Safety Standards

of the
Nuclear Safety Standards Commission (KTA)

KTA 3604 (11/2005)

Storage, Handling, and Plant-internal Transport of Radioactive Substances in Nuclear Power Plants (with the Exception of Fuel Assemblies)

(Lagerung, Handhabung und innerbetrieblicher Transport radioaktiver Stoffe (mit Ausnahme von Brennelementen) in Kernkraftwerken)

This previous version of this safety standard was issued in 06/1983

If there is any doubt regarding the information contained in this translation, the German wording shall apply.

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PLEASE NOTE: Only the original German version of this safety standard represents the joint resolution of the 50-member Nuclear Safety Standards Commission (Kerntechnischer Ausschuss, KTA). The German version was made public in Bundesanzeiger BAnz No. 194a of October 14, 1983. Copies may be ordered through the Carl Heymanns Verlag KG, Luxemburger Str. 449, 50939 Koeln, Germany (Telefax +49-221-94373603).

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Comments by the Editor:

Taking into account the meaning and usage of auxiliary verbs in the German language, in this translation the following agreements are effective:

- **shall** indicates a mandatory requirement,
- **shall basically** is used in the case of mandatory requirements to which specific exceptions (and only those!) are permitted. It is a requirement of the KTA that these exceptions - other than those in the case of **shall normally** - are specified in the text of the safety standard,
- **shall normally** indicates a requirement to which exceptions are allowed. However, exceptions used shall be substantiated during the licensing procedure,
- **should** indicates a recommendation or an example of good practice,
- **may** indicates an acceptable or permissible method within the scope of this safety standard.
Fundamentals

(1) The safety standards of the Nuclear Safety Standards Commission (KTA) have the task of specifying those safety-related requirements which shall be met with regard to precautions to be taken in accordance with the state of science and technology against damage arising from the construction and operation of the plant (Sec. 7 para. 2 subpara. 3 Atomic Energy Act) in order to attain the protective goals specified in the Atomic Energy Act and the Radiological Protection Ordinance (StrlSchV) and further detailed in the "Safety Criteria for Nuclear Power Plants” and in the “Guidelines for the Assessment of the Design of PWR Nuclear Power Plants against Incidents pursuant to Sec. 28, para. 3 StrlSchV - Incident Guidelines” (the version released Oct. 18, 1983).

(2) The licensing requirements in accordance with Sec. 7 Atomic Energy Act regarding the construction and operation of the plant are fulfilled by the facilities intended for the retaining of solid, liquid and gaseous substances in the planned enclosures, for the handling and treatment and the controlled transportation of the radioactive substances within the plant as well as for the transfer of radioactive substances via the planned paths. The KTA safety standards of the 3600 series specify the safety requirements for these facilities.

(3) This safety standard contains requirements serving the purpose of fulfilling the protective goals of the Radiological Protection Ordinance pertaining to technical facilities and additional administrative measures regarding the plant-internal storage, handling and treatment and transportation of radioactive substances with the exception of fuel assemblies as well as to the design of the civil structures and installations.

(4) Requirements with respect to fire protection are specified in the KTA safety standards of the 2101 series, Fire Protection in Nuclear Power Plants.

(5) Products to be released from the plant are subject to the conditions derived from the legal regulation for the transportation of hazardous materials as well as from the receiving conditions of the receiving institution.

(6) Requirements with respect to the electronic accounting system for recording radioactive waste are specified in Sec. 73 StrlSchV.


1 Scope

(1) This safety standard applies to the plant internal storage, handling and treatment as well as transport and transfer of
a) solid radioactive waste,
b) liquid radioactive waste in as far as it does not fall under the scope of safety standard KTA 3603,
c) radioactive components and component parts planned to be dismantled and removed and re-installed until decommissioning of the nuclear power plant with the exception of large components and with the exception of fuel assemblies and activated components of the reactor pressure vessel,
d) radioactively contaminated tools and equipment,
e) radioactivity sources
on the site of nuclear power plants with light-water reactors.

(2) This safety standard also applies to the decay storage as well as to the collection and the handling and treatment of radioactive substances intended to be cleared pursuant to Sec. 29 StrlSchV.

2 Definitions

(1) Waste container
Container for receiving waste products (e.g. barrel, concrete vessel, cast steel vessel, dumpster).

(2) Waste product
Waste product is the processed radioactive waste without packaging and outside of a waste container.

(3) Liquid radioactive waste
Liquid radioactive waste includes
a) contaminated liquid consumables (e.g. oils, hydraulic fluids, cleaning agents and solvents, acids and lye)
and
b) radioactive concentrates in liquid form from the facilities for the handling and treatment of radioactively contaminated water (e.g., evaporator concentrates, filter residues from mechanical filtration, used up ion-exchanger resin) that must be disposed of.

(4) Hot workshop
A hot workshop is a workshop that is specified as intended for working on radioactive parts that possess a license pursuant to Sec. 7 StrlSchV for their handling and treatment.

(5) Mobile conditioning facilities
Mobile conditioning facilities are closed process-oriented systems with defined interfaces. They are used for the discontinuous, e.g., campaign-wise handling and treatment of raw waste or intermediary products thus becoming waste products for intermediate or final storage. Such facilities are especially assembled for the individual conditioning campaign in a nuclear power plant and will be removed after conclusion of the campaign.

(6) Storage
Storage is the storing of handled and treated radioactive waste, of radioactive substances for radioactive decay and of tools, components and component parts intended to be re-used.

Note:
In accordance with the RSK recommendation of Dec. 12, 2002, the different forms of storage are: long-term decay storage, allocation storage, buffer storage and interim storage.

(7) Collection
Collection is the selective transfer of those substances not required anymore in the individual work process at the location and point in time, if at all possible, where and when the substances accumulate.

(8) Sorting
Sorting is the selective separation of material streams according to the criteria of their later application and processing and to the individual waste transfer goals of these materials.

(9) Interim storage locations for solid radioactive substances
Interim storage locations for solid radioactive substances (in this safety standard, interim storage locations for short) are compartments in which, or areas in compartments on which, waste containers with the collected solid radioactive waste and radioactive components and component parts as well as radioactively contaminated tools and equipment are stored until further handling and treatment.

(10) Transport preparation
Transport preparation is the short-term storage in accordance with the transportation requirements for packaged radioactive materials until their transport off the plant site.
3 Handling and Storage of Solid Radioactive Materials

Note:
The text of this safety standard with respect to the handling and treatment of solid radioactive waste is visualized schematically in Figure 3-1.

3.1 Collecting

(1) Any non-enclosed solid radioactive waste shall be collected. Collecting should be carried out such that, under consideration of the necessary operational procedures and the planned ways of transfer, the later sorting effort is minimized.

