Laboratory Safety

Created May 2019, Reviewed May 2023

District Facilities Department
Environmental Services Group

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Type: ☐ Procedure ☐ Specification ☒ Program ☐ SOP ☐ Design ☐ Other ☐ Contract ☐ Accounting ☐ Form ☐ Planning		Department Owner: **Environmental Services Group**		

REV		DESCRIPTION OF CHANGE	DOC APPRV.	EFF. DATE
1.0		Written Program	MCS	5/21/2019
2.0		Review	MCS	4/6/2020
3.0		Review	ANM	7/26/2022
4.0		Review	MCS	5/3/2023

DISTRICT PROGRAM FOR DEVELOPMENT AND IMPLIMENTATION OF PROCESSES TO BE USED IN SAINT PAUL PUBLIC SCHOOLS OPERATIONS

PURPOSE

Laboratory Safety
1910.1450

The following Chemical Hygiene program is designed to be specific to the needs of users of Saint Paul Public Schools in complying with the requirements of OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories Standard, 29 CFR Subpart Z, 1910.1450, as well as to provide other helpful information. It is not intended to supersede the requirements of the standard.

Saint Paul Public Schools is committed to the education of students in safe laboratory practices. Our goal is to ensure the safety of students during their laboratory experiences.

Prior approval from the Saint Paul Public Schools Teaching and Learning Department is required for activities beyond the scope of approved District curriculum for the level of the school.

The District Environmental Services Group (ESG) will review the standard annually for particular requirements, which are applicable to the District and adjust this program accordingly.

This written plan is designed to be specific to the needs of users of Saint Paul Public Schools.

This written plan is intended to comply with the OSHA 1910.1450 standard.

If there are conflicts or discrepancies between this plan and the standard, the standard shall take precedence.

OBJECTIVE

The objective of the Saint Paul School District Chemical Hygiene Program is to set forth policies, procedures, equipment, personal protective equipment (PPE), and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in laboratories. A copy of this program will be maintained by all affected departments. A copy of OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories Standard, 29 CFR 1910.1450, can be obtained from Environmental Services Group.

ASSIGNMENT OF RESPONSIBILITY

Management

Environmental Services Group (ESG)

- Develop and carry out the provisions of the Laboratory Safety written plan
- Make the Laboratory Safety written plan readily available to all employees covered by the Laboratory Safety written plan.
- Ensure all fume hoods and other safety equipment are functioning properly and arrange maintenance for any malfunctions.
- Ensure all fume hoods are audited once a year by a qualified person.
- Ensure that proper training is given to all employees covered under the Laboratory Safety written plan.
- Review and evaluate the Laboratory Safety written plan annually.
- Ensure that proper storage is provided for hazardous chemicals.
- Ensure proper disposal of hazardous waste.
- Keep an updated chemical inventory
- Ensure all eyewash stations and safety showers in their assigned laboratory are working properly and audited once a year by a SPPS licensed plumber.

Staff

Employees

- Exercise proper use and care for prescribed PPE
- Notify the ESG when fume hoods, eyewash stations, safety showers, or other safety equipment malfunction or need to be repaired or replaced.
- Ensure that labels on chemicals are not removed or defaced after arrival.
- Ensure hazardous chemicals are properly stored and labeled.

- Ensure all hazardous waste is properly labeled and stored.
- Notify ESG for hazardous waste removal.
- Maintain Safety Data Sheets (SDS) and ensure each laboratory is equipped with the proper SDS information. Read SDS before working with a new chemical and review as needed.
- Immediately contact ESG for any fumehood, eyewash station or safety show that is not working properly.
- Ensure that the chemical storage room has limited access and no student enters.
- Alert ESG if chemical storage room ventilation malfunctions or other repairs are needed.
- Ensure that student receive proper laboratory safety training.
- Know the appropriate Emergency Response Procedures to a chemical spill or fire. Alert ESG if there is a chemical spill over 5 gallons.

PROCEDURES

Chemical Storage

Read all chemical SDS information to ensure proper storage.

Storage Area

- Establish a separate and secure storage area for chemicals. Keep work and storage areas clean and uncluttered. Chemicals are not to be stored in the classroom.
- Shelving should be appropriate and secure for the items being stored. Any determination of shelving or supports should be monitored until corrected at the earliest convince. Secure shelving sections to walls or floor to prevent tipping of entire sections. Storage shelves should be equipped with lipped edges to prevent containers from rolling off.
- Ventilate the laboratory chemical storage area. Air for chemical storage ventilation shall directly flow into the storage areas and out to the exterior of the building. Immediately contact ESG for any ventilation malfunctions.

Safety Data Sheets

SDSs can be found on the web or shipped with the chemical from the manufacture.

http://meridianmsds.dyndns.org/fmi/iwp/cgi?-db=FacilitateSDS_SPPS&-loadframes

- Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label or **Safety Data Sheet (SDS)** and review its contents before using any chemical substance.
- Have SDS for all chemicals available for immediate reference. These should be placed in the 3-ring binder containing all the SDS sheets and should be available in areas where the chemical is stored OR can be stored electronically with its location available to all employees using those chemicals.
- Keep an updated binder of chemicals SDS sheets.
- Insert SDS sheets for any new chemical purchased.
- Review binder for updates annually – remove and add SDS sheets as needed.
- The sites safety officer is responsible for updating and reviewing the SDS binder.

Chemical Storage

- Store all chemicals in their compatible chemical families. (Consult the Flinn Chemical Catalog/Reference Manual for details).
- Keep an updated inventory of all chemicals, their amounts and location. Stored chemicals should be examined annually for replacement, deterioration and chemical integrity.
- Avoid storing any chemicals, especially flammable materials in direct sunlight.
- Keep chemicals in the chemical prep and storage areas. If chemicals are moved to the classroom for lab, they must be returned to their proper storage location at the end of the day's laboratory periods.
- Store all waste materials in properly labeled containers that identify its general contents (Acids, Bases, etc.), has the words “Hazardous Waste,” and date of collection start.
- Store all flammable in a dedicated flammable cabinet. Keep cool, between 55˚F and 80˚F, at all times. Store away from all oxidizers. Never store flammable in refrigerators unless the refrigerator is explosion proof.
- Store corrosives in appropriate corrosives cabinet.
- Never store flammable materials outside an approved flammable storage cabinet unless in safety cans.
- Do not store chemicals under a fume hood. Avoid storing chemicals on shelves above eye level. Chemicals should not be stored on the floor except in approved shipping containers. Never store chemicals over, under, or near a sink. Store as small amount of chemical as practical.
- Avoid exposure of gas cylinders to heat. Do not store gas cylinders in direct sunlight.

Labels

- Ensure that labels on chemicals are not removed or defaced after arrival.
- Note the date of purchase on all chemicals stored in the manufacturer's container.
- Label all chemical solutions you make with the identity of the contents, date made, and concentration. This will allow anyone to determine the age of a substance at a later date.
- Label the storage area and cabinets with the appropriate hazard recognition signage to identify the hazardous nature of the products. This will allow emergency response officials to quickly see a potentially hazardous area.

Storage Area Personnel

- Only authorized personnel are allowed in the chemical storage area. Students should never be allowed in this area.
- Post emergency telephone numbers in the chemical storage area(s). Have a telephone or some means of emergency communication in the laboratory, chemical storage area and prep area.
- Do not allow incoming shipments of chemicals to be opened and transported by school personnel other than a qualified personal.

Other Equipment and Storage

- Do not store items in the fume hood for prolonged periods. The storage of items in the fume hood is a fire hazard and/or decreases the efficiency of the fume hood.
- Check fume hood annually Fume hoods must be operational at the level of 70-100 linear feet per minute.
- Handle compressed gases as high energy sources, and therefore, as potential explosives. Gas cylinders must be secured in place. They must be protected to prevent valve damage which may be caused by falling. Never lubricate, modify, force or tamper with a cylinder valve.

Chemical Store Room Safety

Safety Equipment and Procedures

- Inspect all protective safety equipment before use. Discard if defective and contact ESG for replacements.
- Never obstruct access to exits, emergency equipment and master utility controls.

- Have appropriate types and sizes of fire extinguishers. Triclass ABC and Halon fire extinguishers are appropriate for laboratories. *(Carbon Dioxide fire extinguishers are inappropriate for laboratories.)* A Class D fire extinguisher should be available when working with flammable solids. Fire extinguishers should be inspected every three months and serviced once a year.
- Provide in any area storing chemicals, an OSHA approved eyewash station capable of treating both eyes continuously for 15 minutes with copious quantities of potable water. This requirement should be tested once a year in compliance with the Eyewash Station and Safety Shower written plan 010. Flush eyewash weekly for at least three minutes to reduce bacterial contamination.
- ESG will provide a readily available spill kit containing sand, absorbents, neutralizing chemicals and other spill control materials for neutralizing chemicals. (See Appendix A.)
- ESG will provide a bucket of dry sand to contain spills and to aid in providing traction on a slippery floor.
- When working with chemicals, fire blankets and eyewash stations must be readily accessible.

Chemical Inventory

A list of banned chemicals can be requested from ESG or found on our website

Initial development will be completed by ESG and yearly updates to listings will be reviewed by ESG.

- Keep an updated inventory of all chemicals. One individual in each building should be assigned this responsibility to assure the inventory is maintained. Contact ESG for assistance with inventories.
- A Chemical Inventory list will be kept within the chemical storage area.
- A Chemical Inventory list will be provided to the front desk personnel in case of fire within the building.
- Keep appropriate SDS readily available in every laboratory.

Threshold of Use – Dilutions

- Chemicals with a high molarity purchased with the intent of diluting for lab use are to stay in the Chemical Storage Room.
- Dilutions are to be made prior to use in the laboratory classroom and/or by students.

Expired Chemicals

- All expired chemicals shall be disposed of accordingly. Stored chemicals should be examined annually for replacement, deterioration and chemical integrity.
- The safety coordinator for each site is responsible for identifying and setting aside expired chemicals for pick up.
- Some chemicals become reactive when they have expired. Read the SDS prior to an expired chemical cleanout.

Hazardous Waste Storage and Disposal

- All lab wastes are to be stored in a sealable container.
- Store like wastes with like wastes; i.e. store acids together, store bases together, etc.
- All containers must be labeled with waste identifier and date container was started, and the words “Hazardous Waste”.
- All containers must be stored in a secondary containment bin.
- **Hazardous Wastes are not to be disposed of down the sink or in trash bins. In this case, “Hazardous Waste” is defined as any material that is caustic, corrosive, toxic, biologically hazardous, and/or an environmental hazard.**
- Hazardous Wastes are not to be moved between SPPS buildings.
- ESG is responsible for disposing of Hazardous Waste. ESG will use a vendor to pick up and dispose of Hazardous Wastes from sites as needed.

Laboratory Safety

- Practice your emergency plans.
- Never block access to emergency exits or equipment.
- Throw away all chipped, etched or cracked glassware into a glassware disposal container. Glassware which is chipped or scratched presents a serious breakage hazard when heated or handled.
- Do not perform any experiments without appropriate person protective equipment, fume hoods, eye wash, ventilation, etc.
- Use a safety shield or other shielding equipment whenever an explosion or implosion might occur.
- Use cylinders of toxic, flammable or reactive gases only under a fume hood.
- Do not extinguish a flame involving a combustible gas until the gas is shut off—otherwise it can re-ignite—possibly causing an explosion. Do not expose flammable liquids to open flame, sparks, heat or any source of ignition.
- Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air.

- Clean work and floor surfaces regularly and keep free of clutter. Keep all aisles clear. Do not run in the laboratory.
- Wash thoroughly after any chemical exposure and/or before leaving the laboratory.
- Never smell chemicals directly; always waft the odors to your nose using your hand. Never smell unknown chemicals.
- Do not pipette by mouth—always use a pipette bulb or other appropriate suction device.

Eyewash Stations and Safety Showers

- Provide in any laboratory handling chemicals, an OSHA approved safety shower. This requirement should be tested once a year in compliance with the Eyewash Station and Safety Shower written plan 010.
- Provide safety showers or body drenches. Showers should be tested once a year. Records of testing should be kept by each laboratory. Immediately contact ESG to repair any shower or body drench which does not flow freely for a minimum of fifteen minutes of normal flow.

Safety Equipment and Protective Clothing

- Develop a firm goggle policy. Wear appropriate eye protection at all times (chemical splash goggles must meet ANSI Z87.1 Standard). Chemical splash goggles must be worn any time chemicals, glassware or heat is used in the laboratory. Goggles fit over glasses. Wear face shields when dealing with corrosive liquids, (i.e. full strength acids and bases).
- Wear gloves which offer protection for all hazards you may find in the lab.
- Always wear a lab coat or a chemical-resistant apron. Remove and clean/discard lab coats and protective equipment if contaminated.
- Use protective equipment to reduce potential exposure; i.e. gloves, fume hoods, etc.
- Use special eye wear when working with corrosive materials. Wear a chemical-splash face shield when handling corrosive materials.
- Use fume hood when:
    - The permissible exposure limit for a chemical is less than 50 ppm as indicated on the chemical SDS;
    - When working with volatile or dust producing chemicals;
    - Using carcinogens, mutagens, teratogens and allergens; and
    - Handling toxic, corrosive, flammable and noxious chemicals.

Personnel Clothing and Hygiene

- Never bring food or beverages, opened or closed, into the lab, chemical prep, or storage area. Food should not be eaten if in a room with toxic materials.

- All Scientific Refrigerators are to be labeled as such.
- Never store food or beverages in a laboratory refrigerator.
- Do not drink from lab glassware or other lab vessels.
- Do not apply cosmetics, smoke, eat, chew, or drink in the laboratory. Wash hands before these activities.
- Use common sense for clothing in the laboratory. Do not wear shorts, wear low heeled shoes, do not wear open-toed shoes or sandals of any kind, always wear socks in the laboratory, do not wear loose or balloon sleeves, tie back long hair, do not wear hanging jewelry, do not wear a long or loose necktie, do not wear an absorbent watch strap, etc.
- Avoid the use of contact lenses in the laboratory. In the event of an accident, chemicals and vapors can be trapped under the contact lenses causing additional eye injury. If contact lenses must be worn, the science teacher must be informed so special precautions and appropriate first aid measures.

Students and Lab

- Never leave students in the laboratory unsupervised.
- Allow only authorized personnel in the chemical storage areas.
- Teachers are legally responsible for student safety.

Emergency Response

This section is to be used in conjunction with ESG Emergency Response written plan 009 that is developed from 29 CFR 1910.38. A review of this procedure with necessary modifications should fulfill many of the requirements for the various types of emergencies that occur in the laboratory.

- Know appropriate emergency procedures, evacuation routes, and fire emergency notification.
- Know appropriate procedure in the event of a power failure.
- Know where and how to use master utility controls to shut off gas, electrical, and water supplies.
- Never obstruct passageways, stairways, hallways, and access ways to water, power etc.
- Teach everyone how and when to use the eyewash sink. Eyewash station effectiveness and operation should be tested every month in conjunction with ESG Eyewash Station written plan 010 developed from 29 CFR 1910.151(c) Promptly notify ESG to repair any eyewash station which does not meet the water flow requirements of ANSI Z358.1. *(Water flow should be able to be maintained for a minimum of fifteen minutes.)*

District Accident and Spill Procedures

Please post the procedure in Appendix A.

Spills over 5 gallons must be reported to ESG immediately

- Know appropriate emergency procedures, waste disposal, spill cleanup and disposal procedures. If disposal requires special handling, call ESG at 651-744-1800.
- Have an alternative evacuation route in the event your primary route becomes blocked.
- If chemical spill on the body, immediately flush copiously with water for 15 minutes. Use deluge shower or eye wash when available

First Aid Policy

- Employees must review the SDS sheet before working with a new chemical and review as needed for first aid procedures.
- In the event of a chemical spill, exposure or injury, employees should obtain medical care through the District workers compensation program.
- Refer students to the school nurse or parent/guardian for medical referral and follow-up.

The affected employee shall be provided the opportunity for medical consultation. See Subpart Z OSHA Standard 29 CFR 1910.1450, section g; and in appendix C for more information

Employee Training

- Chemistry Teachers that have a lab component to their curriculum will undergo Laboratory Safety Training annually.
  ESG will provide the Laboratory Safety Training.
- The Laboratory Safety Training Agenda is listed in Appendix B.
- ESG will keep a record of trainings.

Student Training

Require students use proper laboratory practices and procedures. Teachers are required to educate them of the hazards and safety measures required when working with chemicals in a laboratory.

- Train students in safe laboratory practices and procedures at the beginning of each course.
- Require that students demonstrate mastery of lab safety by use of a quiz or other means.

- Review safety procedures and clean up responses prior to each lab activity.
- Demonstrate use of safety equipment including but not limited to protective clothing, gloves, goggles, eye wash station, deluge shower, etc.
- Key Points of the training shall include:
  - Never work alone in the laboratory, chemical storage or prep areas.
  - Avoid skin contact with chemicals. Minimize all chemical exposures.
  - Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label or **Safety Data Sheet** and review its contents before using any chemical reagents.
  - Allow only authorized personnel in the chemical storage areas.
  - Observe housekeeping and chemical hygiene standards.

Safety Coordinator

- Each site is required to assign a Safety Coordinator Contact
- The Safety Contact is responsible for ensuring all Laboratory Safety Procedures are being followed in the classroom and storage area.
- The Safety Contact is responsible for contacting ESG when it is required.

Classroom Movement

Principles or Administrative are to call Environmental Services Group prior to moving a chemistry teacher to a new or different classroom.

RECORDKEEPING REQUIREMENTS

Management

Recordkeeping requirements outlined in 29 CFR Subpart Z, 1910.1450 shall be maintained by ESG and available upon request or on the District Facilities Department web site.

Contact Information

Any questions, concerns, comments, or other information regarding the District Laboratory Safety Program can be directed to:

- The Environmental Services Group
- Phone: 651.744.1800
- Web Site: https://www.spps.org/Page/3470
- Email: ESG@spps.org

RESOURCES & APPENDIX

OSHA Standard:

- ✓ 29 CFR 1910 OSHA General Industry Regulations & Standards. January 2018. Mancomm. Inc. Davenport, IA.

APPENDIX A

District Laboratory Accident and Spill Procedure

District Laboratory Accident and Spill Procedure

NOTIFY – Call for Help

EVACUATE – Get everyone to a safe Location

ASSEMBLE – Organize and account for the students and workers

REPORT – Fill out an accident report after the emergency is addressed

Remove everyone from the room of the spill. Error on the side of caution and evacuate until safety is confirmed. Treat the injured:

1. Eye contact requires flushing with water for a fifteen (15) minute period and follow-up professional medical attention;
2. Ingestion call 911 and get medical attention immediately
3. Skin contact areas should be flushed with water and removed spill impacted clothing.

NOTIFY THE PRINCIPAL AND NURSE OF THE SITUATION

Only after all occupants are safe and accounted for including adjoining classroom areas if necessary should the spill be addressed.

DO NOT ADDRESS A SPILL UNLESS YOU ARE KNOWLEDGABLE OF THE CHEMICAL SPILLED AND CONFORTABLE HANELING THE QUANTITY RELEASED.

DO NOT ATTEMPT A CLEANUP WITHOUT THE PROPER PRETECTIVE EQUIPMENT AND/OR MATERIALS. CALL ENVIRONMENTAL SAFETY FOR ASSISTANCE/DISPOSAL.

To control the spill:

1. Seal the area/room
2. Turn of the ventilation to the area and turn on exhaust including fume hoods
3. Use absorbent material to absorb and contain the spill
4. Add sodium carbonate to acid spills
5. Add vinegar to base spills
6. Cleanup and containerize the spill
7. Notify ESG if spill is more than 5 gallons
8. Notify ESG for disposal

APPENDIX B

Laboratory Safety Training Agenda

Laboratory Safety Training Agenda

Train on how to use eyewash station and safety shower and teach all employees to find the safety devices quickly in an emergency.

Know appropriate emergency procedures, waste disposal, spill cleanup, evacuation routes, and fire emergency notification. Know proper transportation and disposal procedures for chemicals.

Be thoroughly familiar with the hazards and precautions for protection before using any chemical. Study the precautionary label **or Safety Data Sheet** and review its contents before using any chemical substance.

Never work alone in the laboratory, chemical storage or prep areas.

Skin contact with chemicals should be avoided. Minimize all chemical exposures.

Label all chemicals **and solutions** with **proper** name and hazard.

No unlabeled products should be stored anywhere in the science facility.

Only authorized personnel should be allowed in the chemical storage areas.

Never perform a first-time chemical demonstration in front of your class. Always perform these demonstrations in front of other instructors to evaluate the safety of the experiment.

Compressed gases should be handled as high energy sources, and therefore, as potential explosives.

Have all SDS sheets for chemicals available and current.

Know appropriate procedure in the event of a power failure.

Have an alternative evacuation route in the event your primary route becomes blocked.

Keep work and storage areas clean and uncluttered.

Use only those chemicals for which the quality of available ventilation systems is appropriate.

Review which chemicals are banned by SPPS and where to find that list.