A. PURPOSE
To maintain formaldehyde exposure below the Federal Occupational Safety and Health Administration (OSHA) Formaldehyde Standard 29 CFR 1910.1048 established action level (AL) 0.5 ppm, permissible exposure limit (PEL) 0.75 ppm and/or short-term exposure limit (STEL) 2.00 ppm.

It is Columbia University’s (CU) policy to ensure hazards associated with formaldehyde use are anticipated, recognized, evaluated, controlled and that information concerning these hazards is communicated to affected employees consistent with OSHA Formaldehyde Standard.

B. APPLICABILITY/SCOPE
University personnel who use or come in contact with formaldehyde under normal working conditions or during emergencies.

C. RESPONSIBILITIES
1. Principal Investigator/Laboratory Supervisor
   a. Ensure employees working with formaldehyde receive proper formaldehyde training, including laboratory specific training as deemed necessary.
   b. Ensure employees are provided proper PPE and they use when handling and using formaldehyde, including lab coat, closed toe shoes, long pants, protective eyewear, and appropriate gloves.
   c. Ensure exposure monitoring is conducted when there is potential for formaldehyde exposure.
   d. Ensure employees are informed about results of exposure monitoring.
   e. Ensure employees receive medical consultation when their exposure reaches or exceeds AL, PEL and or STEL, at no cost to employees or if acute symptoms are experienced.
   f. Ensure employees are provided with proper respiratory protection if exposure exceeds regulatory limits and engineering controls are not feasible.

2. Environmental Health and Safety
   a. Provide exposure monitoring when requested by the supervisor or as identified by EH&S through routine survey.
   b. Provide results of exposure monitoring to the supervisor as required under OSHA regulations.
   d. Provide respirator fit testing, if determined necessary through an exposure assessment.
   e. Maintains formaldehyde exposure monitoring and fit testing records.

3. Healthcare Provider
   a. Provide medical surveillance in accordance with the OSHA regulations when exposure exceeds regulatory limits or in case of emergency.
   b. Provide medical clearance when personnel are recommended to use respiratory protection.
   c. Maintain medical surveillance records or respirator medical clearance records in accordance to the regulatory requirements.

D. DEFINITIONS
1. Action Level (AL). Means a concentration of 0.5 parts formaldehyde per million parts of air (0.5 ppm) calculated as an eight (8)-hour time-weighted average (TWA) concentration.
2. Authorized person. Means any person required by work duties to be present in regulated areas, or authorized to do so by the employer.
3. **Emergency.** Is any occurrence, such as but not limited to equipment failure, rupture of containers, or failure of control equipment that result in an uncontrolled release of a significant amount of formaldehyde.

4. **Formaldehyde.** The chemical substance, FORMALDEHYDE, Chemical Abstracts Service Registry No. 50-00-0

5. **Permissible Exposure Limits (PEL).** The time-weighted-average concentration for a conventional 8-hour workday (0.75 ppm) and a 40-hour workweek to which nearly all employees may be repeatedly exposed, day after day, without adverse effect.

6. **Short Term Exposure Limits (STEL).** A 15-minute TWA exposure (2.0 ppm), which should not be exceeded at any time during a workday even if, the 8-hour exposure is within the OSHA-PEL as TWA.

E. **PROCEDURE**

1. **Compliance Procedure**
   a. If an employee’s exposure is at or above the AL and/or STEL, the Supervisor shall take appropriate corrective action, including:
      i. Suspend the use of formaldehyde in the affected area;
      ii. Assess the work practices of the affected employee;
      iii. Develop a written plan describing corrective actions being taken to reduce exposure below the action level and/or STEL;
      iv. Provide a copy of the plan to the affected employee;
      v. Ask employee to complete medical disease questionnaire and seek medical evaluation at the Workforce Health and Safety (WHS) or a Healthcare provider
      vi. Institute appropriate engineering controls;
      vii. Consider product substitution.
   b. Facilities Operations in conjunction with EH&S shall be requested to evaluate the area for the feasibility of installing engineering controls if deemed necessary through an EH&S assessment.
   c. If corrective measures do not maintain exposure below the action level and/or STEL, after consultation with the EH&S Office, the affected employee shall be supplied with appropriate respiratory protection.

