IAEA Safety Standards Operational Radiation Protection and Radioactive Waste Management for Research Reactors

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International Atomic Energy Agency (IAEA)

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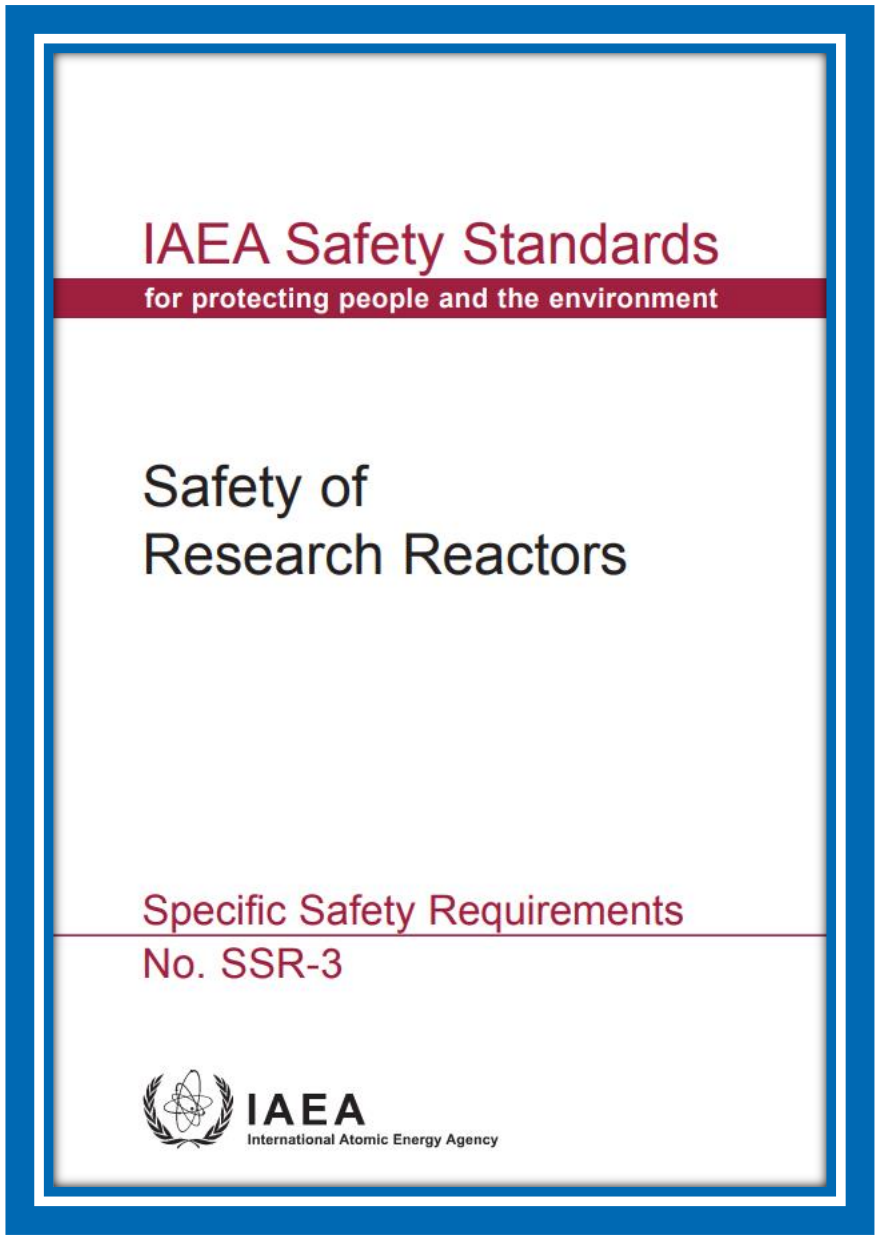
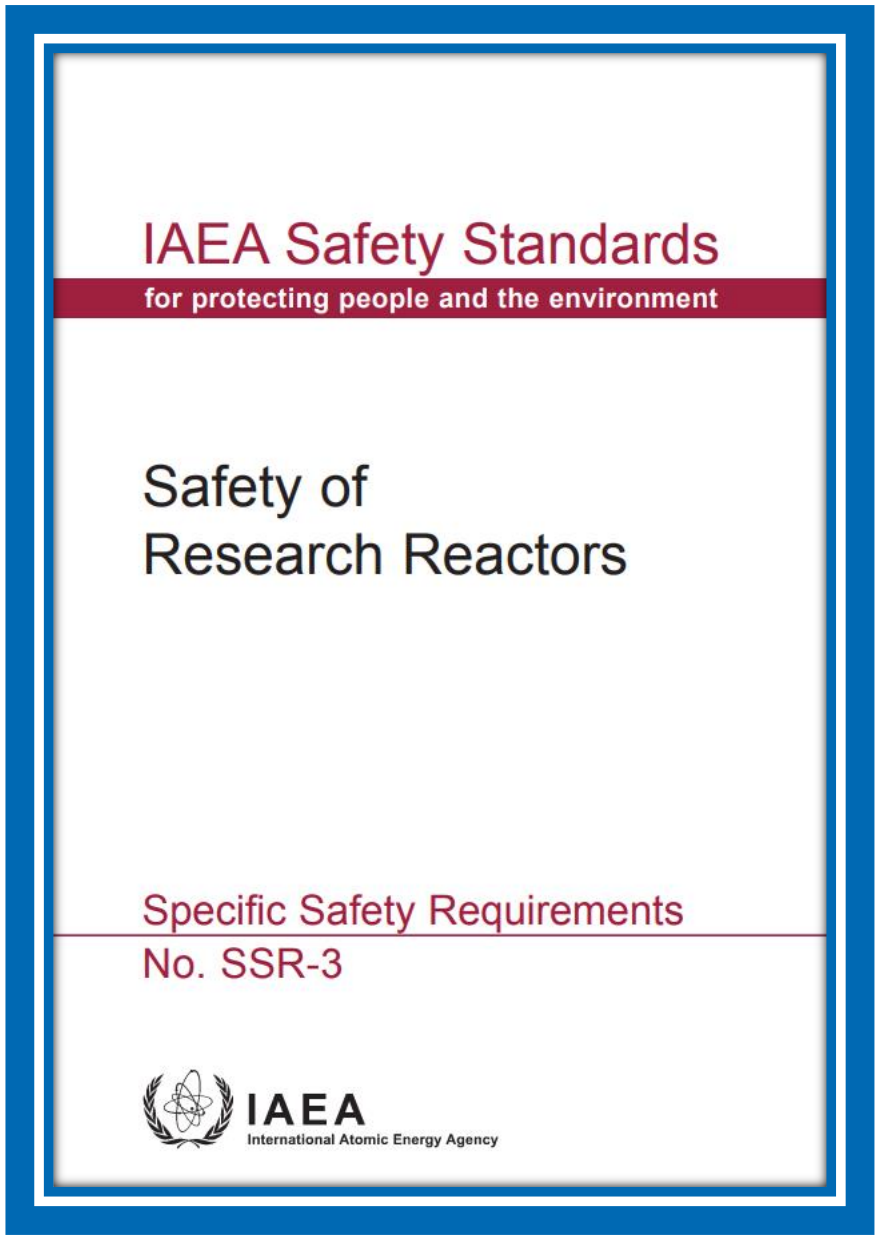
Introduction – Safety Standards Framework

Radiation Protection in Design



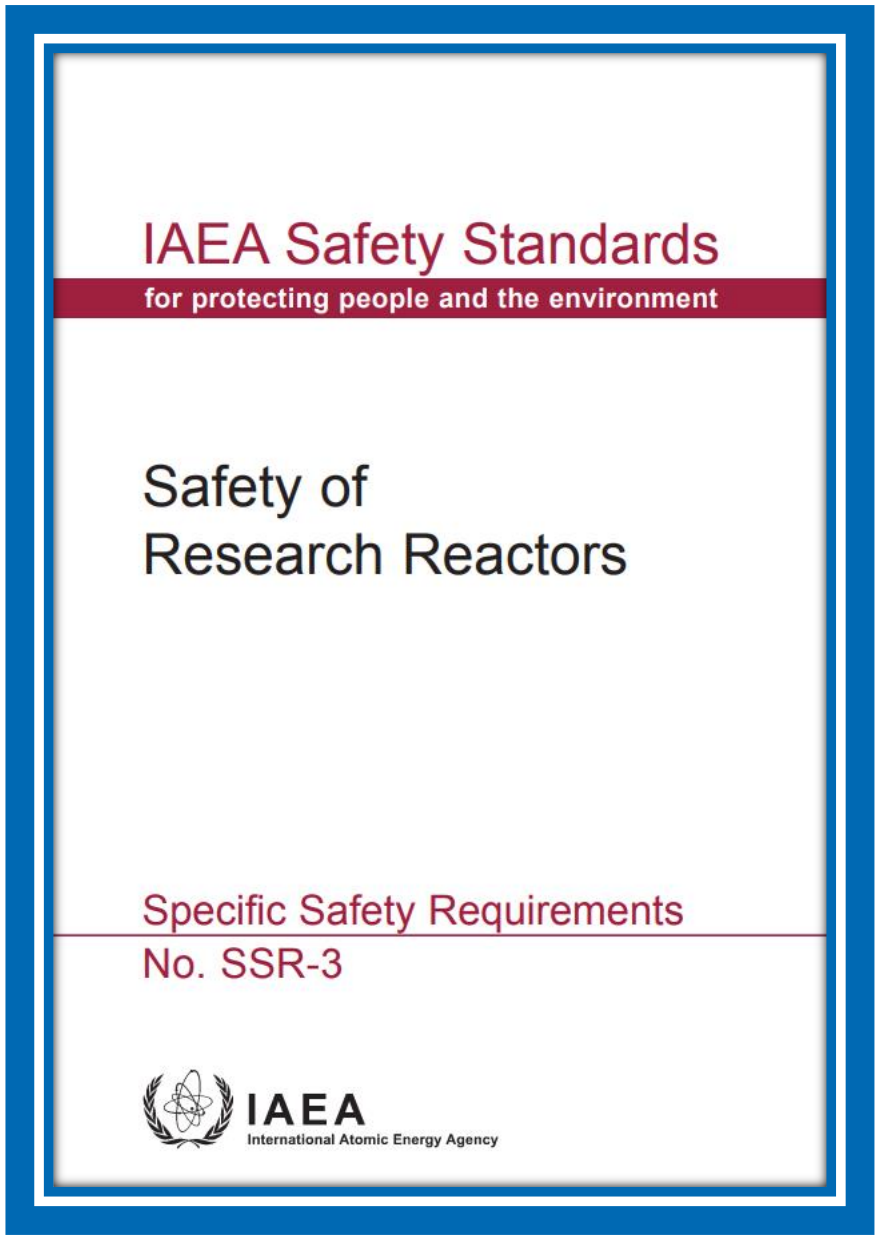
SSR-3, Requirement 8

The design of a research reactor facility shall be such as to ensure that radiation doses to workers and other personnel at the research reactor facility and to members of the public do not exceed the established dose limits, and that they are kept as low as reasonably achievable for operational states for the entire lifetime of the research reactor facility, and that they remain below acceptable limits and as low as reasonably achievable in, and following, accident conditions.



