DATE: September 18, 2015
TO: Center Directives Manager
Langley Research Center

FROM: Grant M. Watson
Director, SMAO

SUBJECT: Memo Authorizing Continued Use of Expired Langley Directive
LPR 1710.17, Respiratory Protection Program
Expiration date: July 6, 2015

REF A: NASA Requirement Waiver for NPR 1400.1 (3.5.2.6), NRW 1400-37

In accordance with reference A, I authorize the continued use of the expired subject directive.

LPR 1710.17, Respiratory Protection Program
The subject directive has been reviewed prior to the expiration date and a summary of the required changes is: The document is currently being updated to comply with NASA requirements which require major revisions.
The directive was also assessed for the risk of continued use after expiration versus the risk of not having the directive available after expiration. The results of that risk assessment are: This LPR is part of the Langley Management system and it provides both general and specific requirements for protective measures to be taken for employees who may be exposed to toxic air contaminants and oxygen-deficient atmospheres.
Justification for the delay is: Due to the loss of time during several Center closures caused by inclement weather, these revisions took longer to complete than initially expected. There would be high risk to the efficient and effective implementation of the LaRC Safety Program if this requirements document is not available in the LMS. There would be high risk to the efficient and effective implementation of the LaRC Safety Program if this requirements document is not available in the LMS.
The updated directive was submitted for Center wide review on May 15, 2015, and is currently ready for disposition.

Please refer any questions or concerns regarding the continued use of this directive to Grant M. Watson, Director

Grant M. Watson, Director, SMAO 9/21/15 (Date)

304/LJNorthern:ljn 9/18/15 (44569)

Langley Research Center

LPR 1710.17A

Effective Date: July 6, 2010

Expiration Date: July 6, 2015

RESPIRATORY PROTECTION PROGRAM

National Aeronautics and Space Administration

Responsible Office: Safety and Mission Assurance Office

PREFACE

P.1 PURPOSE

a. This NASA Langley Procedural Requirements (LPR) contains the requirements for the implementation of the Langley Research Center (LaRC) Respiratory Protection Program. It provides both general and specific requirements for protective measures to be taken for employees who may be exposed to toxic air contaminants and oxygen deficient atmospheres. This LPR does not in any way relieve various NASA organizations and their associated contractors of responsibility for the protection of personnel under their cognizance.

b. The requirements presented in this LPR implement Federal Occupational Safety and Health Administration (OSHA) regulations and NASA management policy for industrial hygiene programs. NASA, contractor management and operations organizations will supplement the provisions of this procedural requirement by implementation of internal policies and instructions, as needed.

P.2 APPLICABILITY

a. This LPR is applicable to all NASA Langley Research Center employees, both contractors and civil servants.

b. Noncompliance with the requirement of this LPR may result in appropriate disciplinary action against civil service employees or sanctions against contractors in accordance with the terms of their contracts.

c. Contracting companies shall have a respiratory protection plan equivalent to this LPR and 29 CFR 1910.134.

d. All mandatory requirements for compliance with the OSHA Respiratory Protection Standard are not repeated in this LPR, but may be found in 29 CFR 1910.134.

P.3 AUTHORITY

a. Title 29, Code of Federal Regulations (CFR), Part 1960
b. 12196, Occupational Safety and Health Programs for Federal Employees
c. NPD 1820.1, “NASA Environmental Health Program”
d. NPR 1800.1, "NASA Occupational Health Program Procedures"
e. NPR 8715.1, “NASA Occupational Safety and Health Programs”
f. NPR 8715.3, "NASA Safety Manual"

P.4 APPLICABLE DOCUMENTS

a. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Regulation 29 CFR 1910, "Standards for General Industry"
b. Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Regulation 29 CFR 1926, "Safety and Health Regulations for Construction"
c. Langley Policy Directive (LAPD) 1700.2, “Safety Assignments”
d. Langley Procedural Requirement (LPR) 1740.6, “Personnel Safety Certification”
e. LMS-CP-7151, “Obtaining Waivers for Langley Management System (LMS) Requirements”
f. Langley Form 65, “Worker Certification Card”
g. Langley Form 66, “Worker Appointment and Certification Form”
h. Langley Form 73, "Self-Contained Breathing Apparatus (SCBA) Inspection & Maintenance Report (Weekly/Monthly Log on Back)"
i. Langley Form 433, “NASA LaRC Safety Assessment”

P.5 MEASUREMENT/VERIFICATION

None

P.6 CANCELLATION

LPR 1710.17 supersedes Chapter 2 of LPR 1710.4.

