

Facility Safety Plan

A. Research Operations/Standard Operating Procedures (SOPs)

The Office of Research Support and Sponsored Programs (RSSP) was established to facilitate the review process created to protect the rights and welfare of research participants and provide guidance on research integrity issues at the University of Arkansas (UA) (<http://www.uark.edu/admin/rsspinfo/>). It also assists researchers in establishing long-term, mutually beneficial relationships with industries, finding funding opportunities, preparing proposals, and complying with applicable requirements. The University is obligated to conduct research and other programs in accordance with accepted professional standards of conduct. The responsibilities are generally set forth in federal and state laws and regulations as well as in specific guidelines provided by funding agencies. Of paramount importance is the protection of the rights and welfare of humans as research subjects, the humane treatment of animals in research and teaching, and the handling, use and storage of radioactive material, biological and toxic agents. RSSP serves as a point of contact for the research community for all matters concerning research compliance. The UA has formed six compliance committees to ensure that research is conducted in accordance with federal, state, and local regulations and guidelines. The Institutional Animal Care & Use Committee (IACUC), the Institutional Biosafety Committee (IBC), the Institutional Review Board (IRB), the Radiation Safety Committee (RSC), the Toxic Substances Committee (TSC) and the Conflict of Interest and Commitment Oversight Committee (COIOC) are comprised of faculty, staff, and community representatives who are appointed by the Provost and Vice Chancellor for Academic Affairs. Descriptions of safety committees are as follows:

Health and Occupational Safety Council (HOSC)

The HOSC recommends policies and procedures relating to general health and occupational safety of persons in the University community. It serves to coordinate the activities of the committees assigned to specific health-related or occupational safety areas: IACUC, IBC, IRB, RSC, and TSC.

Animal Care

The University established the IACUC to oversee, support, and regulate as its representative in overseeing, supporting, and regulating animal care and use. The IACUC is charged with monitoring adherence to the Animal Welfare Act regulations, Public Health Service Policy, and the University's Policy on Animal Care and Use, and is empowered to develop the procedures and forms needed to carry out this task. All research or teaching using live vertebrate animals that is covered by the University's Policy on Animal Care and Use, regardless of its purpose or source of funding, must have prior written approval from the IACUC of an Animal Use Protocol submitted by the user for review by the committee. There is one exception to this policy, which is that specific Animal Use Protocols shall not be required for agricultural teaching applications involving the non-stressful observation of farm animals, demonstration of judging techniques, demonstration of accepted farm management practices, or normal use of farm

animals in production. Instead, standard operating procedures detailing such practices and procedures shall be kept on file in the office RSSP and of the Associate Vice President for Agriculture-Research, and shall be incorporated into the Policies and Procedures of the Dale Bumpers College of Agricultural, Food and Life Sciences and the Agricultural Experiment Station. The Policy on Animal Care and use may be found online at http://www.uark.edu/admin/rsspinfo/compliance/animal-subjects/policy/policy_animal_care_and_use.pdf

Biological Safety

The IBC recommends policies needed for biological safety in connection with research, including policies that provide for the safe performance of recombinant DNA and human pathogen research and policies that ensure compliance with the Guidelines of the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention. This committee performs the institutional functions prescribed by the NIH Guidelines for the Institutional Biosafety Committee. Use and disposal of toxins is also included in the purview of the committee. University researchers initiating programs involving recombinant DNA or pathogens shall contact the RSSP concerning registration of protocols with the committee. The University has adopted a Biosafety Manual that is available online at <http://www.phpl.uark.edu/ehs/BiosafetyManual04.pdf>.

Human Subjects

The IRB recommends policies needed to ensure the safety of human subjects. The University is guided by the ethical principles regarding human subject research as set forth in The Nuremberg Code and the Report of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research entitled Ethical Principles and Guidelines for the Protection of Human Subjects of Research (the "Belmont Report"). These documents, as well as others (e.g., 45 CFR 46 as amended) cited in the Policies and Procedures Governing Research with Human Subjects may be reviewed in the RSSP or online at <http://www.uark.edu/admin/rsspinfo/compliance/irb/index.html>.

