

Country Profile Report

under OSPAR Agreement 18-01

FEDERAL REPUBLIC OF GERMANY

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1 Section 1: General information on national legislation

1.1 Relevant national authorities and responsibilities

Germany is a federal country subdivided in 16 federated states (Bundesländer). Political and administrative responsibilities and competences are split between federal and federated institutions.

By Article 73 of the German constitution (Grundgesetz) the sole legislative power concerning the civil usage of nuclear energy and protection against ionising radiation is attributed to the federal state.

1.1.1 Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and Consumer Protection (Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, BMUV)

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and Consumer Protection (BMUV) is the supreme German authority competent for nuclear safety and radiation protection. Tasks are, inter alia,

- implementation of international regulations in national legislation,
- supervision of compliance with national legislation in the federated states,
- co-operation and co-ordination with other national and international institutions, ministries or NGOs,
- preparing legal drafts for the government,
- giving support to parliamentary law-making procedure and
- international reporting and public relations.

1.1.2 Federal Office for Radiation Protection (Bundesamt für Strahlenschutz, BfS)

The Federal Office for Radiation Protection (BfS) is a scientific-technical authority in the scope of the BMUV with competences in the field of radioactivity and radiation. Its task is to provide

administrative and scientific support to the Ministry in protecting people and the environment from the harmful effects of radiation and radioactive contamination. In particular, the BfS has a leading role in surveilling environmental radioactivity and radioactive discharges from nuclear installations as well as coordinating tasks in radioactive emergency preparedness.

1.1.3 [Federal Office for the Safety of Nuclear Waste Management \(Bundesamt für die Sicherheit der nuklearen Entsorgung, BASE\)](#)

The Federal Office for the Safety of Nuclear Waste Management (BASE) performs regulatory, licensing and supervisory tasks for the German government in relation to the disposal, storage, handling and transport of high-level radioactive waste since 2017. BASE supports and advises the BMUV on issues related to nuclear disposal and nuclear safety.

1.1.4 [Authorities of the federated states](#)

In accordance with Article 85 of the Grundgesetz, the federated states are obliged to implement/execute large parts of the Atomic Energy Act and the Radiation Protection Act.

Each of the 16 federated states has its own authorities for nuclear safety and radiation protection, which are responsible for the regulation and supervision of facilities dealing with radioactive material or ionising radiation.

1.2 [National legislation and basis for regulation](#)

Acts and Ordinances

The national legislation on nuclear safety and radiation protection was restructured in 2017 and 2018 in order to implement the European Council Directive 2013/59/EURATOM. The national legislation is based on two Acts: The **Atomic Energy Act** (Atomgesetz, AtG) and the **Radiation Protection Act** (Strahlenschutzgesetz, StrlSchG). The AtG concentrates on regulations concerning the civil usage of nuclear power and its safety. The StrlSchG regulates and defines general radiation protection issues for nuclear and non-nuclear sector. These Acts ensure the protection of the population and the environment against radiation risks by applying BAT/BEP and that Germany responsibly meets its international obligations concerning radiation protection. The **Radiation Protection Ordinance** (Strahlenschutzverordnung, StrlSchV) specifies overall regulations from the above mentioned Acts.

General Administrative Provisions, Regulatory Guidelines and Recommendations

General Administrative Provisions (Allgemeine Verwaltungsvorschriften, AVV) give detailed instructions to authorities how to implement legal obligations in practice. The **AVV IMIS** establishes how the authorities must construct, maintain and operate the Integrated

Measurement and Information System (IMIS) for the surveillance and monitoring of radioactivity in the environment. The **AVV Tätigkeiten**, a General Administrative Provision concerning practices, minutely prescribes how to calculate the effective dose for a representative person from public caused by radioactive discharges with air or water.

The **Guideline concerning Emission and Immission Monitoring of Nuclear Installations** (Richtlinie zur Emissions- und Immissionsüberwachung kerntechnischer Anlagen, REI) serves as a guide to authorities when specifying the requirements for emission and immission monitoring of radioactive material in administrative permits for commissioning, operation or decommissioning of nuclear facilities. The REI contains default measurement programmes for emission and immission monitoring in the vicinity of nuclear installations. Concerning emission measurements, the REI refers to various safety standards from the Committee for Nuclear Technology (see below).

