Swedish Radiation Safety Authority
Regulatory Code

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The Swedish Radiation Safety Authority's Regulations on Protection of Human Health and the Environment in connection with Discharges of Radioactive Substances from certain Nuclear Facilities

Please note that translated versions of the Authority's regulations lack legal force and are for information purposes only.

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The Swedish Radiation Safety Authority's Regulations on Protection of Human Health and the Environment in connection with Discharges of Radioactive Substances from certain Nuclear Facilities;[1]

issued on 19 December 2008.

On the basis of Section 7 of the Radiation Protection Ordinance (1988:293), the Swedish Radiation Safety Authority hereby issues[2] the following regulations.

Application and definitions

Section 1 These regulations apply to the following nuclear facilities for which the Government has granted licences under the Nuclear Activities Act (1984:3):

1. nuclear power reactors,
2. reactors for research or materials testing,
3. plants for manufacturing of uranium pellets and nuclear fuel bundles,
4. facilities for storage or other handling of used nuclear fuel, and
5. facilities for storage, treatment or final disposal of nuclear substances or nuclear waste.

The regulations apply to all discharges of radioactive substances from nuclear facilities that are directly related to normal operating conditions at the respective facility.

The regulations do not apply to:

1. shallow land burial of low activity nuclear waste under Section 16 of the Ordinance on Nuclear Activities (1984:14), nor
2. transports of nuclear substances or nuclear waste outside the operating area of a facility, nor
3. dismantling of nuclear facilities, nor
4. the conditions following sealing of a waste facility referred to by the Swedish Radiation Safety Authority's Regulations (SSMFS 2008:37) on the protection of human health and the environment in connection with the final management of spent nuclear fuel and nuclear waste.

[1] These regulations were issued previously in the Swedish Radiation Protection Authority's Regulatory Code (SSI FS 2000:12).
[2] Cf. Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation. OJ L159, 29/06/1996, p. 1 (Celex 31996L0029).

Definitions

Section 2 In these regulations the following terms and concepts are used with the meanings specified here.

best available technique:	the use of the most effective method to limit the discharge of radioactive substances and their harmful effects on human health and the environment, and which does not give rise to unreasonable costs
effective dose:	the sum of all equivalent doses to organs and tissues, weighted by their various sensitivity to radiation
committed effective dose:	the total effective dose after an intake of radioactive substances, calculated over 50 years (for children, 70 years)
reference group:	a representative real or hypothetical group from the general public that could be expected to receive the largest radiation doses from a source
environmental surveillance:	discharge surveillance and environment checks
goal value:	the lowest level of discharges of radioactive substances from a nuclear power reactor that could be achieved within a specified period of time
normal operating conditions:	management within given conditions and limitations according to the respective Operational Limits and Conditions ('STF') for a facility
environment check:	collecting samples and measuring radioactive substances within the vicinity of a nuclear facility
optimisation of radiation protection:	limitation of radiation doses to humans as far as reasonably achievable while taking financial and societal factors into account
reference value:	the level of discharges that is representative at optimal management with full function of systems of significance for the generation and limitation of discharges from a nuclear power reactor
discharge surveillance:	collecting samples and measuring discharges of radioactive substances to water and air

Rules of consideration and protection of human health and the environment

Section 3 Human health and the environment shall be protected from the harmful effects of ionising radiation while a nuclear facility is in operation as well as in the future.

Discharges of radioactive substances must not cause more severe effects on human health and the environment outside the borders of Sweden than levels accepted within Sweden.

Section 4 The limitation of discharges of radioactive substances from nuclear facilities shall be based upon optimisation of radiation protection while using the best available technique. Such optimisation of radiation protection shall include all facilities located within the same geographical area.

The possibility that the limitation of discharges to the environment may imply that radiation doses to the personnel will be increased shall be taken into account during such optimisation, as well as the consequences of other waste management.

Section 5 The effective dose to any individual in the reference group by a yearly discharge of radioactive substances to water and air from all facilities situated within the same geographical area shall not exceed 0.1 millisievert (mSv). The effective dose, by which is meant the dose from external exposure and the committed dose from internal exposure, shall be integrated over a period of 50 years.

When calculating doses to individuals in the reference group, children as well as adults shall be taken into account. Dose factors to be used for oral intake as well as intake by inhalation are given in annex III of the Directive 96/29/Euratom.

If the estimated dose is 0.01 mSv or higher per calendar year, realistic calculations shall be performed regarding the most affected area. The calculations shall be based upon measured dispersion data and knowledge of the circumstances in the most affected area during the time period concerned.

The underlying documentation for dose estimations made and the methods used to assess the relationship between the discharged activity and the effective dose shall be submitted to the Swedish Radiation Safety Authority for review.

Section 6 Reference values shall be determined for each nuclear power reactor regarding the yearly discharge of separate radioactive substances or groups of radioactive substances. The reference values shall be determined by the licence holders and be reported to the Swedish Radiation Safety Authority for review. The underlying documentation for the suggested reference values shall be enclosed.

