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	Title: Contamination monitoring and Radioactive decontamination procedure at OITL at KPM, IMB, UiO		
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1 PURPOSE

The purpose of this document is to describe proper guideline how to monitor the contamination before, during and after the experiment with radioactivity at OITL. Individuals should survey themselves and their work areas on an “as used” or daily basis. It is recommended that frequent surveys of hands, lab coats and shoes during and after use of radioactive material to identify contamination, to limit the contamination spread. The radioactive contamination survey will be performed on a weekly basis. This procedure will ensure reliable routines that safeguard staff and users' safety and health and contain a detailed description of relevant radioactive isotopes. It is vital that correct radiation contamination survey is carried out when there is likelihood for radiation exposure. It is equally important that the correct monitoring instrument is selected and used in an emergency setting.

2 RESPONSIBILITIES

The radiation protection officer (RPO) and head of OITL are responsible for updating this SOP and related procedures. The RPO is responsible to make sure that all the calibrated equipment to monitor the radioactivity contaminations are available at OITL.

Personnel involved in the performing animal experiments are responsible for following this SOP and sign for the SOP has been read and understood in the NMS's SOPS Training Record form (TMP 0080)

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3 DEFINITIONS

- DSA: Norwegian Radiation and Nuclear safety authority
- Activity: The activity of a sample of radioactive matter is defined by the number of disintegrations taking place at its core at any given moment. The activity also represents the number of radiations emitted. One call therefore alpha, beta, gamma activity the numbers of alpha, beta, gamma rays that are emitted and are in proportions of the number of disintegrations. The basic unit of activity is the becquerel (Bq). A becquerel represents a decay rate of one disintegration per second.
- Radioactive Contamination: Radioactive contamination is the presence of nuclear substances and radiation devices in any place where it is not desired, in particular where its presence may be harmful. Contamination may present a risk to a person's health or the environment.

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Contamination has also been determined to be the cause of failed experiments. Control of contamination is one of the key concerns whenever radioactive materials are used. Surface contamination should be as low as practicable, and should preferably be removed. After decontamination, the contamination should not exceed the applicable limit values.

According DSA taken from veileder 2 chapter 3-5:

- Inactive area: parts of the body, clothing: Beta and gamma: 4 Bq / cm².
- Active area: protective clothing, glass articles: Beta and gamma: 40 Bq / cm². The measurements can be averaged over 100 cm²: The area map (inactive and active area is marked in appendix:1)

4 PROCEDURE

4.1 Contamination control:

- I. OITL users should use RadEye AB100 to monitor surface contamination both in inactive area (DU 028B) and active area (DU 031, DU 034, DU 035). The rooms under active area are designated area where radioactive materials are handled. Based on the strictest limits for contamination in the ADR regulations, the limit for contamination for RadEye AB100 is set to 10 cps (net). With a normal background (18-20 cps) the instrument should not show more than 30 cps. If the readings are below 30 cps, the surface and/or equipment can be considered and handled as inactive.
- II. Survey the work area, including the floor. Survey the floor in exit doorways. If any waste was disposed, survey around waste containers. Other areas to consider for survey are:
 - a. Cabinet and drawer fronts and handles
 - b. Equipment
 - c. Fume hood sash
 - d. Any part of the animal cage
 - e. Protective aprons
 - f. Any other areas user may have touched while working with the material

Keep areas designated for handling radioactive materials free of non-essential items.
- III. Users should monitor contamination during experimental procedures regularly. During experiment, if contamination of gloves, clothes are found, these should be changed immediately and placed in waste bin for radioactive material. The distance between any radiation source and personnel should be maximized. Doubling the distance from the source quarters the radiation dose (Inverse Square Law). Users should use long forceps to hold radioactive vials during measurement at gamma counter which is placed in DU-031. Users should avoid any kind of pouring of radioactive materials, pipettes and syringes should be used.
- IV. The time spent by personnel near to any radioactive source should be minimized. Plan ahead to minimize time spent handling radioactivity. Carry out a trial run without radioactivity to check your procedures. The shorter handling time results in a smaller dose.

