Leibniz-Institut für Meereswissenschaften

- IFM-GEOMAR -

an der Universität Kiel

Radiation protection direction

for the usage of radioactive substances onboard R/V "Poseidon"

Translated from the

Strahlenschutzanweisung

für den Umgang mit radioaktiven Stoffen an Bord von FS "Poseidon"

1. General

1.1 Non-adequate use of radioactive substances may lead to insufficiencies in health, and subsequently may hinder later use of radio isotopes. Users therefore are requested to observe all public laws, in particular the "Radiadion Protecting Order" ("StrSchV"), user instructions, orders of the ship's command and and the following directions. Users not observing these rules maybe forced to finish their investigations immediately.

The state of Schlewig-Holstein's "Ministerium für Arbeit, Soziales Jugend und Gesundheit" has licenced the use radioactive substances in the **Chemical Laboratory onboard R/V POSEIDON**. The permission is timely limited.

The following isotopes are licenced:

H-3

C-14

P-32

S-35

Planned use of radio isotopes has to be applied for at the official responsible for radiation protection of IFM-GEOMAR three weeks before the cruise. The use of other isotopes as listed above has to be applied for 2 months before the cruise. IFM-GEOMAR then will apply for special licence at the ministry.

All applications need to provide the following information: activity, type and chemical formulae of the radioactive nuclide(s); type and amount of radiactive waste; time period and research region of the cruise; name of the official responsible for radiation protection. The

official responsible for radiation protection must prove his special knowledge through having taken part at an approbiate training course.

2. Entering and leaving the Chemical Laboratory

Users must enter the laboratory in work clothes only. Unauthorized persons, persons under the age of 18 years, and pregnants are not allowed to enter the laboratory.

Work clothes and work shoes must stay in the laboratory. Only exemption is, if the official responsible for radiation protection has stated that they are free of contamination.

3. Usage of radioactive substances

All work must be conducted in the chemical laboratory. Non-neccessary radioactive exposure or contamination of persons, material or the environment must be avoided. Even if radiance is below the limiting values set by the “Radiation Protecting Order”, radiative exposure and contamination must be minimized according taking into account the special circumstances and accepted scientific and technical standards. It is not allowed to eat, to drink, to smoke or to snuff in the chemical laboratory.

Work with radiactive substances only is allowed if the official responsible for radiation protection is present.

Instruments and tools are to be used in the laboratory only; if they are to be brought outside the laboratory they must be free of contamination.

Work with non-sealed (open) radioactive substances is allowed on trays only, that have sufficient capacity to keep all of the liquid. In case of energetic beta-radiance (P-32), sufficient screening and distance keeping devices and filling systems are to be used.

In case that radioactive gases or dust can develop, work must be performed under sufficiently effective escapes.

All vessels and instruments containing radioactive substances must be labelled.

At the end of each work day, parts exposed to radioactive substances like hands, work clothes, work area and used instruments must be cleaned and then be controlled using a swap test.for radioactive contamination. The result is to be protocolled (att. 1). If the result is higher than the allowed limiting value, the procedure has to be repeated. At the end of a cruise or in case the user group changes, the chemical laboratory must be cleaned and efficiency of cleaning must be controlled using swap tests. The result has to be protocolled (att. 2) and together with a balance to be provided to the ship's master and to the "Isotopenlabor" of IFM-GEOMAR.

4. Incidents

The official responsible for radiation protection is to be informed immediately about incidents and accidents in order to initiate neccessary reaction.

Any other work in the chemical laboratory than neccessary to minimize and remove the risks of such incidents must be finished immediately. They maybe continued only after having abolished the incident.

In case a person might have incorporated radioactive substances, she/he must consult an authorized medical practitioner as soon as possible.

While cleaning contaminated objects, the waste water must be taken within containers. After the cruise, filled containers must be handed over to the "Isotopenlabor" of IFM-GEOMAR.

Any accident, incident or events relevant for security and reactions to such, must be reported to the "Isotopenlabor" of IFM-GEOMAR which will forward this report to the "Ministerium für Arbeit, Soziales, Jugend und Familie".

5. Storage and disposal of radiactive waste

Radiactive substances need to be stored under controlled access and be safely protected against fire in boxes foreseen for it or within the lockable refrigerator. The storage place must be secured such that the cladding cannot be damaged if exposed to mechanical forces (including e.g. sea swell). Radioactive substances must not to be stored together with inflammable or other hazardous goods.

The amount of activities outside the storage must be minimized to the necessary activity needed for the special purpuse.

After the cruise, all remaining radioactive substances including radioactive waste must be removed completely and be handed to the official responsible for radiation protection in the "Isotopenlabor" of IFM-GEOMAR or his/her substitute. It is not allowed to dispose radioactive waste water into the sea via the the ship's cooling or waste water system.

6. Radiation Protection Order

A copy of the Radiation Protection Order ("StrSchV") can be found in the chemical laboratory (*in German*).

7. Coming into force

This radiation protection instructions will be effective immediately.

Kiel, 15th December 1994,
The acting director
Signature: (illegible)
Prof. Dr. D. Adelung

Attachment 1

Work with radioactive substances aboard R/V POSEIDON and ALKOR

Daily swap tests

Vessel:_____ **Cruise/leg no:_____**
Laboratory:_____

Date: _____ **Swap tests performed by:**
_____

The daily swap tests serve controlling radioactive contamination after work, once a day. Swap tests are performed in particular on hands, (protecting) clothings, work area, used tools and instruments. The results are noted in the protocol below.

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Attachment 2

Work with radioactive substances aboard R/V POSEIDON and ALKOR

Final protocol after decontamination

Vessel:_____ Cruise/leg no:_____
Laboratory:_____

Time period from _____ to _____

Nominated responsible scientist for radioactive substances onboard :

Name : _____ Institution: _____

The following radio active substances were used:

User	Used substance	Activity	Remainder

After finishing work with radio active substances, all labs and work areas were cleaned, and swap tests were performed approbiately. The swap tests were distributed evenly across the laboratory and the work areas, in particular in the following areas exposed to frequent direct human contacts: telephones, light switches, keyboards, knobs at doors and cupboards, work material, escapes, work tables, floor below work tables.

The swap tests were performed using a a liquid czintilization counter. The results (counts per minute) are marked and attached to this protocol.

The master of the vessel receives the original of this protocol: He is kindly asked, to inform the following user of radio active substances on the results and to ask them to confirm these results by tests on their own prior to their cruise. Otherwise, any further contamination will be blamed to them.

Vessel / date: _____

_____ _____

Nominated responsible scientist onboard **Principal scientist**

Distributed to:

master (original), chief scientist, IFM-GEOMAR (Nominated responsible for radioactive substances)