

Standard Operating Procedure –#COE-SOP-0002

Laboratory Researcher Commissioning Requirements

Facility: NMSU College of Engineering Laboratories

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Scope: This SOP describes requirements for work area labeling, chemical inventory and housekeeping as well as training required to work in a hazardous chemicals laboratory

Date: November 10, 2017

Revision: Zero(0)

Introduction:

This procedure describes the requirements to work in any Chemical Engineering Laboratory. These requirements include training, Experimental Safety Plans, work area assignments and labeling, chemical inventory, hazardous waste management and housekeeping.

These requirements are in conjunction with the COE Chemical Hygiene Plan. Training requirements are as assigned by the Department, Environmental Health and Safety (EH&S) and the COE Safety Specialist. Adherence to other policies include COE Working Alone or In Isolation.

Standard Operating Procedure Details:

Outline of Requirements in this document are as follows. See details below for each of these.

Researcher Training Requirements

- a. EHS and Department Training required before unescorted lab access allowed
- b. COE Safety Training as applicable
2. Experimental Safety Plan Requirements
3. Hood and/or Workspace Assignments
4. Labeling Requirements for workspaces
 - a. Name Tags
 - b. Drawer labels
 - c. Workspace Shelf labels
 - d. Refrigerator/freezer labels
5. Hazardous Waste Requirements
6. Chemical Inventory and Storage
 - a. Bar code scanning into Quartyz
 - b. Quartyz Owner Chemical Inventory

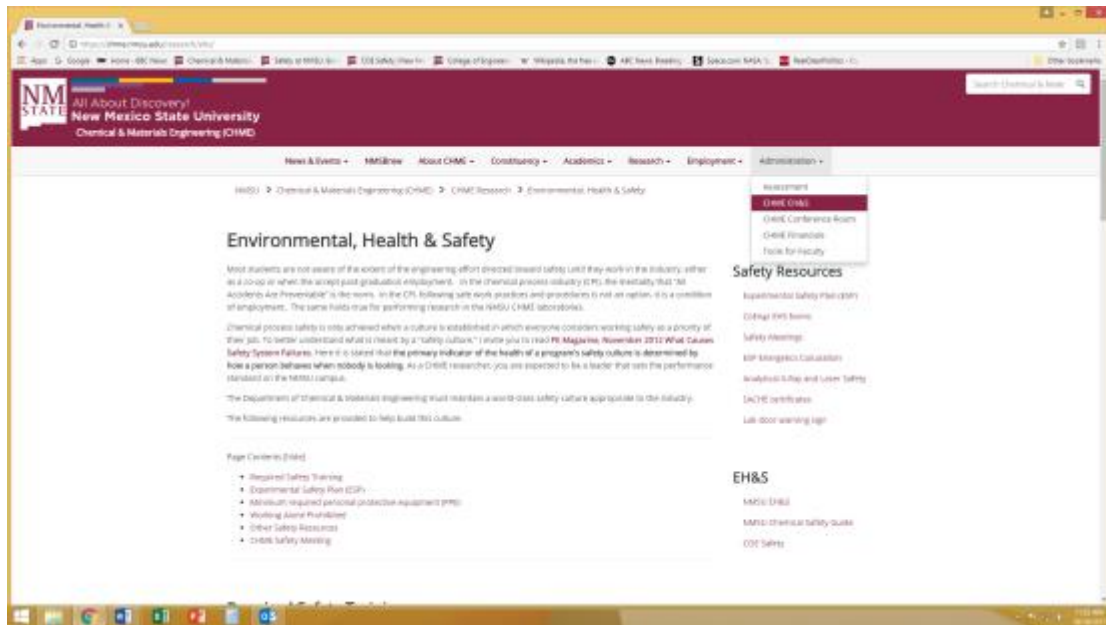
Appendices

- A Laboratory Researcher Commissioning Checklist
- B Jett Hall Laboratory Maps
- C Chemical Segregation and Storage Chart
- D References

