### Laboratory Safety Plan

### Center for Biotechnology and Genomics

### Experimental Sciences Building

(Rooms 102, 105, 106, 109)

(DOC NAME: LAB SAFETY CBG 2014)

Created by: Susan San Francisco On: 20 January 2014

**Section**: **page**

A. Responsible Parties and Emergency Contact Information 2

B. Laboratory Locations Covered by the CBG Laboratory Safety Plan 4

C. Location od (M)SDS, TTU Chemical Hygiene Plan, Other Laboratory Documents 4

D. General Safety Information 5

E. Personal Protective Equipment (PPE) 5

F. In Case of Emergency 6

G. Eating and Drinking in the Lab 6

H. Glassware and Sharp Objects 6

I. Fire, Steam 7

J. Chemical Toxicity 7

K. Biohazards 7

L. Procedures for Work with Carcinogens, Mutagens, Teratogens and Reproductive

 Toxins 8

M. Spill Response and Clean-Up Procedure 9

N. Emergency Evacuation 10

O. Non-CBG and Non-TTU Personnel 11

P. Minors in Laboratories 12

CBG Personnel Sign Sheet 16

**Appendix:**

I. Floor Plans of Labs

II. Sample Class Safety Sign Sheet

III. Rules for non-TTU Students Conducting Experiments in the CBG IV. Minors in Laboratories Consent/Signature Forms (with Attachment A)

V. Chemical Inventory

VI. Instrument Inventory

VII. Standard Operating Procedures (SOPs)

VII. CBG Personnel Training Certifications

### Laboratory Safety Plan

### Center for Biotechnology and Genomics

### Experimental Sciences Building

(Rooms 102, 105, 106, 109)

(DOC NAME: LAB SAFETY CBG 2014)

Created by: Susan San Francisco On: February 9, 2014

**\*\*\*READ ALL SAFETY & EMERGENCY NOTICES POSTED IN THE LABS\*\*\***

**Purpose:**

The Laboratory Safety Plan is a document specific to particular laboratories and is meant to identify potential hazards in the laboratory and give guidance to laboratory personnel in the event of an incident. This will be made available in a hard copy in all labs to which it pertains. This plan is designed to accompany the Texas Tech University (TTU) Chemical Hygiene Plan and provide guidance for issues and conditions that pertain to the Center for Biotechnology and Genomics (CBG) laboratory spaces in the Experimental Sciences Building (ESB). To obtain specific details regarding the areas presented in this document, the TTU Chemical Hygiene Plan, Environmental Health and Safety officials, and the Associate Vice President for Research (Research Integrity) should be consulted.

**The following is a SUMMARY of safety procedures. If unsure of an experimental procedure or instrument operation, it is incumbent on the personnel/user to request additional information before proceeding. Safety is EVERYONE’S responsibility and if you are working in a lab, it is ultimately up to you to be aware, careful, and considerate of everyone’s safety.**

1. **RESPONSIBLE PARTIES AND EMERGENCY CONTACT INFORMATION:**

Departmental (CBG) Chemical Hygiene Officer: Susan San Francisco

(DCHO) susan.san-francisco@ttu.edu

 806-834-4752 (office)

 806-543-5134 (cell)

 806-798-1144 (home)

Alternate Emergency Contact: Ruwanthi Wettasinghe

 ruwanthi.wettasinghe @ttu.edu

 806-834-0973 (office)

ESB Building Manager: David Dorsett

 david.dorsett@ttu.edu

 806-834-2648 (office)

CBG Director: David Knaff

 david.knaff@ttu.edu 806-834-6892 (office)

Lab Managers: Room 102 Masoud Zabet

 masoud.zabet@ttu.edu

 806-834-8947

 Room 109 Rao Kottapalli

 rao.kottapalli@ttu.edu

 806-834-0592

Other Emergency Contact Numbers:

TTU Environmental Health and Safety (EH&S) EMERGENCY:

 Daytime (M-F, 8:00am-5:00pm) 806-742-3876

 After hours (24 hrs, 7days/wk) 806-742-3328

 806-543-3706

EMEGENCY Maintenance: 806-742-3328

TTU Police (UPD) EMERGENCY: 911\*

 Non-emergency: 806-742-3931

Fire Department: 911\*

\*If you call from a cell phone dial 911 and let them know that you are located at Texas Tech University

