



Inspection report

Licence holder: Silex Systems Limited	Licence number: S0090
Location inspected: Lucas Height Science and Technology Centre, NSW	Date/s of inspection: 3-4 June 2020
	Report no: R20/05225

An inspection was conducted as part of ARPANSA’s baseline inspection program to assess compliance with the *Australian Radiation Protection and Nuclear Safety Act 1998* (the Act), the Australian Radiation Protection and Nuclear Safety Regulations 2018 (the Regulations), and conditions of Source Licence S0090.

The scope of the inspection focused on an assessment of Silex Systems Limited (SSL) Laboratory’s performance against the following areas in the ARPANSA Source Performance Objectives and Criteria (POCs): Performance reporting verification; Configuration management; Training; Radiation Protection; and organisation-wide Holistic Safety Culture. SSL Security and Emergency plans; and the interrelationship with site wide arrangements having been a focus of a previous inspection and were noted during the inspection. The inspection consisted of a review of records, interviews, and physical inspection of sources.

Background

SSL is authorised under section 33 of the Act to deal with controlled apparatus prescribed by the regulations that produces harmful non-ionizing radiation when energised.

The main codes and standards applicable to this licence are:

- Australian/New Zealand Standard Safety of laser products Part 1: Equipment classification (AS/NZS IEC 60825-1:2014)
- Australian/New Zealand Standard Safety of laser products Part 14: A user’s guide (AS/NZS IEC 60825-14:2011)
- Australian/New Zealand Standard Safety in laboratories Part 5: Non-ionizing radiations – Electromagnetic, sound and ultrasound (2004) (AS/NZS 2243.5:2004) (the NIR Standard)

Observations

In general, the management of safety and security at the SSL facility was found to be sound.

Plans and arrangement including updated procedures and laser safety training are adequate for undertaking a new project involving the use of controlled apparatus. Inspectors noted SSL’s capacity to manage and maintain safety during the continuation of COVID-19 pandemic social distancing restrictions including embracing on-line learning to provide additional laser safety courses for staff.

Performance reporting verification

SSL quarterly reports have been submitted in a timely manner in accordance with licence conditions and contained relevant information demonstrating compliance with the Acts and Regulations. Other documents required by ARPANSA for maintaining effective control of controlled apparatus including: an accurate source inventory workbook (SIW); and disposal requests as required under section 65 of the Regulations, were cross-checked for verification purposes against the current inventory.

Configuration management

The large laser laboratory contains a fixed laser system and associated optics in a configuration that remains largely unchanged. Any subtle changes in configuration are meticulously managed to ensure control over a laser system design is robust and safe.

The inspection observed SSL's utilisation of fixed control and power supply units helps to standardise the configuration of new laser systems which reduces risks.

The laser lab has an established beam path. However, the new Stable Isotope Project under development has a more agile beam path. To manage this configuration, SSL uses a bounding case analysis approach for the laser rooms.

Each new development has a safety case, and the management of any risk associated with a change is managed by operating a system under low boundary conditions. The laser operates at low repetition rate and low power. Fine tuning of the laser setup is done automatically via remote control. Hazard analysis is conducted whenever there are significant changes to a lab (for example when lasers are changed). Therefore, in any physical changes to the laser process for the Stable Isotope Project, SSL operational management will recommend a safety review be undertaken.

In February 2020, inspectors undertook an initial site visit to SSL to be better informed of a proposed new project involving the reconfiguration of controlled apparatus, to support an upcoming Stable Isotope program. SSL provided a high-level schematic plan of the laboratories to be utilised for the new project. During the inspection, SSL advised that they have not settled on final design. Therefore, laser and processing unit locations may change in the final configuration.

The inspection found that although the final layout of the entire system may vary, the hazard locations will be tracked and managed as part of the final design process for safely operating lasers in the stable isotope optimisation studies.

Training

Safety training and site induction for all staff was current according to the training register examined during the inspection. A mentoring program for new staff has also been implemented. In addition, all staff have been enrolled in external laser courses run by a recognised laser expert training provider.

Security

SSL has proactively taken steps to maintain the interrelationship of SSL Security and Emergency plans with the Australian Nuclear Science and Technology Organisation (ANSTO) site wide arrangements. SSL facilitated awareness training for new ANSTO emergency response personnel in order to familiarise responders with local hazards. SSL has addressed cyber safety and security risks by implementing mitigating measures to preclude unauthorised remote operation or interference with safety settings on controlled apparatus.

Radiation protection

SSL management has demonstrated a commitment to radiation protection by maintaining current plans and arrangements for managing laser safety and by operating lasers in a laboratory environment in accordance with best practice guidance provided in the applicable standards. Appropriate PPE to protect the eyes from all wavelengths of light generated by controlled apparatus was observed.

During this inspection and on a prior site visit to SSL in February 2020, correct radiation warning signs were observed at the entrance to laboratories and in areas where controlled apparatus is in use in compliance with the NIR standard.

The beams generated by the laser systems are in the infrared region which are not visible. Lasers are also noisy. There is a laser radiation emission warning light on the outside of the room which signals when the laser system is in operation.

Section 8.3.2 of AS/NZS IEC 60825-14:2011 considers the adoption of a remote viewing system or window as an alternative to viewing the laser system itself, but it does not mention anything about viewing data in real time by staff not directly involved in operating the laser.

Section 8.4.4 of AS/NZS IEC 60825-14:2011 recommends taking appropriate steps to localise risk reduction. The set-up of an external viewing screen at SSL mitigates the need to enter the laboratory by staff not directly involved in the operation of the laser. Inspectors considered that such measures also assist in addressing potential human factor risk by influencing behaviour. In managing the frequency of interested staff from entering a laboratory to see how a laser experiment is progressing, SSL promotes safe distancing of staff from the hazard using real-time external display. This is considered by the inspectors to be a good practice. This external laser monitoring system design will be applied to the new Stable Isotope Project.

Safety Culture

A first level self-assessment using the ARPANSA Macro Tool for Holistic Safety was performed in late 2019 and early 2020. SSL's safety and security culture was found to be strong across the organisation. Macro Tool recommendations included re-instatement of a WHS committee as well as undertaking a formal safety culture assessment using the appropriate ARPANSA Holistic Micro Tool.

In early 2020, SSL used the Micro tools with both technical and corporate staff to ensure multiple people assessed each tool. This assessment also recommended reformation of the WHS committee and a number of initial tasks were formulated to be undertaken. The inspectors noted that the Silex Board has demonstrated strong leadership and commitment to safety by approving a Safety Action Plan to implement the recommendations.

Findings

The licence holder was found to be in compliance with the requirements of the Act, the Regulations, and licence conditions.

The inspection revealed the following **good practice/s**:

- Safe distancing of staff from the hazard using real-time external display of experiments

No written response to this report is required

THIS REPORT WILL BE PUBLISHED ON THE ARPANSA WEBSITE