

9. Safety

1. Abstract

In accordance with the Act on Prevention of Radiation Hazards due to Radioisotopes, etc., the 51st and 52nd applications for the approval of changes in SPring-8 and SACLA facilities were approved on October 20, 2022 and June 5, 2023, respectively. The environmental radiation inside the facilities and the surrounding area of the SPring-8/SACLA site was monitored, and it was confirmed that the radiation levels were well below the legally mandated limits. Additionally, the management of the 5,892 registered radiation workers was properly conducted. This included the implementation of radiation training and the management of their personal radiation exposure. Similarly, chemicals, high-pressure gases, biological experiments, cranes, and lasers were managed in compliance with all applicable laws and regulations.

2. Radiation safety management

2-1. Summary

There were no problems regarding radiation management in accelerators or facilities on the site in FY2022.

2-2. Applications for approval

The following applications for changes in the radiation facilities were submitted in FY2022.

51st application for approval of amendment

Application date: June 10, 2022

Approval date: October 20, 2022

- (1) Changes in the synchrotron
- (2) Changes in Storage Ring (hereinafter called SR) beamlines BL08W, BL31LEP, and BL46XU

(3) Addition of sealed radioisotopes

(4) Change of name of storage room

52nd application for approval of amendment

Application date: March 3, 2023

Approval date: June 5, 2023

- (1) Changes in SR beamlines BL15XU and BL39XU

2-3. Radiation Protection Committee

The Radiation Protection Committee met two times in FY2022:

37th Harima Radiation Protection Committee (June 6, 2022)

The content of the 51st application for approval of amendment was approved on the condition that the indicated items be corrected.

38th Harima Radiation Protection Committee (March 1, 2023)

The content of the 52nd application for approval of amendment was deliberated and approved.

2-4. Periodic inspections/facility inspections

The following facility inspections were conducted in FY2022.

The facility of the SR beamline BL09XU was inspected on October 3, 2022 and pronounced satisfactory on the same day.

No mandated periodic inspections/confirmations were conducted in FY2022.

2-5. Radiation monitoring

Radiation measurements of all accelerator facilities (including the SR beamlines) of SPring-8/SACLA confirmed that the radiation levels were below the standards mandated by law. In controlled areas of SPring-8/SACLA where workers regularly enter, a maximum dose of 1.5 $\mu\text{Sv/h}$ was detected in a beamline hutch of the Experimental Hall of the SR. However, in places where SPring-8/SACLA users work, the measured radiation doses were less than 1.0 $\mu\text{Sv/h}$ (background level). Radiation doses at other measuring points were also much less than the legal limit of 1 mSv/week (duration of evaluation: 40 h/week). Similarly, periodic inspections confirmed that the radiation doses at the boundaries of the controlled areas during SPring-8/SACLA operations were well below the legal limit of 1.3 mSv per 3 months (duration of evaluation: 520 h per 3 months).

Measurements of the environmental radiation conducted at the boundaries of the site revealed a maximum dose rate of 0.08 $\mu\text{Sv/h}$ and a maximum accumulated dose of 0.02 mSv per 3 months, which was much lower than the legal limit of 0.25 mSv per 3 months (duration of evaluation: 2,184 h per 3 months). Quarterly measurements of the surrounding environment confirmed that SPring-8/SACLA operations did not affect the radiation levels in the environment surrounding the site.

2-6. Management of radiation workers and access control of facilities

In FY2022, there were 5,892 radiation workers. This included 4,385 SPring-8/SACLA users, which accounted for about 74% of all radiation workers. There were a total of 9,491 temporary visitors.

2-7. Management of personal radiation exposure

Personal dosimeters were issued to personnel who worked on the site as radiation workers. Each month, the used dosimeters were collected to measure the exposure doses. Personal dosimeters were also issued to short-stay visitors such as public beamline users for the duration of their stay as well as to resident workers of external organizations for every month that they were stationed. These dosimeters were collected after use to measure the exposure doses.

Measurements of radiation doses conducted in SPring-8/SACLA verified that the exposure doses of all radiation workers were much lower than the limits mandated by related laws and regulations and the Regulations for Radiation Hazard Prevention. These observations demonstrated that there is no radiation problem.

3. Safety management of chemicals

Chemicals were controlled in a manner compliant with related laws and regulations. Biannual working environment measurements on specified chemical substances and organic solvents confirmed that they were handled appropriately in the working environments. Voluntary periodic inspections and necessary repair work on local exhaust devices to handle chemicals were conducted to ensure adequate performance. Narcotics, stimulants, and psychotropics approved for use were controlled in a proper manner. The required application and notification concerning these items were implemented in compliance with all related laws and regulations.

4. Safety management of high-pressure gases

In FY2022, we installed four liquefied nitrogen

storage tanks. The control of high-pressure gases and necessary applications/notifications were conducted in accordance with related laws and regulations.

5. Safety management of biological experiments

5-1. Genetic recombinant experiments

In FY2022, 45 projects (including 23 user projects) were conducted after being examined and approved by the Genetic Recombination Committee or the Bio-safety supervisor.

5-2. Animal experiments

In FY2022, ten projects (including nine user projects) approved by the Animal Experiment Committee were conducted. An on-site inspection of the animal facility for experimental animals was conducted by the Hyogo-prefecture Animal Protection Center on December 6, 2022, and no deficiencies were identified.

5-3. Microorganisms

In FY2022, five projects approved by the committee were conducted.

5-4. Research involving human subjects

In FY2022, 21 projects (including 16 user projects) involving human-derived materials were conducted after approval by the committee and the like.

6. Safety review of proposals

A total of about 2,700 proposals underwent a safety review. The safety issues in 2022A-term and B-term proposals were reviewed in January 2022 and June 2022, respectively. In addition, General Proposals, Time-Designated Proposals, Urgent Proposals, Measurement Service Proposals, In-house

Proposals, and others were also reviewed.

7. Emergency measures

In FY2022, the omicron strain of COVID-19 spread worldwide, and the number of infected staff and beamline users in the SPring-8 campus increased, so we continued to take thorough measures to prevent infection.

In terms of SPring-8 campus safety inspections, the scale of inspections was reduced in order to prevent infection, and the annual joint emergency drill was conducted in the presence of the Kouto Branch of the Tatsuno Fire Department to simulate a fire in the SPring-8 storage ring.

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