The **Verification of the Licensee's Monitoring of Radioactive Effluents from Nuclear Power Stations** (Richtlinie Kontrolle der Eigenüberwachung radioaktiver Emissionen aus Kernkraftwerken, KR) defines a mandatory programme of control measurements to independently assure the quality of activity measurements performed by the undertaken.

Official Procedure Manuals for Monitoring of Radioactive Substances in the Environment and External Radiation (Messanleitungen für die Überwachung radioaktiver Stoffe in der Umwelt und externer Strahlung) are issued by the BMUV. These manuals give instructions how to determine activity concentrations and specific activities in various environmental samples. Their application by authorities or institutions commissioned by them is mandatory in order to ensure national standards in measurement and determination of activities.

Safety Standards from the Committee for Nuclear Technology (KTA)

The Committee for Nuclear Technology (Kerntechnischer Ausschuss, KTA) issues safety standards that reflect the state of the art in science and technology to ensure nuclear safety and radiation protection.

In particular, the safety standard series KTA 3601 to KTA 3605 include technical and procedural requirements for handling radioactive material. The safety standards KTA 3603 and KTA 3605 provides technical requirements and detailed information on techniques for treating radioactively contaminated water and air, respectively, in nuclear power stations. In addition to the requirements for the design of the systems, these safety standards also contain requirements for the reliability in terms of safety, regular testing and maintenance of the installed systems.

National Commissions on radiation protection, nuclear safety and nuclear waste management

The Commission on Radiological Protection (SSK) advises the BMUV on issues concerning the protection from the risks of ionising and non-ionising radiation. The Reactor Safety Commission (RSK) gives advice to BMUV in safety-related matters and thus matters concerning the physical protection of nuclear installations. The Nuclear Waste Management Commission (ESK) is consulted by the BMUV in matters of nuclear waste management (conditioning, storage and transport of radioactive materials and waste, the decommissioning and dismantling of nuclear facilities, and disposal in deep geological formations).

The members of ESK, RSK, and SSK are appointed by the BMUV, but are independent and not bound by directive. As a result of its advisory activity, SSK, RSK, and ESK issue statements and recommendations.

Conventional technical standards, DIN

Furthermore conventional technical standards, in particular the national standards of the German Institute for Standardisation (DIN) and also the international standards of ISO and IEC, are applied in the design and operation of all technical installation, as far as the conventional standards correspond to the state of the art in science and technology.

All safety standards issued by KTA and DIN are regularly reviewed every five years.

1.3 Application of BAT/BEP in domestic legislation

For each nuclear facility, Section 19a of the Atomic Energy Act demands a permanent improvement of nuclear safety and an evaluation report on nuclear safety every ten years. The Radiation Protection Act obliges in Sections 8 and 72 for planned exposure situations to consider the state of the art in science and technology (BAT/BEP) to avoid unnecessary exposures and environmental contamination.

For nuclear installations, BAT and BEP are in detail reflected in technical guidelines, such as safety standards issued by the KTA or in regulatory guidelines, e.g. REI, KR and others.

1.4 Dose limit, constraints and discharge limit setting rationale

Dose limits

In planned exposure situations, the total effective dose to members of the public resulting from all practices must not exceed 1 Millisievert (mSv) per calendar year (Section 80 of the

Radiation Protection Act). For the eye lens and the skin, the annual equivalent dose limits are 15 mSv and 50 mSv, respectively.

The annual effective dose limit for occupational exposure is 20 mSv. The organ dose limit for the eye lens is as well 20 mSv and the limit for skin, hands, forearms, feet and ankles is 500 mSv each (Section 78 of the Radiation Protection Act). An organ dose limit of 2 mSv is defined for the uterus of women of childbearing age. The Radiation Protection Act regulates further occupational dose limits or exceptions from the above-mentioned values for some more specific cases, e.g. for minors and unborn children.

In emergency situations, the reference value for the effective dose is 100 mSv for the public and up to 500 mSv for emergency helpers.

Additionally, in Section 99 of the Radiation Protection Ordinance an effective dose limit of 0.3 mSv is specified for the planned exposure of individual members of the public (reference person) resulting from radioactive emissions by air and water, respectively.

Emission limits

The administratively permitted annual limits on activity or activity concentration for the liquid and gaseous emissions of each facility or installation ensure that the dose limit of 1 mSv for members of the public is not exceeded during normal operation and decommissioning. The emission limits are either taken from table 6 in attachment 11 of the Radiation Protection Ordinance (activity concentrations) or stipulated by the competent authority based on a dose assessment prescribed in the AVV Tätigkeiten.