(2) Substances intended for a clearance pursuant to Sec. 29 StrlSchV shall be collected and stored separately to avoid contamination.

(3) Containers for the containment of solid waste shall enclose this waste such that any loss is prevented under normal operating loads.

Note:
Suitable containers can be, e.g., plastic bags, buckets, pots, barrels.

(4) The openings of the containers for the containment of solid waste shall be designed such that outer contamination is prevented as far as possible, even during filling of the containers.

(5) Containers for the containment of solid waste shall be dimensioned and designed such that the collected waste can be introduced to further handling and treatment with the lowest possible number of handling steps.

(6) The containers for the containment of solid waste shall normally be located close to the place where this waste accumulates or is created.

(7) Containers for the containment of solid waste shall be visibly marked as such.

Note:
The marking can consist, e.g., of a sign saying “Radioactive Waste”.

(8) The dose rate emitted from the collected waste shall be monitored. If it becomes necessary, suitable radiation protection measures shall be taken, e.g., transfer to an interim storage location, setting up of shielding, cordonning off, and the current dose rate values shall be posted.

(9) The collection of combustible substances shall be carried out in accordance with safety standard KTA 2101.3 (e.g., encapsulating the fire load in metallic collection containers).

(10) As soon as operational procedures allow, filled up containers for the containment of solid waste shall be removed and, if necessary, replaced by empty ones.

(11) Unless the content of filled up solid waste containers is immediately subjected to further handling and treatment, the containers shall be marked with respect to the type of solid waste, the dose rate at the surface of the container and the date of the dose rate measurement.

3.2 Interim Storage Location for Solid Radioactive Waste

(1) The solid waste collected in waste containers shall be stored at an interim storage location until further handling and treatment.

(2) Interim storage locations shall, basically, be located in a controlled-access area. Interim storage locations shall be connected to an air conditioning facility that is suited for the controlled discharge or retention of radioactive substances during specified normal operation. Storage in suitable containers may, temporarily, also be carried out in the monitored area, provided the containers are designed such that radioactive substances cannot be released from them.

(3) The useable storage area in the interim storage locations shall be dimensioned such that they are sufficient for storing the increased volume of solid waste briefly occurring during specified normal operation.

(4) Interim storage locations should be conveniently located with respect to delivery and further handling and treatment of the collected solid waste.

(5) The load capacity of the interim storage location floors shall be designed for a load per unit area of at least 10 kN/m² and, additionally, for a load per unit length from a temporary shielding of at least 10 kN/m with a maximum length of 5 meters at the least favorable location.

(6) Interim storage locations shall be provided with the necessary auxiliary equipment for the storage and transport (e.g., storage racks, lifting equipment, pedestrian-activated trucks) that would help to keep the radiation exposure of the personnel as low as possible.

(7) A remotely controlled loading and unloading of interim storage locations shall be monitored by optical and, if necessary, acoustical means.

(8) Interim storage locations shall normally be designed and furnished such that they can be easily decontaminated.

(9) The local dose rate in interim storage locations shall be monitored.

(10) Interim storage locations shall normally be cordoned off and marked as being an interim storage location. It shall normally be possible to close off the interim storage location. In addition to the information required pursuant to Sec. 68 para. 1 StrlSchV, the following items should be contained on the marking:
   a) identification of the compartment,
   b) local dose rate at the door or at the demarcation,
   c) if necessary, indication of contamination,
   d) point in time of the measurements.

3.3 Treatment

(1) After collection or storage, it shall be checked whether further handling and treatment of the waste or substances is required. The objectives can be:
   a) preparations for conditioning,
   b) long-term storage in the nuclear power plant,
   c) transfer into an interim storage or a federal repository,
   d) clearance pursuant to Sec. 29 StrlSchV.

(2) The handling and treatment methods shall be in accordance with the requirements of the product control regarding storage in a federal repository, with the requirements regarding interim storage or with the requirements regarding a clearance pursuant to Sec. 29 StrlSchV.

(3) The handling and treatment of radioactive waste may be carried out with stationary or mobile facilities. As far as applicable, these facilities shall meet the following requirements:
   a) sufficient size of the set-up location,
   b) supply of operating media (e.g., electric power, water, pressurized air),
   c) integration into the waste water and exhaust air systems,
d) radiological requirements (e.g. limitation of the local dose rate)
e) acceptance and functional tests prior to commissioning.

Note: Requirements that are independent of the set-up location of the mobile handling and treatment facilities may be specified in an individual type approval license pursuant to Sec. 7 StrlSchV.

(4) Any facilities for sorting, shredding, densifying, compacting, drying, embedding into matrices, packaging, etc., shall be operated inside a controlled-access area. The basic spatial and logistical framework for the delivery, allocation and transfer of the waste and waste products shall be specified taking the radiation exposure of the personnel into consideration.

(5) Compartments within a controlled-access area in which these facilities are operated shall be connected to an air conditioning facility.

(6) If the waste handling and treatment, especially densifying, compacting and drying, can lead to a release of radioactivity into the inner atmosphere, a selective exhaust shall be provided.

(7) Any process parameters relevant to the characteristics of the waste product, e.g., pressure, temperature, condensate volume, shall normally be recorded over the course of the handling and treatment procedure.

(8) The design and operation of drying facilities shall take fire and explosion hazards into consideration.

(9) The compartment and the facilities for packaging shall normally be designed such that they can be easily decontaminated.

(10) During packaging of solid waste, care shall be taken that
a) the radioactivity inventory at the time of transfer to the receiving party,
b) the mass of a filled container, and
c) the local dose rate at the required distances do not exceed specified limit values.

(11) Before and during work in compartments where solid waste is being handled and treated, the radioactivity concentration in the inner atmosphere and the local dose rate shall be measured. The radioactivity concentration may be measured by collecting dust specimens and, subsequently, evaluating them in the laboratory.

(12) If it is to be expected that gases, heat or corrosive substances develop in the solid waste, then either, packaging shall not be carried out before an impermissible damage to, or distortion of, the container can be precluded, or pressure relieving measures, e.g. sintered metal filters, shall be provided, or suitable container types shall be used.

(13) Any handling and treatment of the waste substances with the goal of obtaining a clearance pursuant to Sec. 29 StrlSchV, such as abrasive procedures (e.g. high-pressure water jetting and dry ice or sand blasting) or chemical pickling shall be carried out in controlled-access areas. The decay storage, the allocation storage for release measurement and the release measurement itself may be carried out in monitored areas.