Radiation Safety

The RSC recommends policies and monitors the implementation of policies and practices regarding the license, purchase, shipment, use, control, transfer and disposal of radioisotopes and sources of ionizing radiation. It also recommends policies and monitors the implementation of policies and practices regarding the purchase, shipment, use, control, transfer, and disposal of sources of non-ionizing radiation. A dosimetry program is in place to monitor the exposure levels of radiation workers. The University has adopted a Radiation Safety Manual that is available online at http://www.phpl.uark.edu/ehs/Radiation%20safety%20manual_aug_04.doc.

Chemical Safety

The TSC recommends policies for the use, storage, and disposal of toxic substances, and monitors the application of the policies for compliance. The University has developed a Chemical Hygiene Plan (CHP), which can be found online at

<http://www.phpl.uark.edu/ehs/ChemicalHygiene05.PDF>. The CHP is the full statement of the UA campus policy and procedures for handling toxic substances to protect laboratory employees and students from health hazards associated with the use of hazardous chemicals in all University laboratories. The CHP is intended to assure that laboratory users are not exposed to substances in excess of the permissible exposure limits as defined by OSHA in [29 CFR 1910 subpart Z](#).

Training Programs

The Office of Environmental Health and Safety (EH&S) (<http://www.phpl.uark.edu/ehs/>) provides the University community with training programs on chemical, radiation, biological, agricultural, fire, occupational (including ergonomics), and campus safety. Training is also linked to weather conditions (i.e. cold and hot weather safety). While several programs are offered periodically to faculty, staff, and students, training is also available at the request of individuals. Training is offered via the web, through training seminars, and with hands on demonstrations. Equipment operators are also required to undergo testing and pass practical applications. Many training programs are linked to required state certifications. The Hazardous Communications Program (HAZCOM) and Bloodborne Pathogens (BBP) training are two such programs that are state mandated training. Hundreds of hours of training is provided by EH&S each year. Additionally, specific training is provided to employees by their supervisor (i.e. lab personnel are trained on job-specific duties by Principal Investigator or a lab technician).

HAZCOM

HAZCOM training is required under the Arkansas state law known as the Chemical Right to Know Act 556 of 1991. Formal HAZCOM training and relevant information is provided to employees to make them aware of hazardous chemicals that they may be exposed to under normal working conditions or in foreseeable emergencies. This training includes the proper labeling and posting of chemicals, waste containers and storage areas, material safety data sheets (MSDS), and employee training. HAZCOM training is provided to employees at employee orientation, when new hazards enter the workplace, and annually.

Bloodborne Pathogens

The University of Arkansas' Bloodborne Pathogen program is designed to meet the requirements of the Occupational Safety and Health Administration's (OSHA) Bloodborne Pathogen Standard, [29 CFR 1910.1030](#). Employees who may potentially be exposed to BBP undergo annual BBP training. Additionally, employees whose work puts them at risk for exposure to BBP are offered Hepatitis vaccinations. Information regarding BBP safety is found at the EH&S website: <http://www.phpl.uark.edu/ehs/Bloodborne.htm>.

B. Facility Equipment and Description

1. **Description of the Facility:** The University of Arkansas (UA) at Fayetteville, located in Northwest Arkansas, is the flagship of the UA System. It is the major land-grant

university in the state and was established in 1871 as a result of the Morrill Land-Grant College Act of 1862. It currently has more than 17,000 students. The UA campus includes more than 130 buildings on 345 acres and offers nearly 200 academic programs. The University of Arkansas houses several leading edge research facilities, including the Center for Sensing Technology and Research, the Arkansas Center for Space and Planetary Sciences, the Chemical Hazards Research Center, the High Density Electronics Center, and the Center for Advanced Spatial Technologies.

2. Description of Personal Protection Equipment: Personal Protective Equipment used within the facility includes, is are not limited to, gloves, goggles, face shields, laboratory coats, radiation shields, and shoe covers.