Original signed on file

Stephen G. Jurczyk
Deputy Director

DISTRIBUTION:
Approved for public release via the Langley Management System; distribution is unlimited.

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Chapter 1

1 RESPONSIBILITIES

1.1 Organizational Unit Manager

1.1.1 Organizational Unit Manager and heads of contractor organizations to the extent provided by their contracts shall:

a. Provide operational implementation of the requirements of this LPR.
b. Ensure personnel:
   (1) Are notified of hazards and protective measures governing work in hazardous atmospheres.
   (2) Are provided appropriate training and orientation to identify hazards associated with airborne agents or oxygen deficient atmospheres in their work places and to use respiratory protective equipment provided for their safety.
   (3) Are notified of any changes or modifications to systems used to control exposure to these conditions.
c. Implement and maintain control measures required for preventing or otherwise reducing employee potential exposure to hazardous atmospheres.
d. Ensure assessment plans, processes, and operations are reviewed for elimination or control of air contaminant hazards.

1.2 LaRC Center Medical Officer (CMO), Occupational Health Clinic

1.2.1 The LaRC Center Medical Officer (CMO), Occupational Health Clinic, or is/her designated representative, shall:

a. Provide medical evaluations to personnel identified by their organizations as respirator users.
b. Provide medical screening and surveillance examinations for those employees who may be occupationally exposed to certain hazardous agents, as required by 29 CFR Part 1910, 29 CFR Part 1926, and/or other applicable NASA requirements.
c. Provide, on a case by case basis, special physical evaluations to personnel identified as being exposed or potentially exposed to hazardous atmospheres as the result of an accident, mishap, or other unusual circumstance.
d. Ensure that physical examination criteria is implemented to conform to the protocols defined by 29 CFR 1910.134 and NPR 1800.1C where required, and other nationally recognized standards as applicable.

e. Maintain records of all occupational medicine activities associated with support to the LaRC Respiratory Protection Program as defined by Federal regulation; e.g., OSHA, NASA Health Standards.
f. Provide employee access to medical records in accordance with 29 CFR 1910.1020 and the Privacy Act of 1974, as amended (5 USC 522.a).

1.3 LaRC Safety Manager

Shall appoint a SFAB Certified Industrial Hygienist as Respiratory Protection Officer, by letter.

1.4 LaRC Respiratory Protection Officer or his/her designated representative,

Implement and administer the LaRC Respiratory Protection Program for NASA LaRC Civil Service personnel.

1.5 Safety and Facility Assurance Branch Industrial Hygienists

a. Provide baseline surveys of operations, tasks, or procedures, which possess the potential to create harmful air contamination.
b. Provide health hazard evaluations (per Chapter 2.3) of operations, tasks, or procedures where baseline surveys have shown the presence of harmful air contaminants at concentrations which may pose a health hazard to personnel.
c. Provide area and/or personal exposure monitoring which represent the exposure of employees where previous surveys have shown the presence of air contaminants at concentrations in excess of the action level.
d. Provide the LaRC Center Medical Officer (CMO), Occupational Health Clinic or his/her designated representative access to exposure monitoring records.
e. Provide to supervisors, site managers, and responsible safety organizations in the affected work area the:
   (1) Results of surveys and recommendations.
   (2) Recommended methods for the control or elimination of hazardous air contaminants.
   (3) Requirements for employees to participate in the LaRC Respiratory Protection Program.
   (4) Recommendations on the selection of respiratory protective equipment.
f. Notify supervisors of exposure monitoring results for affected employees.
g. Review facility plans and operational procedures to assess the adequacy of precautions taken to control workplace air contaminants.
h. Provide technical assistance in the selection and design of engineering controls and work practices used to control or eliminate air contaminants.
i. Perform inspections of breathing air compressors and associated air filtration systems, as necessary.

j. Advise and assist in development of Respiratory Protection Program Training courses.

