Operation Procedure SINQ Sample Preparation WetLab Room EG 002 / Building WNLA

Location
WNLA / EG 002 (SINQ)

PSI Organisation Unit: 3703
Organisation Unit responsible person /Tel
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Laboratory responsible person /Tel
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Approved by Head of Dept.:

Updated:

Remark

Access to the lab room only after instruction by the instrument responsible (local contact) or by the room responsible person.

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1. PSI directives and guidelines

1. Safety, Health Protection and Environmental Protection at PSI ("SGU directive"): AW-01-07-02.
2. Safety analysis procedure for experiment: AW-96-09-03.
3. Chemistry Safety (Activities involving chemicals at PSI): AW-96-08-09.
4. Nanomaterial Safety: AW-96-09-04.
5. Handling HF: AW-96-13-03.
6. Gas and Cryo Safety: AW-96-09-08.
7. Biosafety: AW-96-14-02.
8. Radiation protection PSI: AW-23-96-13.
9. Personal Protective Equipment: (AW-96-07-10).
10. Electrical Safety AW-93-05-02.
11. Fire & Emergency: AW-NFO-98-01.

See safety relevant information on the PSI webpage: https://www.psi.ch/useroffice/safety-at-psi and https://intranet.psi.ch/Safety/WebHome.

See Import Guidelines and Shipping Instructions on the PSI webpage: https://www.psi.ch/useroffice/importshipping.

See dangerous goods' transport procedures on the PSI webpage: https://www.psi.ch/asi/gefahrguttransporte.

2. Scope of application

12. The WetLab WNLA / EG 002 is a part of the LMX User Platform and is allocated for users of beamlines at PSI large facilities.
13. The room and basic equipment there serve to prepare samples to be investigated at PSI beamlines.

3. Responsibilities and competences

14. The laboratory responsible person is in charge for:
    - Safety infrastructure (e.g. eyewash and shower, PPE, fume hood, chemicals' absorbers, biosafety setup, etc.).
    - Correct labelling with safety signs and the access control.
    - Organizing of service, reparation of existing equipment and ordering (if necessary) new tools and devices.
    - Supervision of proper functioning of the glove-box and its purification system.
    - Supervision of proper handling and storage of chemicals ordered by PSI staff and/or delivered by users (after proper registration in the PSI DUO System).
    - Coordination of chemical waste disposing. Chemical waste disposal can be done once per month (1st Wednesday of the month).
    - Work coordination of the co-responsible and the assistant persons.