1.5 Regulation, surveillance and monitoring of emissions

The Atomic Energy Act and the Radiation Protection Act specify which installations and facilities as well as practices require administrative permits or announcements and which conditions at least have to be observed to get a licence. Basic radiation protection standards and principles have to be met as well as compliance with technical safety standards need to be warranted to receive a permission.

Moreover, the competent authority has either the legal obligation or at least the legal authorisation to decree surveillance and monitoring of emissions and environment (Section 103 of the Radiation Protection Ordinance). Surveillance and monitoring programmes are usually in accordance with the REI. In conjunction with the REI, the guidelines KTA 1503 "Monitoring the Discharge of Radioactive Gases and Airborne Radioactive Particulates", KTA 1504 "Monitoring and Assessing the Discharge of Radioactive Substances with Water" and

KTA 1507 “Monitoring the Discharge of Radioactive Substances from Research Reactors” give instructions on monitoring of emissions, which specify e.g. the type of sampling, sample treatment, time periods of sampling, radionuclides considered, detection limits, reporting.

1.6 Environmental monitoring programmes

In addition to emission monitoring, environmental radioactivity is monitored in the vicinity of nuclear installations both by the licensee and by an independent laboratory on behalf of the competent authority. Details are regulated by the competent authority that usually is applying the monitoring programme suggested by the REI. Monitored environmental media are e.g. drinking water, ground and surface water, foodstuff, precipitation, or soil. The sampling and the sample measurements are defined to cover dose contributions from direct irradiation, inhalation and ingestion during normal operation conditions and basis accidents or severe accidents.

In addition to the site-specific monitoring of the vicinities of the nuclear installations, the general radioactivity in the environment is recorded by extensive measurements in the entire territory of the Federal Republic of Germany on the basis of the Radiation Protection Act throughout the Integrated Measurement and Information System (IMIS). The IMIS database is publicly available and is fed by comprehensive environmental monitoring programmes conducted by federal and federated state authorities. The measurement programmes cover a wide range of environmental media, e.g. sediments, air (local dose rate), soils, sewage sludge, waters from different origin (ground, rivers, lakes, Baltic and North Sea), foodstuff and so on. Requirements for the System are set out in the AVV IMIS.

1.7 Radiation dose assessment methods

Hydrodynamical and meteorological models combined with a radioecological model are used to assess doses for a reference person representing the German population. These models, their parameter values and additional assumptions are described in the AVV Tätigkeiten and therein specified references. The dose to members of the public is calculated under conservative assumptions, i.e. the actually obtained dose of an individual is most probably far below the calculated dose.

A new dose assessment method was established in the AVV Tätigkeiten in 2020 replacing the former assessment methodology. Changes are due to EURATOM requirements for more realistic assessment methodologies. All presented doses in this report are calculated with the new dose assessment method from AVV Tätigkeiten for a better comparability.

1.8 Environmental norms and standards

All legal and administrative regulation aims at preventing or minimising emission, release or loss of radionuclides into the environment. The radioactivity in several environmental samples is steadily monitored across the entire German territory and especially in the vicinity of nuclear installations. For further details see paragraphs 2.5. *Regulation, Surveillance and Monitoring of Emissions* and 2.6. *Environmental Monitoring Programmes*.

1.9 Quality assurance

Nuclear installations are inspected several times per year by the licensing authorities. Licensees of nuclear installations are obligated to measure and report their discharges. All measurements must be performed in accordance to the official Procedure Manuals for Monitoring of Radioactive Substances in the Environment and External Radiation. To verify that the facilities comply with the emission surveillance programme, the Verification of the Licensee's Monitoring of Radioactive Effluents from Nuclear Power Stations provides that double samples are randomly measured at independent official laboratories, preferably by the BfS. Using the reported emissions, the BfS calculates the annual radiation exposure of members of the general public for all nuclear facilities in Germany under the terms of the AVV Tätigkeiten.

Furthermore, licensees of nuclear installations and their commissioned laboratories have the obligation to annually take part at intercomparison/proficiency tests provided by various national authorities.