1. **LABORATORY LOCATIONS COVERED BY THE CBG LABORATORY SAFETY PLAN**

All laboratories associated with the CBG are located on the first floor of the ESB. The labs are equipped with an overhead sprinkler system. All labs have an eyewash system near the sink and a chemical spill kit. No radioactive materials are allowed in the CBG labs. Floor Plans for all labs showing the location of safety features and possible hazards are included at the back of this document (**Appendix I).**

1. Room 102: Lab houses instrumentation and chemicals used in chromatographic and electrophoretic separation techniques, mass spectrometers, micro-centrifuges, a balance, pH meter, and high pressure gas cylinders (helium, argon, and nitrogen). It has ceiling snorkels, a chemical fume hood, eyewash, and shower.
2. Room 105: This space is a teaching lab used primarily for courses taught in the Biotechnology Master’s program. It houses shaking incubators, table-top and micro-centrifuges, photodocumentation system, thermocyler and electrophoretic equipment. There is an attached large cold room. The lab has a small table top laminar flow hood and an eyewash next to the sink.
3. Room 106: This space is used for laboratory work associated with CBG research. It houses a shaking incubator, electrophoretic equipment, and micro-centrifuges. This room additionally houses a Promega enzyme freezer for the TTU/TTUHSC research community, and a connected room (106A) with an autoclave, ice machine, and UV/VIS light box. It has a shower and eyewash, and a laminar flow hood.
4. Room 109: Lab houses instrumentation used in DNA analysis, like capillary-based Sanger sequencing and NextGen sequencing. Instruments also include table-top centrifuge, spectrophotometers, tape station, thermocylers, a centrifugal evaporator, and a water purification system. The space also has a large biological safety cabinet (laminar flow hood), a chemical fume hood, and a locked connected room (109A) which stores flammables, other chemicals, and a sonicator. There is a sink eyewash and a shower.

**C. LOCATION OF (M)SDS, UNIVERSITY CHEMICAL HYGIENE PLAN, OTHER LABORATORY DOCUMENTS**

Each lab has a notebook with MSDS sheets for the chemicals present in the lab as well as a copy of the CBG Laboratory Safety Plan. A hard copy of the University Chemical Hygiene Plan as well as the CBG Laboratory Safety Plan (with a copy of lab personnel certifications) is present in the main office of the CBG in room 101 of the ESB. The CBG Laboratory Safety Plan and the TTU Chemical Hygiene Plan are also available online at the CBG website: <http://www.depts.ttu.edu/biotechnologyandgenomics/> and at the Environmental Health and Safety website: <http://www.depts.ttu.edu/ehs/Web/>.

**D. GENERAL SAFETY INFORMATION**

1. There is to be no playing around or running in the laboratory.
2. Avoid spilling fluids on the floor, and if you do, wipe it up immediately and dispose of the absorbant material appropriately. Follow guidelines for cleaning up spills of acids and caustic substances (see **section M** below).
3. There is a first aid kit in ESB Rm. 101 and eyewash stations in in all CBG labs.
4. There are emergency showers in ESB 102, 106, and 109. Showers are evaluated annually by EH&S.
5. There are chemical fume hoods in ESB 102 and 109. Chemical fume hoods are evaluated annually be EH&S.

**E. PERSONAL PROTECTIVE EQUIPMENT**

1. **Eye and Face Protection**
	1. Eye protection (safety glasses or goggles, face shield) should always be worn where there is potential for injury to the eyes or face from small particles, dust, toxic chemicals, biological substances, flying objects or particles, or ultraviolet radiation. These must always remain clean and free of contaminants. Goggles and face shields are available in the labs.
2. **Body Protection**
	1. Lab coats with sleeves should be worn when handling hazardous materials. This will prevent the contamination of skin and clothing. Body protections must always be worn in the laboratory areas.
	2. Avoid loose, long hair or loose fitting clothing. Long hair should be restrained to prevent interference with sight or work apparati.
3. **Hand Protection**
	1. Proper gloves must be worn when handling hazardous materials. These materials usually consist of caustic or toxic chemicals, biological substances, electrical sources, or extremely cold or hot objects that may irritate or burn your hands. In addition, traumatic injuries such as cuts, sprains and punctures may also occur. With the wide range of hazards, there also exists a wide range of gloves that may be used as PPE. It is important to know that not all gloves are protective against all chemicals. Hot gloves are available for hot/cold substances and nitrile/latex gloves are available for chemical use.
4. **Foot Protection**
	1. Close-toed shoes must always be worn in laboratory areas where chemicals and biologicals are present.
5. **Ear Protection**

a. Ear covering headsets are available in room 109A (near the sonicator) for muffling excess noise.