SSR-3, Requirement 34

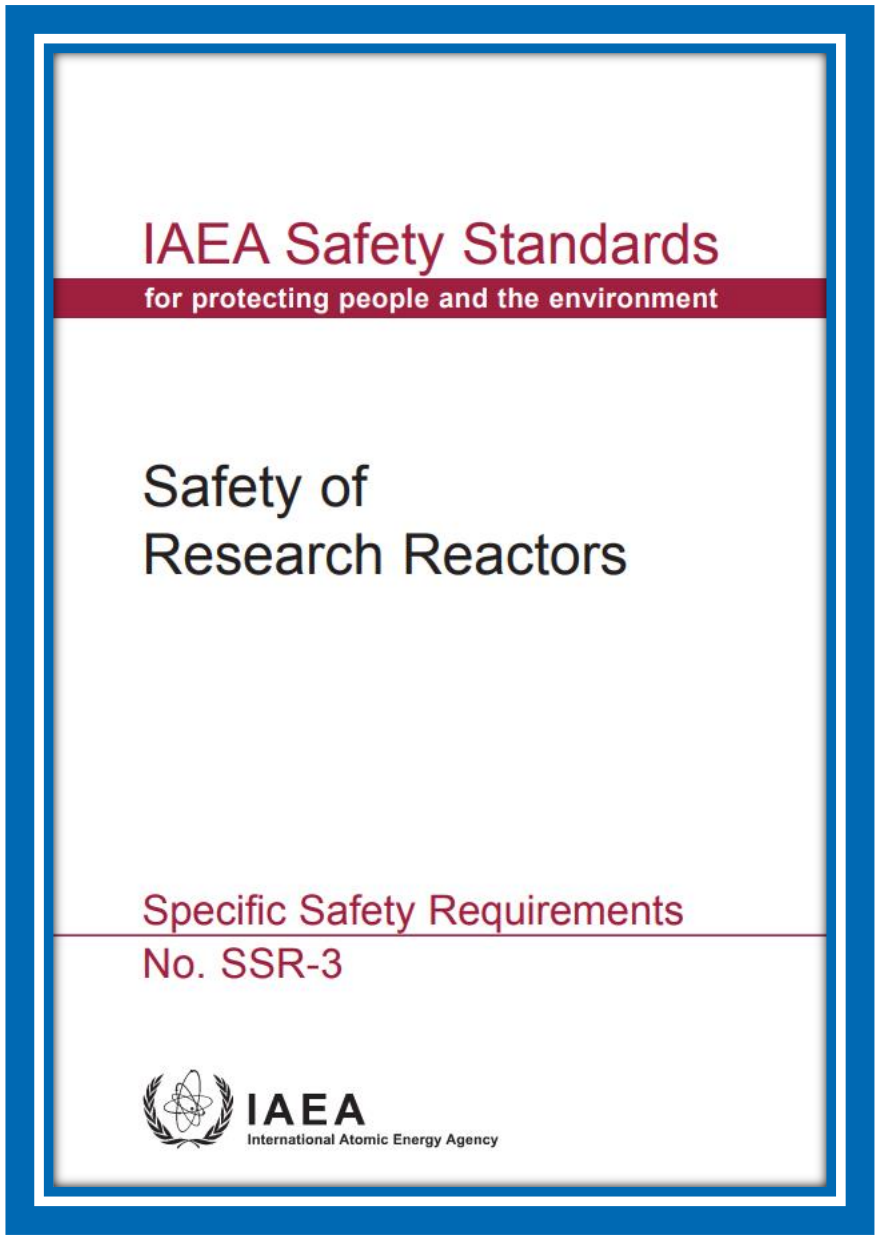
Provision shall be made at a research reactor facility for ensuring that doses to operating personnel, reactor users (experimenters) and the public will be maintained below the prescribed dose limits and will be kept as low as reasonably achievable, and that the relevant dose constraints will be taken into consideration.



SSR-3, Requirement 57

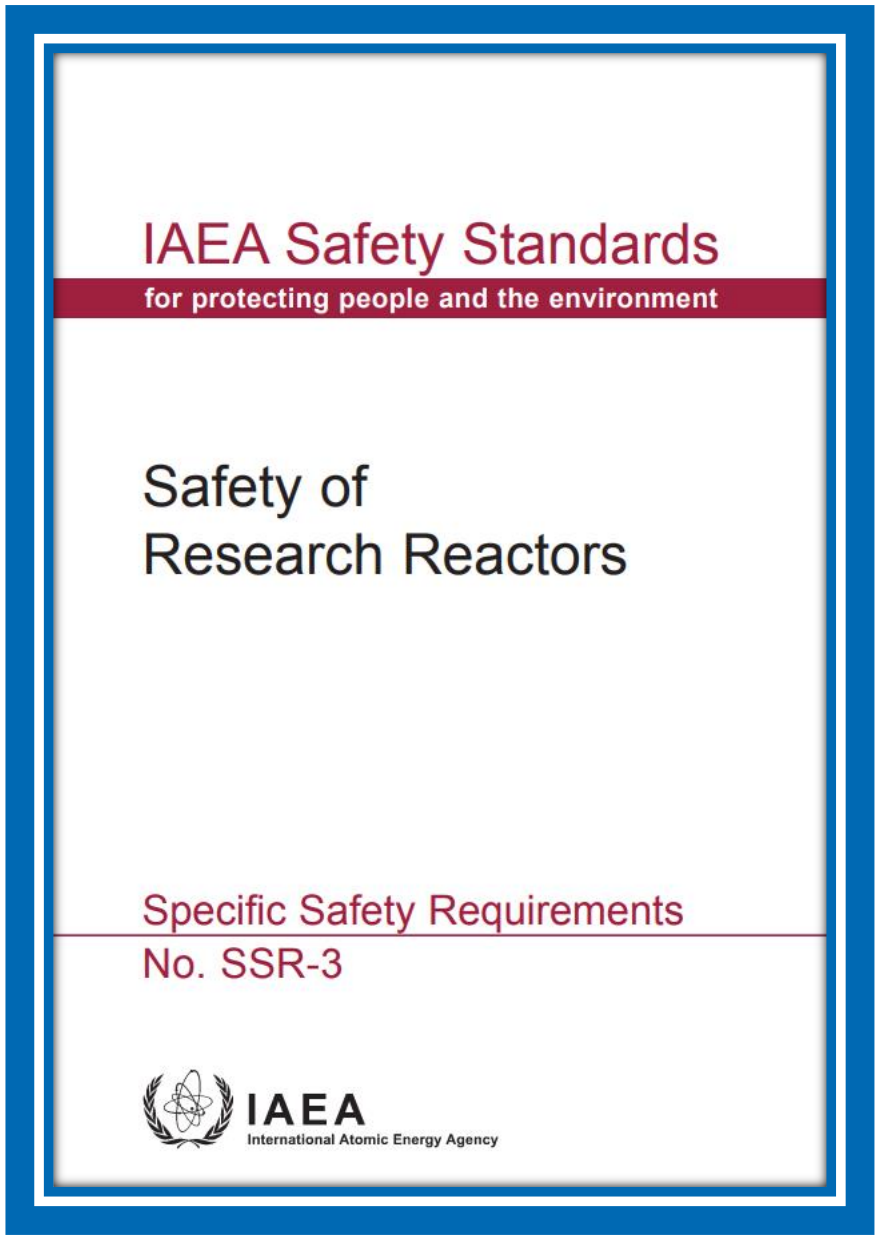
Equipment shall be provided at a research reactor facility to ensure that there is adequate radiation monitoring in operational states and accident conditions

Operational Radiation Protection



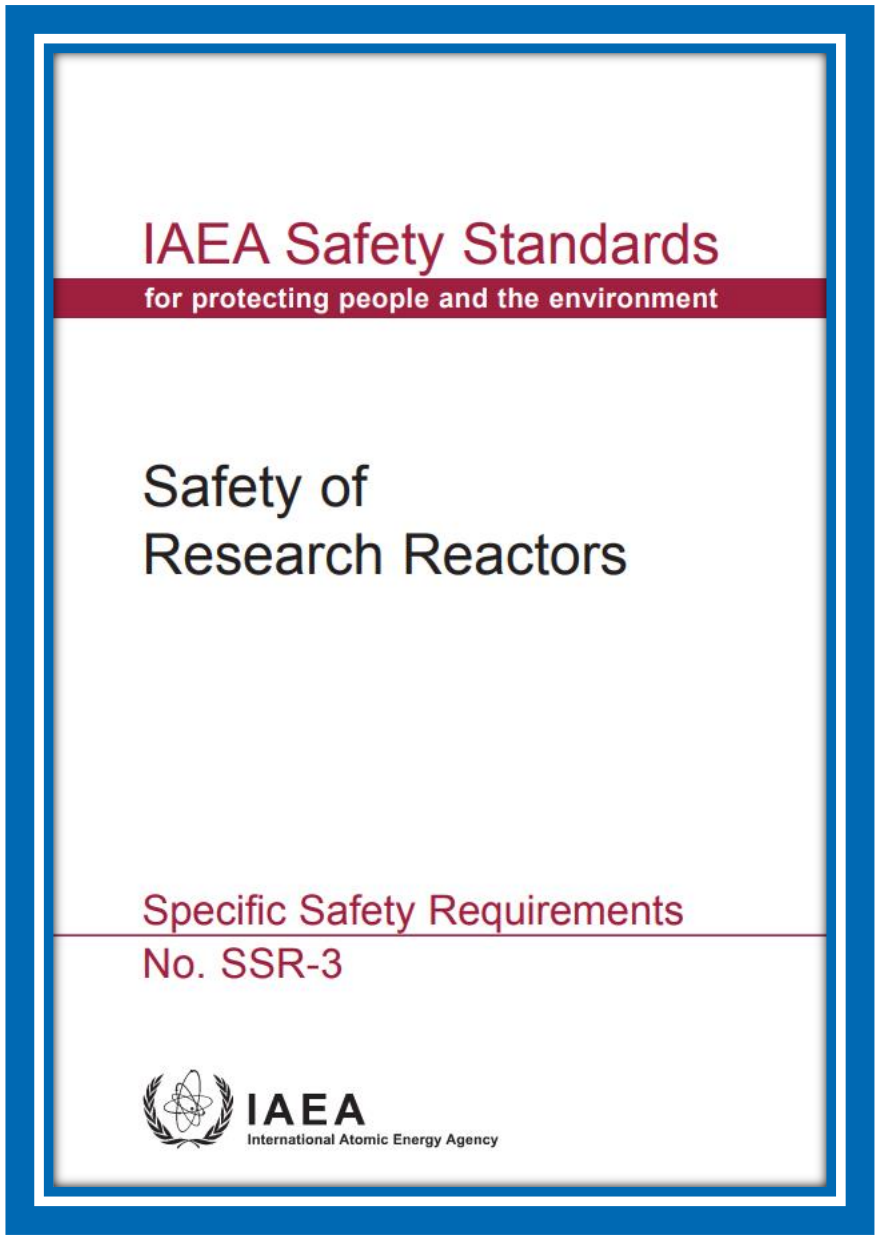
SSR-3, Requirement 84

The operating organization for a research reactor facility shall establish and implement a radiation protection programme.



