

Nuclear Regulatory Issues and Main Developments in Germany

02 May 2018

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Abbreviations

ARTEMIS	Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation
BDEW	Federal Association of Energy and Water Economy e.V.
BfE	Federal Office for the Safety of Nuclear Waste Management
BfS	Federal Office for Radiation Protection
BGE	Federal Company for Radioactive Waste Disposal
BGZ	Federal Company for Interim Storage
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BWR	Boiling Water Reactor
ENSREG	European Nuclear Safety Regulators Group
IAEA	International Atomic Energy Agency
IRRS	Integrated Regulatory Review Service
KTA	German Nuclear Safety Standards Commission
MWe	Megawatt electrical power
NPP	Nuclear Power Plant
PWR	Pressurized Water Reactor
TWh	Terawatt hour

1. General Topics

a) Organisational restructuring of BfS, BfE, BGE and BGZ

On 30 July 2016, the "Act on the Organisational Restructuring in the Field of Radioactive Waste Management" became effective. Corresponding specialised tasks of the Federal Office for Radiation Protection (*Bundesamt für Strahlenschutz – BfS*) have been transferred to the Federal Office for the Safety of Nuclear Waste Management (*Bundesamt für kerntechnische Entsorgungssicherheit – BfE*, <http://www.bfe.bund.de/EN/>).

By the Act, the federal tasks of supervision and licensing in the field of nuclear fuel transport, interim storage of radioactive waste, site selection of a repository and the repository surveillance are bundled in the BfE. Furthermore, in the field of nuclear safety, the BfE handles administrative tasks of the federation and supports the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (*Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit – BMU*).

All operational management tasks relating to final repository projects were merged in the newly established, federally owned company under private law – the Federal Company for Radioactive Waste Disposal (*Bundesgesellschaft für Endlagerung GmbH – BGE*). BGE performs the planning, construction, operation, and decommissioning of repositories. As a so-called project developer pursuant to the Repository Site Selection Act, the BGE is tasked with the search for a repository for high-level waste materials and is responsible for the execution of the procedure under the supervision of the BfE.

The Federal Company for Interim Storage (*Gesellschaft für Zwischenlagerung mbH – BGZ*) was founded in March 2017 and was transferred into the ownership of the Federal Republic of Germany on 01 August 2017. The BGZ is now responsible for the operation of the central interim storage facilities in Gorleben and Ahaus. On 01 January 2019, the BGZ will also assume responsibility for the twelve on-site interim storage facilities for spent fuel at the sites of the nuclear power plants. On 01 January 2020 it will finally assume responsibility for the interim storage facilities for low-level radioactive waste.

b) Nuclear Power Phase Out

After the nuclear accident at the nuclear power plant (NPP) Fukushima Daiichi on 11 March 2011 in Japan, the German legislator decided to phase out the use of nuclear power for the commercial generation of electricity. For the plants currently in operation, the authorisation for power operation will expire on a stepwise basis by the end of 2022 at the latest. The latest NPP to end operation was NPP Gundremmingen B (KRB-B) on 31 December 2017, the next NPP to end operation will be Philippsburg 2 by the end of 2019.

Electricity volumes (Residual Electricity Production Rights) for each NPP are specified in the Atomic Energy Act. In case the stipulated electricity volume has been produced before the appointed date in the Atomic Energy Act, the authorisation for power operation of a NPP expires. Electricity volumes may be transferred partially or in total from one NPP to another.

On 10 January 2018 electricity volumes of 31 TWh were transferred to the Gundremmingen NPP unit C. The transferred electricity volumes come from nuclear power plants already shut down. The transferred electricity volumes are composed of 30 TWh of the contingent of Mühlheim-Kärlich NPP and 1 TWh of the contingent of Unterweser NPP.

On 20 March 2018 an electricity volume of 8.45242 TWh was transferred from the Philippsburg 1 NPP to the Philippsburg 2 NPP.