(14) In the case of substances that are planned to obtain a clearance pursuant to Sec. 29 StrlSchV only after a decay storage, the expected duration of storage shall be determined and specified.

3.4 Storage

(1) With the objective of allocation storage, buffer storage, long-term decay storage, or interim storage, solid waste shall be stored in a plant-internal waste storage facility until their further handling and treatment, or until their transfer to an external interim storage facility or to a federal repository.

(2) Waste storage facilities shall be designed or equipped such that the waste can be stored in accordance with its individual category.

Note: The individual categories are specified according to operational aspects where decisive criteria may be, e.g., the local dose rate at the surface, the activity content, the storage duration or the decay behavior.

(3) Waste storage facilities shall be designed and equipped such that an unhindered delivery and transfer of each waste category is possible with the planned transport equipment.

(4) Within the framework of general planning of a nuclear power plant, waste storage facilities shall be conveniently located with regard to delivery and transfer of the waste.

(5) The regular loading and unloading of a waste storage facility for solid waste shall normally be carried out by remotely operated means if the waste storage facility must be categorized in its entirety as exclusion area.

(6) Remotely operated loading and unloading of waste storage facilities shall be monitored by optical and, if necessary, by additional acoustic means.

(7) If waste storage facilities are not loaded by remotely operated means they shall be designed such that they can be partitioned by mobile shield walls.

(8) The load capacity of the waste storage facility floors shall be designed for a loading from the items to be stored and from the means of transportation involved. If shielding measures are required in operationally accessible waste storage facilities an additional load per unit length of at least 10 kN/m with a maximum length of 5 meters at the least favorable location shall be taken into account.

(9) Floors, walls and the furnishings of waste storage facilities shall normally be designed such that they can be easily decontaminated. The concrete floor topping and the surface coating of the floor in the waste storage facility shall be sufficiently resistant to pressure and abrasion.

(10) Waste storage facilities shall be protected against inward seepage of water.

(11) Waste storage facilities shall normally contain only such furnishings, components or equipment that are required in carrying out the storage, handling and transportation tasks or that are required for fire protection of the storage facility.

(12) Waste storage facilities shall be connected to an air conditioning facility unless it can be ensured that, due to the packaging of the waste, a release of radioactive substances need not be expected.

(13) General planning shall ensure that maintenance tasks within waste storage facilities can be kept at a minimum.

(14) The solid waste stored in the waste storage facility shall be secured against tilting and rolling.

(15) Waste storage facilities shall be kept locked. Only authorized personnel may have access to these facilities.

(16) The containers stored in the waste storage facility shall be clearly, durably and visibly marked. On the basis of this marking it shall be possible to ascertain the following information:

a) type of the stored substance and radioactivity of the major contributing radionuclides,
b) weight of the stored container with its content,
c) local dose rate at the surface as well as in 1 m distance from the surface at the time the container was put into storage,
d) date of putting into storage,
e) storage position,
f) name of the person responsible with regard to this information.

Note:
Usual practice is a numeric marking in connection with a written account.

(17) Written accounts shall be kept on all storage and transfer procedures.

Note:
Insofar as requirements ensue from the electronic record system pursuant to Sec. 73 StrlSchV, these shall be taken into consideration.

(18) The longer-term interim storage of conditioned and partly conditioned radioactive waste with the objective of its allocation for the federal repository shall be subject to the safety requirements in accordance with the RSK-Recommendation of Dec. 12, 2002. The longer-term decay storage or buffer storage with the objective of obtaining a clearance pursuant to Sec. 29 StrlSchV or of the later conditioning for the federal repository shall, as far as applicable, also be subject to these same safety requirements.

Figure 3-1: Schematic flow diagram of handling and treatment, storage and transfer
(In an actual facility, not all of the shown stations and connections need to be realized.)
4 Handling and Storage of Liquid Radioactive Substances

Note: The text of this safety standard with respect to handling and treating liquid radioactive wastes is visualized schematically in Figure 3-1.

4.1 Collecting

(1) Liquid waste shall, without delay at the time of their production, be transferred into the planned containers in accordance with the types of the waste.

(2) The following types of liquid waste shall normally be stored separated from each other:
   a) evaporator concentrates,
   b) filter residues and spent ion exchanger,
   c) waste oil,
   d) organic solvents, and
   e) other liquid radioactive waste.

(3) Substances that are intended for clearance pursuant to Sec. 29 StrlSchV shall normally be collected and stored separately to avoid any decontamination.

4.2 Collection and storage containers

(1) The selected materials – even for the linings, membranes and seals – shall withstand the operational loadings (e.g., from mechanical, thermal and chemical loads as well as from ionizing radiation). In the case of materials sensitive to aging, the behavioral change over time shall be taken into account.

(2) The containers shall be designed and constructed with a view to their ability to be decontaminated (e.g., choice of materials, accessibility).

(3) The containers shall be designed and constructed or equipped such that at least their fluid levels are detectable and that the maximum permissible fluid levels are displayed outside of the container compartments.

(4) Containers used for collecting liquid radioactive waste that are, however, not located in container compartments and are designed and constructed as specified under Section 4.4 para. 1 shall be located in drain pans such that any liquid leakage possibly occurring during filling can be retained. Monitoring equipment shall be installed if the drain pan is not sufficient to take up the full volume of the container.

(5) The capacity of the containers shall be dimensioned such that it is sufficient even for the increased volume of liquid radioactive waste briefly occurring during specified normal operation. Under consideration of this requirement, Table 4-1 lists the minimum required number of the different containers and their overall volumes.

(6) Containers for concentrates shall specifically be equipped with
   a) circulation equipment,
   b) specimen removal connections,
   c) level indicators and alarm equipment,
   d) safety device against overfilling,
   e) interlocking of the filing and the release nozzles,
   f) gas exhaust equipment,
   g) overrun into another storage container, and
   h) connections for flushing.

In the case of mechanical agitators, the penetrations of the rotating parts shall be located above the highest possible fluid level.

### Table 4-1: Minimum values for the number of containers and their capacity for different liquid radioactive wastes in a nuclear power plant with an electric power of 1300 MW

<table>
<thead>
<tr>
<th>Type of Waste</th>
<th>Minimum Number / Overall Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PWR</td>
</tr>
<tr>
<td>Evaporator residues</td>
<td>2/30</td>
</tr>
<tr>
<td>Filter residues, low level</td>
<td>3/100</td>
</tr>
<tr>
<td>Filter residues, intermediate level</td>
<td>2/30</td>
</tr>
<tr>
<td>Ion exchanger resin waste</td>
<td>2/16 contained in filter residues</td>
</tr>
<tr>
<td>Waste oil 1)</td>
<td>1/0.2</td>
</tr>
<tr>
<td>Organic solvents 3)</td>
<td>1/0.2</td>
</tr>
</tbody>
</table>

1) mobile container; the specified container capacity is applicable under the provision that a regular transfer is possible.
2) Under consideration of the decay tank in the condensate demineralizing system, the entire resin filling of the ion exchanger can be removed. There is no operational limit to the working life of this type of ion exchanger.