1.6 Civil Service Line Managers And Contract Employers

1.6.1 Civil Service Line Management and Contract Employers shall:

a. Coordinate with appropriate safety and environmental health personnel to request workplace health hazard assessment of operations with suspected air contaminant generation.
b. Develop written requirements for the use of respiratory protection equipment, as identified in the health hazard evaluation.
c. Ensure proper completion and submittal of LaRC Form 66 annually, Worker Appointment and Certification Form, for Civil Servants (or comparable form for contractors), which is required for the medical evaluation.
d. Ensure that contractor employees who have a medical evaluation by a Physician or Licensed Health Care Professional (PLHCP) outside of the LaRC Occupational Health Clinic have the appropriate documentation on file with their employer that states conformity and compliance with OSHA's medical evaluation guidelines.
e. Ensure that employees seeking certification to use respiratory protective equipment are medically certified to use such equipment and attend Respiratory Protection Program training and respirator fit testing, as required.
f. Verify that employees are issued the correct type and size respirator for which they have been fitted and certified.
g. Ensure the proper use of respiratory protection equipment, engineering controls, and work practices established to reduce workplace exposure to harmful air contaminants.
h. Ensure that employees are not assigned to tasks requiring the use of respirators when they have facial hair, scars, missing dentures, etc., which have the potential for causing leakage in the sealing surface of the respirator.
i. Notify their affected employees of the results of health hazard evaluations and exposure monitoring surveys, as defined in Chapter 2.3 of this LPR.
j. Ensure the proper care and maintenance of respirators issued to their employees.
k. Maintain a current list of employees having respirator use certifications.
l. Review work assignments/work area hazards to determine potential need for use of respiratory protection equipment.
m. When respiratory protection equipment must be worn for protection from hazardous materials, review Material Safety Data Sheets for those materials with the affected employees.
n. Assist in the development of strategies to control or eliminate exposure to hazardous air contaminants.

1.7 Facility Safety Heads

1.7.1 Facility Safety Heads shall:

a. Ensure that personnel within their facility, who fall under the parameters outlined in Chapter 2.2, are trained and certified under the requirements of this LPR.
b. Develop and maintain a list of personnel (civil service and contractor) who have been trained and certified as respirator users in accordance with this LPR.

1.8 INDIVIDUAL EMPLOYEES

1.8.1 Individual Employees shall:

a. Use control procedures established to maintain air contaminant control, including wearing and maintaining respiratory protective devices, as instructed.
b. Cooperate with supervisory, medical, environmental health and safety personnel in activities to evaluate and control air contaminant hazards.
c. Notify supervisors of areas, operations, or equipment that may be a source of air contaminants.
d. Report any suspected exposures to their supervisors.
e. Civil Service employees requiring a respirator certification physical will complete a Langley Form 66, Worker Appointment and Certification Form, and submit to Occupational Health Clinic for evaluation.
f. Notify supervisors and Occupational Health Clinic when there are changes in an employee's health status that may affect their ability to safely use respiratory protection.

1.9 WAIVERS

1.9.1 Request for waivers to any of the requirements in this LPR shall be submitted to SFAB in writing and processed in accordance with LMS-CP-7151, "Obtaining Waivers for Langley Management System (LMS) Requirements."

Chapter 2

2 RESPIRATORY PROTECTION

2.1 Purpose

This chapter provides instruction governing the issuance, maintenance and use of respiratory protection devices on LaRC for civil service and contractor employees.

2.2 General Requirements For Respirators

a. Use of respiratory protection devices shall be required whenever:
   (1) Personnel are required to work in hazardous atmospheres where the action level of the hazardous air contaminant is exceeded or oxygen deficient atmospheres are present.
   (2) Personnel are involved in the handling, transfer, or use of hazardous materials where the toxicity of the contaminant is of such a nature as to place those personnel at significant risk of serious illness or injury in the event of a leak, spill, or other release of the material.
   (3) Personnel are required to enter atmospheres which have unknown concentrations of oxygen and/or air contaminants.
   (4) An industrial hygienist or safety professional determines that personnel exposure(s) could exceed the relevant occupational exposure limit.

b. Only respirators certified by the National Institute for Occupational Safety and Health shall be used on LaRC.

c. The selection of respirators for use on the Center shall be based upon:
   (1) The nature of the hazard(s) associated with the operation or process;
   (2) The nature of the work operation or process;
   (3) The physical and chemical properties and additive effects of the air contaminant(s); (additional general considerations are sorbent efficiencies, odor warning properties, irritation potential, and lower flammability limit);
   (4) The adverse health effects of the air contaminant(s);
   (5) Warning properties of the hazardous air contaminant(s);
   (6) The relevant occupational exposure limits;
   (7) The measured concentration(s) of hazardous air contaminant(s);
   (8) Worker activities in the area of the operation and the potential stress of work conditions on employees wearing the respirators;
   (9) The period of time respiratory protection will be worn by employees during the work shift;
   (10) The physical characteristics, functional capabilities, and limitations of the respirator; and
   (11) The substance specific OSHA standard.
   (12) Self-Contained Breathing Apparatus (SCBA) and Escape Respirators shall be reviewed by the LaRC Fire Chief before being procured for use on LaRC.