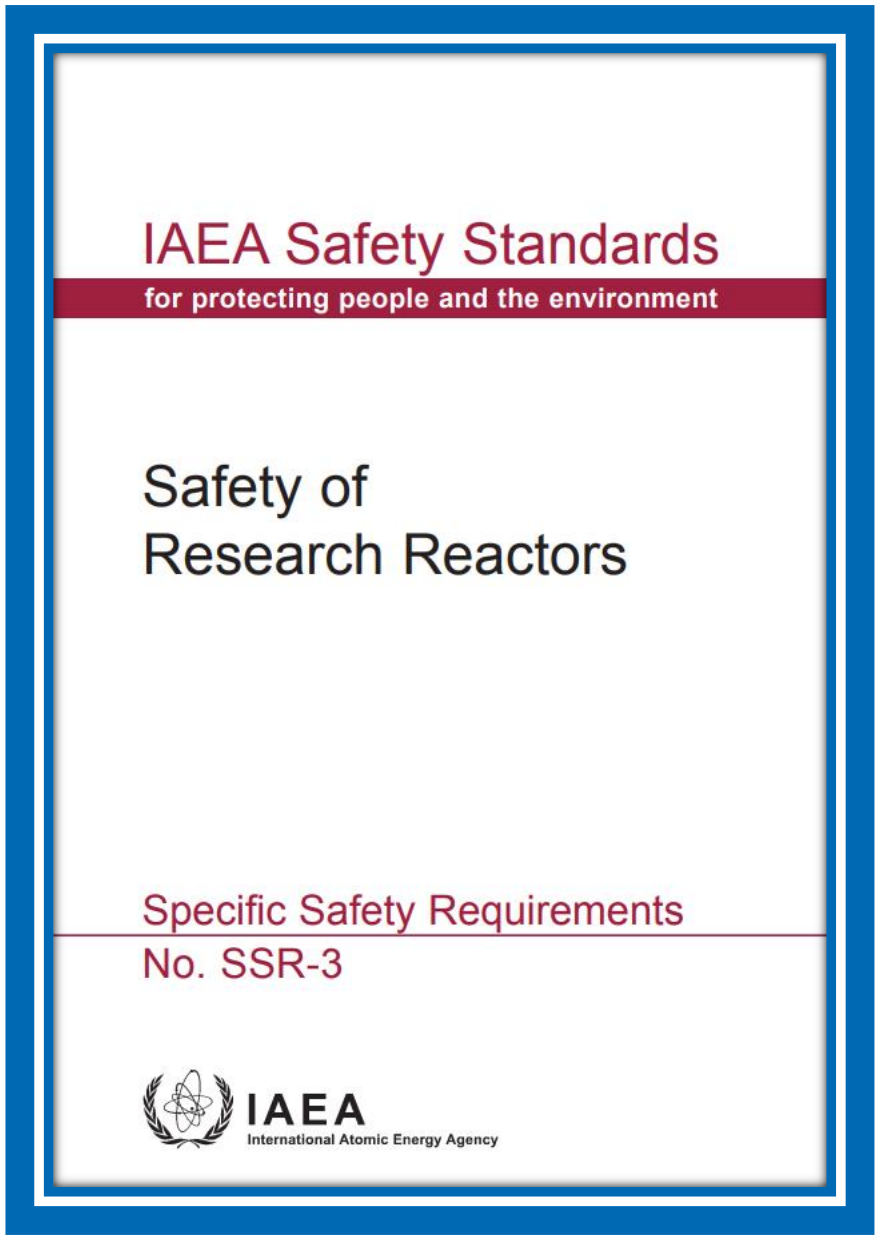
SSR-3, Requirement 84

7.107. The radiation protection programme shall ensure that for all operational states and accident conditions, doses due to exposure to ionizing radiation at the research reactor facility or doses due to any planned releases of radioactive material from the facility are kept below authorized limits and are as low as reasonably achievable.



SSR-3, Requirement 84

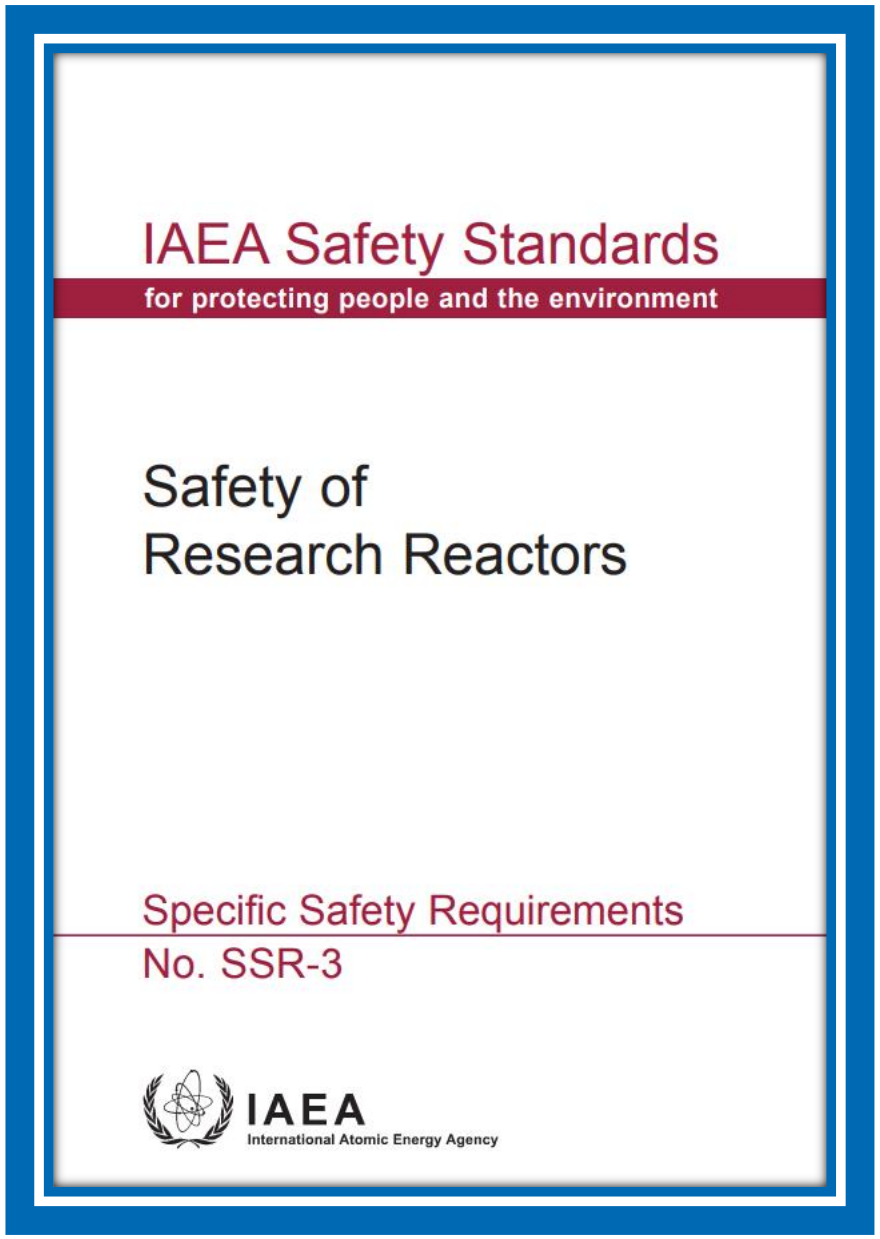
7.108. The radiation protection programme of the operating organization shall have sufficient independence and resources to be able to advise on and enforce radiation protection regulations, standards and procedures, and safe working practices



SSR-3, Requirement 84

7.109. The radiation protection programme shall be established by the operating organization in accordance with regulatory requirements. It shall comply with the requirements of GSR Part 3 and shall be subject to the approval of the regulatory body.