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- V. Shielding between radiation source and personnel should be used especially when radioactive vial is transferred to gamma counter to measure the activity, preparation of radioactive solution will occur in room DU-031 under the hood and preparation of injection and animals for scanning will be at safety cabinet in room DU-034.
- VI. Researcher must cover the work surface with protective and absorbent bench paper to trap droplets of contamination. It is especially convenient to cover the entire work area and then to use smaller pieces on top of the large piece. It is easier to replace the small piece when it becomes contaminated than to replace the entire covering.
- VII. Radioisotope work area will have a set of equipment that is only used for radioactive material work. Depending on protocol, this will include pipettes, a micro centrifuge etc.
- VIII. Researchers must not eat, drink, apply cosmetics in an area where radioactive substances are handled (the whole OITL area). Proper-labelled sticker will be used on all doors of OITL rooms. (Appendix 3)
- IX. Area LU005, DU-028B, DU-031, DU-034 and DU-035, has to be thoroughly checked for contamination before the area is reopened for use by KPM. This includes all equipment, permanent installations, ceiling, walls and floors.
- X. Reusable equipment, like cages and bottles, must be clearly marked and checked for contamination before moved back to KPM. If any equipment is found to be contaminated during checkout, the equipment will be placed into quarantine. To exit the quarantine, the equipment should be checked again and found not to be contaminated.
- XI. Animals are not to be moved out of the OITL area between injections.
- XII. Radiological contamination surveys must be recorded in appropriate standard form placed (appendix- 2) Logbook 132 for R&D/IMB-NMS
- XIII. The logbook 132 R&D/IMB-NMS must be place at the entrance of DU-028B so that any one entering the lab first collect this logbook and check previous history of contamination control.

4.2 Decontamination:

Prevention of contamination is the best pathway to safety.

Personnel decontamination is necessary to prevent intakes by ingestion, inhalations or skin absorption, and to reduce the external exposure from radioactive materials, which remains on the skin or clothing. Survey should be repeated after each phase of decontamination in order to evaluate the effectiveness of the procedures.

In case of contamination of the skin following protocol will be followed: 1. Soak your skin and use soap

2. Work up plenty of lather and keep it moist

3. Work the lather into the contaminated area by lightly rubbing for 2-3 minutes

4. Rinse the area with lukewarm water

5. Repeat the procedure several times if necessary and use a soft brush for light scrubbing. However, discontinue before damaging or scraping the skin. Use hand cream if the skin cracks.

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6. If hands are contaminated, monitor specifically between fingers and under nails. Cut the nails if necessary to remove the attached contamination. Harder decontamination methods and cleaning agents should only be considered after several attempts with soap and water. The benefits of decontamination should be weighed against possible damage from the use of harder decontamination methods.

7. Ensure that all radioactive waste generated during decontamination is properly collected and disposed of into radioactive solid and liquid waste containers.

8. Once decontamination procedures are complete, remove gloves and wash hands thoroughly. Monitor hands, body, lab coats, clothing, etc., for radioactive contamination.

9. In case of surface and equipment contamination, OITL users should immediately label the area or item and promptly decontaminate it to minimize fixation of the contaminant to the surface of the object. Emergency decontamination kit will be available at facility to perform acute decontamination. If an area cannot be decontaminated, the contaminated area should be marked and labeled to indicate the isotope, date and level of contamination. The area should be covered to prevent the spread of the radioactive material.