(7) The number of connecting nozzles on the containers below the fluid level shall be limited to the number required for procedure-technological reasons.

(8) It shall be possible to empty the containers completely.

(9) The operational emptying of stationary containers shall normally be impossible by gravitational flow.

(10) Mobile containers shall be designed and constructed such that an easy and contamination-free handling and emptying of these containers is possible.

(11) Any provided mobile containers shall be marked for which type of the radioactive fluids specified under Section 4.1 para. 2 they are intended.

(12) Mobile containers shall have closures.

(13) Filled-up mobile containers shall be immediately brought away for further storage or handling and treatment and, if necessary, shall be replaced by empty containers.

(14) Filled-up mobile containers shall be clearly, durably and visibly marked. On the basis of this marking it shall be possible to ascertain the following information:
   a) type of liquid and radioactivity of the major contributing radionuclides,
   b) amount of the liquid,
   c) local dose rate at the surface of the container as well as in 1 m distance from the surface at the time the container was put into storage,
   d) date of putting into storage,
   e) name of the person responsible with regard to this information.

(15) Stationary containers shall have an exhaust separate from that of the inner atmosphere. This gas exhaust system shall be equipped to hold back radioactive substances.
4.3 Valves, Pumps and Piping

(1) Valves, pumps and piping should offer the possibility to arrange additional shielding around them without this shielding becoming a major impediment or restriction to other handling or treating procedures.

(2) The liquids may only be conveyed in abrasion and corrosion resistant stationary piping with smooth inner surfaces. The piping of the transfer systems for filling the transportation vessels do not have to be stationary.

(3) Components for the conveyance of radioactive liquids shall normally be physically separated from conveyance systems for non-radioactive liquids, provided, the latter are not required for the operation of the former components.

(4) Systems shall be controlled such that an inadvertent transfer of radioactive liquid waste into other systems is prevented.

(5) It shall be possible to flush and completely empty the vented.

(6) Valves, pumps and piping shall be designed such that precipitations and crystallizations from radioactive liquids are prevented from settling.

(7) Valves that handle suspensions of solid substances shall normally have smooth transitions; their function shall be ensured even for a high content of solid substances.

4.4 Container compartments

(1) Containerized liquid radioactive wastes may only be stored in compartments provided for this purpose. These compartments shall be located inside a controlled-access area.

(2) Records shall be kept on the stored liquid radioactive wastes. These records shall also contain information on the storage location.

(3) Container compartments shall be equipped with sufficiently inclined leak tight drain pans that are dimensioned to be able to hold the content of the largest container. Corresponding monitoring equipment shall signal any accumulation of liquids in the drain pans. Containers may be stored together in a single drain pan, provided, they are separated by shield walls.

(4) It shall be impossible that drain pans can be emptied by gravitational flow.

(5) Each container compartment intended for evaporator concentrates, filter residues and spent ion exchangers may contain only one stationary container.

(6) Liquids accumulated in the drain pans shall be transferrable by pumps into other suitable containers.

(7) The containers shall be spatially arranged such that they can be subjected to visual examination, even if monitoring equipment is provided.

(8) Container compartments shall be dimensioned such that there is sufficient freedom of movement for performing maintenance tasks.

(9) Container compartments shall be connected to an air conditioning facility that is suited for a controlled release or retention for radioactive substances during specified normal operation.

(10) Only such piping and valves or equipment shall normally be installed in container compartments that are required for the safe storage or transfer procedures in the individual compartments.

(11) Walls and floors of the container compartments shall normally be designed such that they can be easily decontaminated.

4.5 Treatment

(1) The handling and treatment of liquid radioactive wastes shall be carried out with stationary conditioning facilities or, in the case of individual waste campaigns, with specially installed mobile facilities. The handling and treatment goals may be:

   a) preparation for conditioning,
   b) long-term storage in the nuclear power plant,
   c) transfer into an interim storage facility or federal repository, or
   d) clearance pursuant to Sec. 29 StrlSchV.

(2) The handling and treatment methods shall be tuned to the requirements of the product control in the federal repository, to the requirements of interim storage or to the requirements regarding the clearance pursuant to Sec. 29 StrlSchV.

(3) The following requirements apply to the handling and treatment in stationary or mobile facilities:

   a) sufficient size of the set-up location,
   b) supply of operating media (e.g., power, water, pressurized air) in conformance with the requirements,
   c) integration into the waste water and exhaust air systems,
   d) radiological requirements (e.g., limitation of the local dose rate), and
   e) acceptance and functional tests prior to commissioning.

Note:
Requirements that are independent of the set-up location of the mobile handling and treatment facilities may be specified in an individual type approval license pursuant to Sec. 7 StrlSchV.

(4) Facilities for drying, solidifying, dehydrating, embedding into matrices, centrifuging, decanting, etc., of liquid radioactive wastes shall be operated inside a controlled-access area. In specifying the spatial and logistic boundary conditions for delivery and transfer as well as for allocation of the waste and waste products, the radiation exposure of the personnel shall be taken into consideration.

(5) If radioactivity can be released to the inner atmosphere during handling and treatment of the liquid radioactive wastes, especially during drying, a directed exhaust shall be provided.

(6) With regard to the characteristics of the waste product, relevant process parameters, e.g., pressure, temperature, condensate volume, shall normally be recorded as a function of the course of the procedure.

(7) The design and operation of the handling and treatment facilities shall take fire and explosion hazards into consideration.

(8) It shall be possible to decontaminate facilities and equipment for handling and treating liquid radioactive waste. The walls and floors of the compartments housing these facilities and equipment shall be such that they can be easily decontaminated.

(9) Before and during work in compartments in which liquid radioactive waste is being handled and treated, the activity concentration in the inner atmosphere and the local dose rate shall be monitored.

(10) If it is to be expected that gases, heat or corrosive substances develop in the waste products from the handling and treatment of liquid radioactive waste, then either, packaging shall not be carried out before an impermissible damage to, or
distortion of, the container can be precluded, or pressure relieving measures, e.g. sintered metal filters, shall be provided, or suitable container types shall be used.

(11) During packaging of liquid of solidified waste, care shall be taken that
a) the radioactivity inventory at the time of transfer to the receiving party,
b) the mass of a filled container, and
c) the local dose rate at the required distances
do not exceed specified limit values.