2. **Exposure Monitoring**
   a. Employees potentially exposed to formaldehyde shall be identified by various means, classified into exposure groups and included in the sampling strategy.
   b. Monitoring shall be repeated upon notification by the supervisor, each time there is a change in production, equipment, process, personnel or control measures which may result in a new or additional exposure to formaldehyde.
   c. Monitoring shall be repeated at the request of an employee or when any employee reports signs or symptoms of respiratory or dermal conditions associated with formaldehyde exposure.
   d. Determination of an employee’s exposure shall be made from breathing zone air samples that are representative of 8-hour and/or 15 minute monitoring.
   e. If, after implementing engineering controls, exposure is at or above the action level and/or STEL, follow-up monitoring shall be conducted under worst-case exposure conditions:
      i. every six months, if employee’s previous exposure was at or above the action level;
      ii. annually, if employee’s previous exposure was at or above the STEL.
   f. It is prohibited to rotate employees for the purpose of limiting the exposure.
Formaldehyde Exposure Control Plan

Procedure: 6.09
Version: 2.2
Effective 06/10/2016

3. Notification of Monitoring Results
   a. Within 15 days of receiving monitoring results, the EH&S Office shall provide written
      notification to:
      i. The Supervisor if results are below the AL/STEL (Notification Results). The
         Supervisor shall post results in the lab and/or inform employee(s).
      ii. The affected employee and Supervisor, if the results are at or above the AL/STEL
          (Exposure Notification/Medical Surveillance).

4. Regulated Areas
   a. When repeated monitoring results shows the concentration of airborne FORMALDEHYDE is
      above the PEL and/or STEL, the Supervisor shall establish the area as a “regulated area” and
      post all entrances and accesses with observable signs containing these words:
         DANGER
         FORMALDEHYDE
         IRRITANT AND POTENTIAL CANCER HAZARD
         AUTHORIZED PERSONNEL ONLY
   b. Access to regulated area shall be restricted to persons who have been trained to recognize the
      hazards of formaldehyde and to work safely using PPE.

5. Respiratory Protection
   a. Respirator use shall only be permitted under the following circumstances:
      i. During the interval necessary to install or implement feasible engineering and work
         practice controls.
      ii. In work situations where feasible engineering or work practice controls are not yet
          sufficient to reduce exposure below PEL/STEL.
      iii. In work situations where engineering controls and work practice controls are not
           feasible.
      iv. In emergencies where exposure could exceed PEL/STEL.
   b. Whenever respirator use is required, the employee shall be provided by their laboratory with
      an appropriate National Institute for Occupational Safety and Health (NIOSH) approved
      respirator at no cost, trained on proper use, and shall use it properly.
   c. The respirator selected shall reduce air-borne concentration of formaldehyde inhaled by the
      employee to at or below TWA or STEL.
   d. The EH&S Office maintains a written respiratory protection program in accordance with the
      OSHA respiratory protection standard and provides training and fit-testing.
   e. Employees must obtain medical clearance from the WHS or a healthcare provider before fit-
      testing and respirator use.
   f. A powered air-purifying respirator shall be made available to any employee who experiences
      difficulty wearing a negative pressure respirator.

6. Protective Equipment and Clothing
   a. Personal protective equipment (PPE) such as lab coats, gloves, goggles, face shields
      appropriate for use with formaldehyde, shall be provided at no cost to employees. The
      Supervisor shall ensure that employees:
      i. Use appropriate PPE when working with formaldehyde.
ii. Avoid contact of the eyes and skin with liquids containing one (1%) percent or greater formaldehyde by the use of chemical protective clothing made of material impervious to formaldehyde.

iii. Use non-latex gloves, such as nitrile or butyl when handling formaldehyde.

iv. Do not reuse PPE and/or clothing that has become contaminated with formaldehyde before it is cleaned or laundered.

v. Store contaminated equipment and clothing in containers labeled as:

   **DANGER**
   
   FORMALDEHYDE -CONTAMINATED (CLOTHING) EQUIPMENT
   AVOID INHALATION AND SKIN CONTACT

vi. Do not take home equipment or clothing contaminated with formaldehyde

vii. Are trained properly before handling or removing formaldehyde contaminated clothing.

viii. Are provided a room to change contaminated clothing, if needed.

ix. Have access to working eyewash and emergency showers and are trained to use them in case of emergency.

x. Any person, who launders, cleans, or repairs FORMALDEHYDE contaminated clothing or equipment shall be informed of formaldehyde’s potentially harmful effects and procedures to safely handle such material.

7. **Housekeeping**
   a. The workplace shall be maintained clean and free from formaldehyde contaminated debris.
   b. Formaldehyde contaminated debris and waste resulting from spills or other activities shall be placed for disposal in sealed container bearing label warning formaldehyde’s presence and its hazards.
   c. Employees involved in clean up or maintenance should be informed about the hazards associated with formaldehyde exposure during such activities.

