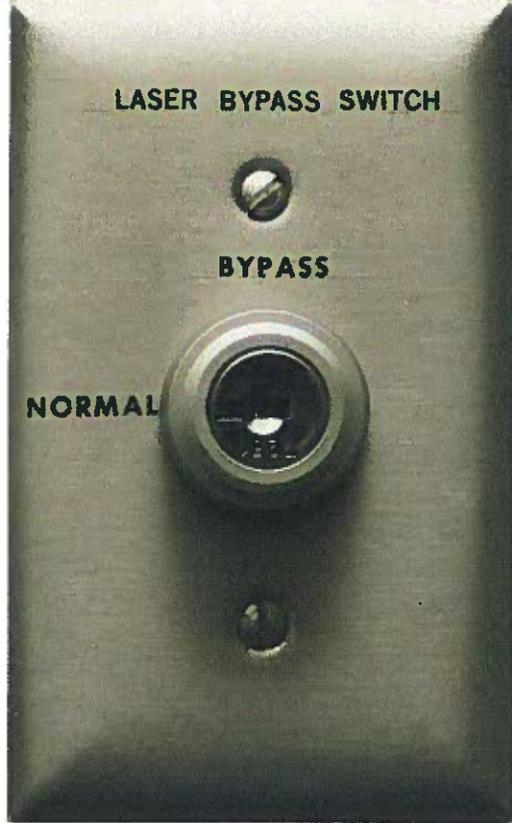


Posted Laser Standard Operating Procedure (LSOP)

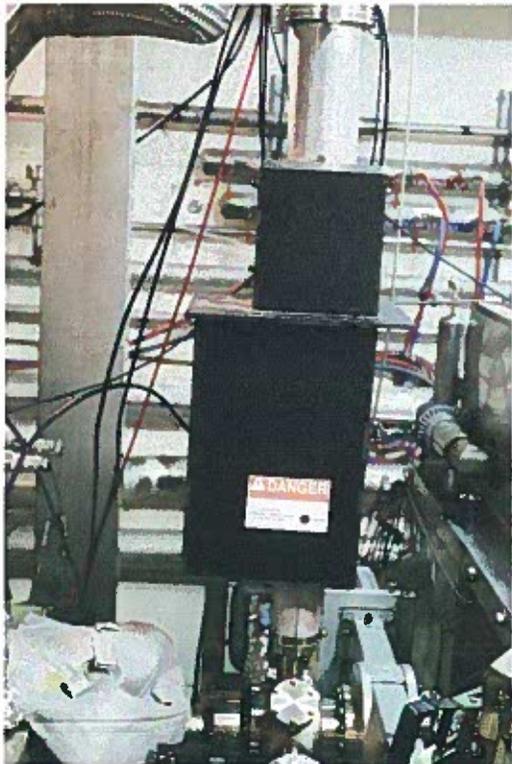


FEL Laser Bypass switch in the FEL Laser Alcove

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

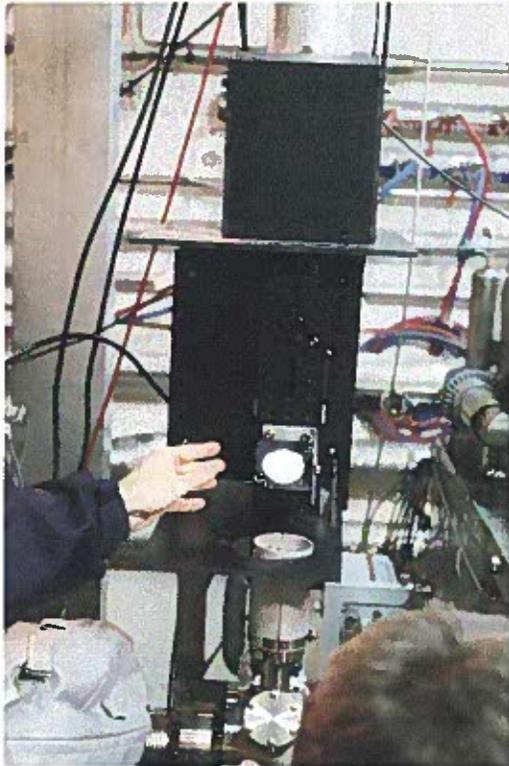


Close up of FEL Laser Bypass switch

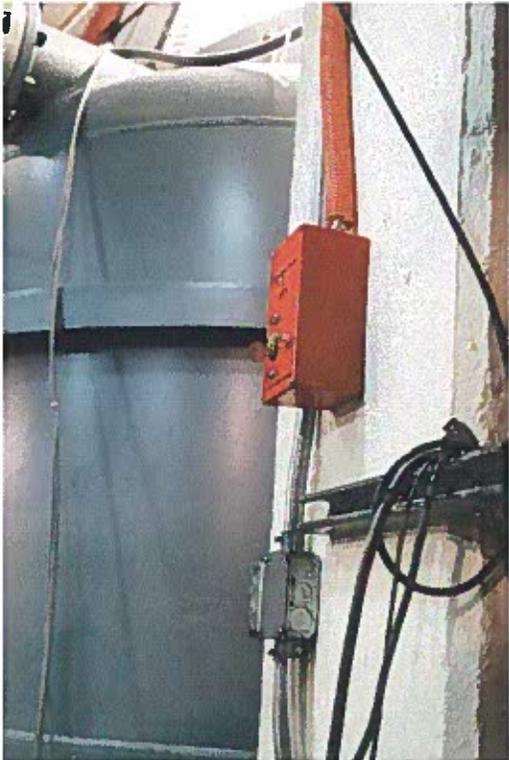


Laser Alignment area with Laser Shroud in place

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)



