

Ruprecht-Karl-University Heidelberg

The authorized representative for radiation protection

**Notes for radiation protection agents  
of the Heidelberg University (radiation protection area II)**

newly revised edition from 2004, based on the new StrSchV from 2001 and the StrSchAnw  
from 2003 for the Heidelberg University

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### ***Fundamental duties of the radiation protection agents***

- 1.) The radiation protection agent is responsible for the keeping of all regulations, instructions and rules for radiation protection and for the general principles for radiation protection.
  
- 2.) The radiation protection agent takes care that both uninvolved persons and employees exposed to radiation at work are not unnecessarily exposed to radiation and he takes care that contamination both in radioactive laboratories and in adjoining public areas is avoided.
  
- 3.) The radiation protection agent must (whilst fulfilling his duties) take care to minimise both internal and external exposition of employees to radiation even below the defined limits.
  
- 4.) Deliberate or negligent violations of the rules for radiation protection may be punished with fines up to 50,000 €. See § 116 StrlSchV.
  
- 5.) The radiation protection agent (who is responsible for the concerned area of radiation protection) designs a user specific instruction for radiation protection in accordance with the department for radiation protection of the “*ZENTRALBEREICH Neuenheimer Feld*”.
  
- 6.) An important duty of the radiation protection agent is to carefully inform all employees exposed to radiation and to provide written instructions. The following items must be offered in printed form or posted in any radiation protection area (accessible to all radiation exposed employees):
  - the radiation protection regulation
  - the instruction for radiation protection
  - the regulations for the handling of radioactive substances at the Heidelberg University  
(radiation protection area II)
  - user specific instruction for radiation protection
  - the dose limits for the rooms (*Anlage zur Allgemeingenehmigung*)
  - addresses to contact in case of an accident at a radioactive place of work (*Alarmliste*)
  - rules of conduct in case of an accident
  - the duties of a radioactive laboratory service (*Isotopenlabordienst*)
  - the instruction for decontamination
  - conditions for the acceptance of radioactive waste
  - if necessary a journal for the Iodine absorption device (*Betriebsbuch Iodsorptionsfilteranlage*)
  - if necessary an operating instruction, an authorization and a building type approval or a test report for a X-ray device

### ***Proficiency and other qualifications***

7.) Proficiency is the basis for the job of any radiation protection agent and part of the requirement for the authorisation to work with radioactive material.

The new radiation protection regulation (*Strahlenschutzverordnung*, StrlSchV) has greatly enhanced the status of proficiency and has stated it more precisely. According to § 30 StrlSchV and § 18a RöV the proof of proficiency requires a suitable education, practical knowledge and successfully completed special courses.

The following regulation is new: once acquired proficiency must be actualised at least every 5 years else it is no longer valid.

**Please note:** According to the present interim regulations the data for actualisation of proficiency given in form 1 must be kept.

8.) The appointment of radiation protection agents thus requires the following items:

- certificate of attending a course in radiation protection (*Fachkundegruppen* 2.1, 2.2, 4.1, 4.2) and if necessary of a course for the actualisation of proficiency
- experience in handling open radioactive sources or X-ray devices (certificate)
- a certificate stated by the police, that the holder has no criminal record (*Führungszeugnis*)
- registration at the department for radiation protection

### ***Regulations for deputies***

The continuous supervision by the radiation protection agent or by his deputy is required in radioactive laboratories. The head of a department should therefore take care for representatives in case of holidays or sickness.

**Please note:** If the radiation protection agent is not present, or if he or his deputy cannot be in situ within ca. 30 minutes, all work with radioactive substances must be stopped!