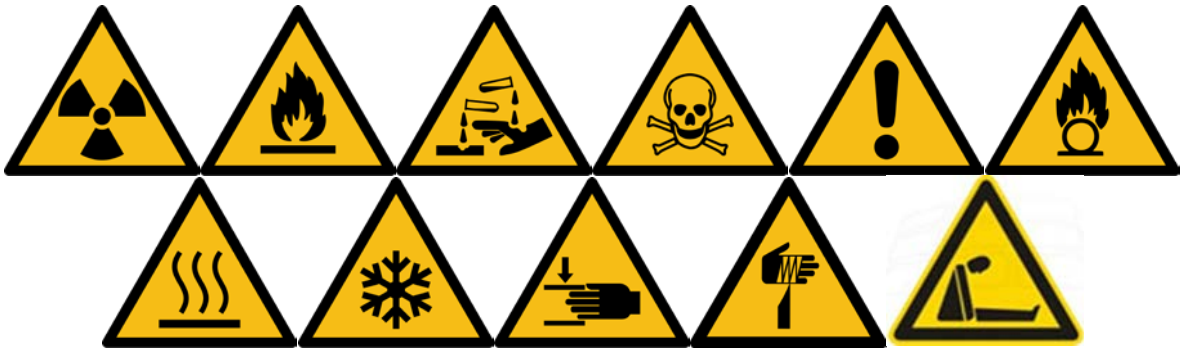
15. The laboratory co-responsible person is in charge for:
    - "Millipore" device maintains.
    - Basic, general consumables (e.g. gloves, Al-foil, paper, pipets, sample containers etc.).
    - Basic chemicals (e.g. ethanol, acetone etc.).
    - Chemical glass dish washer – cleaning glass, sorting clean glass into the drawers.
16. The laboratory assistant is in charge for:
    - Control of proper indication and labelling of user's working places, removing unlabelled samples and chemicals to a temporary storage.
    - Ordering and changing of He-bottles at the glove-box and 10%H_2/He gas mixture for the glove-box regeneration system.
    - Regular service for all pumps in the lab.
17. The instrument responsible are in charge of:
    - Instructing users to follow the "**Operation Procedure SINQ Sample Preparation WetLab EG 002 WNLA**".
    - Instructing users how to use the glove-box (short instruction manual is placed on the glove-box).
    - Instructing users how to use sharps (e.g. needles, broken scalpels, broken glass etc.) disposal container.
    - Instructing users how to use the fume hood, centrifuge, and press.
    - Informing the laboratory responsible person if some consumables have to be ordered or some devices have to be repaired.
18. Maintenance of laboratory infrastructure (ventilation, electricity, water etc.) is provided from the service groups from LOG department of PSI.
19. It is expected that users bring all specific equipment, tools, materials and consumables. If users have a special request they have to contact instrument responsible (local contact) in advance.
20. The external users' advisors (supervisors, line managers, PI) are responsible for a safe working procedures and instruction of all team members involved into the experiment.
21. PSI Safety supporting persons are:
    a. Safety Officer: Winfried Rendler 2677
    b. Radiation protection expert: Albert Fuchs 4487
    c. Chemical safety: *NN* / tba
    d. Biosafety: Philip Berger 4728
    e. Fire protection: Alois Bächli 2037
    f. PSI work safety delegate in case of pregnancy and breastfeeding: Patrick Smit 2993

4. Hazards

Major hazards in room WNLA / EG 002 are:

22. *Stubbing* by bad order, obstructed traffic routes, cables, etc.
23. *Fall* by not-properly use of steps.

24. *Cuts and squeezing*: during mechanical sample preparation (scalpels, knifes, scissors, screw drivers, press, etc.).
25. *Cold burns* by liquid nitrogen.
26. *Burns* by hot plates, drying cabinet, soldering iron.
27. *Fire- and explosion risk*: inflammable organic solvents, fire load in presence of ignition sources.
28. *Etching burns* by acids, bases (alkaline fluids) and etching gases.
29. *Acute toxic elements and compounds* (e.g. hydrofluoric acid (HF), Beryllium (Be), Mercury (Hg), etc.) **require contact experts** in advance.
30. *Irritation* of respiratory track by evaporation of organic solvents and aerosols.
31. *Environment protection*: release of contaminated liquids and gases into aquatic system and air.
32. *Suffocation* by replacement of oxygen in a room by dry ice, liquid / gaseous nitrogen, argon, helium, argon.
33. *Biohazard: preparation of biological samples.* Only research work with biological material on biosafety level 1 (BL-1) is allowed. This includes small lab works like diluting suspensions or solutions, extractions from plant materials as well as cutting off fractions of a bio crystal etc. Biological wastes have to be collected separately in suitable yellows bags. Other activities with biomaterials **require contact experts** in advance.
34. *Ionizing Radiation*: by instruments and materials; **requires contact experts** in advance.
35. *High pressure* (mechanical press).