Goal values shall be determined for each nuclear power reactor regarding the discharge of separate radioactive substances or groups of radioactive substances showing which levels the discharges could be reduced to in a specified period of time.

General provisions

Section 7 Environmental surveillance shall be performed at nuclear facilities.

Section 8 The environmental surveillance shall be subject to quality assurance and shall be documented according to the principles of the ISO 9000 family. The measuring laboratories used in the environmental surveillance shall take part in intercomparison (intercalibration) on request by the Swedish Radiation Safety Authority.

Section 9 Nuclear power reactors shall have action plans to limit the discharge of radioactive substances in the event of fuel damage. The plans shall describe the strategy to prevent fuel damage as well as the measures to be taken in order to limit discharges of radioactive substances to the environment should fuel damage occur.

Section 10 In the event of discharge of radioactive substances to air or water implying that the dose, under Section 5, to any individual in the reference group will exceed 0.01 mSv per month, or if the results from environment surveillance show abnormal levels of radioactive substances, the Swedish Radiation Safety Authority shall be informed as soon as possible.

Section 11 Before new facilities are commissioned or a practice is otherwise changed to imply new paths or sources of discharge, or so that a pre-existing path of discharge is affected, investigations shall be conducted in order to map the extent of the new discharges and their composition, their dispersion in the environment and dispersion factor and expected doses.

The investigations shall be submitted to the Swedish Radiation Safety Authority for review.

Discharge surveillance

Section 12 Discharges of radioactive substances from a nuclear facility into air and water shall be checked by means of measurements. The detection levels of the instruments shall be chosen to afford comparison with the values stated in Section 5 and determined under Section 6, respectively.

Section 13 Releases into air via the main stack of a nuclear power reactor shall be checked by means of continuous nuclide-specific measurements of volatile radioactive substances such as inert gasses, nuclide-specific measurements of continuously collected samples of iodine and particle-bound radioactive substances, and measurements of carbon-14 and tritium.

Releases into air from reactors for research or materials testing shall be checked by means of nuclide-specific measurements of volatile radioactive substances such as inert gasses and by means of nuclide-specific measurements of continuously collected samples of iodine and particle-bound radioactive substances.

Releases into air from plants for manufacturing of uranium pellets and nuclear fuel bundles, for storage or other handling of spent nuclear fuel, or for the storage, treatment or final disposal of nuclear substances or nuclear waste shall be checked by means of nuclide-specific measurements of continuously collected samples of particle-bound radioactive substances and, when applicable, of iodine and tritium.

Section 14 Discharges into water shall be checked by means of measurements of representative samples for each path of discharge. The analyses shall include nuclide-specific measurements of gamma- and alpha-emitting radioactive substances and, when applicable, of strontium-90 and tritium.

Section 15 Representative monthly samples of discharges into water from nuclear power reactors, and reactors for research or materials testing shall be sent to the Swedish Radiation Safety Authority within two months after the end of the month concerned.

Representative yearly samples of discharges into water from nuclear power reactors and reactors for research or materials testing shall be sent to the Swedish Radiation Safety Authority within three months after the end of the year concerned.

Section 16 The function of the monitoring equipment and systems to limit discharges shall be checked regularly and whenever a malfunction is suspected. Written instructions for the maintenance of the equipment shall be available. Changes to the regular system for measuring discharges shall be approved in advance by the Swedish Radiation Safety Authority.

Section 17 The monitoring equipment for releases to air may, without the special permission of the Swedish Radiation Safety Authority, be out of operation for a maximum period of 24 hours for maintenance of the systems for sampling and monitoring, or in the event of a malfunction.

If the monitoring equipment needs to be out of operation for a longer period of time, the operation of the facility may continue during non-office hours until such time that the Swedish Radiation Safety Authority has been informed, provided that the operating conditions are judged to be

stable in the event of discharges. The reasons for such judgment shall be demonstrated when the Swedish Radiation Safety Authority is informed.

When the regular monitoring system is out of operation, monitoring of discharges shall be carried out sufficiently by other means to determine the levels of discharges.

Other shutdown of the monitoring system may only be made following special permission granted by the Swedish Radiation Safety Authority.

Section 18 The reactor water at nuclear power reactors shall be analysed. The analyses shall include nuclide-specific measurements of gamma- and alpha-emitting radioactive substances as well as strontium-90 and tritium.

Section 19 If diffuse leakage of radioactive substances is suspected, and such leakage is not measurable, an investigation shall be conducted in order to determine an upper limit for the possible and non-detectable discharge from the facility into air and water.

Environment checks

Section 20 Environment checks shall be conducted in the vicinity of a nuclear facility according to a scheme determined by the Swedish Radiation Safety Authority.

In such scheme, rules for sampling, treatment, analysis, evaluation and reporting, as well as the kind of samples and the sites for sampling are specified.