The Atomic Energy Act requires a yearly publication of the status on residual electricity production rights. The status as of 31 December 2017 was published by BfE in the Bundesanzeiger (Federal Gazette, BAnz AT 03.04.2018 B5) on 03 April 2018 and on the BfE website: <https://www.bfe.bund.de/SharedDocs/Downloads/BfE/DE/berichte/kt/elektrizitaetsmenge-2017.html>

More information about electricity production rights can be found on the BfE website <http://www.bfe.bund.de/EN/ns/ni-germany/npp/operating-times/operating-times.html>

c) Electricity Production and Nuclear Share

The gross electricity production in Germany reached 654.8 TWh in 2017 (650.6 TWh in 2016). The nuclear share in the gross electricity production in 2017 was 11.7 %, compared to 13.0 % in 2016 and 14.2 % in 2015. The shares of the different energy sources are shown in Table 1.

Table 1: Gross electricity production 2015 - 2017 [TWh]

	2015		2016		2017 *	
	TWh	%	TWh	%	TWh	%
Nuclear	91.8	14.2	84.6	13.0	76.3	11.7
Lignite	154.5	23.9	149.5	23.0	147.5	22.5
Hard Coal	117.7	18.2	112.2	17.2	92.6	14.1
Oil	6.2	1.0	5.8	0.9	5.9	0.9
Gas	62.0	9.6	81.3	12.5	86.5	13.2
Renewables	187.4	29.0	189.9	29.2	218.3	33.3
Others *	27.3	4.2	27.3	4.2	27.7	4.2
Total	646.9	100	650.6	100	654.8	100

[Data from BDEW e.V. March 2018]

* preliminary data

2. Laws and Regulations

a) Matters under International Law

Germany is Contracting Party to the Convention on Nuclear Safety. The seventh Review Meeting took place from 27 March to 7 April 2017. The National Report was published on the website of BMU: <http://www.bmu.bund.de/P4347-1>

For more information, see: http://www.bfe.bund.de/EN/ns/safety/co-operation/cns/cns_node.html

Germany is Contracting Party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. The sixth Review Meeting will take place from 21 May to 1 June 2018. The National Report was published on the website of BMU:

<http://www.bmu.bund.de/P3524-1/>

b) National Legislation

On 16 May 2017 the revised Repository Site Selection Act (*Standortauswahlgesetz*) became effective. The act now contains the recommendations of the Commission "Storage of High-Radioactive Waste Materials" (*Endlagerkommission*).

For more information please refer to chapter 5 of this report.

The Act on the Reorganisation of Responsibility in Nuclear Waste Management (*Gesetz zur Neuordnung der Verantwortung in der kerntechnischen Entsorgung*) came into force on 16 June 2017. According to the law the operators remain responsible for the decommissioning and dismantling of their NPPs and the packaging of the radioactive waste including the financing. However, the federation resumes responsibility for the storage and disposal of radioactive waste. The financial resources for this will be provided by a state-owned fund to which the operators transfer a specified sum of money. The operators can terminate their obligation of subsequent payment by paying an additional risk surcharge. This resulted in a total sum of about 24 billion euros submitted to the fund. On 19 June 2017, the fund for the financing of nuclear waste disposal was established and the board as supervisory body was constituted.

The new Radiation Protection Act (*Strahlenschutzgesetz*), which was adopted on 12 May 2017, transposes the Council Directive 2013/59/EURATOM into national legislation. Besides new regulations on the naturally occurring rare gas radon, on the radioactivity contained in building materials, and on the justification of new medical applications, the radiation protection act provides rules for emergency preparedness and the establishment of a radiological situation centre. The act provides for emergency

plans that have been co-ordinated between federation and Länder and are based on so-called reference scenarios. It is planned to establish a radiological situation centre, which, in the event of an emergency, will make an analysis of the situation, describing the current situation and the assumed future development and proposing recommendations for protection measures. Up until now, the Länder and the federation had to develop own overviews of the situation.