### ***Supervisory functions***

10.) The radiation protection agent has to check before a new employee starts to work in a radioactive laboratory if the new employee who will be exposed to radiation does fulfil the following requirements:

- registration of a new employee exposed to radiation at the department for radiation protection
- medical entrance examination (certificate by the authorized physician for radiation protection)

**Notice:** Employees working in radioactive laboratories and X-ray rooms of the radiation protection area II (*Strahlenschutzbereich* II) are classified as belonging to category B. At the

Heidelberg University the employees exposed to radiation at work - category B must be examined by a radiologist (first examination **and** final examination)

-- integration in the dosimetry of persons

**Notice:** The employees working in the operational control areas (*Betriebliche Überwachungsbereiche*) must be equipped with official personal dosimeters

Exception: The department for radiation protection supplies the cleaning personnel of the university with official personal dosimeters

-- instructions according to § 38 StrlSchV and RöV

**Notice:** Employees who work only in the operational control areas (*Betriebliche Überwachungsbereiche*) must also be instructed annually. Guests and short time visitors will also be instructed by the radiation protection agent.

Exception: The department for radiation protection instructs the cleaning personnel of the university once a year.

11.) The radiation protection agent takes care that the restrictions and prohibitions of work according to the radiation protection regulation (*Strahlenschutzverordnung*) and the instructions for radiation protections (*Strahlenschutzanweisung*) will be obeyed. He has to take special care that pregnant employees and persons under 18 years will not be exposed to radiation and that they will not incorporate radioactive substances.

12.) The radiation protection agent supervises the amounts of material for work and storage as specified in the approval and he observes the conditions of the supervisory authority. Please note that working with radioactive substances without approval in any one rooms of the University (radiation protection area II / *Strahlenschutzbereich II*) is not allowed.

**Notice:** The amounts of material for work and storage in the radiation protection area II (*Strahlenschutzbereich II*) must be regarded as the sum of their single activities. The total amounts for the single radioactive isotopes approved for the University clearly exceeds the exemption limit (*Freigrenze*).

No radioactive substances may be kept in the buffer zones (floors, shuttle areas). Also LSC-devices and other laboratory equipment may not be there.

13.) The radiation protection agent checks if incorporation monitoring is necessary for each single employee. The department for radiation protection will help.

14.) The radiation protection agent regularly monitors the radioactive laboratories for contamination and he checks the adjoining public areas for spread contamination. The department for radiation protection will give its advice about appropriate measuring techniques.

- 15.) The radiation protection agent must confirm in writing that equipment that needs repairing is free of any contamination before the equipment is shipped or given to a workshop.
- 16.) The radiation protection agent takes care that only working equipment which is necessary for the work with the radioactive material (hence no items like umbrellas, radios, bags etc.) may be entered into any radiation protection area (*Strahlenschutzbereich*): into the radiation control areas (*Kontrollbereiche*) **and** into the operational control areas (*Betriebliche Überwachungsbereiche*). In return objects may only be removed out of the control area if they are completely harmless in concern of hygiene and virology and if they are (without any doubt) not contaminated by radioactive substances. This is ensured by opening measurements.
- 17.) The radiation protection agent takes care that the working places where experiments with radioactive substances take place are marked.
- 18.) The radiation protection agent takes care for the regular checks of the sealing and for the maintenance of devices according to the regulations given by the supervisory authority. Copies of the check and maintenance reports must be forwarded to the department for radiation protection.
- 19.) If the casings of enclosed radioactive substances are suspected to be damaged or no longer tight they may no longer be used. The radiation protection agent must take care that an expert checks the tightness as soon as possible.
- 20.) The radiation protection agent takes care that radioactive substances are only stored in authorized rooms and there only in lockable and shielded safes or refrigerators or deep freezers. Radioactive substances which are not required for an actual experiment must be stored there.  
Radioactive substances or encapsulated sources of radiation may not be stored with free access on tables or elsewhere in the laboratory outside the working hours.
- 21.) The radiation protection agent has to ensure that radioactive substances can not be stolen or misused during or after working hours.
- 22.) The radiation protection agent is responsible for the official dosimetry of persons with phosphate glass dosimeters (*Phosphatglasdosimeter*) and – if needed - finger ring dosimeters (*Fingerringdosimeter*, e. g. when adjusting Mössbauer radiation sources, X-ray tubes or during the use of [<sup>32</sup>P] or [<sup>36</sup>Cl] with more than > 200 MBq). The monitoring interval (*Überwachungszeitraum*) is one month for **all** employees.
- 23.) The radiation protection agent has to check regularly the proper function of the iodination work stations (if present), the fume hoods and the laminar flow benches. In case of a malfunction the work with radioactive substances must be stopped immediately.
- 24.) The radiation protection agent takes care that experiments with animals and plants that involve radioactive substances are only performed in radiation control areas (*Kontrollbereiche*). Living animals which have been treated with radioactive substances must be kept in special cages which are available in the central animal laboratory (*Zentrales Tierlabor*). The risk of contamination is higher when organs or blood are being removed. The department for radiation protection must be contacted before the start of the experiments.