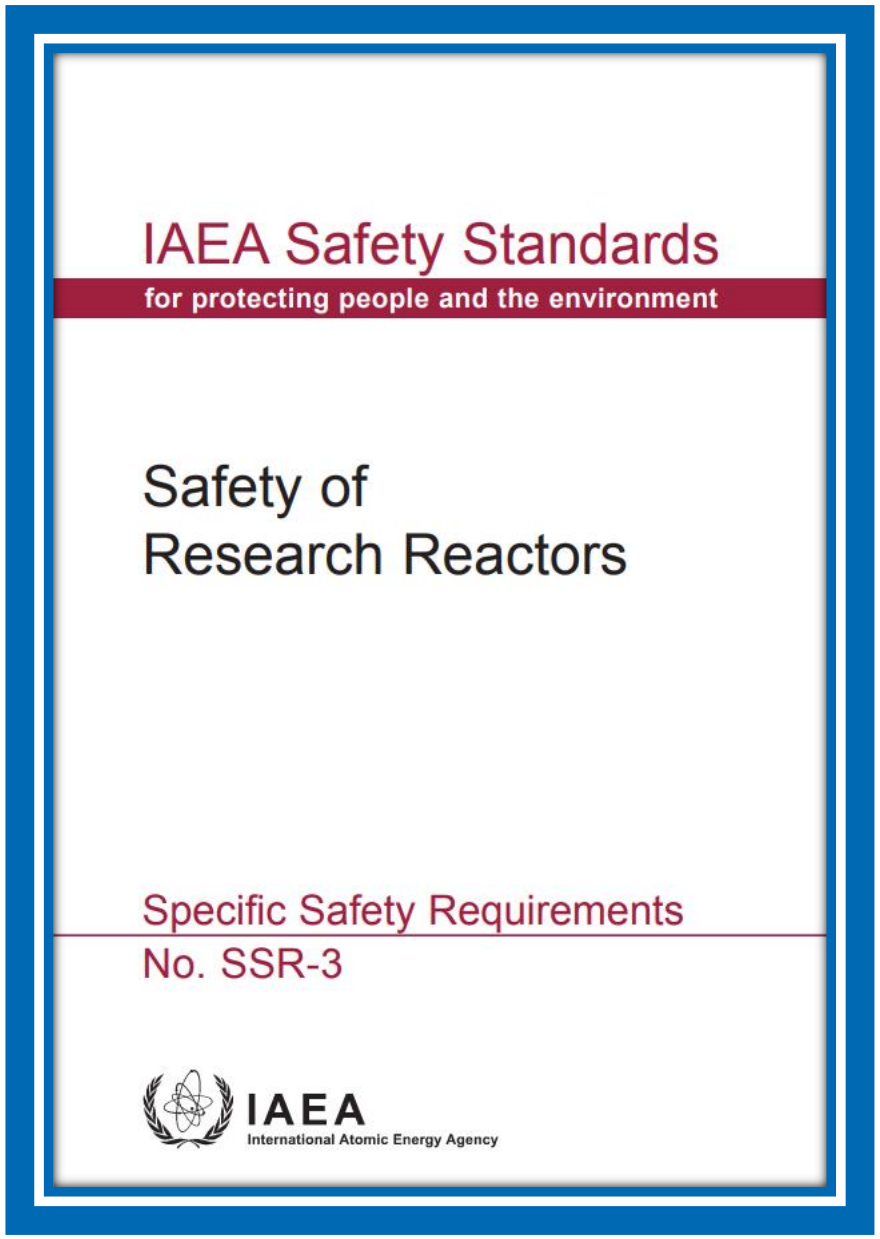
This programme shall include a policy statement from the operating organization that includes the fundamental safety objective of protecting people and the environment and a statement of the operating organization's commitment to the principle of optimization of protection.



SSR-3, Requirement 84

7.110. The radiation protection programme is subject to the requirements for occupational radiation protection and shall include, in particular, measures for the following:

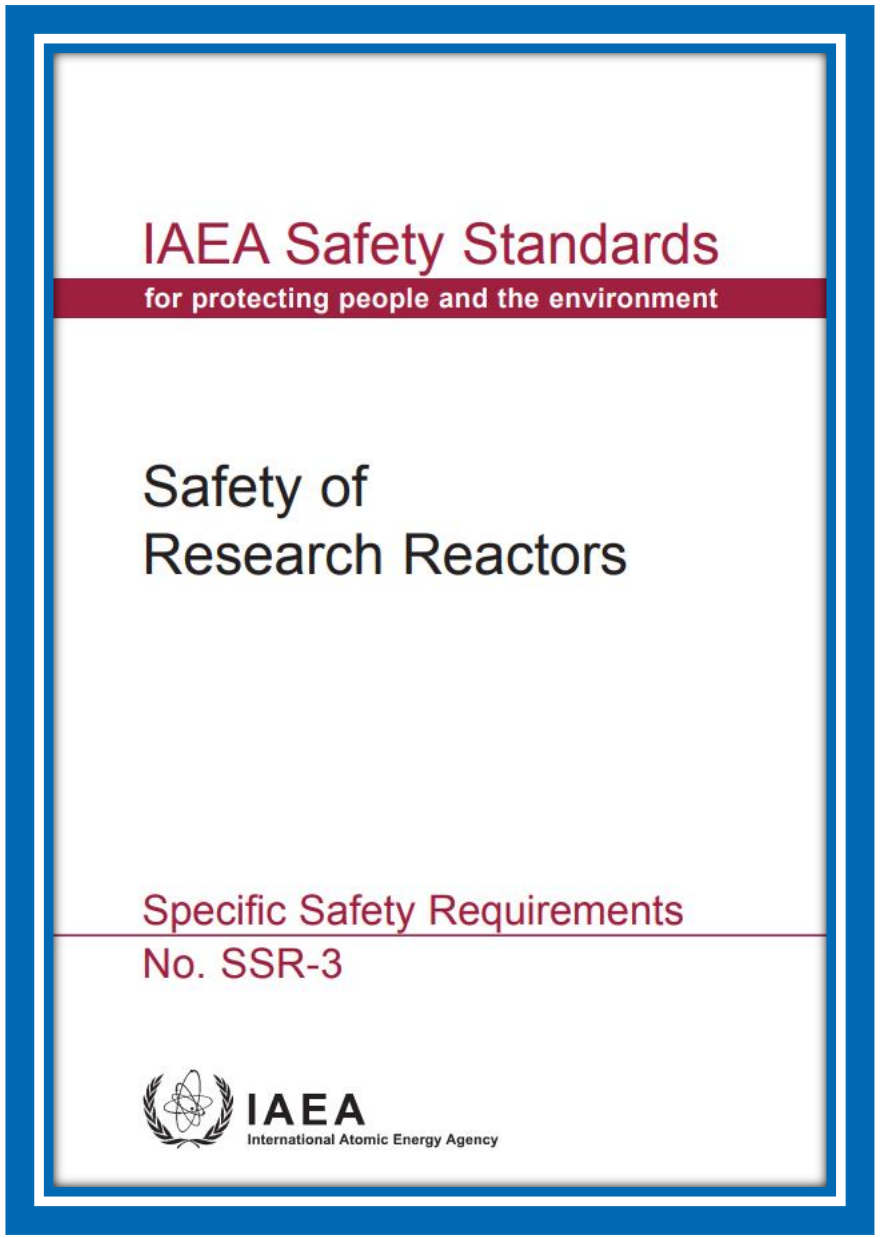
a) Ensuring that there is cooperation between the radiation protection staff and other operating staff and experimental staff in establishing operating procedures and maintenance procedures when radiation hazards are anticipated, and ensuring that direct assistance is provided when required;
b) Providing workplace monitoring and environmental monitoring;
c) Providing for the decontamination of personnel, equipment and structures;
d) Verifying compliance with applicable regulations for the transport of radioactive material;



SSR-3, Requirement 84

7.110. The radiation protection programme is subject to the requirements for occupational radiation protection and shall include, in particular, measures for the following:

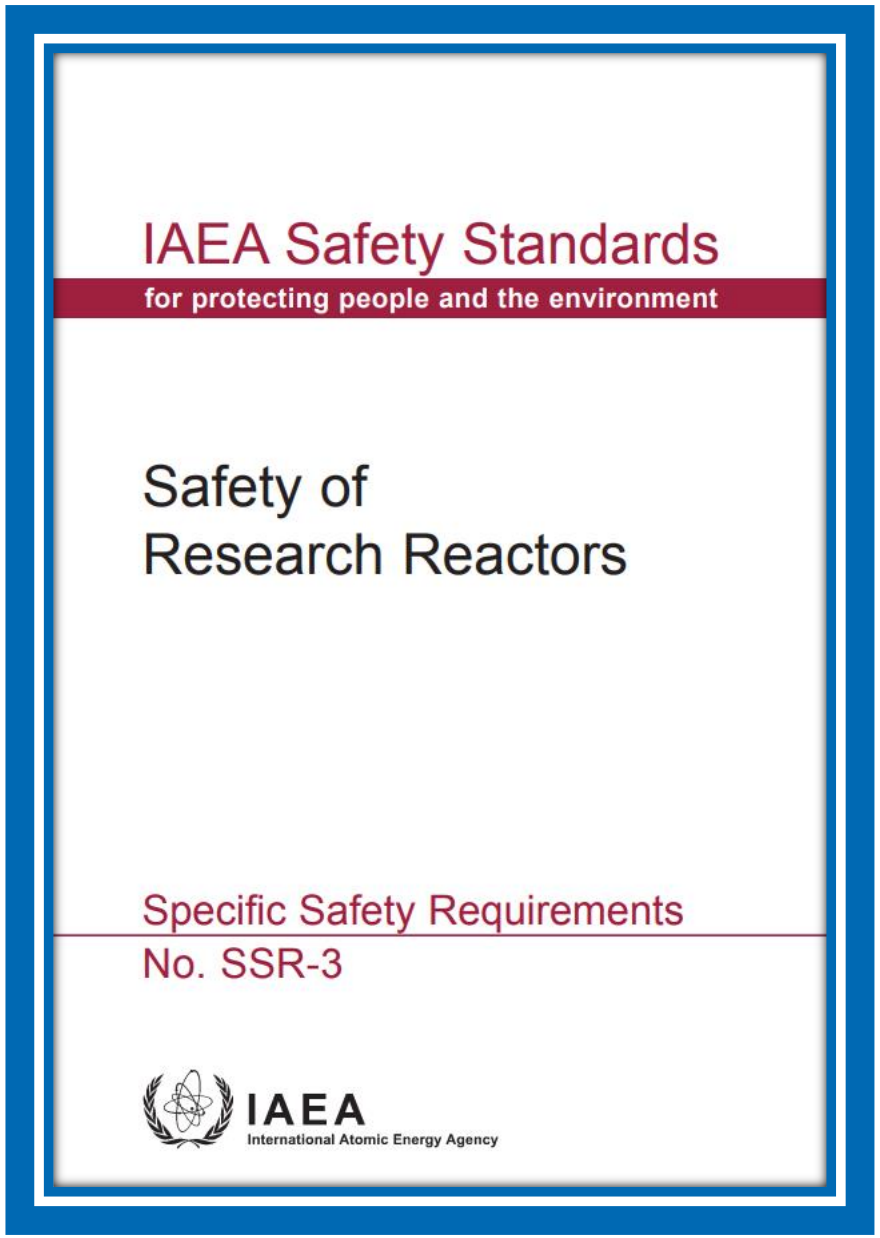
e) Detecting and recording any releases of radioactive material;
f) Recording the inventory of radiation sources;
g) Providing adequate training in practices for radiation protection;
h) Providing for the review and update of the programme in the light of experience;
i) Providing the review and analysis of materials, equipment and conditions for experiments.