d. Selection of appropriate respiratory protection equipment shall take into account the Assigned Protection Factor (APF) for each type of respirator as listed in the Appendix B and OSHA specific substance standards. When using a combination respirator (e.g., airline respirators with an air-purifying filter), employers shall ensure that the assigned protection factor is appropriate to the mode of operation in which the respirator is being used.

e. Respirator users shall be instructed in the limitations of the respirator and the proper procedures for their use, maintenance and storage.

f. Where practical, respirators shall be issued to individual users for their exclusive use.

g. Line supervision shall have the day-to-day responsibility of insuring respiratory protection devices are replaced when necessary.

h. For selection and use limitations of particulate respirators, consult 42 CFR Part 84.

i. Escape Respirators are required in work areas where:
   (1) A potential exists for the rapid development of an immediately dangerous to life or health (IDLH) atmosphere.
   (2) There is no immediate means for the affected employees to egress the IDLH area to a safe atmosphere.

j. Respirators may be used by employees even though the concentrations of airborne contaminants would not be great enough to otherwise warrant such action. Employees voluntarily using respirators shall follow all requirements as stated in this document.

2.2.1 Maximum Use Concentration (MUC)

a. As required by 29 CFR 1910.134:
   (1) The employer shall select a respirator for employee use that maintains the employee's exposure to the hazardous substance, when measured outside the respirator, at or below the MUC.
   (2) Employers shall not apply MUCs to conditions that are immediately dangerous to life or health (IDLH); instead, they must use respirators listed for IDLH conditions in 29 CFR 1910.134(d)(2)(ii).
   (3) When the calculated MUC exceeds the IDLH level for a hazardous substance, or the performance limits of the cartridge or canister, then employers shall set the maximum MUC at that lower limit.

2.2.2 Health Hazard Evaluation

a. An initial health hazard evaluation, on Langley Form 433, “NASA LaRC Safety Assessment”, of potentially hazardous operations shall be conducted when any information, observation, or calculation shows that an employee may be exposed to oxygen-deficient atmospheres and/or air contaminants above their action levels. This includes, but is not limited to, data from monitoring of similar operations, procedure reviews, potential for skin and eye contact, and employee complaints of unusual odors, irritations, or other signs or symptoms of potential exposures.
   (1) The health hazard evaluation shall evaluate and describe:
      i. The operation, process, and/or equipment generating the air contaminant(s);
      ii. Their approximate concentrations;
      iii. Other operations in the area;
      iv. The number of potentially exposed employees;
      v. The duration and frequency of the exposure;
      vi. Respiratory protection requirements, including applicable respirator filter cartridge change out schedule;
      vii. Associated personal protective equipment; and
      viii. Any regulatory requirements applicable to the operation.

b. Health hazard evaluations shall be repeated whenever any changes to facilities, equipment, work practices, procedures, and/or engineering control measures are made.
c. Employees and/or their representatives shall be provided an opportunity to observe area and personal exposure monitoring.
d. Results of health hazard evaluations shall be posted in the affected employees' work areas or otherwise provided to affected employees for their review.

2.3 Medical And Training Requirements

A list of civil service employees who are authorized to use respirators on LaRC shall be maintained by SFAB. Contractor employees who are authorized to use respirators shall be listed on a contractor company authorization list.

2.3.1 Medical Surveillance

a. A medical evaluation is required for every employee who is authorized to use respiratory protective equipment.
b. Specific requirements for medical evaluation are defined in 29 CFR 1910.134, Appendix C, or as otherwise directed by the LaRC Center Medical Officer (CMO), Occupational Health Clinic.
c. LaRC Center Medical Officer (CMO) may accept an already existing medical examination or written opinion from a licensed physician stating whether the

employee has any detected medical condition which would place the employee's health at increased risk from respirator use and any recommended limitations on the use of respirators.

d. LaRC Center Medical Officer (CMO) shall notify the SFAB if the patient is approved or disapproved for respirator use

e. Contractors programs shall have an equivalent medical surveillance program in place.