Furthermore it must be checked if the administered radioactive substances are metabolised and exhausted. The amount of released gaseous radioactive material must be assessed.

### ***Duties connected with the care for technicians, service and foreign personnel***

25.) The radiation protection agent has to ensure that the work in a radioactive laboratory is stopped during the cleaning of the floor or during repair or maintenance services of foreign or internal personnel.

26.) The radiation protection agent ensures that the floors which should be cleaned and the equipment which should be maintained or repaired are free of contamination.

27.) The technicians and caretakers of the departments of the “*ZENTRALBEREICH Neuenheimer Feld*” and also the employees of foreign companies receive their dosimeters from the department for radiation protection. This department also instructs the foreign employees and gives them a written confirmation which serves as a legitimisation for the stay in radioactive laboratories. The radiation protection agent must take care that the above mentioned employees are instructed and that they wear the stipulated protective clothing (gloves, laboratory coats and if necessary breathing masks) and dosimeters.

28.) The working areas of the workmen and cleaning personnel must be measured and approved free of radiation extensively.

29.) Workmen employed at the university or the medical centre may stay in radioactive laboratories only under the permanent supervision of the radiation protection agent. The same is valid for employees of foreign companies.

30.) Pregnant cleaning ladies, pregnant employees of foreign companies and young persons under the age of 18 may neither work in the radiation control areas (*Kontrollbereiche*) nor in the operational control areas (*Betriebliche Überwachungsbereiche*).

### ***Waste disposal***

31.) The radiation protection agent controls the regular disposal of radioactive waste and introduces the involved personnel conscientiously.

32.) The radiation protection agent signs the document of acceptance for radioactive waste (*Übernahmeschein für radioaktive Abfälle*, please use the form 13) and is thereby legally liable for the proper declaration of the radioactive waste to be disposed of.

For each waste container a document of acceptance must be drawn up. Please note the conditions for the acceptance of radioactive waste (*Annahmebedingungen für radioaktive Abfälle*, appendices 5 and 6 of the “regulations for the handling of radioactive substances at the Heidelberg University”, *Regeln für den Umgang mit radioaktiven Stoffen in der Universität Heidelberg*)

The documents of acceptance must be stored for at least 5 years!

33.) Waste which results of working with radioactive substances may not be measured and approved free of radiation by the radiation protection agents and may under no conditions be



disposed of as “normal waste” (*Normalmüll*). This waste produced in the radiation protection areas (in the radiation control areas (*Kontrollbereiche*) **and** into the operational control areas (*Betriebliche Überwachungsbereiche*)) must be handed over to the department of radiation protection.

34.) Laboratory equipment, laboratory devices, LSC-devices and gas chromatography devices with built-in electron capture detectors (ECDs) may only be removed after the department for radiation protection has checked them and if necessary has removed any radioactive sources and has given them free for disposal.

35.) Radioactive labelled carcasses, radioactive samples of organs, radioactive blood samples and straw out of cages of radioactive animals must be handed over to the department of radiation protection in frozen state.

### ***Ordering of radioactive substances***

36.) Radioactive substances must be ordered in written form and may only be signed by the radiation protection agents and their deputies. Ordering by telephone, by email or by www-home pages is not allowed (please use only the form 14).

Please note that missing entries and signatures on ordering forms may cause a delay of payment followed by a reminder of the vendor. If the limit for the ordered amount is exceeded the authorized representative for radiation protection may prohibit the next order.

