

Occurrence Report

After 2003 Redesign

Advanced Photon Source

(Name of Facility)

Accelerators

(Facility Function)

Argonne National Laboratory East

Argonne National Laboratory - East

(Site)

(Contractor)

Name: BARKALOW, THOMAS W

Title: SUF ESH/QA COORDINATOR

Telephone No.: (630) 252-9243

(Facility Manager/Designee)

Name: BRINDLE, SUSAN K

Title: ORPS COORDINATOR

Telephone No.: (630) 252-6286

(Originator/Transmitter)

Name:

Date:

(Authorized Classifier (AC))

1. Occurrence Report Number: SC--ASO-ANLE-ANLEAPS-2008-0004

Labeled Class II Laser Measured as Class IIIB Output

2. Report Type and Date: FINAL

	Date	Time
Notification:	09/16/2008	17:11 (ETZ)
Initial Update:	10/17/2008	17:37 (ETZ)
Latest Update:	10/17/2008	17:37 (ETZ)
Final:	10/17/2008	17:37 (ETZ)

3. Significance Category: 3

4. Division or Project: X-Ray Science Division

5. Secretarial Office: SC - Science

6. System, Bldg., or Equipment: Building 431/laser

7. UCNI?: No

8. Plant Area: laboratory room

9. Date and Time Discovered: 09/12/2008 15:30 (CTZ)

10. Date and Time Categorized: 09/12/2008 16:30 (CTZ)

11. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

12. Other Notifications:

Date	Time	Person Notified	Organization
09/12/2008	16:30 (CTZ)	J. Houck	DOE-ASO
09/12/2008	16:30 (CTZ)	P. Neeson	DOE-ASO

13. Subject or Title of Occurrence:

Labeled Class II Laser Measured as Class IIIB Output

14. Reporting Criteria:

10(2) - An event, condition, or series of events that does not meet any of the other reporting criteria, but is determined by the Facility Manager or line management to be of safety significance or of concern to other facilities or activities in the DOE complex. One of the four significance categories should be assigned to the occurrence, based on an evaluation of the potential risks and the corrective actions taken. (1 of 4 criteria - This is a SC 3 occurrence)

15. Description of Occurrence:

A labeled class II laser used in a high resolution ruby fluorescence high pressure measurement system had its beam power level measured on 9/12/2008 and it was found to be in the class IIIB power output range. The laser was supposed to have a nominal output no greater than 1 mW, but the measured output was 18 mW.

The pressure measurement system had been procured from Optiprex Ltd (a UK company) in October 2006. The procured system is housed within a single enclosure and contains a 532 nm laser, high resolution spectrometer, transfer optics, and visual observation capability (microscope). The device also was provided with data acquisition and analysis software and USB port control so it was a single turn-key instrument ready for use within minutes of unpacking. The system was advertised as containing a class II laser and the received device was labeled as containing a class II laser. As such the device was installed and used in accordance with class II laser safety requirements.

The laser is used to create photoluminescence from a small ruby chip contained on the diamond pressure bearing surfaces of a diamond anvil cell (DAC). The ruby fluorescence spectrum shifts in a predictable manner depending upon the amount of pressure applied and the device is capable of measuring high pressure with an accuracy of up to +/- 0.1 GPa.

The device was used either inside a laboratory space in Building 431 (location at time of discovery of class IIIB output) or inside an instrument station on a Sector 4 beamline inside Building 400 (Advanced Photon Source Experiment Hall).

Sector 4 beam lines are operated by the Magnetics Materials Group of the X-Ray Science Division. A group member attended a conference in Spain, spoke with a representative from easyLab Technologies Ltd, and in the course of the conversation discovered that some Optiprex measurement systems contained lasers of higher than class II power level. The representative stated that easyLab had bought out Optiprex shortly after the device had been purchased by APS and later had been contacted by a light source in Canada regarding a similar measurement system sold to that facility. The Canadian facility's personnel had determined that the system's laser was at a higher power level than advertised. The group member reported this back to his group leader via email on 09/11/2008 and arrangements were made to measure the power level of the system procured for use in Sector 4. The Argonne laser safety officer measured the laser beam power level at about 1530 hrs. on 09/12/2008 and found it to be 18 mW (in the class IIIB power range). The power level was supposed to be 1 mW or less.

This is being reported so owners of these Optiprex ruby fluorescence pressure measuring instruments are aware that the lasers in systems procured before 2007 may be at a higher class power level than advertised.

16. Is Subcontractor Involved? No

17. Operating Conditions of Facility at Time of Occurrence:

Scheduled maintenance period; x-ray beams not available

18. Activity Category:

12 - Research

19. Immediate Actions Taken and Results:

The key to operate the Optiprex measurement system was removed at about 2230 on 09/11/2008 and held by the group leader pending laser beam power level measurement by the Argonne laser safety officer. The key was placed in the device to permit measurement on the afternoon of 09/12/2008 and the measurement revealed the laser had class IIIB power level beam as noted previously. The system was turned off, the key was removed, and the Argonne laser safety officer formally tagged the device out of service. There has been no indication that anyone has been exposed to the laser radiation in two years of operation; however, further investigation and personnel interviews are being conducted.

easyLabs has been notified of the measured power level.