3. List of Specialized Safety Equipment: Specialized safety equipment includes, but is not limited to, chemical fume hoods, biosafety cabinets, eye washes, showers, exhaust and ventilation systems that are used in research activities and maintained by UA Facilities Management. Gas meters (Carbon Monoxide, Oxygen, Combustible LEL, and Hydrogen Sulfide), a particle counter, a velocity meter, and a biological sampler are all available at EH&S to test working conditions. UA research committees assist researchers in determining which safety equipment is applicable to specific research activities.

Emergency equipment available at the University includes automatic external defibrillators, complete trauma kit and portable oxygen/demand valve resuscitator, spill control personnel response bags (each containing: Tyvek suits, gloves, booties, pH paper, full-face respirator, safety goggles and glasses, barrier tape, tags, labels, disinfectant wipes, towels, biohazard bags, pads, pens, work gloves, safety vest, overshoes, Emergency Response Handbook, NIOSH pocket guide, and hard hat), spill and boom containment supplies (pigs and pads), oil dry compound (minimum of 20 bags), backhoes, dump trucks, flat bed trucks, hydraulic lift gate vehicles, pickups, trench shoring equipment (complete set), hand tools, shovels, brooms, rakes, squeegees, complete lumber yard, emergency lighting and generators.

Equipment available at the University includes, but is not limited to, autoclaves, refrigerators, freezers, subzero freezers, centrifuges, weighing machines, balances, polymerase chain reaction machines, spectrophotometers, gas chromatographs, microscopes, drying ovens, x-ray machines, lasers, liquid scintillation counters, Geiger-Mueller (GM) probes, DNA sequencer, incubators, electrophoresis apparatus,

High Density Electronics Center (HiDEC) Equipment: HiDEC is comprised of approximately 4,000 square feet of Class 100/1000 clean room space. Within this space, there are six separate areas designated for specific kinds of research and development related to state of the art multi-chip modules (MCMs). They are the (1) Assembly, (2) Metal/Oxide Deposition and Etch, (3) Photolithography, (4) Deposition and Diffusion, (5) Laser, and (6) Demonstration rooms. Areas 2 and 3 are Class 100 while 1, 4, 5, and 6 are Class 1000. Assembly is used primarily for 'backend' processing (i.e. dicing, wire bonding, and soldering). Metal/Oxide Deposition and Etch contains a Plasma Vapor Deposition (PVD) system for aluminum and chrome silicide, and a Plasma Enhanced

Chemical Vapor Deposition (PECVD) tool for silicon dioxide. In addition, two dry etch and one wet etch unit is available for use. Photolithography contains two box ovens to cure spin-on dielectrics, two alignment and exposing tools for patterning, and three resin-dedicated coaters for application and soft baking purposes. Deposition and Diffusion contains a PVD system for copper, tantalum and titanium as well as a wet bench for nickel/gold plating. In addition, a thermal oxidation system is available to grow silicon dioxide. (<http://www.hidec.uark.edu/?section=capabilities>)

The Innovative Nano/Bio Lab (INB): The INB is comprised of 200 square feet of Class 100/10 cleanroom space. This lab consists of equipment for nano and biological based manufacturing. The class 100 area consists of the following equipment: Optek Differential Pressure laminator, Mini-Brute annealing furnace, Experimental plasma etcher, Pentacene evaporator, Parylene coater, and wet bench. The class 10 area consists of the following equipment: microscope, critical point dryer, solvent wet bench, and Karl Suss MA150 aligner.

The Carbon Nanotube (CNT) Lab: The CNT lab is a research lab comprised of 600 square feet. This lab consists of the following equipment: Small Microwave CVD system, Industrial Microwave CVD system, four fume hoods, three chemical benches, glove box, three ovens, and four furnaces.

C. Radioactive Materials

Arkansas is an Agreement State and received its radioactive materials license from the Arkansas Department of Health and Human Services. A copy of the UA's Arkansas Radioactive Material License Number ARK-064-INC-10-09 is attached.

D. Hazard Analysis

Chemical, radioactive, biological, and physical hazards are present in the University facility. The UA has implemented and maintains a plan for dealing with these hazards and their associated waste.

