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Document name: Chemical Management Procedures		
Issued by: Jenny Lilliehöök, Environmental Coordinator		
Approved by: Cynthia de Wit, Chair of the Environmental Council		

Chemical Management Procedures

Aim

The aim is to support the laboratory management of chemicals in connection with research and education at Stockholm University in order to prevent a negative impact on the environment.

Scope

The procedures should be applied by anyone handling chemical products and biotechnical organisms in their work.

Responsibilities

The head is responsible for chemical management at each department. This responsibility includes ensuring that the *Chemical Management Procedures* are being followed. The head may appoint one or more coordinators for chemical management, each with a documented area of responsibility. The names and telephone numbers of the coordinators should be clearly displayed in each laboratory, so that they are easy to reach in case of emergency.

Purchases

According to Chapter 2, Section 4 of the Swedish Environmental Code, anyone handling or purchasing chemical products at Stockholm University should strive to choose less hazardous products whenever possible. Regarding the most important chemicals, one should try to find more environmentally friendly alternatives to those that are used in large quantities or in teaching, as well as products that are being phased out (see below). The purchasers should explore better options and provide information about alternatives when such are available.

Chemicals should be purchased through the SU Shop, which has framework agreements with a number of retailers. Chemicals that require a permit may not be purchased until a permit has been obtained. Contact the environmental health engineer at the Technical Support Office for assistance with the permit application. When purchasing chemicals, the following aspects should also be taken into account:

A) Product choice principle

Two substitutions have been defined in the legislation and should be made, provided that quality can be maintained and that it is financially and practically feasible:

1. Halogenated solvents should be replaced with non-halogenated solvents, and
2. Lead, cadmium, mercury, and other heavy metals should be replaced with other compounds. (The use of mercury compounds requires an exemption, which can be sought via the Technical Support Office's environment officer.)

B) Phase-out

The University's phase-out list is available in KLARA. The included chemical products are marked in red on the list of chemicals for each research group. The phase-out list contains products that require a

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permit, exemption, or investigation prior to being used, as well as products that should be phased out for other reasons. Purchasers should keep themselves updated on this list in order to avoid purchasing these products whenever possible, and otherwise minimise their use.

C) Import from countries outside the EU

When purchasing chemical products from *within* the EU, the supplier is required, according to Article 31 of REACH, to provide a safety data sheet. The importer of a chemical product *from a non-EU country* is required to draw up a safety data sheet or acquire the necessary written risk and safety information for the imported products (REACH). The import of chemical products from countries outside the EU comes with special regulations regarding reporting products to the products register (see the Swedish Chemicals Agency website).

Chemical register

The Ordinance (SFS 1998:901) on self-inspection stipulates that all organisations must keep a register of chemical products used in the operation. This registry should include information on the quantity and use of the products, as well as the risks they pose to health and the environment.

Stockholm University uses the program KLARA to register all chemical products: https://secure.port.se/alphaquest/app_su/pcmain.cfm. KLARA includes references to legislation concerning each chemical product. Each department should have one or more inventory management coordinators responsible for registering the department's chemicals. These coordinators should undergo inventory management training in KLARA. The register should be updated at least once a year (the inventory period is 2/1-28/2 every year), but regular registration in connection with the purchase is recommended. Old chemicals that are no longer used should be cleared out regularly.

Safety data sheets and documentation of risk assessments

Anyone handling chemical products should have access to safety data sheets (in the appropriate language) with information about risks related to the products. These safety data sheets are available and updated in KLARA, so there is no need to print them out. On the other hand, risk assessments of each laboratory experiment/method should be available in a binder in the laboratory in order to be as accessible as possible.

All hazardous chemical products should have a safety data sheet that is up-to-date. When purchasing a new chemical product that is not already registered in KLARA, the responsible purchaser should ensure that the supplier provides a safety data sheet.

Storage of chemicals

Stockholm University uses a large number of chemical products with a wide range of characteristics. It is thus not possible to provide comprehensive information on the storage of all chemical products here. General rules are described below. For more information, please refer to the products' safety data sheets.

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The head of department, or the person assigned the responsibility for chemical management, is responsible for ensuring that chemicals are stored in a satisfactory manner.

General rules

Hazardous chemical products should be stored in such a way as to prevent health and environmental risks.

For cleaning up spills, vermiculite (or another suitable absorbent) should be available in sufficient quantities for the chemicals in the lab. This should preferably be placed somewhere that is easily accessible, visible and marked. Used absorbents should be disposed of as hazardous waste.

Chemical storerooms and laboratories should not have open floor drains. Any existing floor drains should be covered to prevent leakage. This may involve a tight-fitting lid, a manual mechanism to open and close the drain, or other similar device.

Chemicals should not be stored in fume hoods with open drains. Limited quantities may be stored on trays to prevent spillage. Alternatively, drains can be plugged or flanged. Upon use, the chemicals should be returned to their regular storage. Please note that bottles and other containers affect the circulation of air in the fume hood and that it is not recommended to store chemicals in fume hoods. The lid of the fume hood should be pulled down all the way when it is not being used (if not done automatically), as it has a significant effect on energy use.

Chemicals should be stored with lids when not in direct use, partly due to the risk of leakage, and partly due to volatile chemicals being emitted into the air. This applies particularly to chemicals in fume hoods. Use containers intended for the chemical in question, e.g. corrosives should be stored in containers that can withstand this (see SFS 2008:245, 19§).

Chemical products that require a permit should be stored where unauthorised personnel cannot reach them (KIFS 2008:2, Chapter 2). Examples of such storage include locked storage cabinets, locked laboratories, or areas that require an access card or code. Other hazardous chemical products should be stored separately from products intended for human consumption. Volatile solvents, etc., that may cause intoxication when inhaled, should be stored in such a way as to prevent/discourage this type of use (SFS 1977:994).

