

ANGELINA COLLEGE CHEMICAL HYGIENE PLAN

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21 I. PURPOSE OF CHEMICAL HYGIENE PLAN (CHP)

22 Angelina College is committed to providing a safe working environment and believes
23 employees have a right to know of any health hazards so they can make knowledgeable
24 decisions about any personal risks of employment. This Chemical Hygiene Plan includes
25 policies and responsibilities designed to give each employee an awareness of potentially
26 hazardous chemicals in the workplace and to train them in appropriate, safe working
27 conditions.

28 The Chemical Hygiene Plan applies to all persons, including college employees, students,
29 and visitors authorized to be present in areas in which chemicals are used. All persons
30 subject to the CHP shall be informed of its location and availability as well as the Safety
31 Data Sheets (SDS's) and other pertinent reference materials relating to their health and
32 safety while in the particular work area.

33 All employees will have access to pertinent safety information through their supervisory
34 staff. The people who work in any instructional laboratory are best able to detect
35 potential hazards in either the facility or in work procedures. When safety concerns arise,
36 employees are encouraged to contact their Associate Dean/Director.

37 A training program is designed for the benefit and protection of all laboratory users.
38 Necessary information will be available to inform the users on how best to handle
39 hazardous chemicals and how to make use of the Chemical Hygiene Plan. This plan shall
40 be reviewed and evaluated for its effectiveness annually by the Chemical Hygiene Team.

41 II. STANDARD OPERATING PROCEDURES

42 Because few laboratory chemicals are without hazards, general precautions for handling
43 all laboratory chemicals should be adopted to include minimizing exposure and assuming
44 that any mixture of hazardous chemicals is more toxic than the most toxic component.

45 The following procedures are used when working with chemicals:

46 A. Accidents and spills

- 47 1. Eye contact: promptly flush eyes with water for prolonged period (15 minutes)
48 and seek medical attention.
- 49 2. Ingestion: Each chemical affects the body differently.
 - 50 ❖ Consult SDS and/or contact the Texas Poison Center (800-222-1222).
- 51 3. Skin contact: promptly flush the affected area when contact is extensive. If
52 symptoms persist after washing, seek medical attention.
- 53 4. Clean-up: promptly clean up spills according to the Angelina College Spill
54 Cleanup Procedure (No. 13.3). Clean-up should, in most cases, be performed by
55 the lab instructor or technician.
 - 56 ❖ In any case where there is question as how to safely clean-up spills, contact
57 the environmental projects coordinator (ext. 3244).

58 ❖ In any case where there are severe health hazards due to the spill, contact the
59 physical plant director (ext. 5280).

60 5. Medical attention should be obtained for body contact of hazardous chemicals.

61 B. AVOID UNNECESSARY EXPOSURE TO CHEMICALS.

62 1. Do not smell or taste chemicals. Apparatus that can discharge toxic chemicals
63 (vacuum pumps, distillation columns, etc.) should be vented into local exhaust
64 devices.

65 2. Ensure no holes exist in the gloves before use.

66 3. Use only those chemicals for which the quality of the available ventilation system
67 is appropriate.

68 4. Never eat, drink, smoke, chew gum, or apply cosmetics or lip balm in areas where
69 laboratory chemicals are present. Wash hands before conducting these activities
70 outside the lab.

71 5. Storing, handling, or consuming food or beverages in chemical laboratory storage
72 areas, refrigerators, glassware, or utensils that are also used for laboratory
73 operation is prohibited.

74 6. Wash areas of exposed skin thoroughly before leaving the laboratory.

75 7. Horseplay, disorderly conduct, or use of abusive language in the laboratory is
76 prohibited.

77 8. Always use a pipet bulb or other approved device when pipetting; do not use
78 mouth suction.

79 9. Confine long hair and loose clothing.

80 10. Wear shoes at all times in the laboratory.

81 11. Keep the work area clean and uncluttered, with chemicals and equipment properly
82 labeled and stored; clean up the work area on completion of an operation or at the
83 end of each day.

84 12. Ensure that appropriate eye protection, where necessary, is worn by all persons,
85 including visitors, in areas where chemicals are stored or handled.

86 13. Wear appropriate gloves when the potential for contact with toxic materials
87 exists; inspect the gloves before each use, and replace them as needed.

88 14. Use any other protective emergency apparel and equipment as appropriate.

89 15. Remove laboratory coats immediately upon contamination.

90 16. Seek information and advice about hazards, plan appropriate protective
91 procedures, and plan positioning of equipment before beginning any new
92 operation.

93 17. Use a hood for operations that might result in release of toxic chemical vapors or
94 dust.