Section 21 In connection with any event that has brought about increased discharge of radioactive substances into the environment, a separate environment check shall be conducted if requested by the Swedish Radiation Safety Authority. If so, the consequences for the affected area shall be judged.

Section 22 Monitoring of gamma radiation shall be performed continuously in the vicinity of nuclear power reactors and reactors for research or materials testing. Monitoring shall be carried out within each 30-degree sector on land at about 1 kilometre from the reactor.

Section 23 Continual registration of meteorological conditions shall be made at nuclear power reactors and reactors for research or materials testing.

Reporting

Section 24 The licence holders shall, on the part of nuclear power reactors, report to the Swedish Radiation Safety Authority not later than 31 January every year on the measures that have been taken or are planned to be taken in order to limit the discharge of radioactive substances with a

view to reaching the goal values under Section 6. If the reference values are exceeded, the measures planned with a view to reaching the reference values shall be reported.

Section 25 The discharge of radioactive substances into air and water under Sections 12-14, shown as discharge of activity, and doses to individuals in /the reference group under Section 5, shall be reported to the Swedish Radiation Safety Authority in accordance with Appendix 1.

Section 26 If deviations from Sections 12-14 have occurred, or if monitoring has been carried out in accordance with Section 17, third paragraph, information about the monitoring systems used during the period covered as well as the monitoring method and the frequency of such monitoring shall be included in reports regarding discharges.

Section 27 The results of environment checks shall be reported to the Swedish Radiation Safety Authority in accordance with Appendix 2.

Section 28 Events leading to increased discharge of radioactive substances from nuclear facilities shall be reported as soon as possible to the Swedish Radiation Safety Authority, including information on measures taken to limit such discharge.

Exemptions

Section 29 If there are particular grounds, the Swedish Radiation Safety Authority may grant exemptions from these regulations if this can be done without circumventing the aim of the regulations.

These regulations enter into force on 1 February 2009.

SWEDISH RADIATION SAFETY AUTHORITY

ANN-LOUISE EKSBORG

Ann-Christin Hägg

Appendix 1

Reporting to the Swedish Radiation Safety Authority

1. For nuclear power reactors and, if applicable, for reactors for research or materials testing, measurements of releases/discharges into:
air of inert gasses, iodine, carbon-14, tritium and particle-bound radioactive substances,
water of tritium and gamma-emitting radioactive substances, and
air and water of strontium-90 and alpha-emitting radioactive substances shall be reported every half year, within three months after the end of the half year covered by the report. The results shall be summed up monthly.

2. For plants for manufacturing of uranium pellets and nuclear fuel bundles, facilities for storage or other handling of spent nuclear fuel, and facilities for storage, treatment or final disposal of nuclear substances or nuclear waste, measurements of releases/discharges into:
air of particle-bound radioactive substances and, if appropriate, iodine,
water of gamma-emitting radioactive substances, and
air and water of alpha-emitting radioactive substances and, if applicable, strontium-90 and tritium shall be reported every half year and within three months after the end of the half year covered by the report. The results shall be summed up monthly.

3. A report covering the second half year shall at the same time form the yearly report and summarise:
- all discharges to air and water from nuclear facilities during the year,
- the dose to representative individuals from reference groups,
- diffuse discharges,
- the uncertainty factors of the measurements and the levels of detection, and
- the methods selected for measurements performed.

The report shall be submitted within three months after the end of the calendar year covered by the report.
Radioactive substances in the reactor water at nuclear power reactors shall be reported to the Swedish Radiation Safety Authority on request.

Environment checks

The results of environment checks shall, when applicable, be reported to the Swedish Radiation Safety Authority in accordance with the table below.

Kind of check	**Reporting**
measurements of samples of plants, milk, water and sediment:	Every half year and within three months after the end of the half year covered by the report; the results of measurements shall, when applicable, be summed up per month or per quarter of a year depending on when the sample was taken
sampling in spring and intense sampling:	Not later than 30 September in the same year
sampling in autumn:	Not later than 31 March the following year
particular investigation under Section 21:	Within one month after the last sample taken or as determined by the Swedish Radiation Safety Authority
monitoring of gamma radiation under Section 22:	Every half year and within three months after the end of the half year covered by the report; the results of monitoring shall be summarised per quarter of a year
meteorological conditions:	To the extent determined by the Swedish Radiation Safety Authority

A report covering the second half year shall at the same time form the yearly report and summarise:

- the measurements performed during the year,
- major deviations from the surveillance programme,
- uncertainty factors of measurements and the levels of detection, and
- the methods selected for measurements performed.

The report shall be submitted within three months after the end of the calendar year covered by the report.

Strålsäkerhetsmyndigheten
Swedish Radiation Safety Authority

SE-171 16 Stockholm
Solna strandväg 96

Tel: +46 8 799 40 00
Fax: +46 8 799 40 10

E-post: registrator@ssm.se
Webb: stralsakerhetsmyndigheten.se