8. **Hazard Communication**
   a. All provisions of this program shall be enforced in all laboratories where formaldehyde is used.
   b. Hazard warning labels that identify if the product contains formaldehyde shall be placed on the containers.
   c. Labels shall inform users of “Potential Cancer Hazard”.
   d. SDS shall be made accessible to employees, when requested.
   e. SDS should be reviewed and updated, periodically

9. **Information and Training**
   a. Employees assigned to a workplace where formaldehyde is used must participate in training. Employees exposed to formaldehyde below 0.1 ppm may not require training.
   b. Employees must be trained when introduced into such a work environment and annually thereafter.
   c. Training shall be conducted by EH&S Office and include:
      i. Discussion of the regulation, Safety Data Sheets (SDS) and labels.
      ii. The purpose for and a description of the medical surveillance program as it pertains to signs and symptoms of exposure.
      iii. Discussion of health hazards, such as cancer, irritation and sensitization of the skin and respiratory system, eye and throat irritation, and acute toxicity.
      iv. Instructions to report to the Supervisor the development of any adverse signs or symptoms that are suspected to be attributable to FORMALDEHYDE exposure.
Formaldehyde Exposure Control Plan

v. Description of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate for limiting exposure.
vi. The purpose for, proper use of, and limitations of personal protection, equipment.
vii. Instructions for handling of spills, emergencies and clean up procedures.
viii. The importance of engineering and safe work practices in reducing FORMALDEHYDE exposure.
ix. Instructions for the handling of spills, emergencies and clean-up procedure and role of employee in case of contamination.
d. Training material is available from the EH&S Office upon request and without cost to employees.

10. Review and Update
a. The policy shall be reviewed periodically and updated as necessary.

F. EMERGENCY CONTACTS
1. The Supervisor should be the primary contact and he/she shall establish appropriate procedures and communicate to their employees, how to handle emergencies minimizing injury and loss of life.
2. Employees shall be made familiar with the spill kit, its location and proper use. (For major spills call the EH&S Office or Public Safety Office on campus during evening hours, weekends and holidays).
3. Employees exposed to FORMALDEHYDE in an emergency where exposure could exceed the STEL, shall be referred to Workforce Health and Safety (WHS) at the Medical Center or a healthcare provider for medical consultation.

G. MEDICAL SURVEILLANCE AND EXAMINATIONS
1. Columbia University maintains formaldehyde medical surveillance program is consistent with the OSHA Standard. For example, surveillance is required when:
   a. Employees are exposed to concentrations at or above the action level (AL) and/or STEL.
   b. Employees develop signs and symptoms of potential exposure.
   c. Employees are exposed to formaldehyde during emergencies.
2. Employees covered under the medical surveillance program shall be required to complete a medical disease questionnaire.
3. Annual medical examinations shall be given to employees required to wear a respirator to reduce formaldehyde exposure.
4. When an employee is removed/transferred or restricted to work due to significant symptoms or medical condition from exposure, the supervisor shall assure that the exposure to formaldehyde at the new location is not at/or above the action level (AL) and/or STEL. Transfers will be consistent with Human Resource Policy and the OSHA Standard.
5. Any employee not working as a result of a medical condition due to formaldehyde exposure must arrange for a follow-up medical examination to take place within six months after removal, to determine if they can return to the original job status, or if the removal is to be permanent.
6. An employee has the right to seek a second medical opinion if the examining physician determining medical removal or restrictions.
7. Employees exposed in an emergency shall be medically evaluated as soon as possible. If there is a life threatening condition as a result of exposure, they are to seek immediate attention in at an appropriate medical facility with follow-up the next business day in OHS or a health provider. An Incident Form should accompany employee.

H. RECORDKEEPING
1. Exposure Measurements
   a. The EH&S Office maintains formaldehyde exposure monitoring records.
b. Records shall include:
   i. Date of measurement.
   ii. Operation being monitored.
   iii. Method of sampling and analysis
   iv. Number, duration, time and results of samples taken.
   v. Type of protective device worn.
   vi. Names, job title, UNI numbers and exposure estimates.

2. Medical Surveillance:
   a. The Workforce Health and Safety (WHS) or another healthcare provider, when used, will maintain medical surveillance records as required under applicable regulations.

3. Respirator Fit-Testing:
   a. EH&S maintains records of training and fit testing for half face or full face respirator.
   b. The record shall include:
      i. A copy of Medical Clearance certificate.
      ii. A copy of the Respirator Fit-Testing performed.
      iii. The date of the most recent fit testing.
      iv. Manufacturer, model, size & type of respirator selected by the employee.
      v. The name, job title and ID number, like UNI, of employee.

4. Training
   a. All training records shall be maintained by EH&S through the Rascal system.

5. Retention of Records:
   a. The records shall be retained for at least the following periods:
      i. Exposure records and determinations shall be kept for at least 30 years.
      ii. Medical records shall be kept for the duration of employment plus 30 years
      iii. Respirator fit testing records shall be kept until replaced by a more recent record.

6. Availability of Records:
   a. Upon written request, exposure monitoring or medical records shall be made available for examination and or copying to the subject employee or former employee or their representative.

I. APPENDICES  N/A

J. FORMS  N/A

K. REFERENCES
   2. Policy for Personal protective Equipment in Research Laboratories (http://ehs.columbia.edu/PPEPolicy2.pdf)