

8. Safety

1. Abstract

In accordance with the Act on the Regulation of Radioisotopes, etc., the 54th and 55th applications for the approval of changes in SPring-8 and SACLA facilities were approved on September 26, 2024, and January 29, 2025, 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 legal limits. Additionally, the management of the 6,754 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 concerned laws and regulations.

2. Radiation safety management

2-1. Summary

There were no problems regarding radiation management in any radiation facility on the site in FY2024.

2-2. Applications for approval

The following applications for changes in the radiation facilities were submitted in FY2024.

54th application for approval of amendment

Application date: April 23, 2024

Approval date: September 26, 2024

- (1) Reduce the number of linear accelerators by one
- (2) Changes in the Storage Ring (hereinafter

called SR) beamlines (BL11XU, BL15XU, and BL21XU)

- (3) Changes in the area exempted from radiation-control, TOKUREI-KUIKI, to which the provisions of Article 22-3 of the Enforcement Regulation of the Act on the Regulations of Radioisotopes, etc. apply

55th application for approval of amendment

Application date: December 6, 2024

Approval date: January 29, 2025

- (1) Addition of doors at the boundary of the radiation-controlled areas (3 locations)
- (2) Changes in the SR beamlines (BL15XU, BL21X, BL40XU, and BL41XU)

2-3. Radiation Protection Committee

The Radiation Protection Committee met twice in FY2024.

40th Harima Radiation Protection Committee (April 18, 2024)

The content of the 54th application for the approval of the amendment was deliberated and approved.

The content of the annual report was confirmed.

41st Harima Radiation Protection Committee (September 25, 2024)

The content of the 55th application for the approval of the amendment was deliberated and approved.

2-4. Facility inspections/periodic inspections

The facilities of the SR beamlines BL36XU and BL15XU were inspected on April 11, 2024, and October 17, 2024, respectively. They were

pronounced satisfactory on the same day.

In FY2024, neither mandated periodic inspections nor confirmations were conducted for SPring-8/SACLA. On the other hand, SPring-8/SACLA was irregularly inspected by the Secretariat of the Nuclear Regulation Authority on February 12 and 13, 2025, and pronounced satisfactory on the same day.

2-5. Radiation monitoring

Radiation measurements confirmed that the radiation levels were below the limit values required by law for all facilities where radiation is used in the SPring-8/SACLA site.

In the radiation-controlled areas of SPring-8/SACLA where workers regularly enter, a maximum dose of 4.2 $\mu\text{Sv/h}$ was detected in a beamline hut 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 measurements confirmed that the radiation doses were well below the legal limit of 1.3 mSv per 3 months (duration of evaluation: 520 h per 3 months) at the boundaries of the controlled areas during SPring-8/SACLA operations.

Measurements of the environmental radiation conducted at the boundaries of the site revealed a maximum dose rate of 0.09 $\mu\text{Sv/h}$ 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 to radiation areas

In FY2024, there were 6,754 radiation workers. This included 6,076 SPring-8/SACLA users, which accounted for about 90% of all radiation workers. A total of 11,099 persons temporarily entered the radiation-controlled areas.

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 at Harima, RIKEN. 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 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 FY2024, the control of high-pressure gases and necessary applications/notifications were conducted in accordance with related laws and regulations.

The liquid nitrogen supply system from the cold evaporators in the SR facility began operation in July 2024. In advance, notifications for changes to the high-pressure gas production facilities were submitted in accordance with the laws.

5. Safety management of biological experiments

5-1. Genetic recombinant experiments

In FY2024, 49 projects (including 24 user projects) were conducted after being examined and approved by the Genetic Recombination Committee or the Bio-safety Supervisor.

5-2. Animal experiments

In FY2024, 15 projects (all 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 March 17, 2025, and no deficiencies were identified.

5-3. Microorganisms

In FY2024, six projects were conducted after approval by the Safety Committee for the Handling

of Microorganisms and Similar Materials.

5-4. Research involving human subjects

In FY2024, 16 projects (all user projects) involving human-derived materials were conducted after approval by the Research Ethics Committees.

6. Safety review of proposals

A total of about 1,800 proposals underwent a safety review. The safety issues in 2024A- and B-term proposals were reviewed in April 2024 and in June, September, and November 2024, respectively. Then, about 1,200 proposals in the 2025A-term were also reviewed in December 2024 and March 2025.

In addition, General Proposals, Time-Designated Proposals, Measurement Service Proposals, In-house Proposals, and others were also reviewed. There were no applications for Urgent Proposals in the 2024A- and B-terms.

7. Emergency measures

In FY2024, a joint emergency drill was conducted on September 19, 2024, in the presence of the Kouto Branch of the Tatsuno Fire Department, under the scenario that an earthquake and fire had occurred at the SPring-8/SACLA site.

Safety inspections of the Harima campus of RIKEN were conducted on November 11, 2024, with the participation of inspectors from other campuses.

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