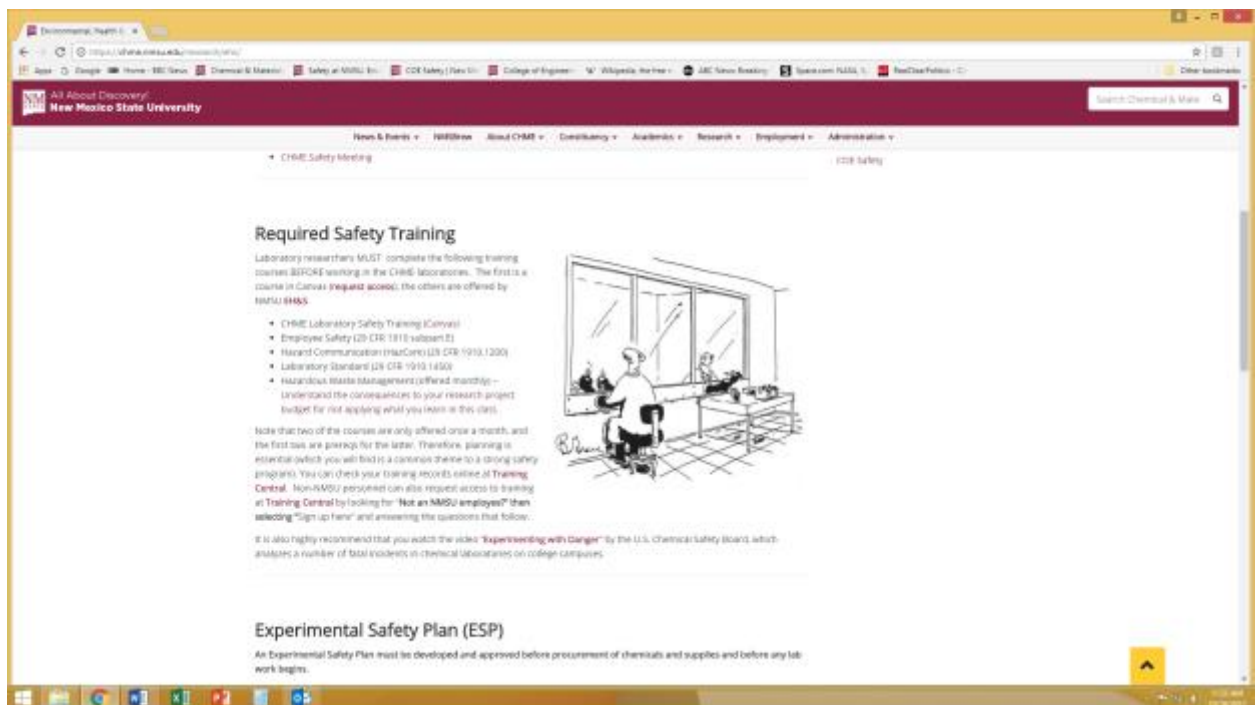
1. Training Requirements

a. EHS and Department required training requirements can be found on the Chemical Engineering Department's website under Administration and looking for the pull down menu for CHME EHS

(https://chme.nmsu.edu/research/ehs/#Required_Safety_Training)



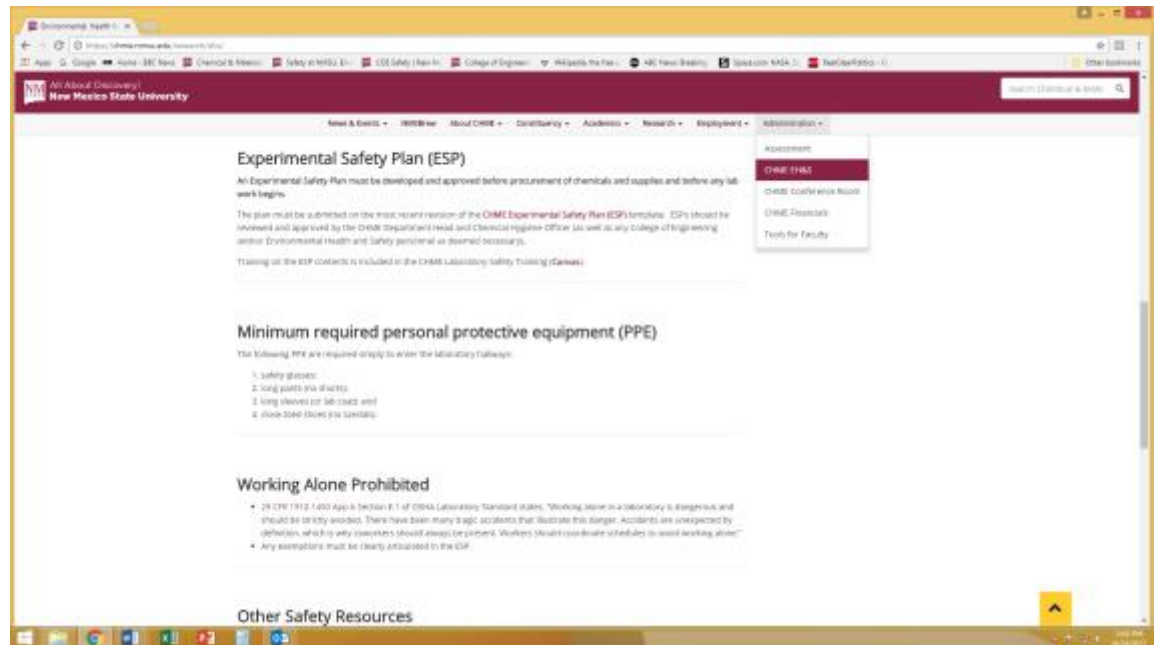
Scroll down until you see the list of required safety training classes



- b. COE Safety Required Training
 - i. Special and/or Specific Training will be determined as part of the ESP Process
 1. Specific hazards, such as cryogenic and carcinogenic materials, combustible dust, machine hazards etc., may require additional or special training. Consult with the COE Safety Specialist for additional details of requirements and offering locations.
 2. Specific equipment training for items such as the fume hoods, biosafety cabinet, laser, centrifuge, etc. will frequently be required. Training will be provided by the Principal Investigator and/or the COE Safety Specialist.

2. Experimental Safety Plan

- a. The researcher must have a signed Experimental Safety Plan to work in the lab. This document and its procedures can be found on the Chemical Engineering Department website at <https://chme.nmsu.edu/research/ehs/>



- b. For new ESPs, always consult this website to use the most current template for the document. All signatures and approval from the COE Safety Specialist are required to begin work.
- c. The ESP must be filled out per established procedure and have the following additional details included in the Experimental Scope in Attachment 1 and on the required drawing in Attachment 2. For new ESP's started after 12/01/17, this information must be provided in the contact information block and in the drawing in Attachment 2.