2.3.2 Changes in Medical Status

a. If the employee's medical status changes or if the employee fails to report for the examination:
   (1) LaRC CMO shall shall notify the SFAB, in writing, per LF 66.
   (2) If an individual is no longer authorized to use a respirator, the SFAB shall immediately notify the employee's supervisor and the FSH.
   (3) The FSH shall provide the SFAB with written notification of the individual's change in duty status.
   (4) The SFAB shall provide the Occupational Health Clinic or equivalent contractor company organization a copy of the individual's change in duty status in writing and the individual shall be removed from medical surveillance.

a. Contractor programs shall notify the FSH of an employee's change in medical status or removal from the contractor respiratory protection program

2.3.3 Employee Training

2.3.3.1 SFAB shall provide to the user the basic safety respirator training or ensure that a similar training has been received by the user.

2.3.3.2 SFAB shall provide a written copy of the attendance list of individuals who received safety respirator training to the Occupational Health Clinic or equivalent contractor company organization

2.3.4 Respirator Fit Testing

a. Qualitative and quantitative fit tests shall be performed only by qualified individuals specifically trained and assigned responsibility for providing respirator fit tests in accordance with 29 CFR 1910.134.

b. Fit-test results shall be related to assigned protection factors as follows:
   (1) Half-mask, air-purifying respirators may be worn in atmospheres no greater than 10 times the established exposure limit, when the respirator user passes the qualitative fit test; or when the respirator user passes a quantitative fit test with a minimum fit factor of greater than 100.

(2) Full-facepiece, air-purifying respirators may be worn in atmospheres no greater than 50 times the established exposure limit when the respirator user passes a quantitative fit test with a minimum fit factor greater than 500.
(3) Powered air-purifying respirators and supplied-air respirators with tight-fitting facepieces require fit testing. They may be used in atmospheres no greater than allowed by the assigned protection factor for that respirator listed in the Appendix B, Table 1.

2.4 Certification

All personnel authorized to wear respiratory protection devices, with the exception of voluntary use of disposable single use filtering face pieces, shall be certified as Respirator Users.

2.4.1 Worker Appointment and Certification Forms

a. Civil Servants shall apply to be Respirator Users by completing and submitting a NASA Langley Form 66, “Worker Appointment and Certification Form.” Contactors applying to be Respirator Users shall complete and submit an appropriate comparable form provided by their company. The contractor’s form shall provide for equivalent information as required by NASA Langley Form 66 and it shall contain an approval process.

b. Upon completion of fit testing and verification of employees' medical certifications, each civil service employee shall be issued a NASA Langley Form 65, "Worker Certification Card," by the SFAB designated IH. Contractors shall be issued an equivalent certification card by their contracting company. The Form 65 shall identify the employee, and the manufacturer(s), model(s), size(s), of Respirator and a card expiration date.

2.5 Respirator Care And Maintenance

Cleaning and maintenance of respirators shall be in accordance with 29 CFR 1910.134, Appendix B-2.

2.6 SCBA/Escape Cylinders Maintenance, Repair And Inspection

SCBA respirators shall be inspected weekly and sanitized monthly or after each use as required by the manufacturer's recommendation and ANSI Z88.2 and Z88.5. Additionally, the air cylinder shall be hydrostatically tested every 5 years. Check-sheets documenting the inspections shall be maintained at the facility using Langley Form 73, " Self-contained Breathing Apparatus (SCBA) Inspection & Maintenance Report (Weekly/Monthly Log on Back)."

2.6.1 Recharging Cylinders

a. The LaRC Safety Manager/Contract Manager shall have responsibility to ensure that compressed air cylinders of SCBA respirators are recharged upon request.
b. A permanent record of the cylinder recharging shall be maintained.
c. Air, which is supplied to compressed air cylinders, shall meet the requirements of the specification for Grade D breathing air as described in ANSI Z86.1

2.6.2 Repair toSCBA/Escape Respirators

a. The LaRC Safety Manager/Contract Manager shall ensure that a repair capability to the extent recommended by respirator manufacturers, is available for these systems.
b. All repairs shall be authorized and shall be performed by personnel trained by the manufacturer of the equipment.
c. A detailed record of all repairs conducted on these systems shall be maintained.

2.6.3 Maintenance

a. When a Government-issued respirator has less than a full air cylinder, the unit shall be returned to the LaRC Fire Station, Building 1248, to be recharged. The tank shall be charged until the gauge on the bottle reads - FULL.
b. If defects are found during an inspection, they shall be brought to the attention of the supervisor and the FSH. The defective SCBA shall be marked **"Danger - Defective Air Pack - Do Not Use"** and returned to the LaRC Fire Station for immediate repair.
c. Adjustments to SCBA equipment shall only be performed by certified personnel.
d. Contractor companies shall have an equivalent maintenance process in place.