(12) The handling and treatment as well as the decay storage to obtain a clearance pursuant to Sec. 29 StrlSchV for liquid substances shall normally be carried in controlled-access areas. Release measurement facilities may also be operated in monitored areas.

(13) In the case of substances that are planned to obtain a clearance pursuant to Sec. 29 StrlSchV only after a decay storage, the expected duration of storage shall be determined and specified.

5 Handling and Storage of Contaminated Tools, Reusable Radioactive Components and Component Parts

Note: In this safety standard the radioactive components and component parts concerned are those that are dismantled and removed for repair, inspection or examination and are replaced by new ones and that are interim-stored after having been cleaned (decontaminated) and repaired for future reuse. These also include equipment being used inside controlled-access areas. The text of this safety standard with respect to handling and treating radioactive components and component parts is visualized schematically in Figure 3-1.

5.1 Interim storage location for components and component parts

(1) At least one interim storage location shall be provided for taking up components and component parts to be subjected to further handling and treatment. Interim storage locations and set-down areas may be provided as temporary installations.

(2) Set-down areas shall not interfere with traffic routes and shall be designed such that any unnecessary radiation exposure of the personnel and inadvertent spreading of contamination is avoided.

(3) Interim storage locations shall be dimensioned such that they will be sufficiently large for storing the increased number of radioactively contaminated components and component parts briefly occurring during specified normal operation.

(4) The set-down areas for components and component parts within the interim storage locations shall be designed such that the required transport and work procedures are not impeded.

(5) The interim-stored components and component parts shall be clearly, durably and visibly marked. On the basis of this marking it shall be possible to ascertain the following information:
a) type of the stored component or component part,
b) local dose rate at the surface of the packaging at the time the component or component part was put into storage,
c) information regarding contamination,
d) date of putting into storage, and
e) name of the person responsible with regard to this information.

(6) The whereabouts of the components and component parts shall be documented. The information specified under para. 5 shall be included in these records.

(7) The interim storage locations are, additionally, subject to the requirements of Section 3.2 paras. 2 and 5 through 10.

5.2 Decontamination

(1) A special decontamination compartment shall be available in which components and component parts can be decontaminated. It shall be equipped to be in accordance with the requirements regarding the effectiveness and method of the decontamination.

(2) The usable surface area of the decontamination compartment shall be sufficient for setting up the necessary decontamination equipment, for performing the decontamination tasks on the dismantled and removed components and component parts as specified under Section 1, leaving sufficient place as set-down areas.

(3) The decontamination room shall be chosen and designed with special regard to transportation, handling and treatment, secondary waste and accessibility. It shall be located within a controlled-access area and, in particular, be conveniently located to the hot workshop.

(4) The floor of the decontamination compartment shall be designed for a load per unit area of at least 10 kN/m² and, additionally, for a load per unit length of at least 10 kN/m with a maximum length of 5 meters at the least favorable location.

(5) The floors, walls and ceilings of the decontamination compartment shall, and the furnishings shall normally, be such that they can be easily decontaminated.

(6) The decontamination compartment shall be connected to an air conditioning facility that is suited for a controlled release and retention of radioactive substances during specified normal operation. Possibilities shall be given for a local exhaust of radioactive fumes and aerosols at the workplaces such that, during decontamination activities, the carrying of respiratory protective equipment will, generally, not be required. The radioactive fumes and aerosols shall, if necessary (e.g. sand blasting boxes), be led through air filters of at least class F7 in accordance with DIN EN 779 before they are led into the exhaust air duct.

(7) The local dose rate and the radioactivity concentration of the inner atmosphere in the decontamination compartment shall be monitored at the start and during course of the work by stationary and mobile measurement devices.

(8) During decontamination, protective equipment (e.g., remote handling devices, glove boxes, shielding walls, foil tents) shall be used as required if they would help to reduce or prevent radiation exposure and inadvertent spreading of contamination.

(9) After completion of the decontamination tasks, the dose rate or the residual contamination of the components or component parts shall be checked.

5.3 Hot Workshop

(1) A hot workshop shall be available in which components or component parts can worked on and repaired. It shall be located within a controlled-access area and be conveniently located to the decontamination compartment.

(2) The usable surface area of the hot workshop shall be sufficient for setting up of the necessary equipment for the work on the components and component parts, for performing the work on the components and component parts, leaving sufficient place as set-down areas.
(3) Protective equipment shall be kept in readiness with regard to reducing radiation exposure and contamination (e.g., mobile shield walls, exhaust facilities and a shielded waste collection location).

(4) Equipment, the operation of which could lead to the release of dusts, aerosols and fumes, shall be equipped with exhaust facilities that will effectively prevent a spreading of these substances such that, during the work, the carrying of respiratory protective equipment will, generally, not be required. The hot workshop and the exhaust facilities shall be connected to an air conditioning facility that is suited for a controlled release and retention of radioactive substances during specified normal operation.

(5) The walls, floors and furnishings of the hot workshop shall normally be such that they can be easily decontaminated. Surfaces of the floors, walls and tables shall be abrasion and pressure resistant to the extent of the expected mechanical loading.

(6) The floor of the hot workshop shall be designed for a load per unit area of at least 10 kN/m² and, additionally, for a load per unit length of at least 10 kN/m with a maximum length of 5 meters at the least favorable location.

(7) The local dose rate and the radioactivity concentration of the inner atmosphere in the hot workshop shall be monitored during course of the work by stationary and mobile measurement devices.

5.4 Storage

(1) A separate storage location shall, basically, be provided for those contaminated tools, radioactive components and component parts that are intended for reuse.

(2) The storage location under para. 1 shall meet the requirements specified under Section 5.1 paras. 4 through 6 and Section 3.2 paras. 2 and 5 through 10.

(3) Deviating from paras. 1 and 2, the contaminated tools, radioactive components and component parts that are intended for reuse may be stored in suitable containers in a monitored area, provided, these containers are of such design that radioactive substances cannot be inadvertently released from them.

6 Plant-internal Transport and Transfer of Solid and Liquid Radioactive Waste and of Radioactive Components and Component Parts

6.1 Transport Paths

(1) The transport paths for such parts that require lifting equipment and vehicles for their transportation shall already be specified in the design stage of a nuclear power plant.

(2) The load capacity and the free cross section of the transport paths shall be dimensioned to suit the expected transports.

(3) The surface lining of the transport paths shall, in accordance with the mechanical loading, be sufficiently resistant to pressure and abrasion.

(4) The design of the transport paths shall be such that they are clear and simple. Horizontal transports shall be planned to be carried out, as far as possible, on the same level.