The Chemical Hygiene Plan and other education sources such as links to the [NIOSH Pocket Guide to Chemical Hazards](#) and [EPA Extremely Hazardous Chemicals](#) are found on the EH&S Chemical Safety website (<http://www.phpl.uark.edu/ehs/ChemicalSafety01.htm>). EH&S programs have been developed to monitor and encourage compliance with the standards established in the Resource Conservation and Recovery Act (RCRA) regarding chemical use, storage and labeling policies, chemical waste management procedures, medical surveillance procedures in the event of overexposures, and training requirements. Chemicals are separated based upon the hazards they pose (i.e. ignitable, corrosive, reactive, toxic). Chemical inventories are kept to a minimum and supervisors are required to maintain an active hazardous chemical inventory list.

Radioactive hazards include ionizing and non-ionizing forms of radiation. Training, radioactive waste pickups, isotope order approval, calibration services, personnel dosimetry to monitor radiation exposure, and consulting support are available from the Radiation Safety Officer and EH&S. Radiation laboratory inspections are conducted annually to ensure safe working conditions for laboratory personnel and the University community.

Biological hazards at the University include work with recombinant DNA, toxins, and pathogens. Training, biological waste pickups, sterilization procedures, and medical surveillance procedures in the event of exposures are available. Additionally, laboratory biological inventories are maintained. Biological laboratory inspections are conducted in laboratories working with Biosafety Level 2 organisms to ensure the safety of laboratory personnel and the University community.

Physical hazards include pressure vessels, pressurized gasses, and powered equipment. Freezing and burn hazards are also present in laboratory settings. Training is provided for equipment usage and emergency procedures.

Hazard controls are in place at UA to minimize exposure of personnel to hazardous materials. These include engineering controls (i.e. chemical fume hoods, biological safety cabinets, sharps containers, secondary containment, broken glass containers); administrative controls (knowledge concerning hazards associated with materials, equipment that employees work with and emergency exits and equipment including eye wash stations, safety showers, and fire extinguishers); and personal protective equipment (i.e. safety glasses, lab coats, gloves). The facility conducts a monthly walk through of research and teaching facilities to identify potential problems. Notices of items of non-compliance are sent to supervisors, who have 30 days to respond in writing to the notice regarding actions taken.

E. Biological Defense Research Program Requirements

No research conducted at UA involves Biosafety Level 3 or 4 materials.

F. Facility Safety Director/Manager Assurance

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The Manager of Environmental Health and Safety offers the following assurances, made to the best of her knowledge, based on available information.

- ◆ **The institution has an existing institutional safety and occupational health program directed toward meeting appropriate Federal, State, and local regulations as required by law, as well as the National Institute of Health Guidelines for Research Involving DNA Molecules, dated Jan 2001.**

- ◆ EH&S works with Principal Investigators and other laboratory personnel to identify hazards associated with the research laboratories in order to eliminate and/or control them in such a manner as to provide a safe research laboratory environment.

- ◆ The Office of Environmental Health and Safety will make available to the Principal Investigator(s), upon request, an annual **Facility Safety Plan Status Report** including significant changes in facility, safety equipment, and safety procedures. The Principal Investigator(s) will be expected to fax the report to 301-619-6627, e-mail it to Cavelle.Williams@det.amedd.army.mil, or send it by mail to Commanding General, U.S. Army Medical Research and Materiel Command, ATTN: MCMR-ZC-S, 504 Scott Street, Fort Detrick, MD 21702-5012.

- ◆ The professional staff of the Office of Environmental Health and Safety is available to consult with all current Principal Investigators holding USAMRMC awards concerning this institution's safety policies and procedures, and will, upon request, consult with all future Principal Investigators holding USAMRMC awards concerning this institution's safety policies and procedures.

Name of Institution's Safety Director/Manager (print)

Signature Date

Mailing Address: _____
Street

City State Zip Code

Phone Number: _____

Fax: _____

E-mail Address: _____

Web Site: _____