**F. In case of an emergency**

Avoid working in the lab by yourself if at all possible. Never work by yourself when performing a potentially dangerous procedure.

1. For dire emergencies, dial 911 and then (during business hours) immediately inform the Departmental Chemical Hygiene Officer (Phone: 806-834-4752, ESB Room101) or other responsible party (see list of names and numbers in Part A of this document), so that emergency officers can be directed to the required location. After hours, inform the DCHO (cell 806-543-5134) and emergency personnel as required.
2. For other emergencies, take necessary action and inform the DCHO or other responsible party (see list of names and numbers in Part A of this document).

**G. EATING AND DRINKING IN THE LAB**

1. Eating, drinking, smoking, chewing tobacco, chewing gum, applying cosmetics, taking medications, or similar activities in laboratories may result in the accidental ingestion of hazardous materials (chemical, radiological, biological); therefore these activities and storing these items are **strictly prohibited** from all laboratory spaces.

**H. GLASSWARE AND SHARP OBJECTS**

1. Exercise extreme care in handling broken glassware and other sharp objects. Make sure there is one other person in the lab when you are inserting glass tubes or pipettes into rubber stoppers, etc.
2. Put all broken glassware and sharp items in the designated containers. There are cardboard containers in every lab for glass disposal (only glass!). Glass must be decontaminated, if necessary, prior to disposal. There are also plastic “sharps” (needles, blades, etc.) disposal containers in the chemical fume hoods in labs 102 and 109.
3. Use established procedure when fitting a bulb or pipetting device onto a pipette.

**I. FIRE, STEAM**

1. Do not place Bunsen burners under or close to the bench shelf! Turn off burners when you leave the lab.
2. Exercise caution when using alcohol. Do not return flaming instruments to alcohol container.
3. Wear insulating gloves when placing or removing material into the autoclave.
4. If the building fire alarm goes off, leave immediately. Take the stairs and assemble outside the main lobby. Re-enter only after the Fire Marshall gives the all clear.

**J. CHEMICAL TOXICITY**

1. Exercise proper caution when working with corrosive chemicals: wear gloves and goggles or face-shields.
2. Do NOT discard ANY microtubes, tips, syringes, or other biomedical supplies in the regular trashcans – even if they are unused! Place them in the Biohazard bags for autoclaving and disposal. See below.
3. Dimethyl sulphoxide (DMSO) can penetrate the skin and can carry many substances through the skin — even through gloves. Therefore, be especially careful to avoid contact with DMSO. Be aware of all potential hazards associated with any chemicals used.
4. Be sure you know where the MATERIALS DATA SAFETY SHEETS are located in the Lab; they may be needed in an emergency.
5. Liquid nitrogen: Danger of frostbite, asphyxiation, and explosion. Use thick insulating gloves, avoid splashing, and work in a well-ventilated area. Wear face-shield or goggles.
6. Place all discarded hazardous materials in designated containers. The designated Chemical Safety person in the lab should (i) fill out the EH&S Hazardous Chemicals Form; (ii) then arrange with EH&S personnel for pick up.

**K. BIOHAZARDS**

1. **Mouth pipetting is absolutely forbidden in this laboratory.**
2. You MAY be working with materials or organisms that pose significant biohazard. It is best to treat all biological material as if it were potentially infectious.
3. Used disposable plastic ware should be autoclaved before discarding into the Dumpster in appropriate bags. This includes gloves, microtubes, pipettes tips, culture flasks, disposable pipettes, syringes, etc. Syringes and needles should be cut or bent before discarding. **DO NOT put any of these or related items in the regular trash as they pose a hazard for the cleaning staff or may cause undue anxiety.**
4. All glassware that may be contaminated with biological agents should be **autoclaved** before washing.