(5) There shall be no steps along the transport paths. Unavoidable differences in level shall be bridged by low-incline ramps.

(6) It shall be ensured by structural and administrative means that the transportation procedures can be carried out unhindered and the component parts cannot be harmed.

6.2 Transport Equipment

(1) Transport procedures may only be carried out with the correspondingly suited transport equipment.

(2) The operation of the transport equipment shall be simple and safe.

(3) The transport equipment employed in a controlled-access area shall normally be such that they can be easily decontaminated.

(4) The transport vehicles for travel within a controlled-access area shall normally not be equipped with combustion engines.

(5) The transport equipment shall be equipped and dimensioned such that the transported items can be shielded if so required.

(6) All transport equipment shall be designed such that, in case of danger, the transport procedure can be quickly interrupted (e.g., mechanical brakes).

(7) The containers for transporting radioactive waste shall be designed such that they will withstand the loads from normal transports as specified, including regularly experienced disruptions, without release of any of the enclosed radioactive substances.

6.3 Transport Procedure

(1) Operating instructions shall be provided for the transports in which the procedures are specified.

(2) Traffic regulations shall be specified for the transports on the nuclear power plant site that shall, generally, follow the Highway Code.

(3) The transported items shall be secured on the transport equipment against tilting, sliding and falling down.

(4) The transports shall be carried out such that inadvertent spreading of contamination is avoided as far as possible.

(5) If, in exceptional cases, transports of unshielded or insufficiently shielded highly radioactive items are carried out, then persons not directly involved with the transport shall be prevented from having access.

(6) Transport procedures once started shall normally be finished without interruption. If unusual conditions make this impossible, then the transports shall be carried out sufficiently far that they present no avoidable hindrance to other work procedures and that general safety is not impeded. Interrupted transports shall be reported to the radiological protection officer or to a person authorized by him and shall be finished as soon as possible.

6.4 Transfer of Radioactive Substances

Note:
The objective of transfer is the transport into another nuclear facility. This transport is subject to the corresponding legal regulations regarding transportation of dangerous goods. More extensive requirements for the transportation of radioactive substances, especially radioactive waste, are also contained in other legal regulations, e.g., Atomic Energy Act, Radiological Protection Ordinance or – in the case of international transports – the Waste Transportation Ordinance. All these regulations, together with the acceptance conditions of the receiving organization, contribute to defining the extent of the required documentation as well as the correspondingly required administrative procedures.

(1) The transfer of radioactive substances requires the examination or supervision by the radiological protection officer or by a qualified person authorized by him.

(2) Before the transfer of liquid radioactive wastes that are to be transported in tank vehicles, the volume of the liquid
radioactive wastes to be disposed of shall be determined and the radioactivity of the major contributing radionuclides estimated on the basis of the records specified under Section 4.4 para. 2 or of the measurement of a test specimen taken before filling the tank vehicle.

6.4.1 Transfer stations for liquid radioactive waste

(1) The transfer stations shall be located within a controlled-access area.

(2) Any accessible surface of the transfer stations shall normally be such that they can be easily decontaminated.

(3) The transfer stations shall be provided with possibilities for decontamination (e.g., supply connection for demineralized water and drain connection for the contaminated water).

(4) Transfer stations for non-packaged liquid radioactive waste shall, during the transfer and filling procedure, be secured against access from personnel not directly authorized for performing tasks related to the transfer.

(5) The filling devices of the tank vehicle for non-packaged liquid waste shall, during the transfer and filling procedure, basicall, be positioned over a leak tight drain pan that shall be so equipped to be drainable. Alternatively, the tank vehicle or the tank container can be equipped with corresponding drip catching devices.

(6) The filling device for non-packaged liquid radioactive waste shall be equipped with a system which will reliably prevent an overfilling of the tank vehicle.

(7) The coupling elements from the transfer station to the tank vehicle shall be equipped with tightly closing valves that can be opened only after proper coupling has been achieved. The residual volume between these valves shall be limited to the technically possible minimum.

(8) The connection hoses or connection pipes of the transfer station shall each be equipped with a drip catching device. Connection hoses including their coupling elements and hose clips shall be dimensioned such that they can be tested at a pressure level twice the maximum permissible operating pressure.

(9) Equipment shall be available that can be used to flush the connection hoses.

(10) Connection hoses including their coupling elements shall, prior to beginning the filling procedure, be subjected to a visual inspection, a leak tightness test, a pressure test at the maximum permissible operating pressure and a functional test.

(11) During filling procedures, the air possibly escaping from the transport containers shall be led directly to the exhaust air system.

6.4.2 Transport allocation storage

(1) Transport allocation storage serves as buffer storage of packaged items until their actual transportation off of the plant site. Location for this storage may be within a monitored area, a controlled-access area, in the open or inside buildings.

(2) In areas used for transport allocation storage, it is not allowed to handle non-packaged radioactive substances.

(3) The packaged items in the transport allocation storage shall be secured against unnoticed opening by suitable means, e.g. lead seals.

(4) The areas for transport allocation storage shall be equipped with suitable handling equipment, lifting equipment, etc., to enable an easy transfer of the packaged items to the transport vehicle.

7 Handling and Storage of Radioactive Sources

7.1 Radioactive Sources

The requirements specified under Sections 7.2 through 7.4 shall apply to the following radioactive sources used for calibration purposes and functional tests:

a) test sources and measurement standards for functional testing and the calibrating of radiation measurement equipment,

b) radiation sources for radiographic examinations,

c) open radioactive source such as

ca) solutions of embedded or non-embedded gamma ray emitting radionuclides of a known radioactivity concentration for calibrating gamma spectrometers, circuit water and waste water monitoring equipment,

cb) solutions of a known radioactivity concentration for the radiochemical determination of the separation efficiencies in identifying and determining radioactive nuclides (e.g., waste water analysis),

cc) gaseous radioactive sources for functional testing of delay facilities and for calibrating measurement equipment for monitoring the exhaust air (e.g., krypton 85, xenon 133).

7.2 Handling of Enclosed Radioactive Sources

(1) The radioactive sources as well as their storage containers shall be marked in accordance with Sec. 68 StrlSchV. On the basis of this marking it shall be possible to ascertain the following information:

a) type of the radioactive substance (name of nuclide),

b) radioactivity and point in time of when it was determined.

(2) The source may only be transported out in containers specified for this transport.

(3) Any work on the leak tight enclosure is impermissible that could possibly damage the enclosure.

(4) Any damage or loss shall immediately be reported to the radiological protection officer in charge.

