

Commentary on 'Working Document on Laser Safety for ATLAS' for EM Calorimeter Links

ASSR – February 29th – CERN

Orientation

The purpose of this document is to address the questions laid out in 'Guidelines for writing an ASSR Safety Report' which forms part of 'ATLAS Systems Safety Review'¹ (ASSR). Each section below corresponds to the guideline subject areas indicated in the ASSR document. This document should be read in conjunction with 'Working Document on Laser Safety in ATLAS'² (WDOLSIA).

(1) Description of the System, Subsystem or Equipment Concerned

- Link Architecture: WDOLSIA – section 2.3
 - Multi-ribbon cables: WDOLSIA – section 2.1.3
 - Ribbon fibre: WDOLSIA – section 2.1.2
 - Multi-fibre connectors – section 2.1.4

(2) Description of the Identified Hazards

Fibre optic system operating at 850nm with Vertical Cavity Surface Emitting Lasers (VCSELs) and multimode GRaded INdex optical fibres (50/125). Single fibres / connectors, 12-way fibre-ribbons / connectors and 96 fibre cables (8 x 12-way ribbons) all present in installation. Maximum VCSEL output power = 3mW. Maximum fibre coupled power = 3mW. VCSELs chosen due to their radiation tolerance, ease of driving and coupling to multimode fibres. High output powers means that optical attenuation effects from radiation damage have a minimal effect on the operation of the link.

- 'Hazards and risks for persons'
 - Eye hazard: WDOLSIA – sections 3.3 and 4.3
 - Skin hazard: None identified
- 'Hazards and risks for the system or equipment itself'
 - None identified
- 'Hazards and risks for the surrounding systems'
 - None identified

(3) Risk Elimination or Mitigation during the Design Phase of the System

- Spirit of CERN Safety Note IS 22 is followed, where applicable. This document concerns free space lasers and so many parts are irrelevant. The IEC documents 825-1 and 825-2 have been used to define the laser safety philosophy in general and to ensure laser hazards are reduced 'As Low As Reasonably Achievable' (ALARA).

(4) Risk Mitigating Actions and Safety Measures

- WDOLSIA – sections 6.1 and 6.3

(5) Residual Hazards and Risks

- None identified.

¹ ATLAS Internal Note: ATC-TY-ER-0001, Revision 1, January 2000.

² http://www.cern.ch/Atlas/GROUPS/FRONTEND/links/install/laser_safety/