- i. Identity of Fume Hood/Work Space
 - ii. Locations of drawers and shelves used by the researcher
 - iii. Location of chemical storage for those materials assigned to the researcher
 - iv. Location of any additional equipment needed for these experiments such as analytical tools in other buildings and lab spaces.
 - v. Identify which waste collection points used
 - vi. Details of transportation of samples if analysis will occur in another building or lab space.
3. Hood and Workspace Assignments
- a. Hoods and workspace will be assigned by either the COE Safety Specialist or the Chemical Engineering Department Lab Manager. A list of hood assignments can be found on the Chemical Engineering Department website.
 - b. Request new or changes to space through those individuals
 - c. Maps of the Jett Hall lab spaces are in Appendix B.
4. Labeling Requirements for Workspaces
- a. Name Tags →
 - i. Each researcher using a hood or other workspace needs to prepare a name tag, place it in a clear holder and affix it to either the front of the fume hood or in a visible part of their workspace. Multiple name tags need to be affixed if more than one researcher is sharing the fume hood or work space even if one is the lead researcher and others are supporting the tasks.
 - ii. You can find a template for name tags and refrigerator labels on the CHME EHS website. Use clear tape to attach the name tag holder to the fume hood.





b. Drawer Label →

- i. Each drawer used by a researcher needs to be labeled with the following information:
 - 1. Researcher name
 - 2. Contents
 - 3. Hazard Conditions if applicable (e.g. biological, combustible dust, etc.)
- ii. A label maker is available for your use in the CHME Office



c. Shelf Label →

- i. Each drawer used by a researcher needs to be labeled with the following information:
 1. Researcher name
 2. Contents
 3. Hazard Conditions if applicable (e.g. biological, combustible dust, etc.)
- ii. A label maker is available for your use in the CHME Office



d. Refrigerator/Freezer Label →

- i. Most refrigerators and freezers are the responsibility of a single Principal Investigator but researchers share space to store their samples and/or chemicals. The outside of the refrigerator should have the following labels:
 1. Chemical Inventory for entire refrigerator with owner names
 2. Researcher name along with description of samples and approximate inventory (e.g. rack of 50 ml test tubes)
 3. You can find a template for name tags and refrigerator labels on the CHME EHS website. Use clear tape to attach the name tag holder to the refrigerator or freezer.



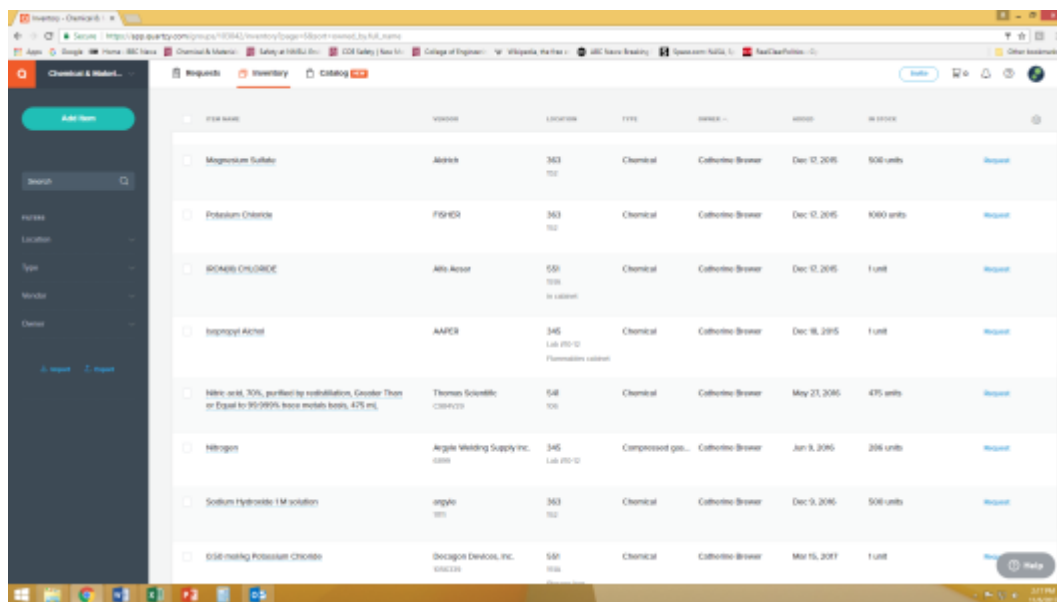
5. Hazardous Waste Requirements

- a. A list of Waste Collection Points by PI can be found on the Chemical Engineering Department website. The researcher will identify their needs for combined or segregated waste collection in their ESP. Those containers will be stored in one of those waste collection points. The required NMSU Waste Tracking forms will be kept current by the researcher when they add materials to containers.
- b. The waste collection points will be monitored by the lab manager to determine when they are full and need to be picked up by NMSU EH&S.

6. Chemical Inventory and Storage

- a. All chemicals will be scanned into the Quartzzy database, along with owner name, exact location, date purchased etc.
- b. Chemicals need to be segregated by flammable and corrosive materials per the chart in Appendix C and stored in appropriate cabinets. Use the cabinets provided under fume hoods for flammable and corrosive storage. Consult the lab manager or COE Safety Specialist for other storage questions.
- c. Some materials will require special storage conditions such as:
 - i. Water or Air Reactive materials will be stored in the inert cabinet
 - ii. Temperature sensitive materials will be stored in a refrigerator or freezer
 - iii. Combustible or hazardous dust producing materials will be stored in containers appropriate to allow opening in restricted space, such as a glove box.