95 ■ As a rule of thumb, use a hood or other local ventilation device when working
96 with any appreciably volatile substance with a threshold limit value (TLV) of
97 less than 50 ppm.

98 ■ Confirm adequate hood performance before use:

- 99 – keep hood lowered to the required level at all times, except when adjustments
100 within the hood are being made
101 – keep materials stored in hoods to a minimum
102 – do not allow materials to block vents or air flow.
103 – Leave the hood in the *ON* position if toxic substances are present within, or if it
104 is uncertain whether adequate general laboratory ventilation is sufficient when
105 the hood is in the *OFF* position.
106 18. Keep all oxidizing agents stored separately from solvents.

107 III. CRITERIA FOR SAFETY MEASURES

- 108 1. Avoid unnecessary exposure to chemicals.
109 2. All chemicals should be stored in closed containers.
110 3. Keep all flammable solvents stored separate from acids; ensure each is stored in
111 authorized, appropriate storage cabinets; only remove amount needed for specific
112 experiment; and immediately return large storage container back to the
113 appropriate storage cabinet.
114 4. If questionable hazardous conditions are found, immediately notify the Associate
115 Dean/Director or the environmental projects coordinator before attempting to
116 remedy the problem.
117 5. Properly label all chemicals being disposed of, providing detailed listing of all
118 agents within the containers. *Do not mix questionable agents.*
119 6. Maintain a currently updated Safety Data Sheet (SDS) manual (paper or digital
120 formats acceptable) within each laboratory area. Review the appropriate SDSs in
121 light of concerns relating to safely handling, storage, or disposal of chemicals.
122 7. Be aware of unsafe conditions and report to the Associate Dean/Director when
123 detected.

124 IV. CHEMICAL INVENTORY

- 125 A. Chemical inventory should be maintained on an annual basis, and a copy of the
126 inventory provided to the Environmental Projects coordinator by December 1 of each
127 year.
128 B. The chemical inventory lists all the hazardous chemicals in the laboratory. Chemicals
129 listed are those...
130 1. classified as hazardous by the Department of Transportation (DOT)
131 2. classified as hazardous by Environmental Protection Agency (EPA)
132 3. displaying a 2 or greater number in any section of the National Fire Protection
133 Association (NFPA) diamond
134 C. Use the Angelina College Chemical Inventory Spreadsheet to list chemicals
135 according to the criteria listed above. The AC Chemical Inventory Spreadsheet is
136 standardized so the various spreadsheets across AC can be compiled for Tier 2
137 reporting purposes.

- 138 V. SAFETY DATA SHEETS (SDS)
- 139 A. Upon completion of the chemical inventory, ensure manufacturer Safety Data Sheets
140 are on file.
- 141 B. Individualized SDS manuals will be will be stored in each designated laboratory.
- 142 1. SDS manuals are kept in a 3-ring binder, or in appropriate digital format.
- 143 2. A current chemical inventory listing is placed in the front of each manual.

144 VI. CHEMICAL STORAGE

- 145 A. Types of chemicals must be separated into the appropriate categories. Special
146 attention must be paid to ensure oxidizing and other reactive chemicals are not stored
147 close to interactive agents.
- 148 B. Chemicals must be segregated into appropriate categories. (For example, acids are
149 segregated from bases; and oxidizers and segregated from reducers.)
- 150 C. Chemical storage is kept as small as practical.
- 151 D. Storage on bench tops and in hoods may cause potential exposure to fire and spills.
- 152 E. Cabinets and specially labeled refrigerators are used for chemical storage only. No
153 food for human consumption is permitted in the refrigerators.
- 154 F. Closed containers are used for transporting flammable liquids within a building.
- 155 G. Cylinders of compressed gases are strapped or chained to a wall or bench top; when
156 not connected to a regulator, compressed gas cylinders should be capped.

157 VII. SHIPPING CHEMICALS

- 158 A. Hazardous chemicals should NOT be shipped or transported from the workplace by
159 Angelina College personnel. This act is against AC policy. Should the need arise, the
160 services of a qualified third-party expert/vendor in the area of hazardous chemicals
161 transport must be secured.

162 VIII. LABELS ON IN-HOUSE CHEMICALS

- 163 A. A hazardous chemical transferred outside the laboratory that is not in its original
164 container must also be labeled.

165 IX. CONTAMINATED WASTE REMOVAL/DISPOSAL

- 166 A. The Hazardous Waste Plan and Procedures provides the basis for
167 eliminating/minimizing harm to people, other organisms, and the environment that
168 results from the disposal of waste laboratory chemicals. It specifies how waste is to
169 be collected, segregated, stored, and transported.
- 170 B. A copy of which is maintained in the office(s) of the Associate Dean/Directors.
- 171 C. All collection, segregations, storage, disposal, and transportation of chemicals is
172 performed in accordance with the Hazardous Waste Plan and Procedures.