For more information refer to: http://www.bfs.de/EN/bfs/laws-regulations/radiation-protection-act/radiation-protection-act_node.html

c) National Regulation and KTA safety standards

For information on currently valid regulatory documents see:

<http://www.bfe.bund.de/EN/bfe/laws-regulations/hns/hns.html>

On 14 November 2017 the 72nd meeting of the German Nuclear Safety Standards Commission (Kerntechnischer Ausschuss – KTA) took place in Stuttgart. During this meeting, seventeen revised KTA safety standards and nineteen revised draft standards were approved, 2 safety standards are taken out of the regular revision process and 62 KTA safety standards were reviewed for the need of revision; for sixteen standards thereof revision procedures were started and 46 standards were re-affirmed.

The newly issued seventeen revised KTA safety standards were:

- KTA 1301.1 Radiation Protection Considerations for Plant Personnel in the Design and Operation of Nuclear Power Plants; Part 1: Design
- KTA 1403 Ageing Management in Nuclear Power Plants
- KTA 1501 Stationary System for Monitoring the Local Dose Rate within Nuclear Power Plants
- KTA 1502 Monitoring Volumetric Activity of Radioactive Substances in the Inner Atmosphere of Nuclear Power Plants
- KTA 1503.2 Monitoring the Discharge of Radioactive Gases and Airborne Radioactive Particulates; Part 2: Monitoring the Discharge of Radioactive Matter with the Vent Stack Exhaust Air During Design-Basis Accidents
- KTA 1503.3 Monitoring the Discharge of Radioactive Gases and Airborne Radioactive Particulates; Part 3: Monitoring the Non-stack Discharge of Radioactive Matter
- KTA 1505 Suitability Verification of the Stationary Measurement Equipment for Radiation Monitoring
- KTA 1507 Monitoring the Discharge of Radioactive Substances from Research Reactors
- KTA 1508 Instrumentation for Determining the Dispersion of Radioactive Substances in the Atmosphere
- KTA 3201.1 Components of the Reactor Coolant Pressure Boundary of Light Water Reactors; Part 1: Materials and Product Forms
- KTA 3401.4 Steel Containment Vessels; Part 4: Inservice Inspections
- KTA 3506 System Testing of the Instrumentation and Control Equipment Important to Safety of Nuclear Power Plants
- KTA 3601 Ventilation Systems in Nuclear Power Plants
- KTA 3603 Facilities for Treating Radioactively Contaminated Water in Nuclear Power Plants
- KTA 3605 Treatment of Radioactively Contaminated Gases in Nuclear Power Plants with Light Water Reactors
- KTA 3901 Communication Means for Nuclear Power Plants
- KTA 3904 Control Room, Remote Shutdown Station and Local Control Stations in Nuclear Power Plants

Nineteen revised draft standards were approved. Sixteen of these draft standards were approved for the procedure according to para. 5.3 of the "KTA rules of procedure" (fast-track procedure) and were issued as a revised safety standard in April 2018:

- KTA 1202 Requirements for the Testing Manual
- KTA 1401 General Requirements Regarding Quality Assurance
- KTA 1402 Integrated Management Systems for the Safe Operation of Nuclear Power Plants
- KTA 1408.1 Quality Assurance for Weld Filler Materials and Welding Consumables for Pressure and Activity Retaining Systems in Nuclear Power Plants; Part 1: Qualification Testing
- KTA 1408.2 Quality Assurance for Weld Filler Materials and Welding Consumables for Pressure and Activity Retaining Systems in Nuclear Power Plants; Part 2: Manufacture