Laser Alignment area with Laser Shroud removed



PSS Laser Shutter control in the Closed position

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)



FEL Lobby View of Elevator & Visitor Safety Awareness Tear-sheet Station

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)



Close-up of FEL Safety Awareness Tear-Sheet Station

Causal Analysis: (Use attachment as necessary)

<p>Root Cause:</p>	<p>Safety System Operator did not follow established procedure because they were distracted while allowing access of untrained personnel into the FEL vault.</p>
<p>Contributing Causes: (List as many as apply.)</p>	<ol style="list-style-type: none"> 1. Administrative Controls are relied on for Access under FEL Laser Bypass Mode. 2. Ergonomics of Access and Laser Bypass systems are such that one individual can arm the Laser Bypass mode while an addition individual can activate the Laser Permit mode in two different locations. 3. There is no warning that the FEL is in Laser Bypass Mode until an individual is between the Access doors and has pulled the PSS Master Key from the Master Key Box (thus activating Laser Permit.) 4. The only indicator within the Accelerator Control Room that the FEL is in Laser Permit is found on a PSS screen which is not easy to see. 5. Posted signs for Laser Safety are confusing. 6. Procedures are available, but were not used during this event.

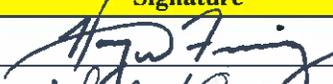
Extent of Condition Check	Responsible Person(s)	JLab CATS Number	Target Date
1.) Check other processes within the FEL which rely on the same administrative controls to protect others from known dangers. If such instances are found and are the only barrier of protection, devise corrective actions which will put another layer between the safety of others and the source of hazard. 2.) Check the Accelerator Operations realm to see if they rely on the same administrative controls to protect others from known dangers. If such instances are found and are the only barrier of protection, devise corrective actions which will put another layer between the safety of others and the source of hazard. 3.) Accelerator Operations Group Leader give Operations Crews a refresher on proper Laser Bypass procedures	1.) Steve Benson 2.) Noel Okay 3.) Noel Okay	NE-2012-10-01	May 18 th , 2012

Corrective Action(s)	JLab CATS Number	Target Date
FEL to adjust Laser Bypass procedure to define that the FEL Laser Safety Officer (or designee) is to coordinate with Operations SSOs as early as possible to allow the SSO's time to review the FEL Laser Bypass (Laser Alignment Mode) procedure before performing any access tasks in that mode. Benson	NE-2012-10-02-01	December 31, 2012
FEL to evaluate current Laser Safety postings with ES&H representative to ensure postings are clear and understandable for trained and untrained personnel. Benson	NE-2012-10-03-01	July 31, 2012
FEL to develop FEL safety awareness training similar to those provided by the Accelerator and each endstation at the lab. Gwyn W	NE-2012-10-04-01	December 31, 2012
Safety Systems Group to evaluate current PSS configuration in order to make changes that enhance the security of the system so that unqualified personnel are less likely to attempt entry. Mahoney	NE-2012-10-05-01	August 31, 2012
Safety System Group to evaluate current PSS configuration in order to provide better indication of laser related hazards to the SSOs at the Access Console. Mahoney	NE-2012-10-05-02	August 31, 2012

Lessons Learned (Confer with Division/Department Lessons-Learned Coordinator) (Use attachment as necessary)	JLab COE Number
Better communication is needed to all parties involved with an access into exclusion zones especially during infrequently run and/or specialized access procedures.	
When performing tasks which utilize human interface as administrative safeguards, distractions should be held to a minimum to avoid human error.	

Investigation Team Confirmation:

The below signees, confirm to the best of their knowledge, that the information presented in this document is accurate and complete.

Role	Print	Signature	Date
Lead Investigator	Harry Fanning		15-MAY-2012
	Dick Owen		18 MAY 2012
	Steve Benson		16 May 2012
	Terry Carlino		16-MAY-2012
	John Jefferson		16-MAY-2012

** Finalization of this report was delayed due to multiple attempts to clarify the ownership of CATS entries.

Upon confirmation submit document to the ES&H Reporting Officer for completion and distribution.

Documentation of Findings: (To be Completed by ESH&Q Reporting Officer)

Notable Event Number:	FEL-12-0214
CATS Number:	NE-2012-10
JLab COE Number:	-
ORPS Number:	N/A
NTS Number:	N/A
CAIRS Entry:	N/A
DOE Cause Code:	A3 Human Performance LTA, B1 Skill Based Error, C02 Step Omitted Due to Mental Lapse, A1 Design/Engineering Problem, B5 Operability if Design/Environment LTA, C01 Ergonomics LTA, A5 Communication LTA, B1 Written Comm. Methods of Presentation LTA, C07 Unclear/complex wording or grammer
ISM Code:	Perform work within controls, Provide feedback and continuous improvement

Acceptance/Acknowledgement of Facts

	Print	Signature	Date:
Associate Director/ Department Manger	George R. NEIL		5/18/12

Distribution:

- ES&H Reporting Officer (Original)
- Associate Director/Department Manager
- Division Safety Officer
- Investigation Team Members

Form Revision Summary

Revision 1.3 – 01/31/12 – Updated ESH&Q Reporting Officer assignment from SSmith to CJohnson per MLogue
 Edited to clarify process steps.

Revision 1.2 – 10/20/11 – Updated ESH&Q Reporting Officer assignment from JKelly to SSmith per MLogue.
Revision 1.1 – 05/24/11 - Edited to clarify process steps.
Revision 1 – 11/23/10 – Updated to reflect current laboratory operations.

ISSUING AUTHORITY	FORM TECHNICAL POINT-OF-CONTACT	APPROVAL DATE	EXPIRATION DATE	REV.
ESH&Q Division	Tina Johnson	10/19/09	10/09/12	1.3

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