SSR-3, Requirement 84

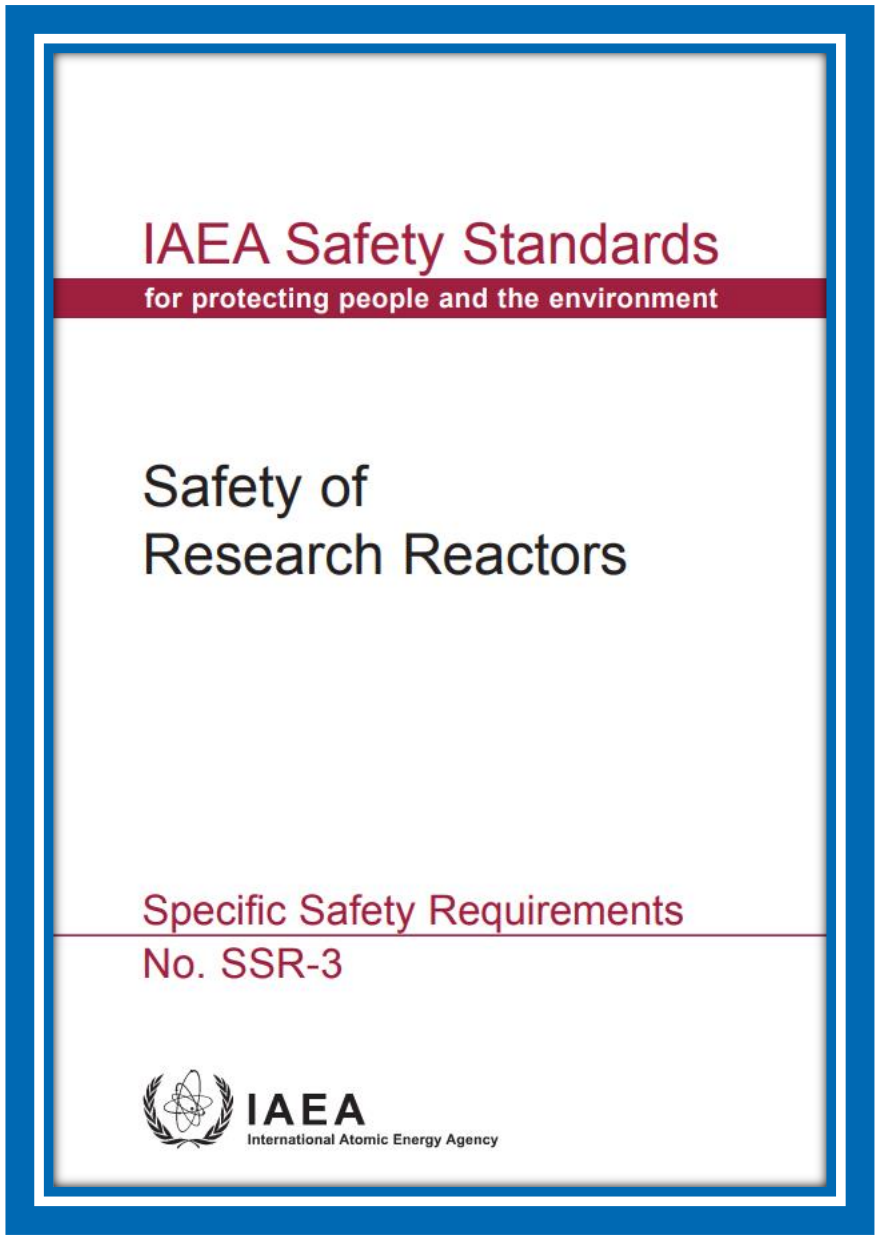
7.111. The operating organization shall verify, by means of surveillance, inspections and audits, that the radiation protection programme is being correctly implemented and that its objectives are being met.

The radiation protection programme shall be reviewed on a regular basis and shall be updated if necessary.



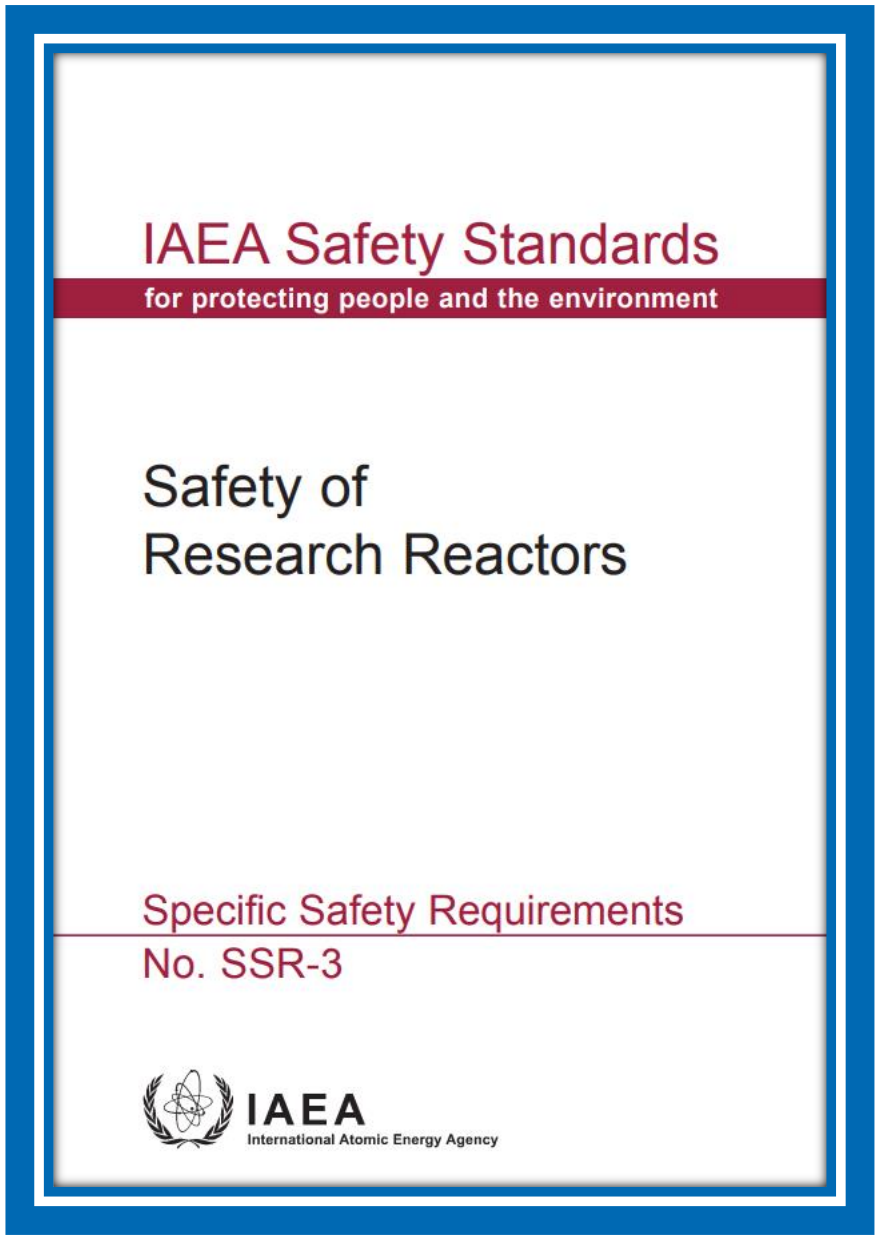
SSR-3, Requirement 84

7.112. To assist the reactor management in ensuring that radiation doses are kept as low as reasonably achievable, the operating organization shall establish dose constraints.



SSR-3, Requirement 84

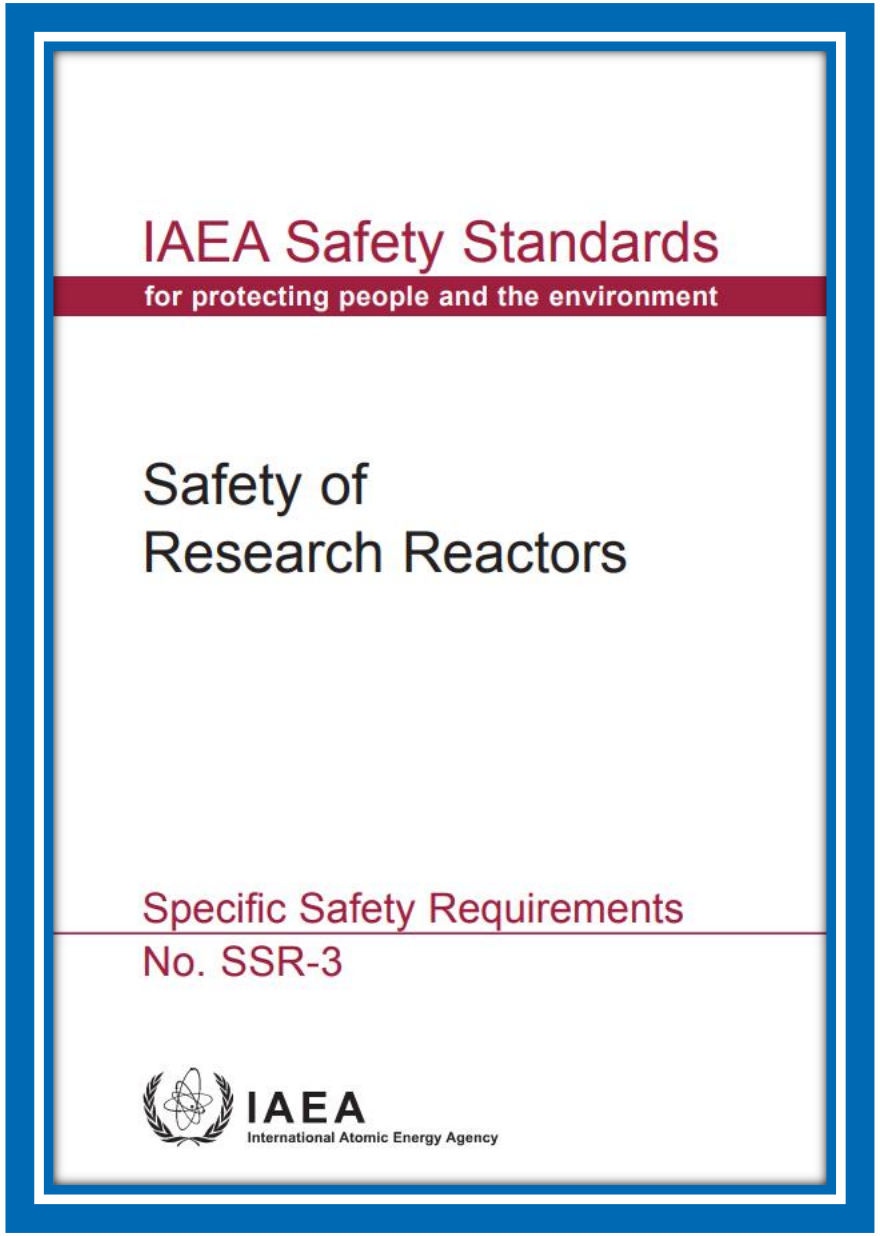
7.113. If the applicable dose limits for occupational or public exposure or the authorized limits for radioactive releases are exceeded, the reactor manager, the safety committee, the regulatory body and other competent authorities shall be informed in accordance with the requirements.



