Safety Office

1. Applications

In March 1997, the Storage Ring of SPring-8 began operations. In addition, the year saw the construction of many SOR beamlines. The Safety Office submitted applications seven times, as shown in Table 1, to change items in the license for operating SPring-8, based on these developments. Among them, six applications have already obtained approval. The Safety Office also applied for a license to operate New Subaru, a 1.5 GeV storage ring built by the Hyogo Prefectural Government (HPG) and the Himeji Institute of Technology (HIT), in December. New Subaru and the linear accelerator of SPring-8 must be operated as an integrated accelerator, and therefore both machine control and the radiation safety systems of the two facilities should be unified. Hence, it was not HPG nor HIT, but JASRI that made the application for New Subaru.

2. Safety Committees

An advisory committee was organized to discuss the technological adequacy of radiation safety at the planned facilities. The committee consists both of in-house staff members and of outside specialists on accelerator safety. The committee met three times in 1997. Intensive discussions were held on the safety system of New Subaru. Another advisory committee was also organized to treat safety problems involving chemical hazards for the SOR experiment.

3. Radiation Safety Inspections

The radiation safety of the storage ring at SPring-8 was inspected by the Nuclear Safety Technology Center (NUSTEC) according to legal requirements; a "completion" inspection took place on February 27th and 28th, and a performance inspection on June 16th and 17th. As for the beamlines, only BL02B1 and BL47XU were checked by NUSTEC on these occasions. The other beamlines, completed afterwards, received inspections only by in-house staff of SPring-8; seven beamlines (BL01BI, BL04B1, BL09XU, BL10XU, BL39XU, BL41XUand BL45XU) passed the inspections in 1997. The in-house inspection of two other beamlines (BL08XW and BL14B1) is still continuing. Furthermore NUSTEC performed a surprise inspection from October 20th to 22nd.

4. Radiation Monitoring

The Safety Office surveyed the radiation environment, i.e., dose equivalent rate at the workspace, in and around the controlled area of SPring-8 when the accelerators were in operation. It was confirmed by these measurements that the dose equivalent rate at any point a radiation worker can access never exceeded 20 micro sieverts per hour, and also that the rate at any boundary of the controlled area never exceeded 2 micro sieverts per hour. The location with the highest dose rate recorded was in the vicinity of the operating klystron. The highest residual radioactivity was found around the beam dump of the linear accelerator. Accordingly, the Safety Office set barriers and signboards around these areas to prevent unnecessary access.

The radioactive concentration of exhaust air from the accelerator hall was continuously monitored and no radioactive contamination

was found. The drain water from the accelerator hall was also checked for radioactive contamination, especially by ^{7}Be and ^{3}H, and the measured values were within the bounds of the natural levels.

The Safety Office also conducted special survey programs to ensure radiation safety during the commissioning period and operational studies on the accelerators and beamlines. The results of these special surveys reflected the improvements with the radiation shielding against gas-bremsstrahlung from the storage ring and with the design of the optical/experimental hatches.

As SPring-8 has been built in a catchment area, it has been necessary to periodically shown that the radiation and the radioactivity levels around the institute do not affect the surroundings. The results of environmental monitoring have also been within the bounds of natural levels.

5. Maintenance and Improvement of Radiation Safety Systems

Radiation safety systems (radiation monitoring systems, interlock systems, and entrance control systems) are the keystones of safety operations for the accelerator facilities, and therefore checking and improving their reliability is of great concern to us. These systems are required to receive a set of intensive inspections twice a year. The Safety Office has also tried to improve the systems by introducing a new operating system (the revised system replaced the older one during the long winter shutdown period of the 1997 fiscal year). It was planned for a new beam transport line to include a radiation monitor in the construction area. As the monitor was connected to the beam interlock system to prevent serious operational failures of the linear accelerator, it was replaced temporally with a mobile-type system.

The Safety Office participated in the planning of the radiation safety system for the above-mentioned new beam transport line. In the design, a system was employed where the radiation monitors connected to the interlock system play a more active role than usual to control the radiation levels around the facility. The monitors check both the cumulative dose (every one hour) and the instantaneous dose rate; when the cumulative dose exceeds its control level the interlock system interrupts operation of the linear accelerator until the cumulative period has passed. We believe such a system will be useful for future high-energy and high-intensity accelerator facilities where radiation shielding only by a shielding wall is difficult.

6. Registration and Personnel Dose Monitoring of Radiation Workers

Individuals numbering 1386 registered as radiation workers at SPring-8 in 1997; 332 of them are in-house staff and 298 are users. No significant values were reported from dose monitoring of these individuals.

7. Safety of Chemical Hazard

A chemist joined the staff of the Safety Office to check the chemical hazard of samples and other chemicals brought into SPring-8 by users. The control of chemical waste is extremely important since SPring-8 is built in a catchment area. We are planning a system for the integral control of chemicals at SPring-8.

Table 1 List of Applications Submitted in 1997

	Items	Submitted	Approved
Application #1	Storage Ring, BL02B1, BL47XU	1/10	2/25
Application #1.5	Modification of application #1	4/18	6/4
Application #2	BL01B1 · BL04B1 · BL09XU · BL14B1 · BL41XU · BL45XU	5/16	7/4
Application #3	BL08XW · BL10XU · BL23SU · BL25SU · BL27SU · BL39XU · BL44B2	6/20	8/11
Application #3.5	BL24XU, new dump line of the linear accelerator, etc.	9/9	10/30
Application #4	BL11XU · BL46XU	11/6	12/24
Application #5	L3BT · BL20B2 · BL33B2, etc.	12/10	1998/4/17
Application NS	New Subaru	12/12	