- KTA 1408.3 Quality Assurance for Weld Filler Materials and Welding Consumables for Pressure and Activity Retaining Systems in Nuclear Power Plants; Part 3: Processing
- KTA 1504 Monitoring and Assessing of the Discharge of Radioactive Substances in Liquid Effluents
- KTA 3201.2 Components of the Reactor Coolant Pressure Boundary of Light Water Reactors; Part 2: Design and Analysis
- KTA 3201.3 Components of the Reactor Coolant Pressure Boundary of Light Water Reactors; Part 3: Manufacture
- KTA 3203 Surveillance of the Irradiation Behaviour of Reactor Pressure Vessel Materials of LWR Facilities
- KTA 3204 Reactor Pressure Vessel Internals
- KTA 3211.1 Pressure and Activity Retaining Components of Systems Outside the Primary Circuit; Part 1: Materials
- KTA 3211.3 Pressure and Activity Retaining Components of Systems Outside the Primary Circuit; Part 3: Manufacture
- KTA 3211.4 Pressure and Activity Retaining Components of Systems Outside the Primary Circuit; Part 4: Inservice Inspections and Operational Monitoring
- KTA 3404 Isolation of Operating System Pipes Penetrating the Containment Vessel in the Case of a Release of Radioactive Substances into the Containment Vessel of Nuclear Power Plants
- KTA 3407 Pipe Penetrations through the Reactor Containment Vessel

Presently, six KTA safety standards are still in a formal revision process.

Discussions of more general interest are currently under way for instance for the following standards and topics:

- KTA 2206: Design of Nuclear Power Plants Against Damaging Effects from Lightning
- KTA 2207: Flood Protection for Nuclear Power Plants
- KTA 3604: Storage, Handling and Plant-internal Transport of Radioactive Substances in Nuclear Power Plants (with the Exception of Fuel Assemblies)

The 73rd meeting of the KTA is planned for November 2018 in Berlin. For detailed information on the KTA and its safety standards, see the KTA website: http://www.kta-gs.de/welcome_engl.htm

d) *Recommendations by RSK, ESK and SSK*

BMU is supported by three independent advisory committees regarding nuclear safety, waste management, and radiation protection.

The Reactor Safety Commission (*Reaktor-Sicherheitskommission* – RSK) recently issued the following recommendations or statements:

- RSK summary statement on man-made hazards, aircraft crash - Reference report: definition of load assumptions and assessment of Konvoi plants (12/2017, in German)
- Evaluation of the implementation of RSK recommendations in response to Fukushima (09/2017, in German)

The complete listing of recommendations and statements by RSK is available on the website <http://www.rskonline.de/en/consultationresults>.

The Nuclear Waste Management Commission (*Entsorgungskommission* – ESK) recently issued the following recommendations or statements:

- Maintaining competence in the field of radioactive waste management (09/2017)

For further information, see the website <http://www.entsorgungskommission.de/en/node/93>.

The Commission on Radiological Protection (*Strahlenschutzkommission* – SSK) recently issued recommendations and statements on the following topics related to nuclear safety:

- Benign tumors (12/2017, in German)
- Radon dose coefficients (12/2017, in German)
- Involvement of medical physics experts in medical radiological procedures – implementation of the requirements of the COUNCIL DIRECTIVE 2013/59/EURATOM) (09/2017, in German)

The complete listing of recommendations and statements, annual reports and other publications are available on http://www.ssk.de/EN/Home/home_node.html

3. Operation and Decommissioning of German Nuclear Power Plants

At present, there are 7 nuclear power reactors (6 PWR and 1 BWR) in operation with a gross capacity of 10,013 MWe.

a) Event Registration

In 2017, a total number of 53 events were reported from German NPPs in operation or permanent shut-down.

The monthly as well as the annual reports on reportable events of German NPPs and research reactors are available on BfE website

http://www.bfe.bund.de/EN/ns/events/reports/reports_node.html .

b) Licensing, Supervisory Issues and Decommissioning Licences

On 6 August 2011 according to the Atomic Energy Act the authorisation for power operation of the seven oldest nuclear power plants (Biblis A, Neckarwestheim 1, Biblis B, Brunsbüttel, Isar 1, Unterweser and Philippsburg 1) and the Krümmel NPP expired. The Grafenrheinfeld NPP ended its operation on 27 June 2015. Gundremmingen B NPP ended its operation on 31 December 2017. Five out of seven currently operating nuclear power plants have already applied for decommissioning.