10/17/2008 Update: Personnel interviews were completed and no one indicated they believed they had been exposed to the laser's beam.

20. ISM:

- 3) Develop and Implement Hazard Controls
- 4) Perform Work Within Controls

21. Cause Code(s):

A2B4C07 - Equipment/ material problem; Material control LTA; Marking/labeling LTA

A2B5C02 - Equipment/ material problem; Procurement control LTA; Fabricated item does not meet requirements

A2B5C03 - Equipment/ material problem; Procurement control LTA; Incorrect item received

22. Description of Cause:

The instrument was advertised as containing a class II laser, was purchased with the understanding that a class II laser would be delivered as part of the instrument, and was found to be labeled as containing a class II laser. The beam line staff had no reason to believe it wasn't a class II laser and it was only due to a coincidental discussion at a conference that a reason to believe otherwise arose.

The three causal factors chosen reflect failures on the part of the vendor that originally supplied the instrument rather than failures on the part of Argonne. The three causal factors also interact.

A2B5C03-Incorrect item received is based on the delivered item not containing a class II laser as advertised.

A2B5C02-Fabricated item did not meet requirements is based on the vendor not utilizing a class II laser in the fabrication of the instrument.

A2B4C07-Marking/labeling LTA is based on the instrument being labeled as containing a class II laser when it did not.

The corrective action to address all three causal factors is to treat the laser as being class IIIB and to follow the resultant requirements for use of a class IIIB laser. This includes shielding all eye level and vertical beam paths, establishing a laser control area, posting the laser control area, providing eye protection appropriate for the wavelength(s) and Power level(s) involved with alignment and use, requiring laser safety training and eye examinations for the laser controlled area supervisor and the authorized laser users, having an issued approved standard operation procedure, and having a signed and posted laser operating permit. All these requirements were met as of 10/10/2008.

23. Evaluation (by Facility Manager/Designee):

Mislabeled the laser classification and the vendor not providing the item as advertised resulted in the beam line staff not identifying and implementing the appropriate controls for the actual hazard potential. This in turn created a higher likelihood that an adverse health effect could occur from using the instrument.

The involved laser is part of a unique instrument originally fabricated and shipped by a small foreign vendor. This specific instrument is not used elsewhere at APS or Argonne. The instrument also was for a specific application which limited its use. Based on interviews with the personnel who used the instrument and its limited use, the mislabeling did not result in any adverse health effects. Now that a higher hazard potential has been identified for use of this laser, the proper controls have been identified and applied.

The Occurrence Report was filed due to the potential for a similar instrument to be in use elsewhere in the DOE complex.

24. Is Further Evaluation Required?: No

25. Corrective Actions

(* = Date added/revised since final report was approved.)

1.	Sector 4 personnel implement controls for use of a class IIIB laser.	
	Target Completion Date: 10/17/2008	Completion Date: 10/10/2008

26. Lessons Learned:

A formal lessons learned report is being prepared for submittal to the DOE lessons learned system.

27. Similar Occurrence Report Numbers:

None found

28. User-defined Field #1:**29. User-defined Field #2:****30. HQ Keyword(s):**

01B--Inadequate Conduct of Operations - Loss of Configuration Management/Control
08C--OSHA Reportable/Industrial Hygiene - Industrial Hygiene Exposure
11H--Other - Procurement Deficiency/Defective Items
11L--Other - Supplier
12J--EH Categories - OS/IH
13A--Management Concerns - HQ Significant (High-lighted for Management attention)
13G--Management Concerns - Suspect/Counterfeit Items - Defective Items Data Collection Sheet
14D--Quality Assurance - Documents and Records Deficiency
14E--Quality Assurance - Work Process Deficiency
14G--Quality Assurance - Procurement Deficiency

31. HQ Summary:

On September 12, 2008, a labeled class II laser used in a high resolution ruby fluorescence high pressure measurement system had its beam power level measured and it was found to be in the class IIIB power output range. The laser was supposed to have a nominal output no greater than 1 mW, but the measured output was 18 mW. The system was advertised as containing a class II laser and the received device was labeled as containing a class II laser. As such the device was installed and used in accordance with class II laser safety requirements. This is being reported so owners of these Optiprex ruby fluorescence pressure measuring instruments are aware that the lasers in systems procured before 2007 may be at a higher class power level than advertised.

32. DOE Facility Representative Input:**33. DOE Program Manager Input:****34. Approvals:**

Approved by: BARKALOW, THOMAS W, Facility Manager/Designee

Date: 10/17/2008

Telephone No.: (630) 252-9243