- 173 X. RECORD KEEPING
- 174 A. Incident reports are written and retained by each Associate Dean/Directors Office,
175 with a copy sent to the Vice President of Academic Affairs.
- 176 B. Medical consultation records are maintained by each Associate Dean/Directors
177 Office, with a copy sent to the Dean of Instruction.
- 178 C. Training attendance records are maintained by each Associate Dean/Directors Office.

- 179 XI. PERSONAL PROTECTIVE EQUIPMENT (PPE)
- 180 A. Students, Faculty, and Staff are required to wear PPE appropriate to the task(s) at
181 hand.
- 182 B. Protective gloves are required when there is a potential for direct skin contact with
183 hazardous chemicals.
- 184 C. An impervious apron is required when there is a potential for a hazardous chemical
185 splash.
- 186 D. Eye protection is required when there is a potential for splashes or sprays of
187 hazardous chemicals.

- 188 XII. CHEMICAL HYGIENE TRAINING
- 189 A. All students and staff are trained in chemical hygiene (see Section XIII, below) at the
190 time of initial assignment to a work area where hazardous chemicals are present.
191 Training is completed prior to the student or staff member being assigned a task for
192 which he/she has a potential for exposure.
- 193 B. All training is documented in writing by attendance records or signature sheets.
- 194 C. Refresher information and retraining sessions are held periodically—but no less than
195 annually.
- 196 D. Student training is conducted by a technically a qualified individual (TQI). In most
197 cases, this is anticipated to be the lab instructor.
- 198 E. Staff training is conducted by a TQI. In most cases, this is anticipated to be the lab
199 instructor or an experienced lab technician.

- 200 XIII. CHEMICAL HYGIENE TRAINING OBJECTIVES
- 201 A. Upon completion of chemical hygiene training, the student or employee will be able
202 to:
- 203 a) Locate the potentially hazardous chemicals in the specific work area.
- 204 b) Recognize the chemical labeling and its meaning.
- 205 c) Locate the SDS book in the specific work area.
- 206 d) Locate the health hazard, physical hazard, environmental protection, and
207 special protection sections of the SDS and explain their use.
- 208 e) Identify the appropriate protective clothing for the area.

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XIV. CHEMICALS REQUIRING APPROVAL FOR USE

- A. There are certain chemicals used in the chemistry lab that due to their particular hazardous nature require an evaluation of the proposed protective procedures before any activity involving handling of the chemical is commenced.
- B. Approval from the Associate Dean/Director is required before working with any of the acutely hazardous chemicals appearing on the attached list.

XV. ACUTELY HAZARDOUS CHEMICALS (PARTIAL LIST)

- A. The Environmental Projects Coordinator should review the chemical inventory listing and designate the acutely hazardous materials actually present.
- B. The listing should be reviewed as necessary to keep it up-to-date.
- C. The following list provides an idea of the types of materials that should be considered as acutely hazardous, and hence require approval before use.
 - 1. Toxic Gas
 - Carbon Monoxide
 - Arsine
 - Fluorine
 - Hydrogen cyanide
 - Phosphine
 - 2. Acutely Toxic Compounds
 - Dioxin
 - Ricin
 - Plutonium
 - Cyanide Compounds
 - 3. Shock Sensitive Compounds
 - Picramide
 - Chloride
 - Picric acid
 - Various nitro compounds (e.g., nitroglycerin)
 - Benzoyl peroxide
 - Acetyl peroxide
 - 4. Highly Corrosive Compounds
 - Benzenesulfonic acid
 - Hydrofluoric acid
 - Methanoic acid
 - Ethanoyl chloride
 - Benzotrichloride

- 245 5. Extremely Flammable Compounds
246 ▪ Carbonyl sulphide
247 ▪ Carbon monoxide
248 ▪ Ethylene oxide
249 ▪ Arsine
250 ▪ Di-n-propylamine

251 XVI. MEDICAL CONSULTATIONS AND EXAMINATIONS

- 252 ❖ For any situation requiring emergency medical attention, 9-911 should be called.