10. In case any equipment (pipette or animal cage lid) will be contaminated with long-lived isotopes (Ac-225, Th-227, Lu-177) used by Bayer Health care's researchers, equipment will be quarantined for 2 months

5 DOCUMENT HISTORY

Version	Description
001	Title: Contamination monitoring and Radioactive decontamination procedure at OITL, IMB, UiO

6 REFERENCES

PET trace service manual

Veileder 2: Bruk av åpne radioaktive kilder i laboratorium

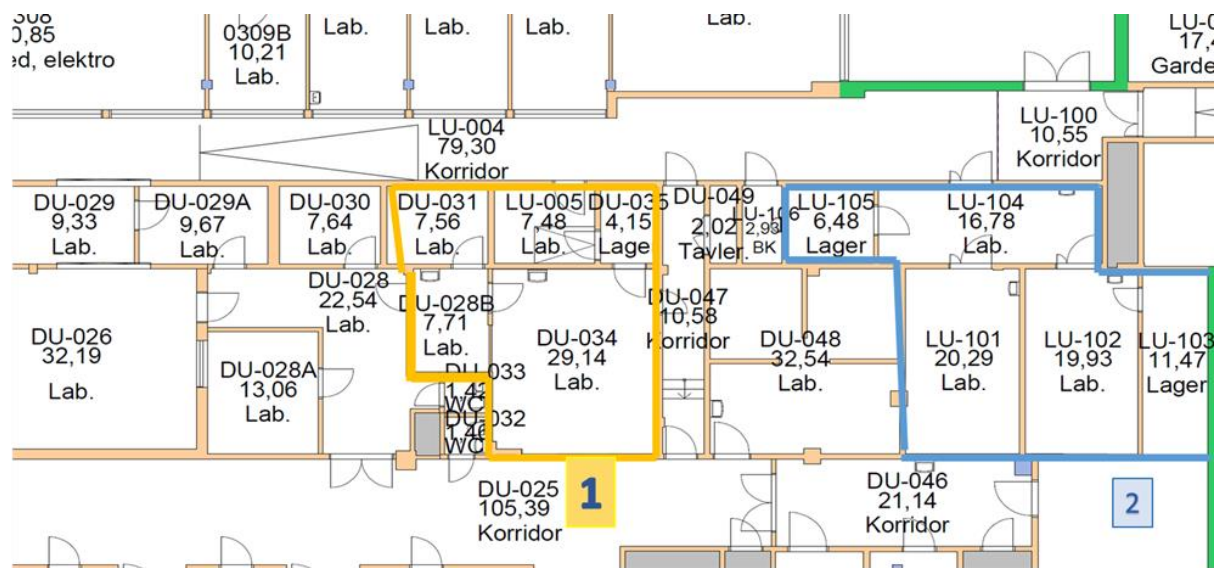
Veileder 10: Nukleærmedisin (NRPA)

7 APPENDICES

Appendix	Doc. Id.	Title
1	OITL-01	OITL map
2	Contamination record form-01	Contamination monitoring record form in log book 132 R&D/IMB-NMS

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Appendix 1: OITL map (active and inactive area)



Legend

- 1= Facility for preclinical animal experiments rented by Norsk medisinsk syklotronsenter AS.
- 2= Facility for preclinical Radiochemistry production , quality control and Invitro study lab rented by Norsk medisinsk syklotronsenter AS.

DU-028 B- control room for PET-SPECT-CT scanner and this area is defined as inactive area
DU-031: is defined as active area where radiochemical dose preparation will be performed and waste bin for long lived and short lived isotopes will be placed.
DU-034: is defined as active area where animal will be handled for scanning and injection of dose will be performed.

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DU-035: is defined as active area where animals will be kept for longitudinal studies by using long lived isotopes (AC-225, Th-227, LU-177)

Appendix: 2: Authorized Researcher's OITL radiation contamination Survey Record

Authorized Researcher's Name:..... Room no: ... Page:

SURVEYS must be performed BEFORE & AFTER EACH USE, Each Week (Friday) and AT THE END OF THE MONTH.

All records must be available for inspection and kept for 5 calendar years

IF CONTAMINATION IS FOUND

	Date	Instrument ID	Background cpm	location	Results	Monitored by	Cleaned	Labeled	disposed
1							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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15							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 3: No food and drinking sign in all doors of OITL