**L. PROCEDURES FOR WORK WITH CARCINOGENS, MUTAGENS, TERATOGENS, and REPRODUCTIVE TOXINS**

1. It is the responsibility of the lab workers to be aware of hazards associated with any chemical they use. Information is available from Material Safety Data Sheets found in each lab.
2. All new workers in the laboratory who will work with carcinogens, mutagens, teratogens and reproductive toxins will be trained by a responsible party.
3. For any chemical used in the laboratory, the lab worker is responsible for being aware of known or suspected hazards. For each known carcinogenic, mutagenic, or teratogenic chemical or reproductive toxin to be used the lab worker should identify these and other hazards (i.e. corrosive, reactive, flammable, toxic, irritant) based on available MSDS recommendations available in the laboratory.
4. The lab worker should be aware of the physical form of the chemical and any potential phase changes during the experiment.
5. The lab worker should be aware of the quantity on hand to be used.
6. Opened containers of carcinogens, mutagens, teratogens and reproductive toxins should be stored in the labeled area under the hood and used in the hood as indicated in the laboratory.
7. Sealed containers of carcinogens, mutagens, teratogens and reproductive toxins should be stored according to their hazards.
8. Usage of these compounds should be limited to lab workers trained in their safe usage.
9. All use of carcinogens, mutagens, teratogens and reproductive toxins should be carried out in the hood labeled for their use.
10. Lab workers should wear Personal Protective Equipment (PPE) including, but not limited to gloves, lab coat, hair restraints, goggles and any other PPE recommended by the MSDS that is deemed appropriate.
11. When working with hazardous chemicals, only group members should be in the lab. To prevent unauthorized usage of chemicals access is limited. Access to the labs can only be acquired through the Center Director, the Core Facility Manager or other authorized laboratory personnel.
12. If OSHA monitoring is required, it should be performed by EH&S.
13. Every lab worker is to receive training in the safe handling of hazardous chemicals and is to document this by signing an informed consent document.
14. If you have any questions, please ask the Core Facility Manager.

M. SPILL RESPONSE AND CLEAN-UP PROCEDURE

1. In the event of a chemical spill, the individual(s) who caused the spill is responsible for prompt and proper clean-up. It is also their responsibility to have spill control and personal protective equipment appropriate for the chemicals being handled readily available.

1. The following are general guidelines are to be followed for a chemical spill.
	1. Immediately alert area occupants and supervisor, and evacuate the area, if necessary.
	2. If there is a fire or medical attention is needed, contact UPD at 911.
	3. Review Material Safety Data Sheets (MSDSs) or other references for recommended spill cleanup methods and materials, and the need for personal protective equipment (respirator, gloves, protective clothing, etc.)
	4. Attend to any people who may be contaminated. Contaminated clothing must be removed immediately and the skin flushed with water for no less than fifteen minutes. Clothing must be placed in a waste bag for disposal if contacted by chemicals or placed in an autoclave bag for autoclaving if contacted by biological material.
	5. If a volatile, flammable material is spilled, immediately warn everyone, control sources of ignition and ventilate the area.
	6. Don personal protective equipment, as appropriate to the hazards. Refer to the Material Safety Data Sheet or other references for information.
	7. Consider the need for respiratory protection. The use of a respirator or self-contained breathing apparatus requires specialized training and medical surveillance. Never enter a contaminated atmosphere without protection or use a respirator without training. **If respiratory protection is needed and no trained personnel are available, call EH&S at 806-742-3876.** If respiratory protection is used, be sure there is another person outside the spill area in communication, in case of an emergency. If no one is available, contact EH&S at 806-742-3876.
	8. Using the chart below, determine the extent and type of spill. If the spill is large, if there has been a release to the environment or if there is no one knowledgeable about spill clean-up available, contact EH&S at 806-742-3876. 
	9. Protect floor drains or other means for environmental release. Spill socks and absorbents may be placed around drains, as needed.
	10. Contain and clean-up the spill according to the table above. Loose spill control materials should be distributed over the entire spill area, working from the outside, circling to the inside. This reduces the chance of splash or spread of the spilled chemical. Bulk absorbents and many spill pillows do not work with hydrofluoric acid. POWERSORB (by 3M) products and their equivalent will handle hydrofluoric acid. Specialized hydrofluoric acid kits also are available. Many neutralizers for acids or bases have a color change indicator to show when neutralization is complete.
	11. When spilled materials have been absorbed, use brush and scoop to place materials in an appropriate container. Polyethylene bags may be used for small spills. Five gallon pails or 20 gallon drums with polyethylene liners may be appropriate for larger quantities. Supplied spill kits contain hazardous waste bags. Each lab in the CBG contains a **HAZARDOUS SPILL KIT** pail.
	12. Complete a hazardous waste sticker, identifying the material as Spill Debris involving XYZ Chemical, and affix onto the container. Spill control materials will probably need to be disposed of as hazardous waste. Contact EHS at 806-742-3876 for advice on storage and packaging for disposal.
	13. Decontaminate the surface where the spill occurred using a mild detergent and water, when appropriate.
	14. Report all spills to your supervisor or the Principal Investigator and EH&S.
	15. If at any point the person(s) does not feel adequately equipped or comfortable proceeding with the clean-up, or if the situation is likely to escalate, contact EH&S for further assistance.

