**SOP for ULTRAVIOLET RADIATION**

This SOP provides information and recommendations for use and handling of devices that emit ultraviolet light (UV).

Ultraviolet light is non-ionizing radiation that falls within the 100-400-nanometer wavelength region of the electromagnetic spectrum. Within this region UV rays are commonly broken down into the following three main sections:

Region\* Hazard Potential Wavelength (nm)

UVA Lowest 315-400

UVB Mid-High 280-315

UVC Highest 100-280

\*The International Commission on Illumination

For most people, the main source of UV exposure is the sun. Exposure from the sun is typically limited to the UVA region, since the earth’s atmosphere protects us from the more harmful UVC and 97-99% of the UVB region. Limiting our exposure time and/or use of sunscreen lotions are usually an easy and effective method for controlling overexposure to UV radiation. However, additional precautions should be taken when working in a laboratory. Common lab equipment can generate concentrated UV radiation in all three regions. Two types of UV sources are found in the lab: portable UV lamps and mercury (Hg) bulbs in microscopes.

The Hg arc lamp is used as a source of ultraviolet radiation during exposure. Ultraviolet radiation can cause burns of the skin or of the outer layers of the eye. Chronic exposure to ultraviolet radiation can cause skin cancer. The ultraviolet illumination system has been designed so that the user is not exposed to the UV. However, the user should avoid looking directly at the UV source and avoid exposure to reflected or diffused UV from the lamp. In addition, the Hg arc lamp operates at high voltage and the user should make sure that the power supply and illuminator are covered properly, and that cables are properly connected.”

**Health Risks**

Unfortunately, overexposure to UV radiation often times has no immediate warning signs. Symptoms of overexposure, including different stages of erythema (sunburn) or photokeratitis (welder’s flash) typically appear 4-24 hours after an exposure has occurred.•Skin- UV radiation can initiate erythema within exposed skin. This “sunburn” consisting of “redness” and blistering varies in severity, and can occur from only a few seconds of exposure. Symptoms can also vary due to one’s genetic makeup. Pale to fair skin individuals are more susceptible to burns. In addition various medications (i.e. birth control) can exaggerate symptoms. Chronic exposure to UV radiation has been linked to premature skin aging, wrinkles and skin cancer. •Eye- UV radiation exposure can damage the cornea, the outer protection coating of the eye. Photokeratitis is a painful inflammation of the eye caused by UV radiation-induced lesions on the cornea. Symptoms include a “sand like” feeling in the eye that can last several days. Chronic exposures to short term UV radiation can lead to formation of cataracts.

**Precautionary Measures**

**Engineering Controls:**

•Containment/Location- Having equipment located in a separate room, alcove or low traffic area of a lab is ideal. To avoid exposure to other employees, avoid placing equipment in the direct vicinity of desk areas and or other equipment. Use of shields, curtains, UVR absorbing glass, or plastic is recommended.

•Eliminating Reflection- Many surfaces, especially those that are shiny, easily reflect UVR. To reduce the intensity of reflections, painting problematic surfaces with non-UVR-reflective material is effective.

**Personnel Protective Equipment (PPE):**

Eyeglasses- Should be ANSI-Z87 rated and provide UV protection from side exposure via a side lens or “wrap around” lens. Normal eye protection and/or prescription glasses provide little to no protection! Contact the manufacturer for guidance on selecting Z-87 ANSI eyewear with the appropriate UVE rating scale for your application. The rating of the eyeglasses will be printed on the lens.

Face Shield- UV-rated face shields should be worn in addition to eyeglasses or goggles.

Gloves- At a minimum nitrile or tightly woven fabric gloves are recommended, however glove should protect the employee not only from UV light but from the hazard of the activity being performed.

**UV bulb disposal**

Many of these devices have UV light bulbs that can be replaced. DO NOT dispose of UV bulbs in the regular trash. Disposal of these bulbs must be handled through EHS as the bulbs are considered hazardous and subject to certain regulatory requirements for disposal.

Lab Coat- Employees should cover exposed skin. Lab coats, along with proper lab attire should be worn.