The following table gives an overview over the applications for decommissioning and the licences granted for decommissioning for German NPPs since 2011.

Table 2: Applications for decommissioning due to nuclear phase-out

NPP		Permanent Shutdown	Application for Decommissioning	Licence granted / In decommissioning
Unterweser	KKU	06.08.2011	04.05.2012	05.02.2018
Brunsbüttel	KKB	06.08.2011	01.11.2012	–
Isar 1	KKI 1	06.08.2011	04.05.2012	17.01.2017
Philippsburg 1	KKP 1	06.08.2011	24.04.2013	07.04.2017
Neckarwestheim 1	GKN 1	06.08.2011	24.04.2013	03.02.2017
Biblis A	KWB A	06.08.2011	06.08.2012	30.03.2017
Biblis B	KWB B	06.08.2011	06.08.2012	30.03.2017
Krümmel	KKK	06.08.2011	24.08.2015	–
Grafenrheinfeld	KKG	27.06.2015	28.03.2014	11.04.2018
Gundremmingen B	KRB B	31.12.2017	11.12.2014 *	–
Philippsburg 2	KKP 2	In operation	18.07.2016	–
Neckarwestheim 2	GKN 2	In operation	18.07.2016	–
Grohnde	KWG	In operation	26.10.2017	–
Emsland	KKE	In operation	22.12.2016	–
Brokdorf	KBR	In operation	01.12.2017	–

*) dismantling of components

The NPP Gundremmingen Unit C received a licence on 22nd January 2018 for the use of modified Uranium fuel elements in 11x11 fuel rod layout with an average nominal enrichment of 4,6 w/o Uranium 235, also usable in a mixed core.

c) Safety Reviews

Periodic Safety Reviews are performed at a 10-years interval. Due to the nuclear power phase-out for only two of the remaining NPPs safety reviews will have to be performed, for Brokdorf NPP and Gundremmingen C NPP until 2022.

Germany participates in the first EU Topical Peer Review with the topic "ageing management of nuclear power plants". The EU Topical Peer Review is coordinated by the ENSREG. The process of the Topical Peer Review comprises three phases: a national assessment performed by the member states, a Peer Review including a workshop and a Follow-Up. The German national assessment report as part of the first phase of the process was published in December 2017: <http://www.bmu.bund.de/N54444-1/> For more information on the process, see: <http://www.ensreg.eu/eu-topical-peer-review>

Germany is obliged to participate in IAEA safety reviews at least every ten years. The next "Integrated Regulatory Review Service" (IRRS) is invited to Germany for the first quarter of 2019. For more information, see: <http://www.bmu.de/P301-1/>

An ARTEMIS mission (Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation) is invited to Germany for the 2nd half of 2019.

4. Research Reactors

Germany had altogether 46 research reactors of which currently 7 are still in operation. Among the reactors in operation there are 3 with a continuous thermal power above 50 kW, BER-II in Berlin, FRM-II in Munich and FRMZ in Mainz. Additionally, 4 training reactors with a thermal power of maximum 2 W are in operation. The final shut-down of BER-II is planned for the end of 2019. An application for decommissioning was filed on 24 April 2017.

The RSK issued their final statement regarding the robustness assessment of German research reactors on 22 March 2017. The report is available on the RSK homepage (only in German): <http://www.rskonline.de/sites/default/files/reports/epanlage2rsk492hp.pdf>

Moreover 39 research reactors are permanently out of operation. 3 of them are shut down, but so far no decommissioning licence has been granted for them. Another 7 of them are under decommissioning and the remaining 29 research reactors had been decommissioned and are released from regulatory control.

