

ESQ-IH Summary Survey Report

September 13, 2011, 3:07 PM

Facility = Argonne National Laboratory; Survey # = 2011-00132

Survey Title:	<i>UV SURVEY, LAPPD OPTICAL STATION, 360/C244, HEP Division</i>		
Survey Number:	2011-00132	Date Requested:	9/1/2011
Facility:	Argonne National Laboratory	Date Completed:	9/9/2011
Survey Rationale:	Baseline monitoring	Similar Exposure Group:	N/A
Requestor:	Xie, Junqi	Date Range From:	9/9/2011
		To:	9/9/2011
Preparer:	Murdoch, Bruce		

Survey Description:

On September 9, 2011, ESQ-Industrial Hygiene performed a survey for stray ultra-violet radiation from the newly-constructed LAPPD (Large-Area Picosecond Photodetector) station. The instrument was located in Room C244 of Building 360.

This instrument consists of an ultraviolet lamp in a light-tight housing, with output beam coupled to a UV monochromator by means of closed tubing. The output of the monochromator is coupled into a light tight box with internal optics. The box can be opened by the removal of a lid and side panels. Internal detector signals are sent out from the box via cables. In normal operation, the box will remain closed, but it might be opened for beam alignment.

The purpose of this survey was to determine if sufficient stray UV radiation would emanate either from the cracks in the closed box during normal operation, or with the box lid open, to present a hazard to personnel in the laboratory.

Survey measurements were taken with an International Light model 1400A Radiometer/Photometer, fitted with an International Light Actinic UV filter probe. This survey instrument automatically corrects for the biological sensitivity of eye and skin, so that no further corrections are needed to compare readings with the ACGIH TLV worker exposure limits. Both the Radiometer and the probe were factory calibrated and certified, and were function-checked before and after the survey.

Summary of Results:

The researcher, Junqi Xie, first set the monochromator output wavelength to 200 nm. Surveys were taken along the slight gaps around light box lid, and then inside the box in the direct path of the beam. This procedure was repeated with the wavelength set to 270 nm.

At both wavelengths, no significant UV radiation was detected above the lower detection limit of the instrument, which is about 0.02 microwatts/cm². With the lid removed and the detector placed in the direct path of the UV beam, facing the source, the measured radiation intensity did not exceed 0.3 microwatts/cm².

ESQ-IH Summary Survey Report

September 13, 2011, 3:07 PM

Facility = Argonne National Laboratory; Survey # = 2011-00132

Survey Title: UV SURVEY, LAPPD OPTICAL STATION, 360/C244, HEP Division
Survey Number: 2011-00132 **Date Requested:** 9/1/2011
Facility: Argonne National Laboratory **Date Completed:** 9/9/2011

Conclusions and Recommendations:

The 8-hr ACGIH (American Council of Government Industrial Hygienists) TLV (Threshold Limit Value) for continuous exposure to UV is 0.1 microwatts/cm². This limit may be increased proportionally for shorter exposures accumulated during one 8-hr work day. Thus the limit for 3-hrs exposure is increased to 0.3 microwatts/cm². These limits are established to avoid the risk of damage to eye or skin tissue.

The intensity of UV radiation produced by the LAPPD lamp/monochromator is not very high. However, direct exposure to the 0.3 microwatts/cm² beam, or a stray reflection of that beam, would exceed the allowable limit after 3 hrs total exposure in one day. Therefore, we recommend that a strict procedure be established to operate the light source only when the light box is closed. We also recommend that the lid of the box should be prominently labeled with the words "CAUTION UV radiation. Turn off lamp before opening."

If it becomes necessary to operate the light source with the box open, for alignment or adjustment purposes, then a strict procedure should require the use of acrylic safety glasses (which typically attenuate UV by 95% or more), and an acrylic face shield. Gloves should also be worn, along with long-sleeved clothing. It is also recommend that a prominently visible "ON" indicator light be attached to an AC power switch for the UV light source.

With the light box closed, the measured UV radiation does not exceed 20% of the 8-hr TLV. and there is no significant UV hazard to personnel working around it,

Supervisors in areas monitored must notify employees of representative sampling results in writing, either individually or by posting sampling results in an area accessible to affected personnel. The entire survey report need not be presented; however, where exposures exceed permissible exposure levels, planned corrective action must be indicated. Records of this notification must be maintained by your Division in an auditable form and may be reviewed during DOE or internal audits.

If this report indicates that a regulatory standard has been exceeded, Laboratory policy requires entering it into IMTS and tracking it to closure. If a regulatory standard has been exceeded, notice is also required to the Compliance, Oversight and Assessment organization, to the attention of Stuart Meredith.

If you or employees have questions regarding interpretation of results, contact ESQ Industrial Hygiene at 2-3310.