**N. EMERGENERY EVACUATION**

1. Emergency Action Plan (EAP)
	* 1. Know locations of:

Emergency Exit, Fire Extinguishers, Fire Alarms, Emergency Eye Washes, Emergency Showers, First Aid Kits, Fire blankets, Flashlights and batteries, Emergency kit, Chemical spill supplies, Material Safety Data Sheets

* + 1. In a global emergency, that requires entire building to be evacuated, leave the building and proceed to your designated assembly area at: **R2 Parking lot on NORTH SIDE of ESB. See map below.** **Do not use elevators.**
		2. The procedures below should be executed before evacuating the building **only if it is safe to do so**.
			1. Make sure all bunsen burners are off.
			2. Make sure all electrical devices (hot plates, etc.) are turned off.
		3. Re-enter building only after an official “all-clear” is given.



**O. NON-CBG and NON-TTU PERSONNEL**

The CBG is often used to provide facility tours to prospective job candidates, invited speakers, and student groups. Students and post-doctoral researchers from TTU and non-TTU researchers often use the CBG labs for research, and lab-based classes taught in CBG labs usually enroll students from a variety of departments as well. The high traffic and variety of people in the labs make it imperative that chemical and instrument safety rules are followed at all times. All labs in the ESB (and the outside ESB doors) are on an automatic locking system to prevent access by non-authorized personnel.

**1. All students taking laboratory-based classes in the CBG** must sign a form indicating that they understand the safety rules (see **Appendix II**).

**2. Non-CBG or non-TTU adult personnel conducting experiments in the CBG labs**:

a. Individuals seeking prolonged access (greater than 24 hours) or after hours access to CBG laboratories to perform work or experiments must receive the permission of authorized personnel before entering a laboratory.

b. Non- CBG or non-TTU personnel conducting an experiment in the CBG, must wear the appropriate PPE designated for the particular laboratory and experimental procedure.

c. Non-TTU students must sign a “Rules for Non-TTU Students Conducting Experiments in CBG Labs” (**Appendix III**), and if required, complete the TTU-EH&S Laboratory Safety Training prior to entering the laboratory.

**3. Non-CBG or non-TTU adult personnel on tours in the CBG:**

a. If chemical or biological agents are not being used, Laboratory Safety Training is not required.

b. Dignitaries and others visiting the laboratories shall wear the appropriate PPE if chemical or biological agents are in use and must be escorted by a senior member of the laboratory. Research operations shall be reduced to level of demonstration.

**P. MINORS IN LABORATORIES**

A minor is an individual under the age of 18 years.

1. **For minors that are going to be in the laboratory for a tour**, the following guidelines shall be followed:

a. The Center Director must give permission.

b. Groups will be no larger than 10 minors per senior laboratory member at a time.

c. The laboratory manager or other senior member of the laboratory research operation must be in direct supervision while the tour group is in the laboratory.

d. Appropriate PPE must be worn by all individuals while in the laboratory when chemical, physical or biological hazards are in use.

e. Research operations must be suspended while the tour group is in the laboratory; demonstration activities are allowed (with appropriate PPE).

f. If an active experiment is to be observed, **section 2** below must be followed.