7.3 Handling of Open Radioactive Sources

(1) The storage containers for open radioactive sources shall be marked in accordance with Sec. 68 StrlSchV. On the basis of this marking it shall be possible to ascertain the following information:

a) type of the radioactive substance (name of nuclide),

b) radioactivity or activity concentration and point in time of when it was determined.

(2) The sources may only be transported in containers specified for this transport.

(3) When handling open radioactive sources care shall be taken that any incorporation and contamination is prevented.

(4) If it must be suspected that, due to handling of open radioactive sources, an incorporation occurred, the radiological protection officer or a person authorized by him shall immediately be informed.

(5) All those equipment used for transfer filling and various handlings and treatments of open radioactive sources and the contamination of which has not been removed shall be marked accordingly if a possibility of a mix-up cannot be excluded.
7.4 Storage

(1) The storage locations for the radioactive sources shall be located within the controlled-access area or in the monitored area and shall be marked accordingly.

(2) Storage locations and the storage containers of the radioactive sources shall be designed such that they can be easily decontaminated.

(3) Compartments intended for the storage of open radioactive sources the radioactivity of which exceeds the clearance limit values shall be connected to an air-conditioning facility, the air supply and air exhaust of these compartments shall be such that a distribution of contaminated air is avoided.

(4) Open and enclosed radioactive sources – when they are not being used or not involved in a work procedure – shall be stored in the containers provided for this purpose. The containers shall be marked accordingly.

(5) Storage compartments containing radioactive sources the radioactivity of which exceeds the clearance limit value shall be checked for contamination in regular time intervals and the local dose rate shall be monitored.

(6) Records shall be kept on the available, the incoming and outgoing radioactive sources and their whereabouts. On the basis of these records it shall be possible to ascertain the following information:

a) storage location,
b) type of the radioactive substance (nuclide name),
c) radioactivity or activity concentration and point in time of when it was determined,
d) type of the radioactive source (open or enclosed),

In the case of open radioactive sources, the chemical compositions shall, additionally, be recorded.

8 Tests

8.1 Facilities for the Storage, Handling and Treatment and Transfer of Radioactive Substances

8.1.1 General requirements

(1) Facilities for the storage, handling and transfer of radioactive substances shall be subjected to the following tests:

a) tests prior to construction,
b) accompanying tests,
c) inservice inspections.

(2) The results of the tests shall be recorded in reports, attestations and certificates. These test records shall contain all important information about the tests performed. This information shall include at least:

a) unambiguous identification of the test object,
b) type of test and specification of the corresponding test instruction,
c) list of the documents supplied for the individual test,
d) the individual tests performed and their results,
e) identified deficiencies and, if necessary, the imposed deadline by which the deficiency shall be repaired and subsequent renewed test shall be performed,
f) summarizing remarks whether or not or under what restrictions the test object corresponds to the requirements and can be correctly applied and operated as specified,
g) name and signature of the tester including the location and date of the test.

(3) The tester shall affix every individual document that he has checked with a mark of approval and with a reference mark correlating the document to the corresponding test certificate.

(4) If any previously examined documents are changed then the changes shall be subjected to a renewed examination.

8.1.2 Tests prior to construction

(1) In accordance with the specifications of the proper authority the following items shall, if applicable, be checked by an expert authorized by the authority:

a) whether the facilities required for storage, handling and treatment and release are provided and suitable,
b) whether the facilities are designed in accordance with the applicable regulations, standards and guidelines and are sufficient with respect to the safety related requirements,
c) whether the facilities can be subjected to the inservice inspections required in accordance with the test schedule as specified under Section 8.1.4 para. 2.

(2) In this regard and if applicable, the design of the facilities shall be examined based on the following documents:

a) safety analysis report,
b) plant specifications,
c) procedural descriptions and diagrams,
d) transportation flow diagrams,
e) radioactivity flow diagrams (volumes and activities),
f) lists of components with the important data,
g) valve list,
h) lists of the measurement locations and interlocks,
i) component arrangement plans,
j) piping arrangement plans.

Note: The component and piping arrangement plans prior to the construction of the buildings contain location and arrangement of components, valves and pipes beginning at a nominal diameter greater than or equal to 50.

k) loading plans,
m) compartment lists with the expected local dose rates,
n) test schedule for inservice inspections and maintenance tasks,
o) building plans and layout drawings in which the radiological protection measures are marked (e.g., boundaries of monitored areas, set-down locations for dismantled radiating parts, transport paths for radioactive wastes).

The extent and detailing of the documents shall be in accordance with the extent of the individual license agreement.

Note: See also: "Guideline for the Radiological Protection of Personnel during Maintenance Tasks in Nuclear Power Plants with Light Water Reactors; Part 1: Precautionary Measures to be Taken During Planning of Plant" of July 10, 1978 (GMBL. 1978, p. 418).

8.1.3 Accompanying tests

8.1.3.1 Extent of the accompanying tests

The accompanying tests shall comprise:

a) design review,
b) material, construction and pressure tests, and

c) acceptance and functional tests.

Type and extent of the tests shall be specified in a test schedule.
8.1.3.2 Design review

A design review shall be carried out for those facilities for the storage, handling and treatment and transfer of radioactive substances, the failure of which could lead to a radioactivity release that would exceed the licensed limit values for specified normal operation or for which it must be feared that the limit values pursuant to the Radiological Protection Ordinance regarding radiation exposure of one or more persons are exceeded; this design review shall be carried out in accordance with specifications by the proper authority and, if required, in cooperation with an expert authorized by this authority.

8.1.3.3 Material, construction and pressure tests

The fabrication and assembly of facilities or of parts of facilities for the storage, handling and treatment and release of radioactive substances that are subject to the design review specified under Section 8.1.3.2 shall be tested in the manufacturing plant or on the construction site. It shall be checked whether the facility parts are in conformance with the design reviewed documents. These tests shall be performed by qualified personnel of the operating utility or of the manufacturer and, if required in accordance with specifications by the proper authority, in cooperation with an expert authorized by this authority.

8.1.3.4 Acceptance and functional tests

(1) Facilities or parts of facilities for the storage, handling and treatment and release of radioactive substances that are subject to the design review specified under Section 8.1.3.2 shall be subjected to acceptance and functional tests prior to commissioning and after every repair. These tests shall be performed by qualified personnel of the operating utility or of the manufacturer and, if required in accordance with specifications by the proper authority, in cooperation with an expert authorized by this authority.

(2) Prior to the acceptance and functional tests of design-reviewed facilities or parts of the facilities, the results from the material, construction and pressure tests shall have been made available. The acceptance and functional tests shall be performed, if applicable, in accordance with the following documents:
   a) test schedules,
   b) plant specifications,
   c) procedural descriptions and diagrams,
   d) operating and maintenance instructions,
   e) transportation flow diagrams,
   f) component data sheets,
   g) plans of measurement locations and interlocks,
   h) valve lists,
   i) component arrangement plans,
   k) piping arrangement plans.