- d. Low hazard dry materials may be stored on the open shelves in the fume hood workspace. These materials need to be stored in secondary containment such that they cannot be spilled or knocked off the shelves. The shelf needs to be labeled with appropriate information as shown in Paragraph 4 above.
- e. Print the chemical inventory list from Quartzly using the following method. Use the export function on the left side of the screen to receive an excel spreadsheet.



The screenshot displays the Quartzly inventory management software interface. The main content area shows a table of chemical inventory items. The table has columns for Item Name, Vendor, Location, Type, Stock, and In Stock. The items listed include Magnesium Sulfate, Potassium Chloride, BOMBS CHLORIDE, Benzoyl Acet, Nitric acid, Nitrogen, Sodium Hydroxide 1 M solution, and 65% wetting Potassium Chloride.

Item Name	Vendor	Location	Type	Stock	In Stock
Magnesium Sulfate	Alfa Aesar	363 102	Chemical	Collector Bottle	Dec 12, 2016 500 units
Potassium Chloride	FISHER	363 102	Chemical	Collector Bottle	Dec 12, 2016 1000 units
BOMBS CHLORIDE	Alfa Aesar	550 102 10 cabinet	Chemical	Collector Bottle	Dec 12, 2016 1 unit
Benzoyl Acet	AAPER	345 Lab 201-12 Flammable liquid	Chemical	Collector Bottle	Dec 16, 2015 1 unit
Nitric acid, 50%, purified by redistillation, Greater than or Equal to 99.999% free mercuric ions, 475 mL	Thomson Scientific 0261221	548 102	Chemical	Collector Bottle	May 23, 2016 475 units
Nitrogen	Argon Welding Supply Inc. 02611	345 Lab 201-12	Compressed gas...	Collector Bottle	Jan 9, 2016 200 units
Sodium Hydroxide 1 M solution	argyle 101	363 102	Chemical	Collector Bottle	Dec 9, 2016 500 units
65% wetting Potassium Chloride	Deccagon Devices, Inc. 101210	550 102	Chemical	Collector Bottle	Mar 15, 2017 1 unit

This will generally contain the entire CHME inventory. You will need to sort this data to find those items you own. After you have your items together, print that part of the spreadsheet.

Quanto Chemical Inventory

451100	Calcium Chloride			Carlson's Brwiler	885	1152			200	g	
451101	Magnesium Sulfate	Aldrich		Carlson's Brwiler	365	1152			200	g	
451102	Sodium Carbonate	Aldrich		Carlson's Brwiler	365	1152			200	g	
451103	Sodium Sulfate anhydrous			Carlson's Brwiler	551	1514			200	g	
451104	Magnesium Chloride	Fisher		Carlson's Brwiler	885	1152			200	g	
451105	Sodium Chloride	Fisher		Carlson's Brwiler	885	1152			200	g	
451106	Potassium Chloride	Fisher		Carlson's Brwiler	885	1152			2000	g	
451107	Calcium Carbonate	BAKER		Carlson's Brwiler	365	1152			2000	g	
451108	Calcium Sulfate	BAKER		Carlson's Brwiler	365	1152			20	g	
451109	Sinc Oxide	Sigma		Carlson's Brwiler	365	1152			2000	g	
451110	CALCIUM SULFATE DIHYDRATE	BAKER		Carlson's Brwiler	885	1152			400	g	
451111	PHENOL-CHLORIDE	alfa Aesar		Carlson's Brwiler	885	1514	in cabinet		1	gal	
451112	Glycerol	Cleary, Altech		Carlson's Brwiler	572	1514	in cabinet on secondary		1	gal	
451113	0.50 mol/kg Potassium Chloride	Decongen Services, Inc	1056228	Carlson's Brwiler	551	1514	Storage box	NA	1	l	
451114	Sodium Chloride	Fisher		Carlson's Brwiler	885	1152			200	g	
451115	Sodium Chloride	Fisher		Carlson's Brwiler	885	1152			200	g	
451116	Potassium Chloride	Fisher		Carlson's Brwiler	885	1152			2000	g	
451117	Potassium Carbonate	Fisher		Carlson's Brwiler	885	1152			200	g	
451118	Calcium Carbonate	BAKER		Carlson's Brwiler	365	1152			2000	g	
451119	CALCIUM SULFATE DIHYDRATE	BAKER		Carlson's Brwiler	365	1152			400	g	
451120	Hydrochloric Acid 2M			Carlson's Brwiler	365	1152	Storage Tub		200	ml	
451121	CALCIUM CHLORIDE	Sigma Aldrich		Carlson's Brwiler	885	1514	Lab #10-11	Plastic storage bin	20	g	
451122	Potassium Chloride	Fisher		Carlson's Brwiler	885	1514	Lab #10-11	Plastic storage bin	20	g	
451123	Acetone	PHARMCO-AMER		Carlson's Brwiler	518	Lab #10-11	Flammables cabinet		1	gal	
451124	Isopropyl Alcohol	AMER		Carlson's Brwiler	345	Lab #10-11	Flammables cabinet		1	gal	
451125	Isopropyl Alcohol	Sigma		Carlson's Brwiler	345	Lab #10-11	Flammables cabinet		474	ml	
451126	Acetone	Acros		Carlson's Brwiler	345	Lab #10-11	Flammables cabinet		200	ml	
451127	Propylene Glycol	Pfalt-Gara		Carlson's Brwiler	463	Lab #10-11	Plastic storage bin		474	ml	
451128	HNO ₃ 30%, 70%, purified by redistillation. Greatest trace of metal is 80-800% trace metals level. 473 ml.	Thomas Scientific	058420	Carlson's Brwiler	541	118		216.13	473	ml	
451129	PURAR Hydrochloric acid, 30%, TraceSELECT™, for trace analysis. 500 ml.	Thomas Scientific	092465	Carlson's Brwiler	541	118		92.79	500	ml	
451130	Sodium Hydroxide 1.0M solution	in bulk	11123	Carlson's Brwiler	885	1152			8	200	ml
451131	Sulfuric Acid 3M	single	11131	Carlson's Brwiler	885	1152			8	200	ml
451132	Potassium Hydroxide			Carlson's Brwiler	885	1514			20	g	

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- f. Print a copy of the chemical inventory for the fume hood and/or workspace, placed it in a clear sleeve and affix it to the side of the hood with the name tags. This inventory needs to be kept current with any changes to ESPs.