37.) Please order radioactive substances as prescribed below:

- check if the supplier has got a copy of the approval for handling
- check the maximum ordered amounts (the approved amounts of material for work and storage may not be exceeded)
- send your orders by fax or by letter (white sheet of paper)
- acknowledge the delivery on the delivery note with your signature and add the date, the time and the place (building, room number) of the delivery
- complete the details of the delivery on the order form and add the details about the delivered radioactive nuclides and their activities (blue, red and yellow sheet of paper)
- hand over the original bill, the delivery note, if necessary an order to pay and the red and the blue sheet of paper to the department for radiation protection
- if the total amount of the bill shall not be transferred by the financial department of the university or the university hospital please add an envelope with the relevant address

Keep the yellow sheet of paper, the copy of the bill and the delivery note for at least 5 years in your files (period of keeping)

38.) Deliveries of radioactive substances may only be accepted by the radiation protection agent or by his deputies

39.) Deliveries of radioactive substances may only be accepted at the entrances of the radiation control areas (*Kontrollbereiche*) or the operational control areas (*Betriebliche Überwachungsbereiche*). The radioactive substances must be transported immediately to their appropriate store.

40.) When encased radioactive substances or ECDs are ordered or purchased the same procedures must be followed as with open radioactive substances. The purchase of a liquid scintillation counter with an external standard option (dpm measurement) includes the purchase of an encased radioactive substance! The same procedure is valid for  $^3\text{H}$ - and  $^{14}\text{C}$  standard preparations for the calibration of a LSC.

### ***Matters that must be reported/applications***

41.) The radiation protection agent is obliged to give information and to report about the following items (see also the appendix 3 of the regulations for the handling of radioactive substances at the Heidelberg University):

- the ordering of radioactive substances (please use form 14)
- the six-monthly report about the actual amount of radioactive substances with short and long half-life (please use form 9)
- the report about the acquisition of special radioactive substances, e. g. radioactive sources given free from other departments or external institutions, the buying of a LSC with integrated external standards, the buying of gas a gas chromatograph with integrated ECD etc. (please use only the form 14)
- the report about the handing over of radioactive substances, e. g. radioactive sources given free to other departments or external institutions, the handing over or scrapping of a LSC with integrated external standards, the handing over of gas a gas chromatograph with integrated ECD etc.
- the report about significant short-term changes of the amount of radioactive substances (please use form 17)
- The waste disposal is registered by handing over the document of acceptance for radioactive waste (*Übernahmeschein für radioaktive radioaktive Abfälle*) to the department of radiation protection (please use form 13)
- the application of the entrance physical examination/final physical examination of persons exposed to radiation (please use form 3)
- the written confirmation that equipment that needs repairing is free of any contamination before the equipment is shipped or given to a workshop (please use form 10)
- the report of the pregnancy of employees exposed to radiation at work (please use form 6)
- the report about the need of the monitoring of incorporation (urine analysis)

- the six-monthly report about the actual number of employees exposed to radiation at work (please use form 4)
- the registration of new employees exposed to radiation at work (please use form 5)
- the cancellation the registration of employees exposed to radiation at work (please use form 5)
- the report of the instruction according to §38 StrlSchV or §36 RöV (please use form 7 or 8)
- the report about any contamination (persons and equipment)
- the report about special incidents (accidents in radioactive laboratories, malfunctions, problems with the aeration, malfunction of radiation meters, suspected incorporation of radioactive substances, loss of radioactive substances)
- the report of water damage
- the report about malfunctions of the iodine absorption device (if present)
- the report about malfunctions or anomalies during the use of radiation units (if present) or of other strong sources of radiation
- the report about orders for checking or maintaining of shielded radioactive sources (Mössbauer spectroscopy, blood radiation unit) or of other devices which produce ionising radiation (X-ray devices, electron microscopes)

42.) Changes of the approvals (rooms, the amount of stored or used material, the kind of radioactive nuclides) and also changes of the operating instructions for X-ray devices (e. g. the change of X-ray tubes, the change of locations) must be registered or applied for at the department for radiation protection (please use form 11 or 12).

43.) Because of their special responsibility – even outside working hours - the radiation protection agents and their deputies must provide the information about their place of residence and the accessibility of the technical control centre (*Zentrale Leitwarte Technik*) and of the authorized representative for radiation protection (please use form 2).