**2. For minors involved in experimental procedures:**

Minors age 13 years and younger are not eligible for laboratory study or work

experiences, or allowed to be present in laboratories or other hazardous work areas at

TTU, with the following exceptions and guidelines:

**a.** Special observation-only experiences may be arranged for minors (including those age of 13 years and younger) through the CBG, the Associate Vice President for Research (Research Integrity) and EH&S;

**b.** Special participatory/educational laboratory experiences involving minors age 13 years and younger may be considered on a case-by-case basis by the CBG, if authorized in accordance with procedures set forth in the TTU Chemical Hygiene Plan, provided that the minor is:

**i.** Under the direct supervision of the sponsoring CBG investigator or other senior CBG personnel; and

**ii.** Not involved and/or exposed in any activities that could be considered “particularly hazardous” or that may be considered to be detrimental to their health or well being. See details in the TTU Chemical Hygiene Plan on file in ESB 101 or at <http://www.depts.ttu.edu/ehs/Web/>.

**iii.** For purposes of a. or b. above, all minors under the age of 14 must be properly supervised and accompanied by an adult while on TTU grounds and within TTU facilities where hazards are present.

Minors of age 14 and 15 years may participate, if authorized (see details in the TTU Chemical Hygiene Plan on file in ESB 101 or at the web address), in laboratory study or work experiences that do not include work in areas or occupations considered to be “particularly hazardous” or that may be considered to be detrimental to their health or well-being. These conditions are described in the TTU Chemical Hygiene Plan which should be consulted prior to accepting these minors into these laboratory experiences.

Minors of age 16 and 17 years may participate, if authorized (see details in the TTU Chemical Hygiene Plan on file in ESB 101 or at the web address), in laboratory study or work experiences that include work in non-hazardous jobs or activities. Minors of age 16 and 17 years are prohibited from working directly with highly hazardous materials. These conditions are described in the TTU Chemical Hygiene Plan which should be consulted prior to accepting these minors into these laboratory experiences.

 **3.** **General Rules and Authorization for All Minors Working in CBG Laboratories:**

The sponsoring supervisor overseeing experiments in CBG laboratories is specifically responsible for the safety and compliance of all minors who are approved under institutional guidelines as employees, student, or visitors in the CBG. Read section 8 of the TTU Chemical Hygiene Plan for specific guidance.

 **a.** All minors are prohibited from working directly with highly hazardous materials (see TTU Chemical Hygiene Plan for a description of these)

**b.** Minors shall be closely and directly supervised at all times by the sponsoring investigator.

**c.** Under no circumstances will minors be allowed to work or study with or around radiation sources, biological agents, hazardous chemicals, equipment, or animals in manners that pose a risk to their health or well-being.

Authorization of a minor to work in a CBG laboratory:

 **a.** Minors shall successfully complete all required laboratory safety training, as appropriate, and any site-specific training required by the CBG prior to commencing work activities.

**b.** A parent or guardian must give written consent for minors to participate in laboratory study or work experiences, unless the minor is emancipated.

**c.** The Associate Vice President for Research (Research Integrity), sponsoring

investigator, and the CBG Director must also authorize the participation in writing. Authorization will be granted only for recognized TTU or other recognized sponsored educational programs.

d. Minors in Laboratories Consent/Signature Sheet in **Appendix IV** shall be completed and provided by the sponsoring investigator in the CBG or program to The Office of Research Services for approval prior to commencing the laboratory study or work experience. The original will be forwarded to the Associate Vice President for Research (Research Integrity) for final authorization and copies will be sent and kept by EH&S and the Associate Vice President for Research (Research Integrity) while the original will be returned to, and maintained by the CBG/investigator.

**e.** Minors may work in office space (not located in a laboratory) under the supervision of a PI, faculty, staff or his/her agent, subject to the conditions presented in **section P**.

**Your signature confirms that you have read and understand the policies and rules of laboratory safety in the CBG labs and agree to comply with the special restrictions imposed on work in this area, and that you had the opportunity to ask questions.**

**Signature: Date:**

**Signature: Date:**

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