SSR-3, Requirement 84

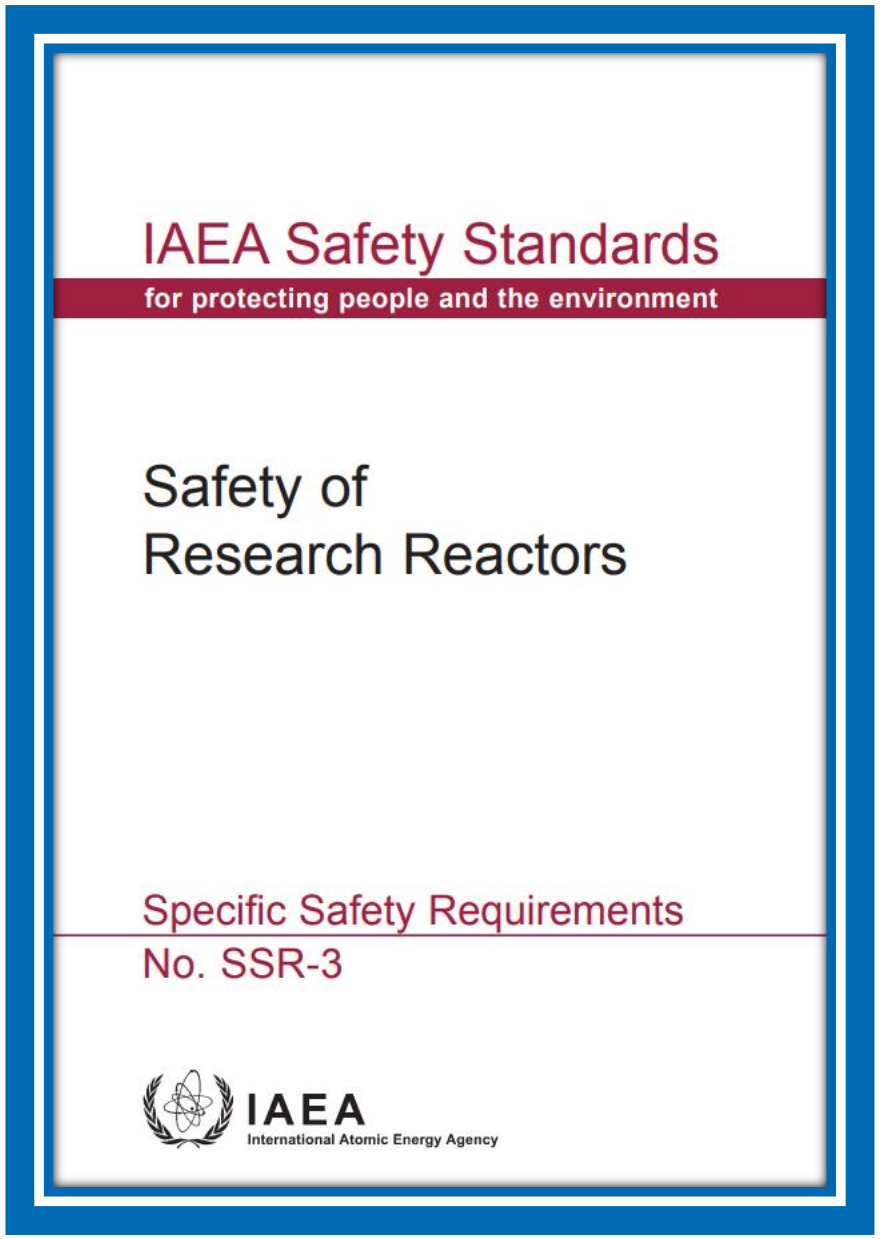
7.114. All personnel who may be occupationally exposed to radiation at significant levels shall have their doses measured, assessed and recorded, as required by the regulatory body or other competent authorities, and these records shall be made available to the supervisor of the health surveillance programme, the reactor manager, the regulatory body and other competent authorities as designated in the national regulations.

Radioactive Waste Management in Design



SSR-3, Requirement 15

Special consideration shall be given at the design stage of a research reactor facility to the incorporation of features to facilitate radioactive waste management and the future decommissioning of the facility.

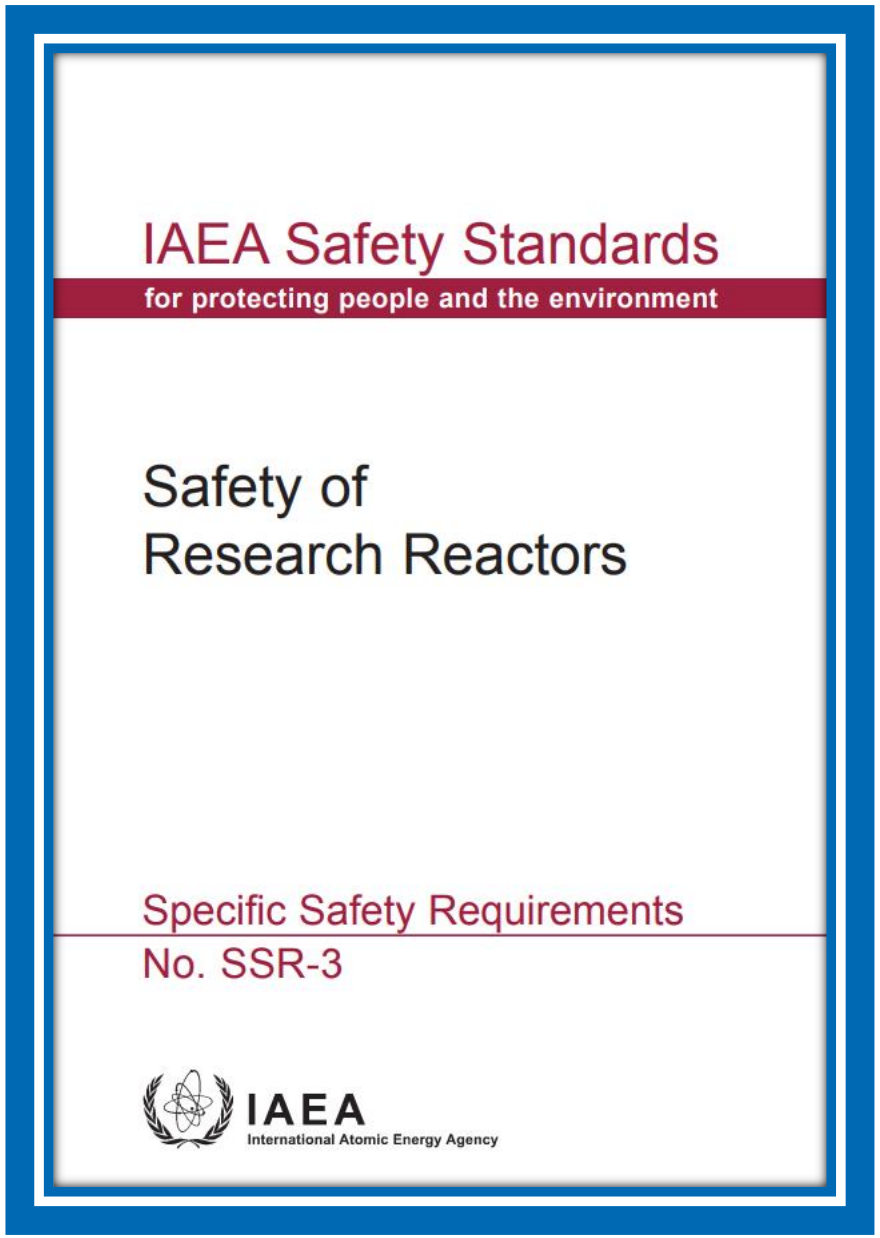


SSR-3, Requirement 59

The design of a research reactor facility and its associated experimental facilities shall include provisions to enhance safety in waste management and to minimize the generation of radioactive waste.

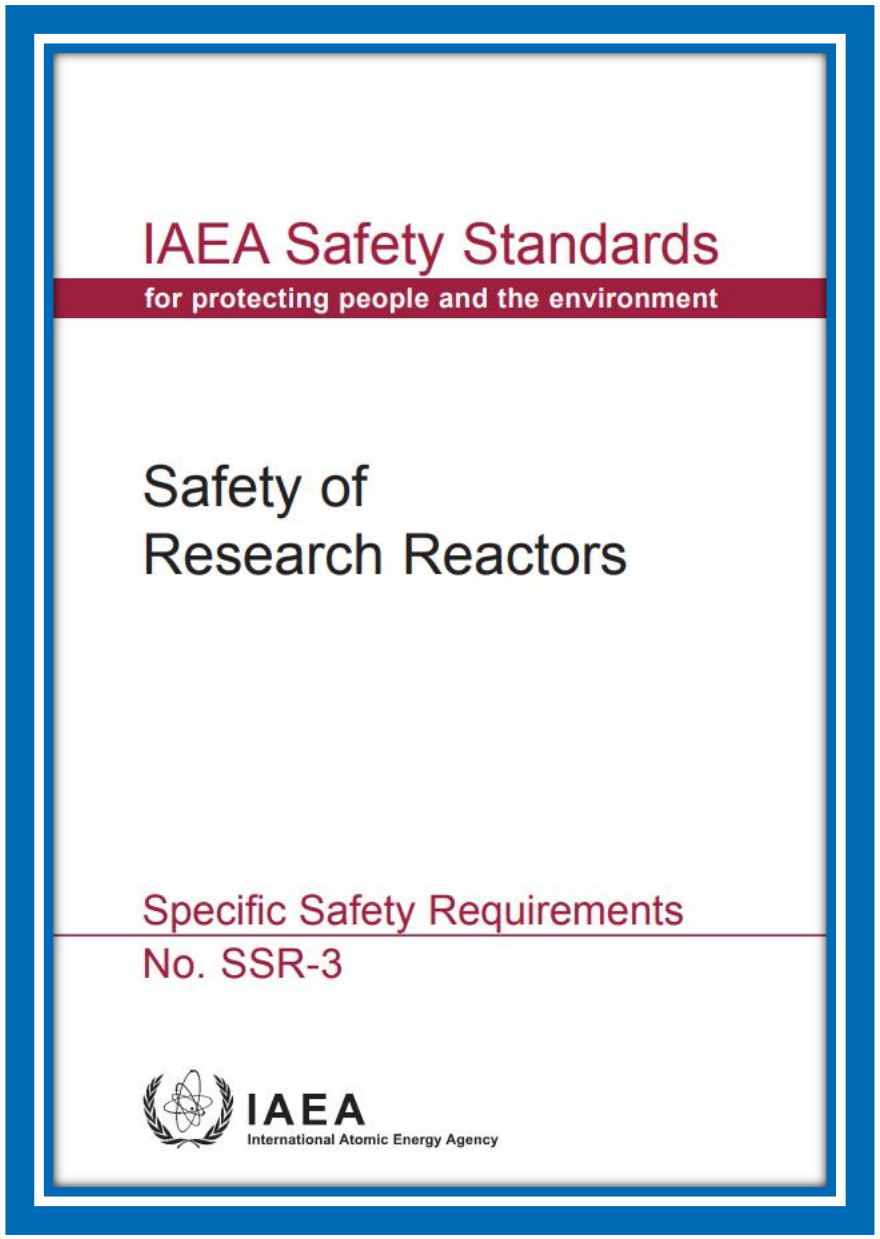
Systems shall be provided for treating solid, liquid and gaseous radioactive waste to keep the amounts and concentrations of radioactive releases as low as reasonably achievable and below authorized limits on discharges.