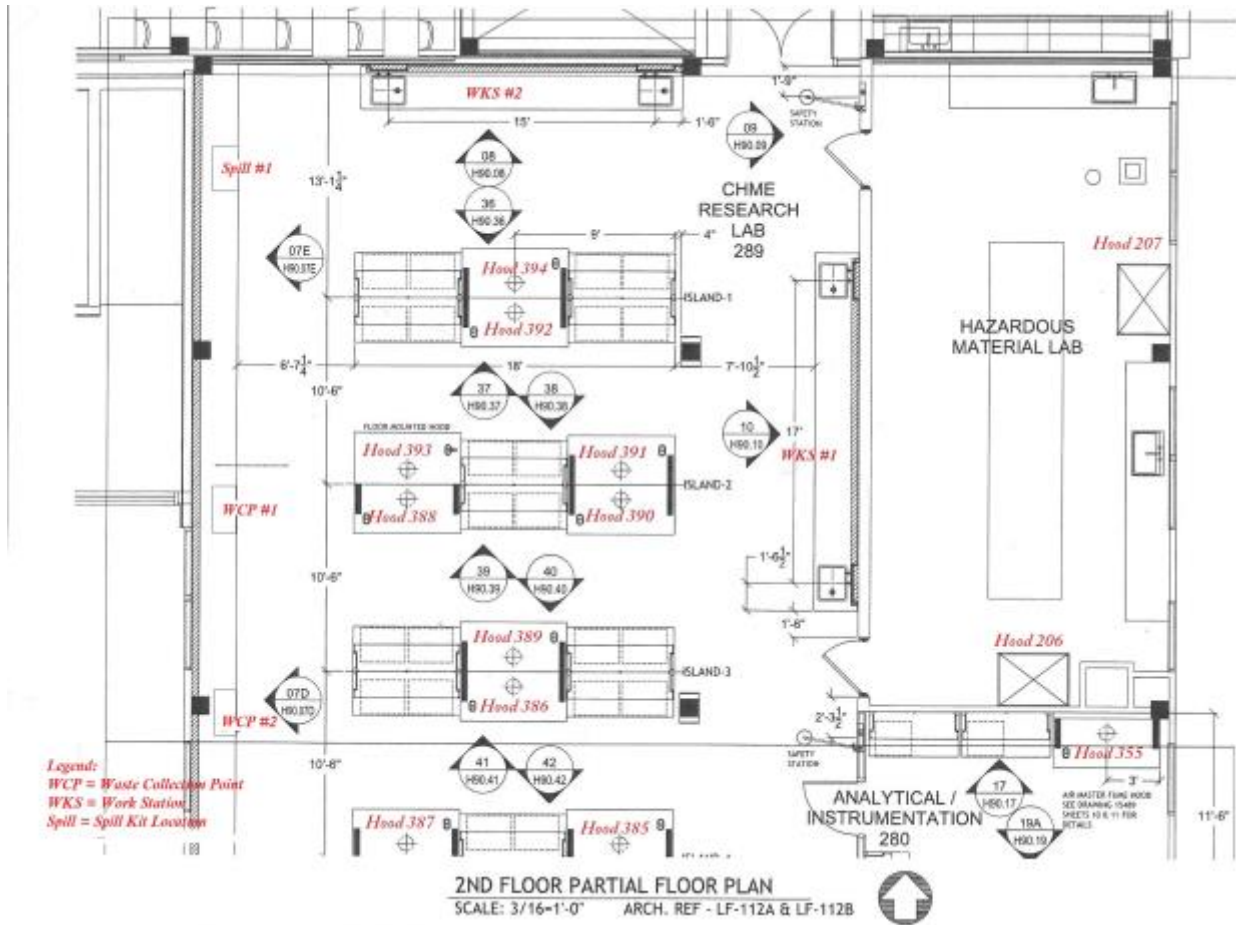
Appendix A - Laboratory Researcher Commissioning Checklist