5. Repository Site Selection

The Repository Site Selection Act (*Standortauswahlgesetz*) regulates the individual procedural steps for a result-oriented, science-based, and transparent search and selection of a site for a safe repository for high-level radioactive waste. The aim is to determine the site for a repository offering the highest possible degree of safety for a period of one million years.

The Commission "Storage of High-Radioactive Waste Materials" (*Endlagerkommission*) published its final report in June 2016. The resulting legislative changes in the Repository Site Selection Act became effective on 16 May 2017, after Bundestag and Bundesrat had decided on the issue. Thus, the procedure for the repository site selection is now defined in detail. The search covers the entire country without preferring certain regions or excluding certain regions from the outset.

The BGE as the operator develops proposals for subsections, regions and sites as well as for site-related exploration programmes and test criteria. The BfE supervises the search for a site and organises the participation of the public for the federal government. In three phases the search areas for a repository are increasingly narrowed:

- Phase 1: Determination of siting regions for the surface exploration
- Phase 2: Surface exploration and proposal for underground exploration
- Phase 3: Underground exploration, siting proposal and decision on the site

At the end of each phase, the BGE proposals are examined by the BfE. The final decision in each phase is taken by the parliament which will pass laws naming the siting regions, the sites for underground exploration and the final site for a repository.

The current phase is phase 1. The BGE requested and collected data concerning the exclusion criteria defined in the Repository Site Selection Act, such as tectonic, mining and hydrogeological data from the geological services of the Länder.

In addition, the Repository Site Selection Act regulates the establishment of a pluralistically composed National Advisory Board (*Nationales Begleitgremium*). Central task of the National Advisory Board is the conciliatory and independent monitoring of the repository site selection procedure, in particular the implementation of public participation in the site selection procedure until a decision has been made in

favour of one site. The National Advisory Board started its work with its first meeting on 5 December 2016. For more information, please refer to http://www.nationales-begleitgremium.de/DE/Home/home_node.html (only in German).

Further information on the site selection can be found at the BfE internet: http://www.bfe.bund.de/EN/soa/soa_node.html

The information platform of BfE and BGE containing all publicly available documents concerning the site selection can be found here: http://www.bfe.bund.de/SiteGlobals/Forms/Suche/BfE/DE/SOA-Suche_Formular.html (only in German)

6. Nuclear Fuel and Waste Management

a) *Repositories and Repository projects for Radioactive Waste*

Germany has one repository for radioactive waste with negligible heat generation currently in build-up (Konrad repository) and two mines in which low- and intermediate-level radioactive waste is stored and which will be decommissioned in the future (Morsleben repository and Asse II mine).

On 25 April 2017, the operator responsibilities for the Asse II mine as well as the Konrad and Morsleben repositories were transferred from the BfS to the BGE. The BfE is the nuclear supervising authority for all repository projects.

The Konrad mine is currently being converted to a repository for radioactive waste with negligible heat generation. On 26 March 2007, a definitive plan-approval decision (licence) was granted for the construction and operation of the repository.

The Morsleben mine was used as repository for low- and intermediate-level radioactive waste from 1971 until 1998. The BfS applied for the decommissioning of the Morsleben repository under nuclear law on 9 May 1997. The plan-approval procedure is currently underway.

In the Asse II mine low- and intermediate-level radioactive waste was stored from 1967 to 1978. According to the Atomic Energy Act, the Asse mine shall be decommissioned immediately. Decommissioning is to take place once the radioactive waste has been retrieved from the facility.

For further information on the repository projects, see <http://www.bfe.bund.de/EN/nwm/repositories/introduction/introduction.html>

b) *Interim Storage of Spent Nuclear Fuel*

In Germany three central interim storage facilities are in operation at Gorleben, Ahaus and Lubmin. On 1 August 2017, the operator responsibilities for the Gorleben and Ahaus interim storage facilities were transferred from the GNS (*Gesellschaft für Nuklear-Service mbH*) to the new, state-owned operator BGZ.