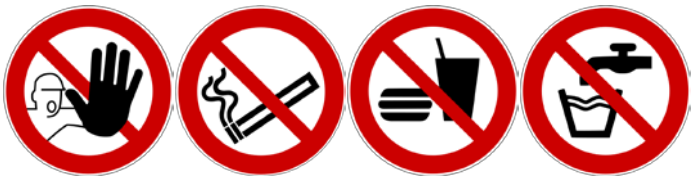
5. Actions / Lab rules

General procedures

36. The Lab WNLA / EG 002 is allocated in Controlled Area.
    - Users must wear personal dosimeter properly.
    - Smoking, eating, drinking, using of lipsticks is strictly forbidden.
    - Food storage in the lab freezer and fridge is forbidden.
    - Using of tap water for foods and beverages preparation is strictly forbidden.
    - Dishwashing and dishes drying in the laboratory is prohibited.
    - Before removing tools, samples or other items from the controlled area user must call a staff member from the Operational Radiation Protection Section for the mandatory radiation control measurement.

- User must make use of the monitors to check for potential contamination before leaving a controlled area.

37. Any unauthorized persons are not allowed to be in the lab.
38. A loose must be tied back. Dangling jewellery, ties etc. must be removed.



39. Users have to know the following information/rules before starting the corresponding work:
    a. Hazards, transport, storage, handling, usage, control, return and disposal of materials which users use (solids, liquids, aerosols, cryogens, gases, etc.).
    b. Location of fire extinguishing equipment, emergency shower, eyewash, first aid kit, chemicals' absorbers, and biosafety setup.
    c. Location and use of steps.
40. To wear the personal protective equipment (PPE) is mandatory:
    lab coat and safety glasses (contact lenses are forbidden), if health is affected suitable gloves and dust (gas) mask.

41. Contaminated gloves must be removed, when touching a pen, phone, door, computers, books etc.
42. To wear shoes with a flat sole, which completely cover the foot are mandatory.
43. Wear long pants, skirts, or dresses etc.
44. Every glove-box's user has to sign the separate list next to the glove box lock.
45. The user's working space has to be marked. All users' materials have to be stored in the provided storage boxes labelled with the completed form (user's name, local contact's name, instrument, phone number, sample description, and time range of the experiment - start and end date).
46. Work with open flame, hot plates and hazardous stuff; especially with volatile materials (toxic solids, aerosols (generated by ultrasound and centrifugations), biohazards, nanoparticles, organic solvents, strong acids and alkaline solutions) have to be carried out in the fume hood. Fume hood has to be closed as much as possible to work properly. Using of open flame and hot plates in the lab increase explosion risk.
47. All lab work carried out with chemicals have to follow the rules of good chemical practice.
48. All lab work carried out with biology samples have to follow the rules of good microbiological practice. This includes disinfection, sterilization and waste disposal of all tools and items as well as the workplace after having finished the experiments.
49. Each user is urged to leave the lab clean and well ordered.

Specific hazards and related actions

50. *Suffocation hazard*: if work with liquid nitrogen.
    Actions: Oxygen sensors and intervention plan.
51. All chemicals intended to bring to the lab room have to be declared in the DUO system.
52. Users must inform the room responsible person when bringing hazardous stuff into the lab room (MSDS has to be attached).
53. Chemicals have to be stored in ventilated chemical cabinets. Containers filled with liquid chemicals/solvents are placed in a collecting van. The rules of storage chemicals together have to be followed.
54. Use *EX-protected* refrigerators if ignition source has to be excluded when organic solvents and other material will be stored cool.
55. For *needle disposal* use the special needle collecting box. Biohazardous materials (tissues, cells, infectious materials, GMOs) have to be collected separately and disposed according to the specified procedure (inactivation by autoclave) - **require contact experts** in advance.
56. Label all chemicals containers sufficiently (user's name, local contact's name, instrument, phone number, date, unambiguous name of substance (verifiable abbreviation) and solvent, concentrations) and, if indicated, with GHS-pictograms. Not-sufficiently labelled containers will be removed at any time and disposed of without further notice by the room responsible persons.
57. All users' samples, materials and consumables brought by the users have to be removed after the end of the experiment. If some samples stay in the glove box, they have to be clear labelled and registered in the glove box log-book (Name, Institution, chemical formula, duration of storage).
58. All chemicals when they are not anymore required have to be disposed according to PSI rules.