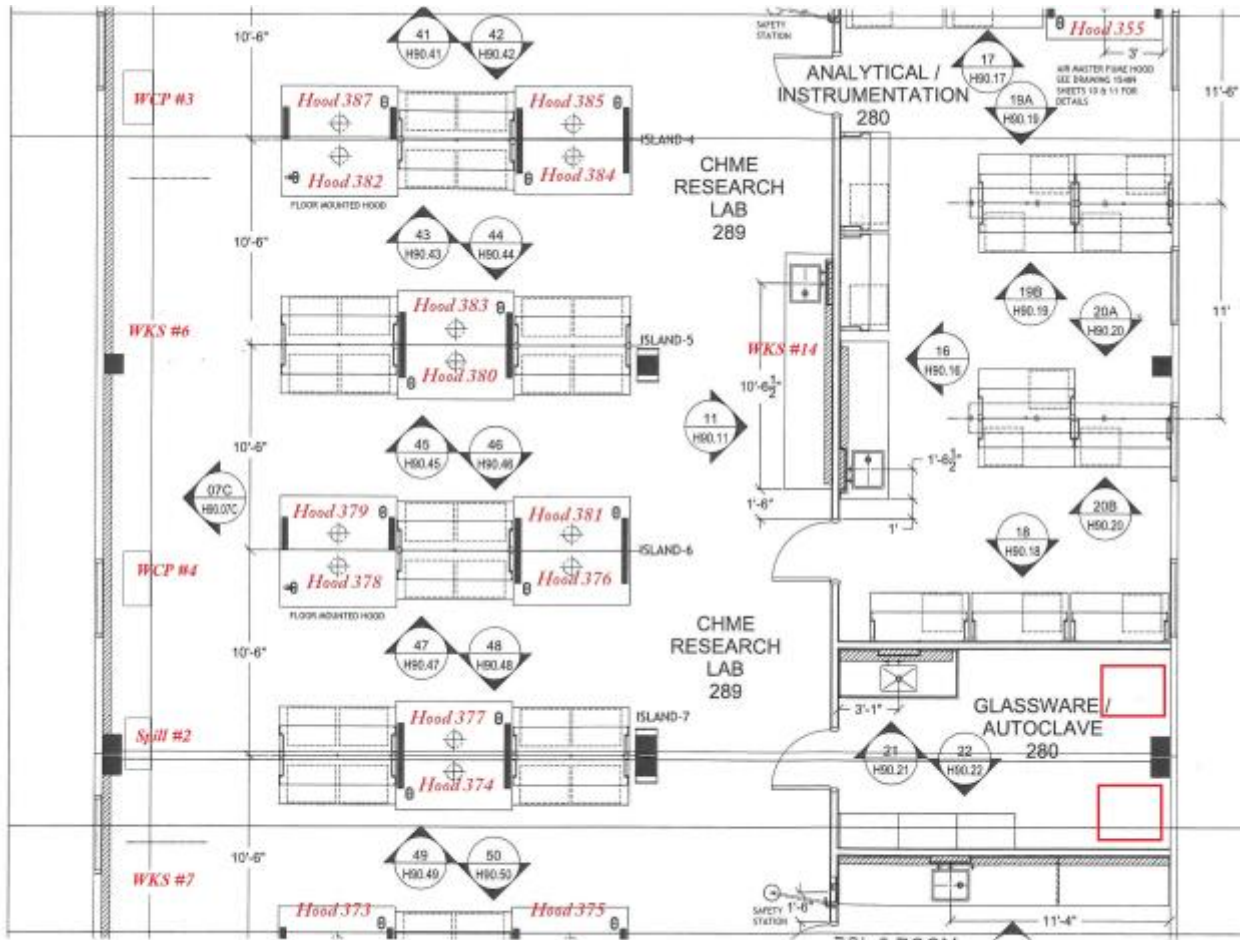
CHME – Researcher Commissioning Checklist

Date		
Researcher Name		
Principal Investigator Name		
Item	Description	Complete (Y/N)
Hood Assignment	Hood Number # _____	
Bench Top Assignment	Bench Area # _____	
ESP Update Submitted	ESP #'s _____, _____ _____	
Name Tag Label(s)		
Drawer Label(s)		
Shelf Label(s)		
Refrigerator/Freezer Label(s)		
Hazardous Waste Collection Points Identified?		
Hazardous Waste Containers Available?		
Chemicals Inventory in Quartz		
Chemicals Inventory Posted		
Fume Hood Training Complete		

See COE-SOP-0002, "Researcher Lab Commissioning Requirements" for more details and examples.