At the Gorleben Transport Cask Storage Facility (*TBL Gorleben*) nuclear fuel is stored in the form of spent fuel elements from light water reactors as well as vitrified high-level radioactive waste (HAW) from the reprocessing of German fuel elements. The Transport Cask Storage Facility Ahaus (*TBL Ahaus*) is a storage facility for the storage of nuclear fuels and other radioactive materials. The Interim Storage Facility North near Lubmin (*Zwischenlager Nord – ZLN*) is a facility for the storage of spent fuel and vitrified HAW from the reprocessing of fuel elements in the Karlsruhe Vitrification Facility (*Verglasungseinrichtung Karlsruhe – VEK*). For more information on the central interim storage facilities, see http://www.bfe.bund.de/EN/nwm/interim-storage/central/central_node.html

Additionally, twelve on-site interim storage facilities at the sites of the nuclear power plants have been licensed by BfS between November 2002 and December 2003, all are in operation.

Interim storage of waste from reprocessing plants in Sellafield, Great Britain and La Hague, France which is still to be returned to Germany shall take place at four on-site interim storage facilities. On 29 September 2017 licence applications were filed by the operators of the on-site storage facilities Philippsburg, Biblis, Brokdorf and Isar in this matter. The licensing procedures are ongoing, depending on the assessment of the supporting documents BfE can come to a decision on the applications for the interim storage at these sites by end of 2018.

The licence of the Brunsbüttel interim storage facility was revoked by the Federal Administrative Court in January 2015. The competent authority of Schleswig-Holstein made a disposition that the storage of spent fuel at the Brunsbüttel interim storage facility may continue until the beginning of the year 2018, extending it in December 2017 for another 2 years until 31 January 2020. In November 2015, the operator applied for a new licence for the facility. This licensing procedure is currently ongoing. For further information, see

<http://www.bfe.bund.de/EN/nwm/interim-storage/decentralised/licence/kkb-en.html>

The *Jülicher Entsorgungsgesellschaft für Nuklearanlagen mbH* (JEN) operates an interim storage facility for ball-shaped fuel elements from the former AVR experimental reactor in Jülich. The licence for the JEN storage facility was limited to June 2013. The licensing procedure for the storage of the fuel elements in Jülich for a short-term period is still ongoing. In 2016, a license was granted for the storage of these fuel elements in the TBL Ahaus. A license application for the transport of the fuel elements to Ahaus has been filed. For more information, see

<http://www.bfe.bund.de/EN/nwm/interim-storage/decentralised/licence/kkj-en.html>

c) *Nuclear Fuel Fabrication and Reprocessing*

Germany has one facility for the fabrication of fuel elements for light water reactors (ANF) and one uranium enrichment plant. The facility for the fabrication of fuel elements is located in Lingen (*Brennelementfertigungsanlage Lingen*) and has a capacity for uranium conversion of 800 t/a. The uranium enrichment plant is located in Gronau (URENCO Germany) and has a licenced capacity of 4500 tSW/a.

The only German reprocessing plant in Karlsruhe (*Wiederaufbereitungsanlage Karlsruhe – WAK*) is in decommissioning, the first decommissioning licence was granted in 1993. The 25th licence for decommissioning from 26 April 2017 includes the dismantling of equipment of the Karlsruhe vitrification facility (VEK).

d) *Transports*

Transports of (spent) nuclear fuel and vitrified waste are subject to the approval requirements of § 4 of the Atomic Energy Act. On 30 July 2016, this responsibility was transferred from the BfS to the BfE.

On 15 January 2018, the BfE approved the transport of 13 defective fuel elements from the shut-down Brunsbüttel NPP to a nuclear research institute in Sweden (Studsvik Nuclear AB), where they will be examined. A maximum of three transports by road was approved, the transport license is limited until 31 August 2018. The three transports were carried out in February 2018.

On 3 April 2017 the licensing applications for the transport of waste from reprocessing plants in Sellafield, Great Britain and La Hague, France the waste from to the facilities in Biblis and Philippsburg were filed.