The independent scrutiny of self-monitoring and the mandatory intercomparison measurements for quality assurance are essentially identical with the operators' measurements in line with the technical safety standards KTA 1503.1 and 1504. Therefore, the quality of environmental and discharge sample measurements, and the assessment of impact of discharges on members of the general public is based not only on the work of the operators but also on a national system of regulators, governmental bodies and independent advisors.

Section 2: Nuclear Power Plants (in operation)

none

Section 3: Reprocessing facilities (in operation)

none

Section 4: Fuel fabrication facilities (in operation)

OSPAR-ID	Name	Location	Year of Commissioning/ Decommissioning	Receiving waters	Catchment area	Other information
DE09	ANF	Lingen Lower Saxony	1979	Ems, North Sea	Ems	
DE19	URENCO	Gronau North Rhine Westphalia	1985	Municipal sewage system, Vechte/IJsselmeer, North Sea	Vechte/IJsselmeer	

Section 5: Radioactive waste treatment facilities (in operation)

OSPAR-ID	Name	Location	Year of Commissioning/ Decommissioning	Receiving waters	Catchment area	Other information
	RBZ GKN	Neckarwestheim, on the site of the NPS GKN	2021	Neckar, Rhine, North Sea	Rhine	
	RBZ KKP	Philippsburg, on the site of the NPS KKP	2021	Rhine, North Sea	Rhine	

Section 6: Research reactors (in operation)

OSPAR-ID	Name	Location	Year of Commissioning/ Decommissioning	Receiving waters	Catchment area	Other information
DE26	FRMZ Mainz	Mainz Rhineland-Palatinate	1965	Main, Rhine, North Sea	Main	Pebble-bed reactor

Section 7: Decommissioning activities

OSPAR-ID	Name	Location	Year of Commissioning/ Decommissioning	Receiving waters	Catchment area	Other information
DE01a	KBA Biblis A	Biblis Hesse	1974/2011	Rhine, North Sea	Rhine	NPS
DE01b	KBB Biblis B	Biblis Hesse	1976/2011	Rhine, North Sea	Rhine	NPS
DE02	KBR Brokdorf	Brokdorf Schleswig-Holstein	1986/2021	Elbe, North Sea	Elbe	NPS
DE03	KKB Brunsbüttel	Brunsbüttel Schleswig-Holstein	1976/2011	Elbe, North Sea	Elbe	NPS
DE04	KKG Grafenrheinfeld	Grafenrheinfeld Bavaria	1982/2015	Main, Rhine, North Sea	Main	NPS
DE05	KWG Grohnde	Grohnde Lower Saxony	1984/2021	Weser, North Sea	Weser	NPS
DE09a	KKE Emsland	Lingen Lower Saxony	1988/2023	Ems, North Sea	Ems	NPS
DE11b	GKN II Neckarwestheim	Neckarwestheim Baden-Württemberg	1988/2023	Neckar, North Sea	Neckar	NPS

DE12	KWO Obrigheim	Obrigheim Baden-Württemberg	1968/2008	Neckar, Rhine, North Sea	Neckar	NPS
DE13a	KKP1 Phillipsburg 1	Phillipsburg Baden-Württemberg	1979/2011	Rhine, North Sea	Rhine	NPS
DE13b	KKP2 Phillipsburg 2	Phillipsburg Baden-Württemberg	1984/2019	Rhine, North Sea	Rhine	NPS
DE14	KKR Rheinsberg	Rheinsberg Brandenburg	1966/1990	Havel, Elbe, North Sea	Havel	NPS
DE15	KKS Stade	Stade Lower Saxony	1972/2003	Elbe, North Sea	Elbe	NPS
DE16	KKU Unterweser	Esenhamm Lower Saxony	1978/2011	Weser, North Sea	Weser	NPS
DE17	KWW Würgassen	Beverungen North Rhine Westphalia	1971/1997	Weser, North Sea	Weser	NPS
DE24	HMI Berlin	Berlin Berlin	1958/2019	Havel, Elbe, North Sea	Havel	Research reactor
DE08b	HZG Geesthacht	Geesthacht Schleswig-Holstein	1958/2010	Elbe, North Sea	Elbe	Research reactor
DE25	FRJ1 Jülich	Jülich North Rhein Westphalia	1962/2006	Rur, Maas/Meuse, North Sea	Rur	Research reactor
DE18	KIT Karlsruhe	Karlsruhe Baden-Württemberg	1961/1981	Rhine, North Sea	Rhine	Research facility including reactors and a pilot reprocessing plant