Special consideration should be given to the risks of storing different chemicals together. To avoid improper storage of incompatible chemicals, the recommendation is to have separate cabinets for chemical products from different categories: poisons, acids, bases, and flammable liquids.

- Acids and bases should not be stored together with each other or any other substances.
- Flammable liquids should not be stored together with flammable gas or combustible materials.
- Oxidising agents should not be stored together with less reactive substances. Strongly oxidising agents should preferably be stored in their own cabinet. Oxidising agents may be stored in a fire resistant cabinet or poison cabinet.

Storage in storage cabinets

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- Proper ventilation is required when storing flammable liquids indoors
- Each fire cell may contain a maximum of 50 litres of flammable liquid and 5 litres of flammable gas.
- Flammable liquids should be stored in an embanked area to prevent uncontrolled spillage.
- Ethers and other peroxide-forming substances should be stored in tightly sealed containers in a dark and cool place.
- Corrosives should not be stored above eye level.
- Refrigerators and freezers used for storage of chemicals that may form flammable vapours should be built especially for this purpose.
- Chemicals and similar substances may not be stored in refrigerators or freezers intended for food storage. Storage cabinets (usually older ones) that do meet the current standards should be replaced. Shelves in the storage cabinets should have a raised edge to prevent, for example, a bottle from sliding off the shelf and falling down when bumped into. The bottom shelf/cabinet floor should have a higher edge/embankment.

Labelling of containers

According to KIFS 2005:5, 10§, all containers should be labelled with the name of the product, danger symbol, etc. If such labelling is missing due to product transfer or outer packaging, a new label should be created. In some cases, labelling is not necessary for small containers, such as test tubes, where work is ongoing.

Introduction to laboratory work

All new personnel and all new students should receive an introduction before they are allowed to work independently in the laboratory. Completion of the introduction should be documented and signed by the participants.

The introduction should include information on how to act according to these “Chemical Management Procedures”. Furthermore, it should cover other general rules for safe laboratory work from both a health and an environmental perspective, including risk assessment and knowledge of potential risks and emergency preparedness. In addition to these general procedures, departments with laboratory activities should develop their own localised instructions.

Flammable goods

A permit is required for professional handling of flammable goods, and consideration must be given to the terms of this permit and applicable laws. The University has a central permit for handling flammable goods. Each department in possession of more than 5 litres of flammable liquids or flammable gas should have at least one person with training in how to handle flammable goods. The environmental health engineer at the Technical Support Office coordinates this training.

Radioactivity

Work with radioactive sources is subject to extensive legislation. The University has a central expert on protection against radiation who can be reached via the environmental health engineer at the Technical Support Office. Departments engaged in such activities should appoint someone to be

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responsible for protection against radiation. The University requires and provides special training to these individuals. The departments are expected to follow the comprehensive documentation on procedures found in the quality manual, which also covers health and environmental aspects. All such activities should be reported to the environmental health engineer, and all necessary permits must be acquired.

Biological materials

Specific legislation applies to work with biological materials, such as biological agents, GMOs (genetically modified organisms), GMMs (genetically modified microorganisms), animal by-products, and human biological materials.

The University has a biosafety expert, appointed by the Vice-Chancellor, who convenes a biosafety committee to support the departments. Departments that conduct experiments with GMOs, GMMs, or other biological materials in their research should be familiar with the relevant legislation, adopt special procedures for their activities, and appoint one or more coordinators. All such activity should be reported to the biosafety committee, and all necessary permits must be acquired.

Animal testing

Work with laboratory animals is subject to specific legislation regarding permits and training. There is a veterinarian available, who can be reached via the environmental health engineer at the Technical Support Office. Departments engaging in animal testing should adopt special procedures for these activities and appoint one or more coordinators. Permits should be applied for via the environmental health engineer at the Technical Support Office, while an appointed animal facility manager has certain local areas of responsibility.

Waste and drains

In order to reduce the environmental impact of hazardous waste generated from University operations, it is important for everyone to do their part. Liquid chemical waste may only be poured down the drain if it is on the list in the "Procedure for disposal of liquid chemical waste down the drain". Other chemical waste should be disposed of as hazardous waste to the waste contractor in room M212 at KÖL, see "Waste Management Procedures for Stockholm University".

Evaporation should not be used as a disposal method for chemical waste. All chemicals should be handled in such a way as to minimise emissions into the air. In some cases, evaporation may be used as a way to reduce the water content of a solution, e.g. inorganic substances in an aqueous solution. When evaporating water from organic solutions, there must be absolute certainty that no harmful substances are evaporated along with the water.

Risks and emergencies

All personnel working in laboratories where chemical products and biotechnical organisms are handled should know what to do in case of emergency. Environmental risk assessments should have been made. A list of people/bodies to contact in case of emergency should be easily accessible. The use of safety equipment should be practised continuously. The appointed coordinator should have a general idea of which chemicals are stored in which laboratories. For more information, please refer to

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the documents “Procedure for Environmental Risk Assessment” and “Environmental Risks in Case of an Emergency or Incident”.

Documentation

The following documentation should be available at each department handling hazardous chemical products:

- Delegated areas of responsibility
- Chemical register in KLARA
- Risk assessments for laboratory work
- Environmental risk assessment of the activities
- Incident and deviation reports in SAMIR
- Records of the introduction of students and new personnel to laboratory work

References

- Stockholm University’s environmental website, Miljöwebben: www.su.se/miljo
- Swedish Chemicals Agency: www.kemi.se
- SU’s list of environmental laws (via Notisum <https://www.notisum.se/rn/nLawList.aspx?listid=26568>)
- Swedish Work Environment Authority: www.av.se