Radioactive Waste Management in Operations



SSR-3, Requirement 85

The operating organization for a research reactor facility shall establish and implement a programme for the management of radioactive waste.

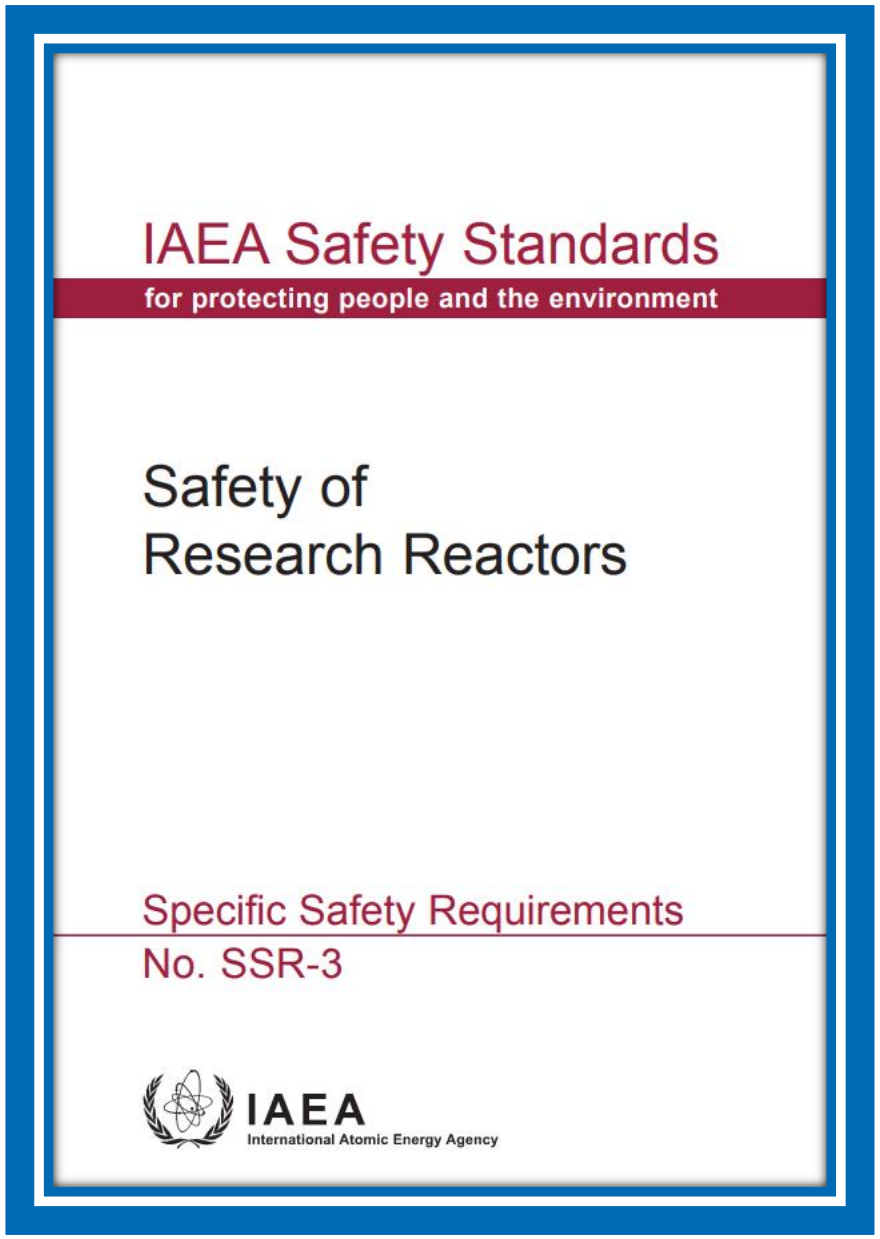


SSR-3, Requirement 85

7.115. The programme for the management of radioactive waste shall include the characterization, classification, processing, transport, storage, and disposal of radioactive waste.

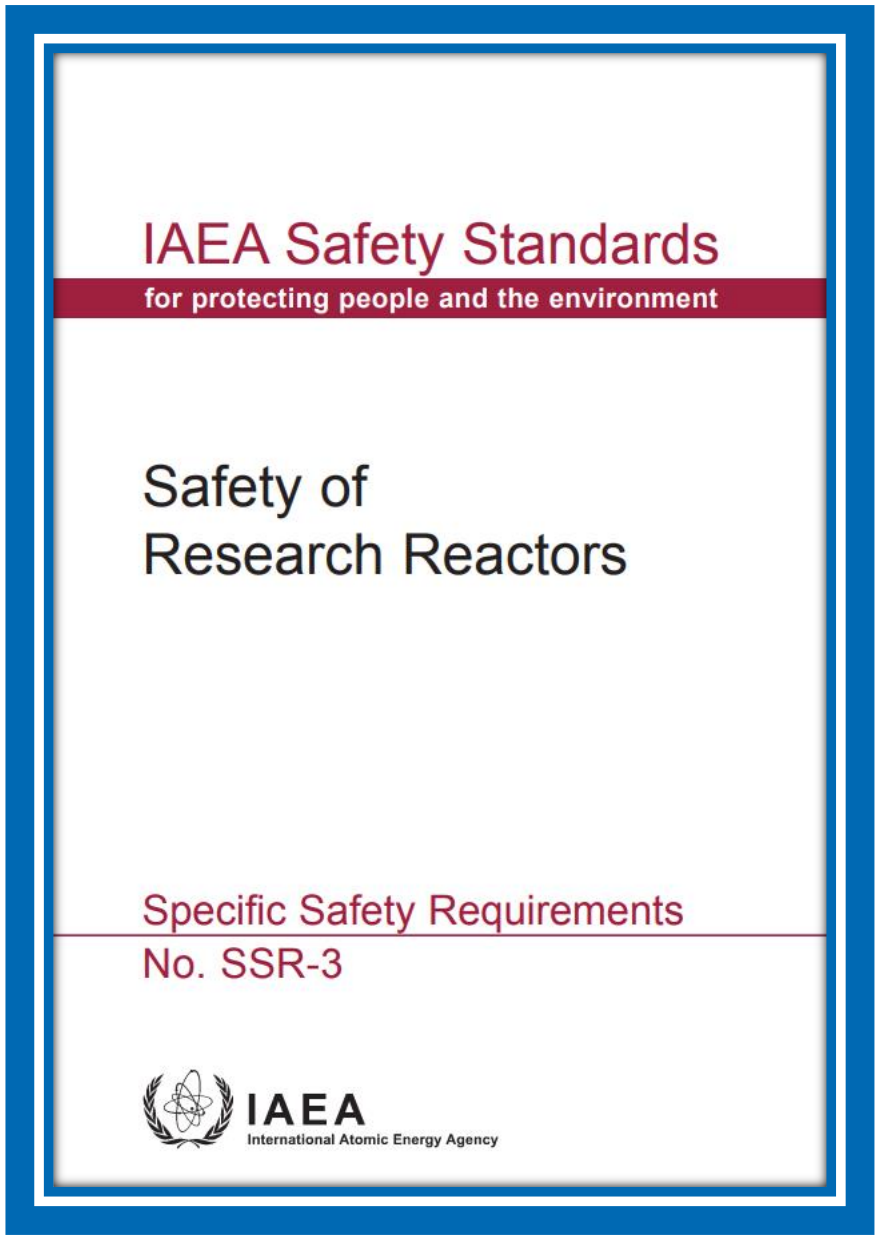
Processing and storage of radioactive waste shall be strictly controlled in a manner consistent with the requirements for the predisposal management of radioactive waste.

Records shall be maintained for waste generation and waste classification.



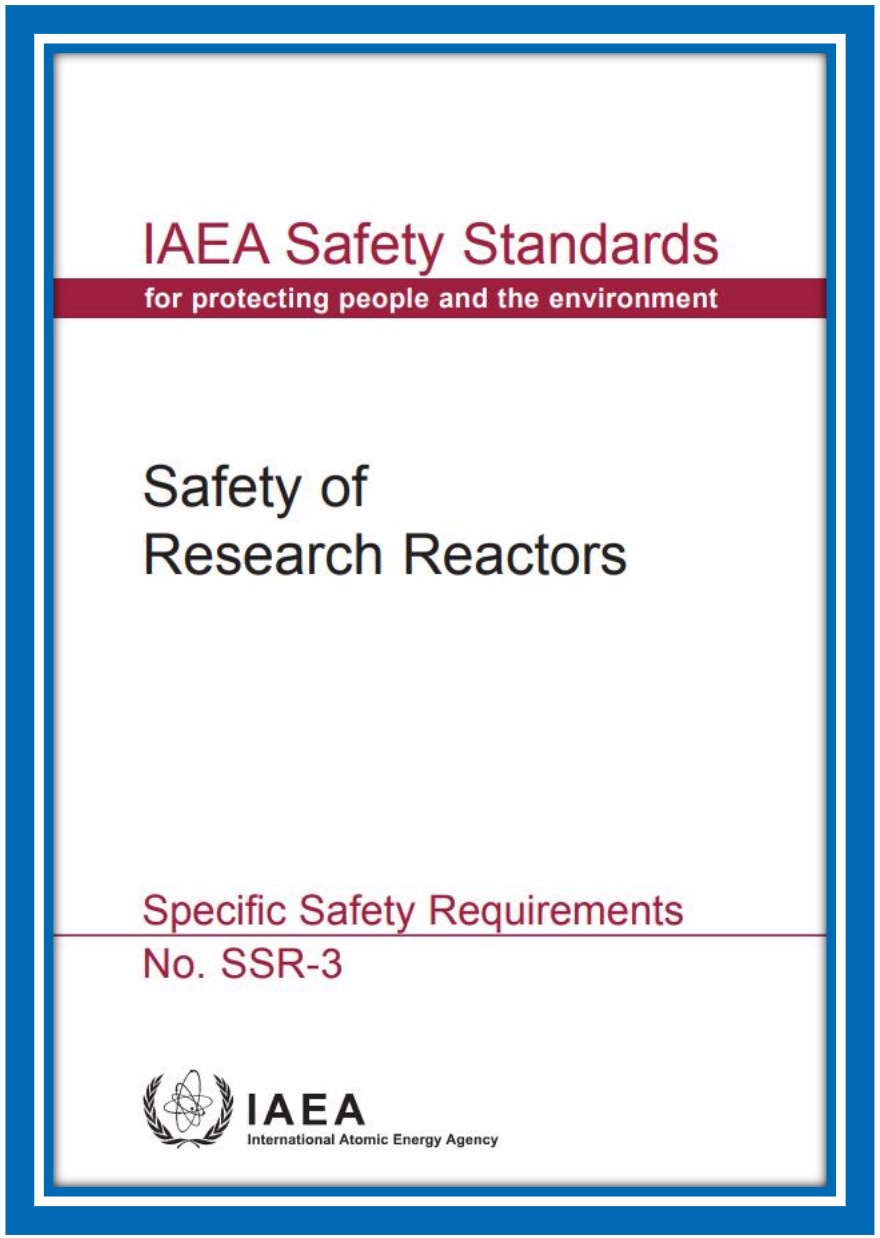
SSR-3, Requirement 85

7.116. The reactor and its experimental devices shall be operated to minimize the generation of radioactive waste of all kinds, to ensure that releases of radioactive material to the environment are kept below permissible regulatory limits and as low as reasonably achievable and to facilitate the handling and disposal of waste.



SSR-3, Requirement 85

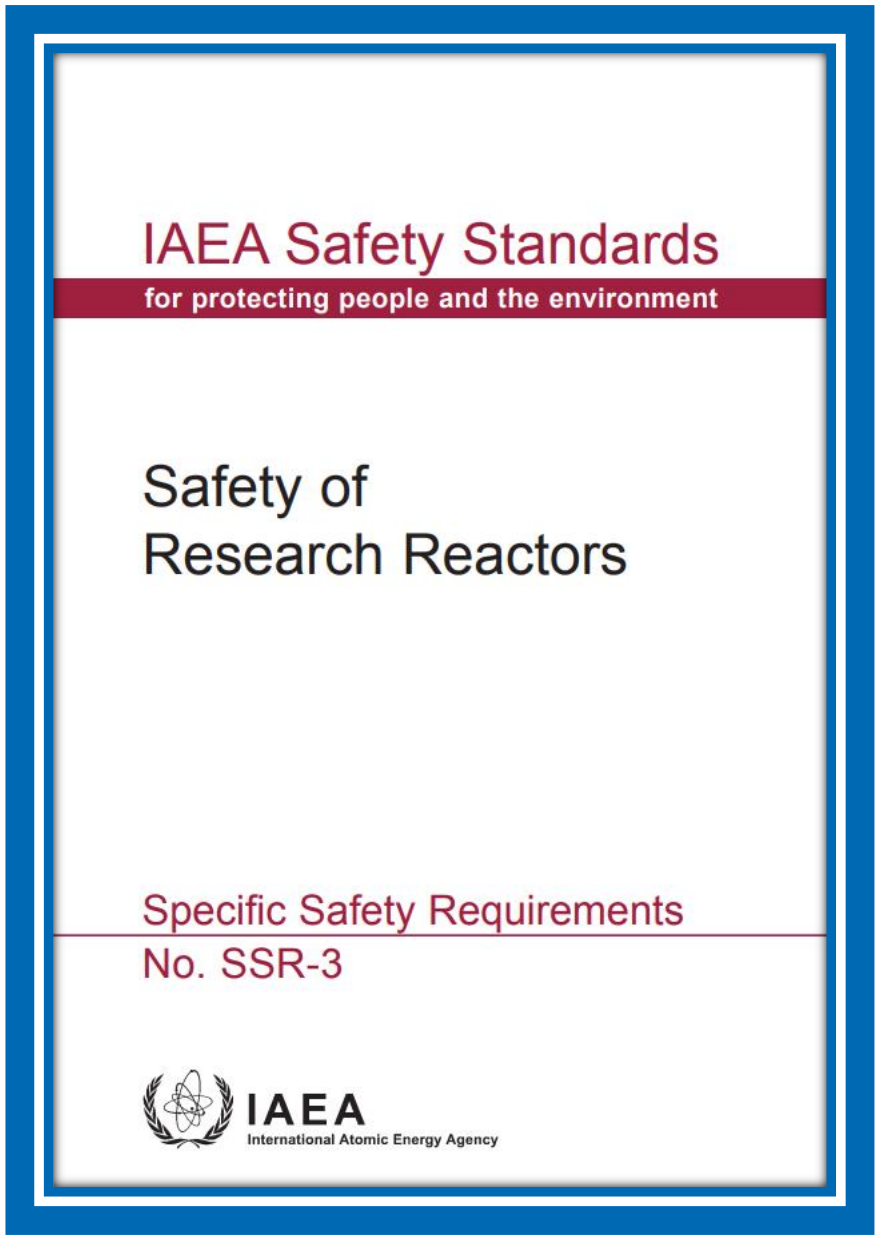
7.117. Releases of liquid and/or gaseous radioactive effluents to the environment shall be monitored and the results shall be recorded in order to verify compliance with the authorized limits. They shall also be reported periodically to the regulatory body or another competent authority in accordance with its requirements.



SSR-3, Requirement 85

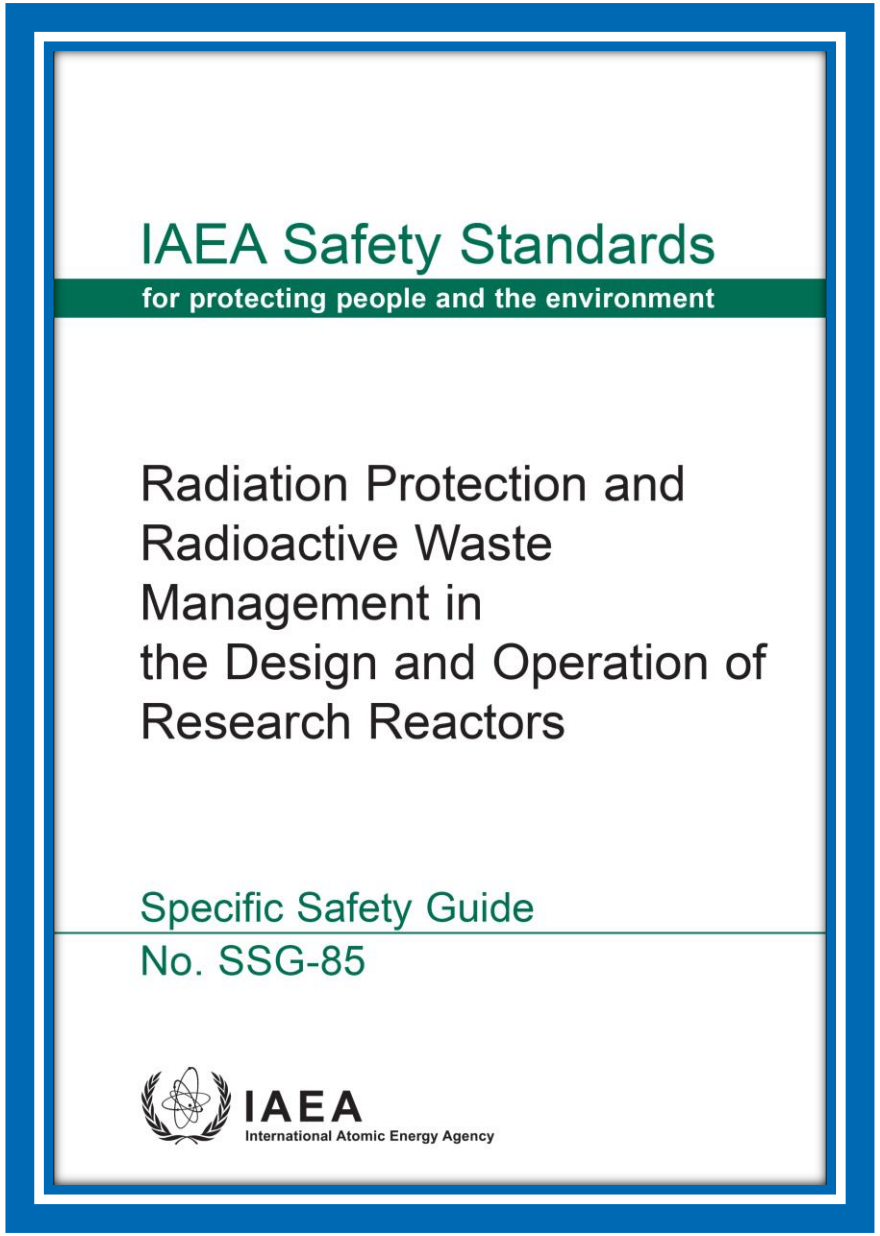
7.118. Written procedures shall be followed for the handling, processing, transport and storage of radioactive waste.

These activities shall be carried out in accordance with the requirements of the regulatory body or other competent authority.



SSR-3, Requirement 85

7.119. An appropriate record shall be kept of the quantities, types and characteristics of the radioactive waste processed and stored on the reactor site or removed from the reactor site for the purpose of processing, storage or disposal.



SSG-85

The objective of this Safety Guide is to provide recommendations on radiation protection and radioactive waste management in the design and operation of research reactors to meet the relevant requirements of SSR-3, in particular Requirements 8, 15, 34, 57, 59, 84 and 85.

The recommendations provided in this Safety Guide are aimed at operating organizations of research reactors, regulatory bodies and other organizations involved in a research reactor project.

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Questions?

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