(3) Within the framework of the acceptance and functional tests it shall be established whether the facilities have been constructed in accordance with the licensed documents and whether they can be safely operated and properly maintained.

8.1.4 Inservice inspections

(1) Inservice inspections shall be performed to establish whether the facilities for the storage, handling and treatment and transfer of radioactive substances continue to meet the specified requirements.

(2) Type and extent of the inservice inspections, the inspection intervals and the testers shall be specified in a test schedule. If required in accordance with specifications by the proper authority, this test schedule shall be established in cooperation with an expert authorized by this authority.

(3) The inservice inspections shall comprise:
   a) examination of the operating records regarding the operation, tests and maintenance and repair tasks,
   b) visual inspection and checking of the proper functioning of the facility, its systems and its components with special attention paid to the safety equipment and safety measures required as specified under this safety standard or under the license, and
   c) verification of the test certificates and attestations for exchanged parts.

8.2 Mobile Facilities

8.2.1 General requirements

(1) Mobile conditioning facilities shall be subjected to the following tests:
   a) preliminary tests,
   b) acceptance and functional tests,
   c) in-service inspections.

(2) The results of the tests shall be recorded in reports, attestations and certificates. These test records shall contain all important information about the tests performed. This information shall include at least:
   a) unambiguous identification of the test object,
   b) type of the test and specification of the corresponding test instructions,
   c) list of the documents supplied for the individual test,
   d) the individual tests performed and their results,
   e) identified deficiencies and, if necessary, the imposed deadline by which the deficiency shall be repaired and subsequent renewed tests shall be performed,
   f) summarizing remarks whether or not or under what restrictions the test object corresponds to the requirements and can be correctly applied and operated as specified,
   g) name and signature of the tester including the location and date of the test.

(3) The tester shall affix every individual document that he has checked with a mark of approval and with a reference mark correlating the document to the corresponding test certificate.

(4) If any previously examined documents are changed then the changes shall be subjected to a renewed examination.

8.2.2 Preliminary tests

(1) Prior to the delivery and installation of a mobile conditioning facility in a controlled-access area, it shall be checked whether
   a) the planned mobile conditioning facility is suited to safely perform a correct conditioning of the raw wastes as specified,
   b) this facility has been licensed in accordance with the Atomic Energy Act or subordinate legal provisions and that the licensing provisions have been complied with,
   c) the planned set-up location of the mobile conditioning facility is suited with regard to its technical boundary conditions, e.g., floor loading, operating media supply, influence on radiological conditions in neighboring areas and in transport paths, logistics for the supply of raw waste and for the transfer of the conditioned wastes, and whether the radiological protection of the personnel is ensured during its operation.
(2) With regard to the tests specified under para. 1, the following documents shall be provided:

a) procedural sequence plan, test sequence plan or a campaign-independent procedure qualification for the conditioning procedure,

b) specification of the waste water, exhaust media and other substances released from the conditioning facility and transferred to the systems of the nuclear power plant,

c) component arrangement plans, loading plans, technical support documents for the required interfaces, specifications of the required operating media, descriptions pertaining to the operation and maintenance,

d) individual type approval license, if applicable, including all subordinate provisions
da) test schedule for inservice inspections, and

db) test schedules for commissioning and functional tests.

8.2.3 Acceptance and functional tests

After installation of the mobile conditioning facility the facility shall be subjected to an acceptance and functional test. This test shall be performed to ascertain whether:

a) the technical condition, the spatial arrangement and the interconnection of facility components and their connection to the corresponding systems of the nuclear power plant are in correspondence with the conditions on which the preliminary test was based,

b) all operating modes proceed in a functionally correct and fault-free manner,

c) in the presence of corresponding initiating criteria, the safety related switching functions are correctly executed as specified (e.g., emergency shut-down, high-temperature shut-down, isolation of the systems, high-temperature warning, break of the vacuum),

d) the functioning of all safety related switching functions is ensured in all of the individual operating procedures, and
e) the radiological protection of the personnel is ensured during operation and maintenance.

8.2.4 Inservice inspection

Note:
The inservice inspections of mobile conditioning facilities are performed with a special view to their meeting the specified requirements and are performed under the responsibility of the licensee authorized for the mobile facility.

If individual type approval licenses pursuant to Sec. 7 StrlSchV are available for these facilities then the requirements regarding inservice inspections shall be extracted from these licenses.

9 Documentation

(1) The documents provided for the construction and operation of the facilities for storage, handling and treatment, transfer and transport shall be compiled prior to the commissioning of the facilities. These documents shall reflect the actual state of the planned storage and handling and treatment.

(2) The documents shall reflect the technical and administrative measures required to meet the requirements specified under Sections 3 through 8. Special attention shall be paid to describing the planned procedures and the required radiological protection measures; these shall, if required for better clarity, also be described in corresponding drawings.

(3) The documents specified under Sections 3.4 para. 17, 4.4 para. 2, 5.1 para. 6, 5.4 para. 2 and 7.4 para. 6 shall be included in the documentation.

(4) The persons authorized with the planning or supervision of storage, handling and treatment and transport procedures as well as for the transfer shall have access to the documents required for properly performing these tasks.

(5) When recording the radioactive wastes, the requirements regarding the electronic record system pursuant to Sec. 73 StrlSchV shall be taken into consideration.
Appendix

Regulations Referred to in this Safety Standard

Regulations referred to in this safety standard are valid only in the versions cited below. Regulations which are referred to within these regulations are valid only in the version that was valid when the latter regulations were established or issued.

Atomic Energy Act

StrlSchV
Ordinance on the protection from damage by ionizing radiation (Radiological Protection Ordinance - StrlSchV) of July 20, 2001 (BGBl. I, p. 1714), most recently changed by Act of September 1, 2005 (BGBl. I, p. 2618)

RSK Guideline (12/2002)
Safety requirements for the longer-term interim storage of low-level and intermediate-level radioactive waste, in the version of Dec. 5, 2002 and the reformulated Sec. 2.7.1 (third dash item) of Oct. 16, 2003

KTA 2101.3 (12/2000)
Fire protection in nuclear power plants; Part 3: Mechanical and electrical components

KTA 3603 (06/1991)
Facilities for treating radioactively contaminated water in nuclear power plants

DIN EN 779 (05/2003)
Particulate air filters for general ventilation - Determination of the filtration performance; German version EN 779:2002