253 XVII. CHEMICAL HYGIENE PLAN RESPONSIBILITIES

- 254 A. The chemical hygiene responsibility for a specific laboratory rest with the laboratory
255 instructor, who receives support from the Associate Dean/Director. The laboratory
256 instructor must:
- 257 1. Monitor procurement, use, and disposal of chemicals used in the lab.
 - 258 2. Know the legal requirements concerning regulated substances in use. (*Regulated*
259 refers to the EPA "List-of-lists")
 - 260 3. Seek ways to improve the chemical hygiene program.
 - 261 4. Ensure students know and follow the chemical hygiene rules, which protective
262 equipment is available and in working order.
 - 263 5. Determine the required levels of protective apparel and equipment.
 - 264 6. Ensure that facilities and training for use of any material being ordered are
265 adequate.
 - 266 7. Planning and conducting each operation in accordance with the chemical hygiene
267 plan.

268 XVIII. PROVISIONS FOR ADDITIONAL EMPLOYEE PROTECTION

- 269 1. Dispose of glass and sharp objects in authorized safety disposal containers.
- 270 2. Dispose of all contaminated medical or bio-hazardous waste in authorized
271 biohazard bags.
- 272 3. Corridors are to remain unobstructed at all times.
- 273 4. Never obstruct exits, fire extinguishers, fire hoses, main gas shut-off valves, or
274 other safety equipment.
- 275 5. Make sure all equipment is properly grounded and that the wiring of all
276 equipment is in good condition.
 - 277 a) If exposure of the wiring is noticed, immediately unplug the equipment and
278 notify your immediate supervisor and Associate Dean/Director.

- 279 6. In any case of exhaust failure,
280 a) If personnel are in danger of contamination by toxic or infectious agents,
281 immediately remove all personnel from the area, closing off the area until the
282 problem has been properly resolved.
283 b) immediately notify your immediate supervisor and Associate Dean/Director.
284 7. Chemical Storage Cabinets are to be placed away from laboratory exits.

285 XIX. GLOSSARY

286 A. The following terms are used as part of the Chemical Hygiene Program:

- 287 ■ ACUTE – An adverse effect with symptoms of high severity coming quickly
288 to a crisis.
- 289 ■ CARCINOGEN - A substance capable of causing cancer.
- 290 ■ CHEMICAL AGENTS – A wide variety of fluids that have a high potential
291 for body entry by various means. Some are more toxic than others and require
292 special measures of control for safety and environmental reasons.
- 293 ■ CHP – Chemical hygiene plan
- 294 ■ CHRONIC – An adverse effect with symptoms that develop slowly over a
295 long period of time or that frequently recur.
- 296 ■ COMBUSTIBLE – Able to catch on fire and burn
- 297 ■ DOT – Department of Transportation
- 298 ■ EPA – Environmental Protection Agency
- 299 ■ FLAMMABLE – Capable of being easily ignited and of burning with extreme
300 rapidity.
- 301 ■ INFECTIOUS AGENTS – Sources that cause infectious either by inhalation,
302 ingestion, or direct contact with the host materials.
- 303 ■ LABORATORY SCALE – Work with chemicals that can easily and safely be
304 manipulated by one person excluding the commercial production of chemicals
305 for sale.
- 306 ■ LC 50 – The concentration of a substance in air that causes death in 50% of
307 the animal exposed by inhalation. A measure of acute toxicity.
- 308 ■ LD 50 – The dose that causes death in 50% of the animals by swallowing a
309 substance. A measure of acute toxicity.
- 310 ■ MUTAGEN – Capable of changing cells in such a way that future cell
311 generations are affected. Mutagenic substances are usually considered suspect
312 carcinogens.
- 313 ■ NFPA – National Fire Protection Agency
- 314 ■ OSHA – Occupational Safety and Health Administration, the regulatory
315 branch of the Department of Labor concerned with employee safety and
316 health.

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- PEL – Permissible Exposure Limit. This is the legally allowed concentration in the workplace that is considered a safe level of exposure for an 8-hour shift, 40 hours per week.
 - PPE – personal protective equipment
 - pH – A measure of how acidic or caustic a substance is on a scale of 1 to 14. A pH of 1 indicates that a substances is acidic; and a pH of 14 indicates that a substance is basic.
 - PHYSICAL AGENTS – Workplace sources recognized for their potential effects on the body. Heat exposure or excessive noise levels are examples of this risk group.
 - SDS – Safety data sheet
 - SENSITIZERS – Agents to repeated exposure over time creating an allergic reaction at some point in time.
 - STERILITY – Changes made in male or female reproductive systems resulting in inability to reproduce.
 - TERATOGENS – A substance that causes a deformity in newborns if a significant exposure exits during pregnancy.
 - TLV – Threshold Limit Value. The amount of exposure allowable for an employee in an 8-hour day.
 - TQI – technically qualified individual

337 XX. REFERENCES

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