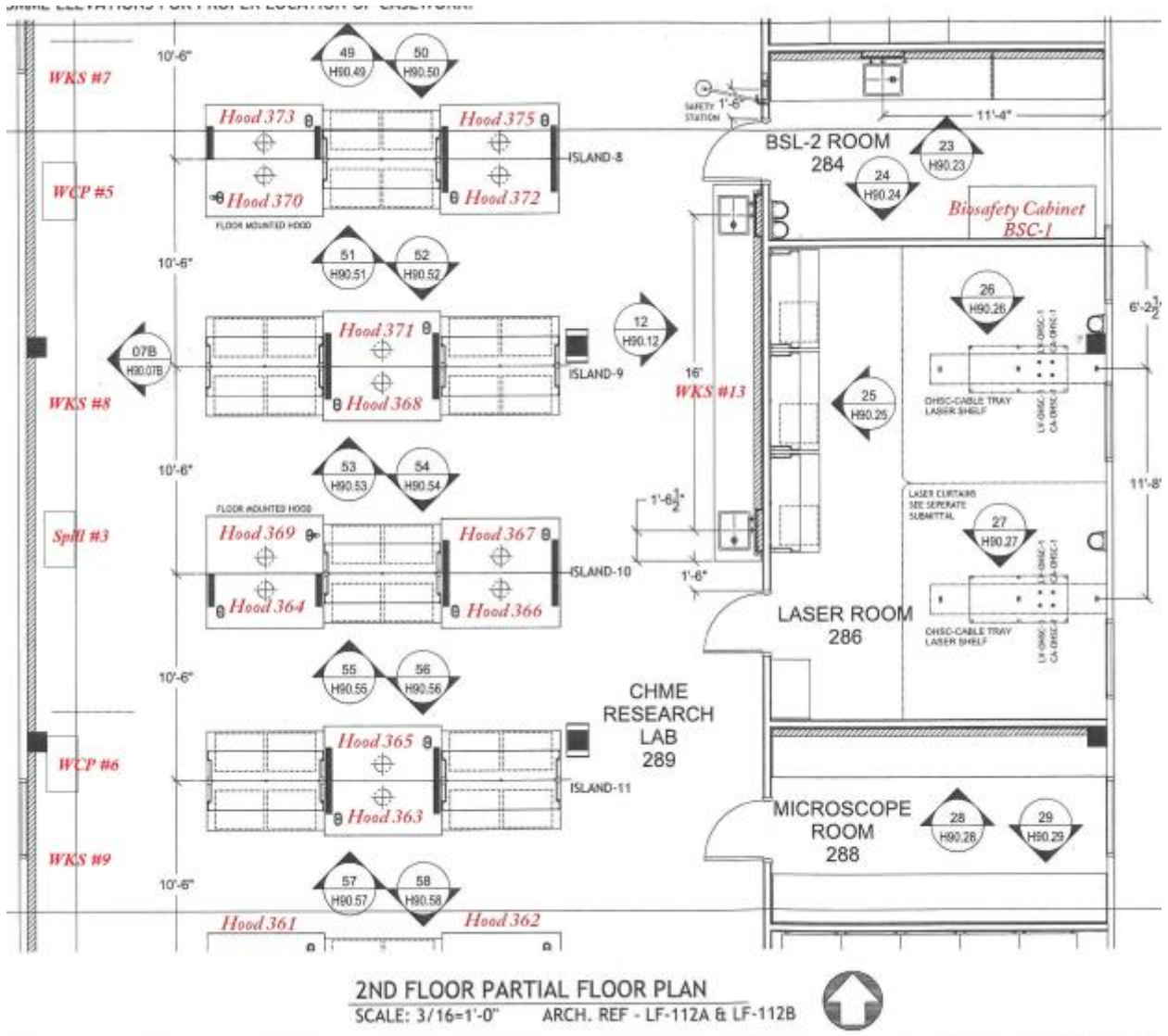
Appendix B - Jett Hall Laboratory Maps



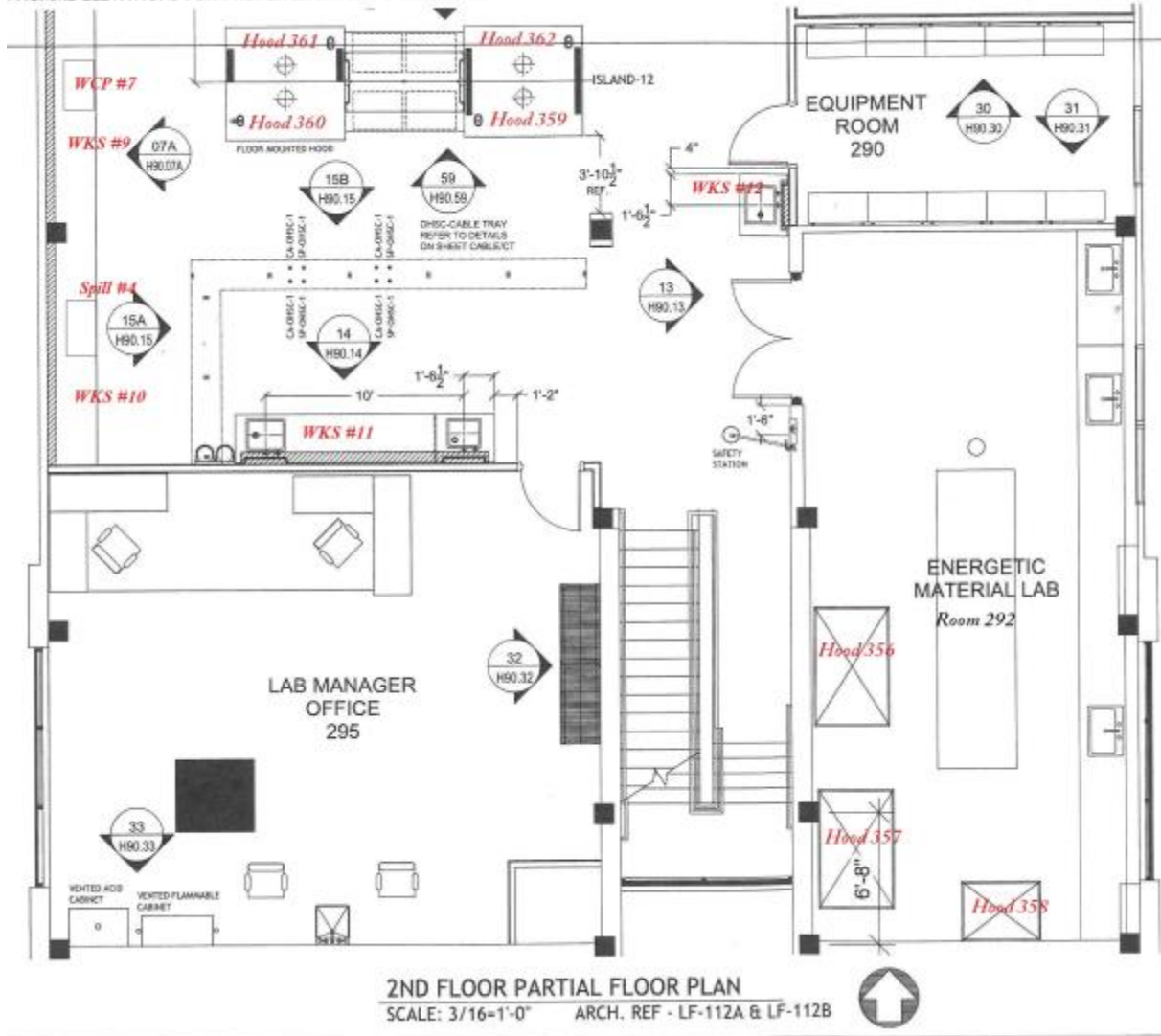


2ND FLOOR PARTIAL FLOOR PLAN
 SCALE: 3/16=1'-0" ARCH. REF - LF-112A & LF-112B





ARE ARCHITECTURAL PRODUCED & NOT TO BE USED FOR CASEWORK VERIFICATION.
I HOMME ELEVATIONS FOR PROPER LOCATION OF CASEWORK.



Appendix C - Chemical Segregation and Storage Chart

Midd Lab Safety			
CHEMICAL SEGREGATION AND STORAGE CHART			
CLASS OF CHEMICALS	RECOMMENDED STORAGE METHOD	CHEMICAL EXAMPLES	INCOMPATIBLES SEE SDS IN ALL CASES
Compressed Gases - Flammable	Store in a cool, dry area, away from oxidizing gases. Securely strap or chain cylinders to a wall or bench top.	Methane, Acetylene, Propane	Oxidizing and toxic compressed gases, oxidizing solids.
Compressed Gases - Oxidizing	Store in a cool, dry area, away from flammable gases and liquids. Securely strap or chain cylinders to a wall or bench top.	Oxygen, Chlorine, Bromine	Flammable gases.
Compressed Gases - Poisonous	Store in a cool, dry area, away from flammable gases and liquids. Securely strap or chain cylinders to a wall or bench top.	Carbon monoxide, Hydrogen sulfide	Flammable and/or oxidizing gases.
Corrosives – Acids INORGANIC	Store in a separate, lined/protected acid storage cabinet. <i>*DO NOT store acids on metal shelves*</i>	Inorganic (mineral) acids - Hydrochloric acid, Sulfuric acid, Chromic acid, Nitric acid. <i>Note: Nitric acid is a strong oxidizer and should be stored by itself. Separate nitric acid from other acids by storing it in a secondary container or a separate acid cabinet.</i>	Flammable liquids, flammable solids, bases, oxidizers. Organic acids
Corrosives – Acids ORGANIC	Store in a separate, lined/protected acid storage cabinet. <i>*DO NOT store acids on metal shelves*</i>	Organic acids - Acetic acid, Trichloroacetic acid, Lactic acid	Flammable liquids, flammable solids, bases, and oxidizers. Inorganic acids
Corrosives - Bases	Store in a separate storage cabinet.	Ammonium hydroxide, Potassium hydroxide, Sodium hydroxide	Flammable liquids, oxidizers, poisons acids.