6. Access control

59. Access of all individuals is controlled by the Interflex system. The personal data are kept confidential according to the legal provisions. Given access can be denied by the room responsible person in case of immediate danger and according to point 11 of this operation procedure.

7. Alone working

60. Generally alone working is not allowed if reactive, etching, and acute toxic stuff is handled. If such work will be done during off-hours (17:00-8:00 and weekends) the advisor (supervisor, line manager, PI) must be informed. The advisors have to take actions to ensure safe working according to PSI regulations and department specific rules.

8. Actions in case of emergency, First aid

61. In case of fire or emergency (e.g. intoxication), follow the steps outlined in the operation procedures.

62. Users are instructed on this procedure by the instrument responsible person (local contact) or by the room responsible person or by a designated representative. Training specific for this room could be organized if necessary with recorded participations.
63. Actions for the case of emergency for the entire building WNLA.
64. If specific hazards have been identified, take actions according to the propositions defined in PSI operation procedures.

Always:

65. Keep in mind: Self-protection first!
66. Alert SIZ: Tel. **3333**
67. **Rescue**
68. **Take first** actions according the specific instructions predefined in the operation procedures (acute toxic compounds (toxins, HF, gases, Be) inflammable and suffocation gases, etc.).
69. Radioactive and chemical contamination: Remove contaminated clothes; clean the skin (gently!) with water. Decontamination will be determined by the action forces.

9. Trainings

70. All users have to be sufficiently informed on occurring hazards in room WNLA / EG 002, the appropriate actions in routine operation and in cases of emergency. The room responsible person is accountable for this.
71. All responsible persons involved have to acquire the appropriate knowledge which enables them to fill their function by participating in appropriate education and instruction courses. The advisors are accountable for initiating and control.
72. In case of additional hazards (acute toxic substances, laser, non-ionizing radiation) the room responsible person will inform his/her supervisor and initiates a hazard assessment and adapts this procedure accordingly.

10. Disposal of materials and maintenance works

Disposal:

73. The PSI concept for recycling and disposal has to be followed.
74. Users are obliged to use minimal amounts of chemicals to reduce waste.
75. Inactive and active waste must be strictly separated.
76. Disposing of chemicals has to be done properly using the available containers for acid, organic solvent and water solution wastes. All other chemicals/samples can be disposed in the “chemical/sample waste tray” in closed containers with a label indicating the contents. Plastic containers for waste are available next to the tray. All waste containers and trays are placed at the ventilated collection place (on the left site of the fume hood).
77. Chemicals: Disposal of chemicals out of the lab will be organized by the room responsible person. Intermediate storage, especially of organic solvents, and transport to disposal at chemical waste at collecting station West has to be performed according to the PSI regulations.

78. SINQ Sample Preparation Lab WNLA / EG 002 doesn't have capacity to store extraordinary amount of solvent wastes therefore, the amount of the produced waste has to be reasonable. If sample preparation requires a large volume of solvent, the user has to discuss this in advance with the PSI local contact (beamline scientist) and the laboratory responsible.
79. As there's no autoclave in the SINQ area for biological stuff, all biological waste (including used wipes, tissues, gloves, pipette tips etc.) has to be disposed and sealed in special waste bags which must be checked by the radiation protection unit at PSI before those bags leave experimental areas in WNHA as well as WNLA and are to be transferred to BIO department for extermination. Above **require contact experts** in advance.

Reporting deficits:

80. Defect devices and deficits of room infrastructures have to be reported to the room responsible person who will initiate appropriate actions.

11. Sanctions

81. Disregard of these directions will result, even without remanding, in immediate cancellation of access to room WNLA / EG 002. This process will be initiated by the room responsible person and reported to the organisation unit responsible, the lab head and the safety officer of PSI.

12. Appendix

82. Herewith I confirm that I have read and fully understood this „operation procedure". I agree to be bound by PSI facilities' safety regulations applicable during my stay related to my activities at PSI.

Name: _____

Date:

Signature: