Agua Fria Union High School District No. 216

Chemical Hygiene Plan

Revised, October 1, 2020

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I. Chemical Hygiene Plan

Revised, October 1, 2020

For Science Departments of Agua Fria Union High School District No. 216

The Chemical Hygiene Plan for Science Departments of the Agua Fria Union High School District No. 216 is written to comply with criteria applicable to the school science laboratory found in:

OSHA Hazard Communication Standard 1910.1200 of 1984

and

Laboratory standard of Part 1910 – Occupational Safety and Health Standards Section 191.1450 Occupation exposure to hazardous chemicals in laboratories

and

Appendix A to 191.1450 – National Research Council Recommendation Concerning Chemical Hygiene in laboratories

and

CDC/NIOSH School Chemistry Laboratory Safety Guide

II. Chemical Hygiene Officer

The Chemical Hygiene Officer for each high school shall be a member of the science department or administrative staff as assigned annually by the Principal.

_____has been appointed
(Name of Person)

Chemical Hygiene Officer at _____
(Name of School)

Principal's Signature: _____ Date: _____

A copy of this completed form is to be filed with the Chemical Hygiene Plan in the Principal's office of each middle school and each high school.

A copy is to be submitted to the Department Chair, Science.

A copy is to be submitted to the District Operations and Safety office.

Chemical Hygiene Officers for the 2019-2020 school year are:

- Carl McBee – Agua Fria High School
- Rosy Muftikian – Millennium High School
- David Russell – Desert Edge High School
- Hailey Walker – Verrado High School
- Deilani Ferguson – Canyon View High School

III. Chemical Hygiene Plan - Overview

For Science Departments of Agua Fria Union High School District No. 216
Overview

Purpose: The Chemical Hygiene Plan has been developed to provide employees of Agua Fria Union High School District No. 216 with information necessary to safely work in the school science laboratory.

Access: All components of the Chemical Hygiene Plan will be available to all employees as follows:

1. Each high school will have copies of the Chemical Hygiene Plan, the school chemical inventory, and the Materials Safety Data Sheets in the Principal's office, science department and/or chemical storage area. Each high school will provide a copy of the site Chemical Hygiene Plan, the school chemical inventory, and the Materials Safety Data Sheets to the District Operations and Safety office.

2. Each high school science teacher will be given access to a copy of the Chemical Hygiene Plan through the Agua Fria Union High School District homepage at http://www.aguafria.org. (Please go to *Departments* and click on Operations and Safety and then click on *Safety* to access the Plan.) In addition the Chemical Hygiene Plan and Materials Safety Data Sheets will be given to each high school custodian/maintenance department and kept in a location known and accessible to all maintenance workers.

3. Records of previous exposure or medical records related to hazardous chemicals in the science laboratory will be available from the Human Resources office.

Revisions: All components of the Chemical Hygiene Plan will be reviewed annually and necessary revisions will be made, approved by the Governing Board and disseminated.

Compliance: An annual evaluation of compliance to the OSHA Laboratory Standards and an inspection of the science chemical storage areas of each high school will be conducted. A written report will be completed noting any conditions not in compliance with the OSHA Hazardous Chemicals in Laboratories Standards, CDC/NIOSH School Chemistry Laboratory Safety Guide, and the Chemical Hygiene Plan for Science Departments of Agua Fria Union High School District. Problems indicated by the inspection will be noted and corrective measures will be taken in a timely manner with the cooperation of the school. A copy of the inspection report and any

notations will be kept by the school Chemical Hygiene Officer and the School Principal and may be viewed by other employees of the school upon request. A copy of the inspection report and any notations, as well as corrective actions, will be provided to the District Operations and Safety office.

IV. Chemical Hygiene Officer Duties

Role: Chemical Hygiene Officers have the duty and responsibility of monitoring the Chemical Hygiene Plan at their respective schools. A Chemical Hygiene Officer will be appointed at each high school on an annual basis by the principal.

Their duties will include:

1. Being familiar with all aspects of the Chemical Hygiene Plan, especially chemical storage and safety provisions in the science area.

2. Being a contact person for disseminating information involving chemical safety to employees of the school. This will include an annual in-service for employees (See Section IX - Employee Training).

3. Being a resource for employees at the school on matters involving the use of chemicals in the science laboratory.

4. Inspecting safety equipment at the beginning of each semester and cooperating with the annual inspection of laboratories and chemical storage areas. See Section III – Compliance and Section VIII – Facilities and Safety Equipment of Science Laboratories.

5. Reporting to the school principal, the District Operations and Safety office and any other persons deemed necessary, any conditions involving chemicals that pose risks to health or safety.

6. Monitoring science chemical inventories and updating the school chemical inventory list when necessary.

7. Making requests to the Maintenance Supervisor for disposal of unwanted chemicals from the science area. A request for disposal of unwanted chemicals includes the name of the chemical, if known, and the quantity of the chemical. Requests for disposal of chemicals should be sent to the Maintenance Supervisor by May 15th of each school year.

8. Review chemical purchase orders to indicate no prohibited chemicals are being ordered.

While the appointment of a Chemical Hygiene Officer is intended to enhance safety for employees, it does not lessen the responsibility of any employee to learn and practice safe procedures for working and teaching in a school science laboratory.

V. Operating Procedures – General Rules for Employees

All employees involved in the science laboratory environment or teaching a science lesson involving chemicals must read and adhere to the provisions of the Science Safety Guidelines for Teachers, the AFUHS District Chemical Hygiene Plan and model the same correct, safe behaviors expected of students in the Science Safety Rules and Procedures Agreement.

No teacher or other employee should attempt a laboratory experiment unless they are appropriately trained in that science discipline, are fully aware of possible hazards, and are willing to follow all procedures necessary for a safe laboratory experience. No experiment is justified if the safety of an employee or student is in doubt.

In addition, employees should:

1. Maintain records of the amounts of these materials on hand, amounts used and the names of workers involved.

2. Minimize all chemical exposure.

3. Not underestimate chemical hazards.

4. Know and understand the hazards of each chemical reactant and each of the products of chemical experiments as stated in the MSDS, lab direction, etc.

5. Know how to properly store all chemicals. If there is a question, the Chemical Hygiene Officer for the school should be consulted.

6. Wear appropriate eye protection at all times. Chemical splash goggles must be worn anytime chemicals, glassware, or heat are used in the laboratory.

7. Use protective safety equipment to reduce potential exposure, i.e. gloves, respirators, fume hood, etc., especially when working with carcinogens, reproductive toxins, and substances with a high degree of acute toxicity. (See Appendix G) A safety shield or fume hood must be used for hazardous demonstrations.

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

9. Know the locations for all personal safety and emergency equipment such as eye wash, shower, fire extinguisher, and spill control materials.

10. Know appropriate emergency procedures, waste disposal, spill clean-up, evacuation routes, and fire emergency notification.

11. Only teachers/staff may handle concentrated materials requiring mixing or dilution.

12. Exercise great care in moving chemicals from room to room. Use trays or carts with raised edges for moving glassware and chemicals.

13. Wash hands thoroughly after handling any chemicals or materials.

VI. Chemical Storage Rules and Procedures

No chemicals should be purchased or used in science laboratory exercises unless they:

(a) support the Arizona State Science Standards, Advanced Placement Science Curriculum and International Baccalaureate Science Curriculum

(b) are published in an appropriate laboratory manual with complete instructions.

(c) and are supported by CDC/NIOSH School Chemistry Laboratory Safety Guide

Chemicals are to be purchased from commercial chemical suppliers except for those chemicals listed in Appendix A that may be purchased from local community suppliers. **Under no circumstances** are chemicals to be accepted as gifts or otherwise acquired from private individuals, manufacturing companies, government agencies, etc. The teacher should be familiar with any exercise involving chemicals and follow safe procedures for use and storage of those chemicals.

The quantity of chemicals stored should not be excessive. It is recommended that quantities be limited to amounts no greater than what will be consumed over two academic years. Refer to the CDC/NIOSH Guidelines for specifications on shelf life and storage directions.

1. An updated inventory of all chemicals, their quantities, and storage location must be kept in the Principal's office and in the science department and/or chemical storage area. A copy of this inventory must be provided to the Operations and Safety office.

2. All chemicals including solutions you have made must be clearly labeled. In addition to the contents and concentration, the date of purchase or mixing should be written on the label. **No unlabeled chemicals** are to be stored.

3. All chemicals should be stored in chemically compatible families. Refer to the CDC/NIOSH for information about compatible families.

4. Store chemicals in a separate, locked, dedicated storeroom. If chemicals are used in the classroom for lab exercises, they must be returned to the proper storage location at the <u>end of the period</u> unless needed in the next subsequent period.

5. Only authorized personnel are allowed in the chemical storage area. Students are NOT ever authorized.

6. Store the minimum amount of chemicals needed and avoid bulk purchases. Smaller containers, though generally more expensive, promote freshness, maintain quality, reduce the likelihood of contamination, and lesson severity of spills.

7. To reduce the potential for overexposure to more hazardous materials consider purchasing ready-to-use products that require no mixing or dilution of concentrated ingredients when appropriate.

8. Store corrosives in appropriate corrosives cabinets.

9. No flammable materials should be stored outside of an approved flammables storage cabinet unless in safety cans.

10. Store flammables away from all sources of ignition.

11. Never store flammables in refrigerators unless the refrigerator is explosion proof.

12. Avoid storing hazardous chemicals on shelves above eye level.

13. The storage area and cabinets should be labeled to identify the hazardous nature of the products stored within.

14. Chemicals should not be stored on the floor except in approved shipping containers.

15. Storage areas should be well ventilated.

16. Chemical exposure to heat or direct sunlight should be avoided.

17. Reduce the accumulation of waste by disposing of it as soon as possible after use. This will eliminate the complications associated with the disposal of large quantities.

18. Metal and glass containers of flammable liquids are limited to a maximum size of one gallon. Approved safety cans are limited to a maximum size of two gallons.

- Acetone
- Amyl Ethyl Ketone
- Cyclohexane
- Ethanol

- Methanol

19. Compressed gas cylinders must be stored with the cylinder valve closed, safety cap installed if provided, away from heat, and adequately secured to prevent damage caused by rolling or falling. Acetylene and liquefied gas cylinders are stored in the upright position.

20. Employees conducting an inventory or inspection of a chemical storage area must wear splash goggles and lab coats. If chemical containers are being rearranged, employees are not to work alone.

21. Drawers and cabinets at each laboratory station need to be checked and cleaned after each lab exercise.

VII. Specific Rules and Guidelines for Chemical Safety in the School Science Laboratory

Material Safety Data Sheets:

Every chemical on campus is required to have an MSDS. A Material Safety Data Sheet (MSDS) is a technical information sheet detailing health and safety information concerning a hazardous chemical or chemical substance. Most MSDS' are divided into the following nine sections:

PRODUCT IDENTIFICATION

This section identifies the chemical and manufacturer. It gives both the chemical and trade names along with any synonyms for the substance.

HAZARDOUS INGREDIENTS

The percentage of each hazardous ingredient in the substance is given and data on its hazards are provided.

Often the concentration of the substance to which a person can safely be exposed is given. The safe exposure limit is reported as the Threshold Limit Value (TLV) or the Permissible Exposure Limit (PEL). Both TLV's and PEL's represent safe exposure limits and are figured for average exposures over a typical eight-hour workday.

TLV's are used to express the airborne concentration of a material to which **nearly** all persons can be exposed day after day without adverse effects. TLV's are expressed in three ways:

> TLV-TWA: The allowable time-weighted average exposure limit calculated for a normal eight-hour workday.
>
> TLV-STEL: The short-term exposure limit or maximum concentration for a continuous fifteen minute exposure period (maximum of four such periods per day with at least sixty minutes between exposure periods provided that the daily TLV-TWA is not exceeded).
>
> TLV-C: The ceiling exposure limit – the concentration that should not be exceeded even instantaneously.

PEL's also may be expressed as a time-weighted average (TWA), short-term exposure level (STEL) or a maximum ceiling exposure level (C).

TLV's and PEL's listed on a MSDS are usually expressed as "parts per million" (ppm), that is, parts of a contaminant per million parts of air. TLV's and PEL's may also be expressed as milligrams per cubic meter (mg/m^3).

PHYSICAL DATA

Here the MSDS covers the physical characteristics of the chemical or chemical substance. In order to control potential hazards, it is important for employees to be familiar with the physical characteristics of the substances that are used.

FIRE AND EXPLOSION DATA

The section provides information concerning a substance's potential for fire and explosion, plus any special precautions that should be taken during firefighting activities.

HEALTH HAZARD DATA

This section gives health information, including primary routes of entry for the chemical or chemical substance, signs and symptoms of exposure, medical conditions aggravated by exposure and whether the substance is a know carcinogen (cancer-causing agent). In addition, it gives first aid procedures so employees can be prepared if an emergency occurs.

The toxicity of a substance is usually reported as LS50 (Lethal Dose) for solids and liquids and LC50 (Lethal Concentration) for dusts, mists, gases and vapors. The LD50 is the ingested **dose** of a substance that produces death in 50 percent of a group of laboratory animals. The LC50 is the inhaled **vapor concentration** of a substance that produces death in 50 percent of the animals.

REACTIVITY DATA

This section describes that material's stability, incompatibility with other substances, and hazardous products that may be produced if the substance should decompose. It also lists conditions to be avoided for storage and handling of the substance.

SPILL AND LEAK PROCEDURES

This section gives special information on how the substance should be handled during a spill or leak. It also describes the recommended disposal method. This information is especially important when preparing emergency procedures.

SPECIAL PROTECTION INFORMATION

This section lists any personal protective equipment (respiratory protection, gloves, eye protection) needed to safely handle the substance. If protective equipment is required, this section will list the specific types that are recommended, such as a full-face mask respirator, rubber gloves, and chemical

safety goggles. Safe use of some substances may require special ventilation, and this information will be found in this section of the MSDS.

SPECIAL PRECAUTIONS

This section lists special precautions to follow when handling the chemical or chemical substance. Health and safety information not covered in other parts of the MSDS are listed here.

Specific Rules:

The rules and guidelines below are designed to avoid a number of hazardous situations. However, it must be realized that some employees such as chemistry teachers may be exposed to chemicals on a daily basis for a long period of time. These employees should be especially aware of the toxicological information on the Material Safety Data Sheets for chemicals they frequently use.

1. Never perform unauthorized laboratory experiments. Perform chemical experiments from a published procedure with an understanding of possible hazards. Deviation from authorized lab experiments requires approval from the Department Chair, Chemical Hygiene Officer and site Principal. Deviation from authorized lab experiments must be reported to the Operations and Safety office prior to the lab experiment.

2. Inspect all protective safety equipment before use. If defective, do not use.

3. Have appropriate types and sizes of fire extinguishers. Triclass ABC are appropriate for laboratories. Carbon dioxide fire extinguishers are inappropriate for laboratories. A Class D fire extinguisher or clean, dry sand should be available when working with flammable solids. Fire extinguishers should be inspected every six months. An inspection sheet for each fire extinguisher must be posted next to the fire extinguisher listing each date of inspection.

4. Do not block fire exits. Keep all aisles clear.

5. Post emergency telephone numbers in the chemical storage area. Have a telephone, intercom, or other means of emergency communication in the laboratory. In the event of a chemical spill/explosion, evacuate the lab, call 911, notify nurse and principal. Principal/site administrator must immediately notify the Operations and Safety office.

6. Clean up spills immediately and thoroughly. Follow approved spill cleanup procedures; spills should only be cleaned up by approved personnel.

7. The use or storage of mercury or mercury compounds is prohibited. Spills involving mercury need special care by Hazardous Materials specialists and the Fire Department. Call 911 immediately should any amount of mercury be spilled. You cannot dispose of any mercury at your school.

    a. Thermometers, barometers, or other devices containing mercury are not to be used. Although slightly less accurate, non-mercury thermometers remove a serious safety hazard and a troublesome clean up procedure. The use of electronic substitutes, such as probe ware, is required.

    b. To have mercury-containing devices disposed of, call Office of the Maintenance Supervisor.

8. Neutralizing chemicals, such as a spill kit, dry sand, kitty litter, and other spill control materials, should be readily available.

9. Chemical Disposal/Waste Plan *(note: Follow MSDS for proper disposal)*

    a. Due to the periodic disposal of unwanted chemicals by a licensed disposal company, the quantity limits on stored chemicals, and the restrictions on purchasing, the disposal cost of hazardous reagents from the school science department should be minimized. The Chemical Hygiene Officer will be in charge of disposal of all hazardous reagents.

    b. All unknown chemicals will be considered hazardous.

    c. In general, the small quantities (test tube amounts) of chemical waste generated by the science laboratory pose no problem for water treatment plants. Flush with adequate amounts of water to protect plumbing. If there are any questions about a substance, consult with the Chemical Hygiene Officer.

    d. Biological preservatives such as alcohol or formalin may be flushed with water if quantities do not exceed a few gallons. However, it is suggested that specimens be ordered in packaging that uses the minimum amount of preservative. Non-formaldehyde preservatives are preferred.

    e. Preserved dissection specimens may be disposed of like any other materials going to the landfill.

    f. Procedure for acquiring and disposing of chemicals. The school's Chemical Hygiene Officer should send a request for disposal of unwanted chemicals to the Maintenance Supervisor by May 15th of

each school year. The Chemical Hygiene Officer must give approval in writing for the acquisition of any chemicals in high schools.

10. Work and floor surfaces should be cleaned regularly and kept free of clutter.

11. Do not use chipped, etched, or cracked glassware. Glassware that is chipped or scratched presents a serious breakage hazard when heated or handled.

12. Eye protection must be worn. Chemical splash goggles must meet ANSI Z87.1 Standard. Wear face shields when dealing with corrosive liquids, (i.e., full strength acids and bases).

13. Wear gloves that offer protection for all hazards you may find in the lab.

14. Always wear a lab coat or a chemical-resistant apron when dealing with corrosive chemicals.

15. Do not pipet by mouth. Always use a pipet bulb or other appropriate suction device.

16. Wash hands thoroughly after any chemical exposure or before leaving the laboratory.

17. Never smell chemicals directly; always waft the odors to your nose using your hand.

18. Foodstuffs should not be present or eaten if in a room with toxic materials.

19. Do not apply cosmetics (including perfumes, colognes, etc.) in areas where laboratory chemicals are present.

20. Read all labels carefully; the names of many chemicals look alike at first glance.

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

22. Handle toxic, corrosive, flammable, and noxious chemicals under a fume hood.

23. Do not expose flammable liquids to open flame, sparks, heat, or any source of ignition.

24. At least every semester inspect all shelf clips in your acid cabinet to check for possible corrosion. Corroded shelf clips can lead to a shelf collapsing and causing dangerous spills.

25. Use a safety shield when igniting flammable solids.

26. Use extreme caution when handling finely divided (dust-like) material. Finely divided materials may form explosive mixtures with air and also make inhalation of toxic materials more likely.

27. Discourage the use of contact lenses in areas where chemicals are used or stored. If contacts must be worn, wear non-vented goggles.

28. All accidents or near accidents (close calls) should be carefully analyzed with the results distributed to all who might benefit. Send your information to the Science Department Chair for distribution. Send a copy of this information to the Operations and Safety office.

29. In the event of an injury or exposure to a hazardous chemical, the person shall be referred to the school nurse as soon as possible. Fill out an accident report describing the event in detail before leaving campus for the school day. Accident report forms are obtainable from the school principal or I-drive. The completed accident report form must be given to the site principal / administrator. A copy of the completed accident report form must be provided to the Operations and Safety office by the site principal.

30. Develop and practice Laboratory emergency plans (fire, spills, power failure, etc.) with your students.

VIII. Facilities and Safety Equipment for Science Laboratories

For the safe operation of the Science Laboratory the following conditions are necessary where chemicals, open flames, heating of glassware, or release of fumes are involved.

1. An easily accessible fire blanket must be present where open flames are used.

2. Clean and functional splash goggles must be available.

3. Adequate laboratory ventilation must be provided when chemical fumes are liberated. Exhaust air must be vented externally to the building or otherwise purified. A rate of four to twelve air changes per hour is recommended. Refer to the operating procedure and manuals to ensure non-vented fume hoods are operating properly.

4. Fire extinguishers must be of the right type, Tri-class ABC, and they must always be properly inspected. A fire extinguisher must be located in each laboratory and chemical storage area.

5. Eyewash stations must be functional and flushed at least once a month. Eye wash bottles should be maintained according to the manufacturers' directions.

6. Fume hood must be functional. A level of 60 – 100 linear feet per minute is recommended.

7. A safety shield must be available for demonstrations. This does not remove the responsibility for wearing safety goggles.

8. Full body showers are to be located in high school chemistry labs.

9. Running water should be available for hand washing in laboratories using preserved specimens or handling chemicals.

In no instance should a classroom not properly equipped be used for laboratory exercises involving chemicals, flames, or release of fumes. The Chemical Hygiene Officer must inspect all safety equipment at the beginning of each semester and correct deficiencies immediately. The Chemical Hygiene Officer must keep documentation of corrective actions taken. A copy of this inspection report and defined corrective actions must be provided to the site principal/administrator and to the Operations and Safety office.

IX. Employee Training

At the beginning of each year, the Chemical Hygiene Officer will provide an orientation about the Chemical Hygiene Plan to employees who will be working in the science laboratory and chemical storage areas. Employees hired after this orientation must be presented the same information before they begin work in the science laboratory. All employees who will be working in science laboratories and chemical storage areas must also receive a copy of this manual. A sign-in log regarding the Chemical Hygiene Plan orientation and receipt of manual (electronically or hard copy) must be maintained by the Chemical Hygiene Officer. Updates at department or other meetings as well as orientation for employees hired once the initial training has occurred must also be tracked via a sign-in sheet. The date of training must be included on the sign-in sheet. This log is subject to inspection by site or District administration.

The orientation will include the following:

1. Distribution of the written Chemical Hygiene Plan for Science Departments of Agua Fria Union High School District to each high school science teacher and each maintenance/custodial department. If these employees have copies already, any changes or updates of information will be provided.

2. Locations of the chemical inventory & Material Safety Data Sheets. Copies of MSDS sheets should be in a location within the Science Department that is known by & accessible to all teachers who use these materials.

3. Procedure for reporting accidents. Use the “Incident Report” form to report an accident.

4. Procedure for reporting unsafe conditions.

5. Procedure for medical treatment involving chemical exposure. Remember one source of information for medical treatment is found on Material Safety Data Sheets.

6. Procedure for acquiring and disposing of chemicals. The school’s Chemical Hygiene Officer should send a request for disposal of unwanted chemicals including the name of the chemical, if known, and the quantity of the chemical to the Maintenance Supervisor by May 15th of each school year. The Chemical Hygiene Officer must give approval in writing for the acquisition of any chemicals in high schools.

7. Instruction on how to read the Material Safety Data Sheets to obtain appropriate hazard information.

8. A reminder of the list of chemicals prohibited in the school science laboratory. (See Appendix C & D in the CDC/NIOSH School Laboratory Safety Guide)

9. Instruction on emergency procedures in the event of fire, chemical spills, or injury.

Additional employee training should be regularly included in Science Department meetings and/or other in-service meetings.

Appendix A

Chemicals Purchased from Local Community Suppliers

The chemicals listed below may be purchased from local community suppliers such as grocery stores. All other chemicals are to be purchase from commercial chemical suppliers.

- Antacids
- Aluminum
- Aluminum foil
- Ammonia
- Aspirin
- Baking soda
- Baking powder
- Bleach
- Chalk – for lab experiments
- Corn syrup
- Copper
- Corn starch
- Dish detergent
- Drano
- Espon salt
- Flour
- Food coloring
- Gelatin
- Hydrogen peroxide 2%
- Honey
- Iron
- Liquid bluing
- Nail polish remover
- Pancake syrup
- Plastic wrap
- Rock salt
- Rubbing alcohol
- Salt
- Shampoo/conditioner
- Steel
- Sugar
- Tea bags
- Tie dye dyes
- Tylenol
- Vegetable oil
- Vinegar
- Windex
- Woolite
- zinc

Procedure for adding chemicals to the list of chemicals that may be purchased from local community suppliers

The Chemical Hygiene Officer may give a temporary approval for the purchase of a chemical not listed in Appendix A, Chemicals Purchased from Local Community Suppliers for the current school year.

1. The Chemical Hygiene Officer will notify Department Chair, Science, of this temporary approval.

2. The Chemical Hygiene Officer will notify all other Chemical Hygiene Officers and the District Operations and Safety office of this temporary approval.

3. At the beginning of each school year all of the Chemical Hygiene Officers will meet and review all chemicals that have received temporary approval during the previous school year and decide whether to add the chemicals to list of chemicals in Appendix A.

Appendix B

Agua Fria Union High School District No. 216

Science Safety Guidelines for Teachers

The following minimum guidelines must be read and observed by all teachers K-12 who teach science. These guidelines are part of the Chemical Hygiene Plan and are reviewed annually.

General Guidelines:

1. It is the teacher's responsibility to know any hazards that might be associated with a laboratory experiment or demonstration and to take steps to protect themselves and their students against such hazards. Only demonstrate experiments and/or have students perform experiments that are very familiar to you. If there is any doubt about the safety of an experiment, wait until you can find someone who can answer your questions before proceeding.

2. Students must be under the active supervision of a teacher during any science experiment. Teachers are never to leave the room while students are engaged in a laboratory exercise or when chemicals or equipment are in use in the room.

3. Teachers must be familiar with all safety equipment and emergency procedures. Safety equipment (safety goggles, aprons, etc.) appropriate to the laboratory experiment must be provided. The teaching environment should be appropriate for the science activities performed. The teaching environment includes features such as room size, adequate ventilation, the presence of fire extinguishers, eye wash fountains, etc. Student maturity and behavior should be taken into consideration when selecting laboratory exercises.

4. Students must be instructed in safety rules before lab activities. The "Agua Fria Union High School District No. 216 Science Safety Rules and Procedures Agreement" is required for high school students enrolled in any science course. (See Appendix C)

5. Students must be instructed in procedures for leaving the science room under emergency conditions.

Chemical Guidelines:

Teachers who engage in laboratory activities involving chemicals need to consult the Chemical Hygiene Plan for more specific rules and procedures designed to protect them as employees of Agua Fria Union High School District No. 216.

1. Do not acquire or store any chemicals unless they support the Arizona Science Standards, and/or Advanced Placement / International Baccalaureate Science Curriculum.

2. Purchase or receive chemicals only from reliable sources such as science supply companies. Do not accept donations from other sources, private or public.

3. Avoid stockpiling chemicals in order to prevent problems with storage space, deterioration, magnitude of accidental spills, etc.

4. All chemicals must be stored in a locked storage room. Students must not have access unless directly supervised by a teacher.

5. Adequate ventilation is essential. Most elementary school classrooms, or classrooms not equipped as a science lab, do not have adequate ventilation for experiments involving volatile substances.

6. Chemical splash goggles must be worn during all chemical experiments. If students are observing a chemistry demonstration, a protective safety shield is needed in addition to the safety goggles.

Equipment Guidelines

1. Do not operate and do not allow a student to operate any piece of equipment that is not thoroughly familiar to you. Be sure that you have thoroughly explained the operation procedures to the student.

2. Teachers and students must wear eye protection when heating glassware, using chemicals, or performing experiments that could generate flying objects. In addition, a safety shield should be used during demonstrations that pose these hazards.

3. Instruct students in the proper use of flames or heating elements before use in an experiment. Use alcohol burners with caution. Do not allow students to fill burners; fill in well-ventilated areas. Never fill when flames are in use; never keep stock containers of alcohol or other flammables in a room where flames are in use. Never transport a lit alcohol burner.

4. Never allow a student to focus direct sunlight through a microscope. Magnifying glasses can also cause eye damage if a student looks through them at the sun.

5. Thermometers, barometers, or other devices containing mercury are not to be present - **ever**.

6. Inspect all electrical cords before use. Keep areas around electrical cord, outlets, and equipment dry.

Biological Guidelines

1. No lab exercises involving the collecting of or use of blood are to be performed. Blood experiments are to be done with commercially available blood substitutes and microscopy of human blood is to be done with commercially prepared slides, and not fresh smears.

2. The deliberate culture of microorganisms should be done only if the teacher is familiar with safe culture procedures. No cultures are to be made using known pathogens. Human and animal body fluids, including saliva, are not to be cultured.

3. Care and common sense should be used in collecting and handling live insects and other invertebrates.

4. Animals are permitted at school only with prior approval of the principal.

5. Vertebrate animals should be kept in the classroom only if they can be treated humanely and their handling monitored by the teacher. Animals capable of inflicting bites should be displayed only, not handled. No experimentation that causes pain, malnutrition, thirst, or other stress to an animal is permissible.

6. Students are not encouraged to bring pets from home. If a student brings an animal to school, it should support instruction based on the curriculum and be with the prior knowledge and approval of the teacher and the principal. Proper care and safe display of the animal must be provided.

7. Students and teachers should wash their hands thoroughly after handling chemicals, plants and/or animals.

Science Field Trips

1. Field trips must be conducted in accordance with District policy.

2. Field trips must be well planned and include activities that support the Essential Knowledge and/or Essential Understandings of the Science Standards. Instruct students about any potential hazards at the field trip site.

3. Students must be under competent adult supervision. The number of adult supervisors should be appropriate for the type of field trip and the age and maturity of the students. The number of chaperones must follow District policy.

4. Field studies that leave the natural environment undisturbed are encouraged. If collecting specimens for further study, be conservative in the number of specimens collected and use methods that cause the least disruption to the habitat. Do not collect any rare or endangered species. Do not remove any specimens from a protected area such as a park, conservation area, or nature preserve.

5. Do not use bare hands when turning over rocks, logs, etc. or when handling animals capable of inflicting bites and stings. Regard the field trip site as a lab setting and provide protective equipment if necessary.

6. Do not allow students to eat or taste plant material collected in the wild, or drink from ponds, streams, or lakes.

7. Avoid using glass containers in the field. Use plastic or cardboard containers for collecting or transporting materials.

Appendix C

Agua Fria Union High School District No. 216

STUDENT SCIENCE SAFETY RULES AND PROCEDURES AGREEMENT

In order to ensure that science experiments are safe and positive learning experiences, students and their parents should read, discuss, and sign the Science Safety Rules and Procedures Agreement. No student will be permitted to participate in laboratory work until the agreement is signed by a parent and student and returned to the teacher. Parent and Student signed Science Safety Rules and Procedures Agreements must remain on file with each science teacher and must be available for inspection at any time by Department Chair, Chemical Hygiene Officer, site or District administration.

1. Act in a responsible manner at all times. Misconduct that endangers any student will not be tolerated.

2. Never work without adult supervision. Do not handle any materials until instructed by the teacher to do so.

3. Perform the experiments as directed. Do not do anything that is not part of an approved experimental procedure. Follow all instructions given by the teacher. Read the written procedures. If you don't understand a procedure or piece of equipment, ask the teacher.

4. Eating, or drinking in the lab or experimental work area are forbidden.

5. Wear appropriate protective equipment. A lab coat or apron and ANSI approved eye protection should be worn when necessary. Keep hands away from face, eyes, and mouth while using chemicals or preserved specimens.

6. Learn the locations and operation of emergency equipment including eyewash fountains, safety showers, fire extinguishers, fire blankets, etc. Report all accidents, injuries, close calls, or unsafe conditions to your teacher.

7. Shoes must be worn at all times; never go barefoot in the lab. Special care should be taken with floppy clothing. Tie back long hair to keep it away from flames and chemicals.

8. Never taste a chemical. Never pipette by mouth – always use a pipette bulb.

9. Check odors only if instructed to do so by gently wafting some of the vapor toward your nose with your hand.

10. Carry sharp objects with tip or sharp edge pointing downwards. Do not try to catch falling sharp objects.

11. Use caution when heating materials in the lab. Keep hands and face away from the mouth of a test tube or beaker being heated. Turn off burner or hot plate when you are finished – never leave an active heat source unattended.

12. Do not enter science prep rooms or storage areas unless under teacher supervision.

13. Never take chemicals, supplies, or equipment out of the laboratory without the knowledge and consent of the science teacher.

14. Clean your lab area; put away all equipment and reagents; wash your hands at the end of each work session. Report any damaged glassware or equipment to your teacher.

15. All personal items, backpack, bags, etc… are to remain in a locked classroom. Personal items are not permitted in the lab.

Your Science Teacher may add additional safety instructions to the back of this form.

I, _____, have read, understand, and agree to follow these science safety rules and procedures. I agree to abide by any additional instructions, written or verbal, provided by my science teacher or adult supervisor.

_____

Student Signature Date

_____

Parent Signature Date

List any allergies or medical problems of which your teacher should be aware, including contact lenses.

Appendix D

Agua Fria Union High School District No. 216

Science Chemical Review List

No chemicals should be purchased or used in science laboratory exercises unless they:

(c) support the Essential Understandings and/or the Essential Knowledge found in the Arizona Science Standards, and/or AP/IB Science Curriculum, and

(d) are published in an appropriate laboratory manual with complete instructions.

Chemicals are to be purchased from commercial chemical suppliers. **Under no circumstances** are chemicals to be accepted as gifts or otherwise acquired from private individuals, manufacturing companies, government agencies, etc. The teacher should be familiar with any exercise involving chemicals and follow safe procedures for use and storage of those chemicals.

The quantity of chemicals stored should not be excessive. Quantities should be limited to amounts no greater than what will be consumed over two academic years.

The following list of chemicals was prepared using data from the Flinn Chemical Catalog/Reference Manual. Evaluation of these chemicals involved reactivity, toxicity, carcinogenic potential, explosiveness, and flammability. This brief list should be compared to the chemical inventory. Those chemicals preceded by an asterisk (*) should not be purchased, used, or stored. The other chemicals listed should be used or stored only with appropriate cautions. The MSDS should be read before using these or any other chemicals. The Flinn Chemical Catalog/Reference Manual is a good source of information on potential hazards.

Hazards indicated: C = positive or suspected carcinogen

T = moderately to extremely toxic

R = highly reactive and/or corrosive

F or E = potentially flammable or explosive

This list is subject to periodic review and updating. Inquiries on the status of any chemical may be directed to the Department Chair, Science.

SMALL QUANTITIES ONLY

Acetamide – C

Acetic acid (glacial) – T, F, R

Acetic acid – R

*Acetic anhydride – F, R, T

Acetone – F, T

Acetyl chloride – F

Acrylonitrile – C

dl-Adrenalin – T

*Aluminum chloride (anhydrous) – R, T

*Ammonium bichromate – T, E. F

Ammonium chromate – T

Ammonium dichromate – T, E, F

Ammonium hydroxide (14M) – T

Ammonium hydroxide (6M) – T

Ammonium nitrate (crystals) – T, E

Ammonium vanadate (ammonium metavandate) – T

*Aniline – T, C

*Aniline hydrochloride – T

*Antracene – C

Antimony – T

Antimony oxide – T

Antimony pentachloride – R

Antimony trichloride - T

*Arsenic – T

*Arsenic chloride – T

*Arsenic pentoxide – T

*Arsenic trioxide –C, T

*Asbestos – C

*Arcarite – C

*Barium chloride (crystals) T

Barium oxalate – T

Barium peroxide – T, F (High School Only, Demo Supply)

*Benzene – C, T. F

*Benzidine – T

*Benzoin – C, T

Benzoyl chloride – T, R

*Benzoyl peroxide – T, E, R

*Beryllium carbonate – T

Biuret solution – R

*Bromine – T, F

*Bromine water – T (High School Only & fresh supply only)

*Cadmium – C, T

All Cadmium compounds – T

Cadmium bromide – T

Cadmium carbonate – T

*Cadmium chloride – C

PROHIBITED

Cadmium nitrate – C, T, F

Cadmium sulfate – C, T

*Calcium carbide – F

*Calcium cyanide – T

Calcium hypochlorite – T

Calcium nitrate (crystals) – F

Calcium oxide – R, F

*Carbon disulfide – F, E

*Carbon tetrachloride – T

*Catechol (pyrocatechol) – T

*Chlorine, chlorine water – T (High School Only & fresh supply only)

*Chloral hydrate – T

*Chloretone (chlorobutanol) – T

*Chloroform – C, T

Chlorpromazine – T

*Chromium – C, T

*Chromium (powder) – C

*Chromium oxide – C

Chromium potassium sulfate – T

*Chromium trioxide (chromic acid) – C, T

Cobalt – T

Cobalt chloride – T

*Colchicine – C, T

Cyclohexane – F, T (for high school only)

*Cyclohexene – F, T, E

*Cyclohexanol – F, T

Dichlorobenzene – T

*Dimethylaniline – T

*Dichloroethane (ethylene dichloride) – C

*2,4-Dinitrophenol – T, E

*Diisopropyl ether – E

Dioxane – C

Ethyl alcohol – F, T

*Ethylene dichloride (Dichloroethane – C, F, T

Ethylene oxide – T, F

Ether (ethyl ether) – F, E

Ferrous sulfate – T

*Formaldehyde (37% solution) – T, C

Formalin (10% formaldehyde) T

*Formic acid – R

*Gasoline – F, E

*Gunpowder – E

*Hexachlorophene – T

*Hydrobromic acid – T

Hydrochloric acid – R

*Hydrofluoric acid – T

Hydrogen gas – F

Hydrogen peroxide (over 6% for high school only) – T, R

Hydrogen sulfide – T

Hydroquinone – T

Iodine crystals – T, R (High School Only, Demo Supply)

Isobutyl alcohol – F, T

Isopentyl alcohol – F, T

Isopropyl alcohol – F

Lactic acid – R

All Lead compounds – T

*Lead acetate (flakes) – T, C

*Lead arsenate – C, T

Lithium – F, R (max. qty. – 1 yr. demo supply

Lithium nitrate crystals – E, R (max. qty. – 1 yr. demo supply)

Magnesium – F

Magnesium chlorate – T

Magnesium perchlorate – R

*Mercury (and all compounds) T

Methyl alcohol – F, T

Methyl ethyl ketone – F

Methyl iodide – C

Methyl methacrylate – T, F

*Millon's reagent solution – T

Nickel(ous) Ammonium sulfate crystals – T

Nickel carbonate – C

Nickel(ous) chloride – T, C

Nickel(ous) nitrate – T, C

Nickel oxide – C

Nickel(ous) sulfate – T, C

Nicotine – T

Nitric acid – R

Osmium tetroxide – T

Oxygen tanks – F

Para-dichlorobenze (1,4 Dichlorabenzene) – T

*Paris green – T

Pentane – F

*Perchloric acid – R, E

Perchloroethylene – C, T

*Petroleum ether – F

*Phenol (Crystals or 88% solution) – C, T

1-Phenyl-2Thiourea – T

Phenylthiocarbamide powder – T

*Phosphorous, red or white – F

*Phosphorous pentoxide – F, R

*Picric acid

Potassium metal – E, R (max. qty. – 1 yr. demo supply

*Potassium cyanide – T

*Potassium chlorate – T, E

Potassium chromate – C, T

Potassium dichromate – R, T, C

Potassium ferricyanide – T

Potassium ferrocyanide – T

Potassium hydroxide (solid) – T, R

Potassium nitrate – F, E

Potassium nitrite (crystals) – F, E

Potassium periodate – R

Potassium permanganate – T, F

*Potassium sulfide – F, T

Propionic acid – F

n-Propyl alcohol – F

Pyridine – T, E

Pyrogallol (Pyrogallic acid) – T

Sebacoyl chloride/hexane soln. – F

Silver acetate – T

*Silver cyanide – T

Silver nitrate – T, R

Soda lime – R

Sodium metal – F, R (max. qty. – 1 yr. demo supply)

*Sodium arsenate – T, C

*Sodium arsenite – T, C

*Sodium azide – T, E

Sodium chlorate – F

Sodium chromate – T, C

*Sodium cyanide – T

Sodium dichromate – T, C

Sodium fluoride – T

Sodium hydroxide solutions – R (purchase of pre-mixed soln. recommended)

Sodium hydroxide – R

Sodium nitrate – R, E, T

Sodium nitrate (granular) – T, F, E (for A. P. Chemistry only)

Sodium nitrite – C, T, E

*Sodium peroxide – E

Sodium sulfide – T, F

Sodium thiocynate – T

Stannic chloride – R, T

*Strontium – F

Strontium nitrate – F

Sudan IV – C

*Sulfuric acid (fuming) – T, R

Sulfuric acid – R, T

Tannic acid – C, T

Tetrabromoethane – T

Thioacetamide – C, T

Thiourea (thiocarbamide) – C

*Toluene – T, F

Toluidine – C

Trichloroethylene – C, T

Uranyl acetate – C

Uranyl nitrate – C, F, E

Urethane – C

Vinylite – C

Winkler's solution #2 – R

Wood's metal – T

Xylene – F, T

Zinc nitrate (flakes – T, F

Appendix E

Science Department Chemical Storage Inspection Checklist

This checklist describes the conditions for a science chemical storage area to be in compliance with the Chemical Hygiene Plan for Agua Fria Union High School District No. 216. Copies of this report and documentation of necessary corrective actions taken are to be kept by the Chemical Hygiene Officer and the Department Chair, Science. A copy of this checklist must be provided to the District Operations and Safety office.

School_____ Storage Location_____

Inspection by_____ Date_____

Signature of Chemical Hygiene Officer _____

Date_____

Conditions within storage area: □□□□Satisfactory, C = Corrective action needed

1. All chemicals are clearly labeled with all appropriate information. _____
2. Chemicals are stored on secure shelving. _____
3. Chemicals are spaced to allow safe storage and removal of chemicals. _____
4. Stored quantities of hazardous chemicals do not exceed a two-year supply. _____
5. The chemicals stored are only those required for science instruction. _____
6. Labeled cabinets are used for storage of flammables and contact hazards. _____
7. Storage area is free of defective containers. _____
8. Hazardous chemicals are not stored above eye level. _____
9. Locked doors secure access to the chemical storage area. _____
10. A fire extinguisher is located in the chemical storage area. _____

11. Materials are available for spill control and cleanup. _____

12. Floor area is free from clutter and provides easy exit from storage room. _____

13. None of the following are stored:

    a. Gasoline _____

    b. Mercury or mercury compounds _____

    c. Benzoyl peroxide _____

    d. Carbon disulfide _____

    e. Ether _____

    f. Picric acid _____

    g. Perchloric acid _____

    h. Arsenic powder, pentoxide, trichloride, or trioxide _____

    i. Asbestos _____

    j. Benzene or benzidine _____

    k. Chromium powder or chromium (IV) oxide _____

    l. Lead arsenate _____

    m. Sodium arsenate or sodium arsenite _____

14. MSDS sheets are available in a clearly marked location. _____

15. Metal and glass containers of flammables are limited to one gallon in size. _____

16. Glass bottles are limited to one gallon for any of the following chemicals: acetone, amyl alcohol, methyl ethyl ketone, cyclohexane, ethanol, methanol. _____

17. Chemical storage area and laboratory has adequate ventilation.

18. Operation of fume hood is adequate; 60 to 100 linear feet per minute is recommended _____

Remarks: If more room is needed, please attach additional documents.

Appendix F

Chemical Hygiene Plan Checklist

This Chemical Hygiene Plan checklist is for use in Agua Fria Union High School District No. 216 for annual inspections of science departments to ensure effectiveness & compliance with OSHA Standard 29 CFR 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories. Copies are to be kept by the Chemical Hygiene Officer & the Department Chair, Science. A copy of this checklist must be provided to the District Operations and Safety office.

School_____ Chemical Hygiene Officer_____

Date _____ Inspection by_____

Item #	Compliance: ✓ indicates compliance with OSHA Standard

_____ 1. Laboratory use of hazardous chemicals complies with OSHA Standard.

_____ 2. Work is performed on laboratory scale.

_____ 3. Employees are not exposed to substances requiring monitoring as defined by the OSHA Standard.

_____ 4. There is a written Chemical Hygiene Plan as defined by OSHA Standard.

_____ 5. The Chemical Hygiene Plan is capable of protecting employees from health hazards associated with chemicals in the laboratory.

_____ 6. The Chemical Hygiene Plan is readily available to employees, employee representatives, and evaluators.

7. The Chemical Hygiene Plan indicates specific measures to ensure employee protection in the laboratory including the following:

_____ a. Standard operating procedures relevant to safety and health to be used when working with hazardous chemicals are addressed.

_____ b. Circumstances that require prior approval are addressed.

_____ c. There is documentation of employee information and training at the time of employment and/or new assignment.

_____ d. Employees are given access to a copy of the Chemical Hygiene Plan.

_____ e. The Chemical Hygiene Plan is reviewed in detail with employees at least annually and any new provisions are explained.

_____ 8. Only chemical processes that do not require use of respirators are used.

_____ 9. Employees are provided the opportunity to receive medical attention under the circumstances defined in the Standard.

_____ 10. Chemicals of unknown composition are assumed hazardous and covered in the Chemical Hygiene Plan.

_____ 11. Labels on incoming containers of hazardous chemicals are not removed or defaced.

_____ 12. Chemical Hygiene Plan indicates particularly hazardous chemicals not allowed for laboratory use or storage.

_____ 13. Procedures for removal of unwanted or hazardous chemicals are explained.

_____ 14. The Chemical Hygiene Plan is reviewed and updated at least annually

Recommended Actions: please attach additional documents

Appendix G

Chemical-Specific Safety Procedures

Reproductive Toxins:

- Reproductive toxins should be handled only in a hood, using appropriate protective apparel (especially suitable gloves) to prevent skin contact.
- Reproductive toxins should be properly labeled and stored in well-ventilated areas in unbreakable secondary containers, if possible.
- Notify supervisor/instructor of all incidents of exposure or spills.

High Acute Toxicity Chemicals: (Supplemental rules to be followed in addition to those mentioned above):

- Use and store these chemicals in areas of restricted access that are posted with special warning signs. These areas should include a hood (with a face velocity of at least 60 linear feet/minute) or other containment device for procedures that may generate aerosols or vapors containing the substance.
- Use gloves, long sleeves and other protective apparel as needed to avoid skin contact. Always wash hands after working with these chemicals.
- Maintain records of the amounts of these materials on hand, amounts used and the names of the workers involved.
- Assure that at least two people are present at all times if a compound in use is highly toxic or of unknown toxicity.
- Be prepared for accidents and spills. Store breakable containers of these substances in chemically resistant trays. Cover work and storage surfaces with removable, absorbent, plastic backed paper.
- If a major spill occurs outside the hood, evacuate the area; assure that cleanup personnel wear suitable protective apparel and equipment.
- Thoroughly decontaminate or incinerate contaminated clothing or shoes. If possibly, chemically decontaminate by chemical conversion.
- Store contaminated waste in closed, suitably labeled, secondary containers (for liquids, plastic bottles half-filled with vermiculite).

Select Carcinogens: (Further supplemental rules to be followed, in addition to all these mentioned above):

- Conduct all transfers and work with these substances in a designated area--a restricted access hood, glove box or portion of a lab designated for use of highly toxic substances, for which all people with access are aware of the substance being used and necessary precautions. The designated area should be conspicuously marked with warning and restricted access signs. Prepare a plan for use and disposal of these materials and obtain approval of the appropriate lab supervisor or instructor.

- All containers of these substances should be properly labeled with identity and warning labels.
- Store containers of these chemicals in ventilated, limited access areas in appropriately labeled, unbreakable, chemically resistant, secondary containers.
- If using toxicologically significant quantities of a select carcinogen on a regular basis (3 times per week or more), consult a physician concerning desirability of regular medical surveillance.
- Use a wet mop instead of dry sweeping if the toxic substance was a dry powder.
- When using a positive pressure glove box, thoroughly check for leaks before each use. Trap exit gases or filter them through a HEPA filter and then release into the hood.
- Use chemical decontamination whenever possible; ensure that containers of contaminated waste (including washings from contaminated flasks) are transferred from the controlled area in secondary container under the supervision of the laboratory supervisor/instructor.
- Decontaminate any equipment, including glassware, in the hood before removing them from the controlled area. Decontaminate the controlled area before resuming normal work there.
- On leaving the area, remove protective apparel and wash hands, forearms, face and neck.

Flammables:

- Never heat flammable liquids with an open flame or hot plate. Use a heating mantle, steam bath or hot water bath.
- Never use or store flammable chemicals near any source of ignition, spark or open flame.
- Handle solvents in an exhaust hood or a well-ventilated area.
- Ground containers when transferring from one container to another if the potential for sparking exists.
- Do not store large quantities of flammable reagents in the laboratory.
- Store flammable liquids in appropriate safety cabinets and/or safety cans.

Appendix H

Safety Precautions and Operation of Paramount Fume Hood

Safety

1. See the Chemical Guide located behind the front panel to verify the chemical(s) being used are compatible with the hood filters.
2. Do not use open flame inside the hood.
3. Ensure pre-filters are installed prior to use. Change the pre-filters quarterly.
4. Use care when installing Filter Cells; units are heavy.
5. Exhausted carbon filters have absorbed vapors from chemicals used in the hood and therefore are chemical waste.
6. Users need to be familiar with the operating procedures for the hood.
7. The Chemistry Lab ventilation system must be operating while using the hood.
8. Abnormal odors may indicate that the hood filters may need to be changed.
9. The hood is not intended for highly toxic vapors, unknown reactions, hazardous particulates or experiments generating high levels of contaminants.
10. Minimize the quantity of the chemical(s) used in the hood.
11. Adjust the sash position to the 100 lfps setting for chemicals with TWA's below 50 ppm.
12. Leave Blower on for at least one (1) minute after work in the enclosure has been completed.
13. If a chemical is spilled inside the hood, leave the blower running until all traces of the chemical has been removed.
14. Make sure the Filter Cells are installed prior to using the hood.
15. If the hood blower fails during use, terminate the experiment and evacuate the Lab.
16. For manufacturer's assistance with the hood or filter selection, contact Labconco at 800-821-5525 or 816-333-8811.

Operating the Hood

1. Note: Refer to the hood instructional manual for routine maintenance requirements (see Appendix I) which are dependant upon amount of use and type of chemicals used within the hood.
2. To start the hood, turn on the blower with the switch ….
3. Observe for error messages
    a. AIR FLOW ERROR – Indicates low air flow
    b. SENSOR 1 ALARM – Sensor in carbon filter detected a high level of organics

c. SENSOR 2 ALARM – Indicates high level of organics in the exhaust ducting
d. SENSOR WARM-UP – Sensor warming up.
e. MEMORY ERROR - indicates filter hours and other stored times were not stored correctly in memory

Appendix I

Routine Maintenance

Monitoring and changing the filters is the primary maintenance required with this enclosure.

Under normal operations, your Paramount will require little routine maintenance. The following maintenance schedule is recommended:

Weekly

- Using an appropriate glass cleaner, clean the sash and sides. Wipe down the interior surfaces of the unit using a damp cloth.
- Clean the exterior surfaces of the unit, particularly the front and top to remove any accumulated dust.

Monthly

- Test filter condition using a gas detector tube at intervals of 20% if the total estimated time. The exception to the 20% recommendation is formaldehyde or any carcinogen or suspected carcinogen. These hazardous chemicals must be checked at least every 10% of the total estimated time. Gas detector tubes for the specific chemicals that are being used in the enclosure can be obtained from your laboratory supply dealer.
- Check face velocity on the HEPA filtered models. Change HEPA filter when face velocity drops below 90 feet per minute.
- Replace filter when chemical breakthrough is indicated by odor, time, detector tube, vapor sensor or for some chemicals, analytical instrumentation.
- The Safety First Vapor Senor does NOT eliminate the need to sample with detector tubes. The sensor is capable of detecting organics in the range of 50 ppm. Your chemicals may have TWA's less than 50 ppm.
- See "Filter" section of manual.

Quarterly

- Change the prefilters every three months or more frequently if dusty conditions exist.