Explosives	Store in a secure location away from all other chemicals. Do not store in an area where they can fall.	Ammonium Nitrate, Nitro Urea, Sodium azide, Trinitroaniline, Trinitroanisole, Trinitrobenzene, Trinitrophenol/Picric acid, Trinitrotoluene (TNT).	All other chemicals.
Flammable Liquids	Store in a flammable storage cabinet. <i>Note: Peroxide forming chemicals must be dated upon opening. e.g., ether, tetrahydrofuran, dioxane</i>	Acetone, Benzene, Diethyl ether, Methanol, Ethanol, Hexanes, Toluene	Acids, bases, oxidizers poisons.
Flammable Solids	Store in a separate dry cool area away from oxidizers, corrosives.	Phosphorus, Carbon, Charcoal	Acids, bases, oxidizers, and poisons.
Water Reactive Chemicals	Store in a dry, cool location. Protect from water and the fire sprinkler system, if applicable. Label location - WATER REACTIVE CHEMICALS-	Sodium metal, Potassium metal, Lithium metal, Lithium Aluminum hydride	Separate from all aqueous solutions, oxidizers.
Oxidizers	Store in a spill tray inside a non-combustible cabinet, separate from flammable and combustible materials.	Sodium hypochlorite, Benzoyl peroxide, Potassium permanganate, Potassium chlorate, Potassium dichromate. <i>Note: The following chemical groups are considered oxidizers: Nitrates, Nitrites, Chromates, Dichromates, Chlorites, Hypochlorites, Chlorates, Perchlorates, Permanganates, Iodates, Persulfates, Peroxides, Acrates, Bromates, Superoxides.</i>	Separate from reducing agents, flammables, combustibles, organic materials.
Poisons/Toxic	Store separately in a vented, cool, dry, area in chemically resistant secondary containers.	Cyanides, heavy metal compounds, i.e. Cadmium, Mercury, Osmium	Flammable liquids, acids, bases, oxidizers.
General Chemicals Non-Reactive	Store on general laboratory benches or shelving. Use upper shelving for non-hazardous chemicals only.	Agar, Sodium chloride, Sodium bicarbonate, and most non-reactive salts	See MSDS

May 2016

Middlebury Sciences Environmental Health & Safety

go/labsafety

Appendix D - References:

1. Standard Operating Procedure –#COE-SOP-0001, “Chemical Fume Hood Operation”
2. NMSU COE Chemical Hygiene Plan