NOTE: Grade D breathing air supplied for SCBA equipment, as well as to facilities requiring breathing grade air is done so through the Building 1248, Fire Station, compressor. This breathing air shall be tested quarterly to meet the requirements of the specification for Grade D breathing air as described in ANSI Z86.1. The quarterly testing shall be performed by the SFAB Industrial Hygienist.

2.6.4 Program Evaluation

a. LaRC Safety Manager, or designee, will conduct periodic evaluations, not to exceed 3 years, of the workplace to ensure that the requirements of this LPR are being implemented (required by 29 CFR 1910.134(c)(1)(ix)).
b. Evaluations will include consultations with employees who use respirators and their supervisors, site inspections, air monitoring and a review of records.
c. Problems identified will be addressed by the LaRC Safety Manager, or designee. Any findings will be reported to the Executive Safety Council, and the

report will list plans to correct deficiencies in the respirator protection program and target dates for the implementation of those corrections.

2.6.5 Records

a. Access to employee exposure and medical records shall be in accordance with 29 CFR 1910.1020 and the Privacy Act of 1974, as amended (5 USC 522.a).
b. Employee exposure and medical records shall be maintained in accordance with the requirements of 29 CFR 1910.1020.
c. Copies of this LPR, 29 CFR 1910.134 (OSHA Respiratory Protection Standard), other applicable OSHA regulations, and any appropriate records required by this LPR shall be provided, upon request, to employees, former employees, representatives of employees, representatives of the U.S. Department of Labor, and NASA Headquarters personnel.
d. Copies of this LPR and other current NASA reference documents are available electronically at the Langley Management System website.
e. Occupational Health Clinic shall maintain all documentation concerning the examination process.
f. Contractor companies shall conduct a medical review of each proposed contractor respirator user and the results of the medical reviews shall be reported to the Contract Manager or his/her designee.
g. Contractor company shall maintain all documentation concerning the examination process.

APPENDIX A - DEFINITIONS

Action Level: A measured airborne concentration of an air contaminant that is equal to one-half the occupational exposure limit for the contaminant, or other concentration where specified by OSHA substance-specific standard.

Assigned Protection Factor: The workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by this section.

Demand: A mode of operation for supplied air respirators in which air flows into the respirator only when inspiration creates a lower pressure within the facepiece than the ambient atmospheric pressure.

Filtering Facepiece: A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Maximum Use Concentration (MUC): The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator. This is determined by the assigned protection factor of the respirator or class of respirators and the exposure limit of the hazardous substance. The MUC can be determined mathematically by multiplying the assigned protection factor specified for a respirator by the required OSHA permissible exposure limit, short-term exposure limit, or ceiling limit. When no OSHA exposure limit is available for a hazardous substance, an employer must determine an MUC on the basis of relevant available information and informed professional judgment.

Occupational Exposure Limit: The more stringent of:

a. The permissible exposure level (PEL) for the hazardous chemical as listed in 29 CFR Part 1910, Subpart Z; or

b. The Threshold Limit Value (TLV) for the hazardous chemical assigned by the American Conference of Governmental Industrial Hygienists in the latest edition of “Threshold Limit Values for Chemical Substances and Physical Agents in the Work Environment”; or

c. Where there is no PEL, TLV, or NASA standard for the chemical, an exposure level based on available published scientific information such as Material Safety Data Sheets.

Respirator: Any device worn by an individual that is intended to provide the wearer with respiratory protection against inhalation of airborne contaminants or oxygen deficient atmospheres.

Immediately Dangerous to Life or Health (IDLH): An atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

APPENDIX B – ASSIGNED PROTECTION FACTORS

Assigned Protection Factors (APF)[9]					
Type of respirator [1,2]	Quarter Mask	Half Mask	Full Facepiece[5]	Helmet/ Hood	Loose-Fitting Facepiece
Air-Purifying Respirator[3]	5	10[4]	50	–	–
Powered Air-Purifying Respirator (PAPR)	–	50	1,000	25/1,000[4]	25
Supplied-Air Respirator (SAR) or Airline Respirator[6,7]					
Demand Mode	–	10	50	–	–
Continuous Flow Mode	–	50	1,000	25/1,000[8]	25
Pressure-Demand or Other Positive-Pressure Mode	–	50	1,000	–	–
Self-Contained Breathing Apparatus (SCBA)					
Demand Mode	–	10	50	50	–
Pressure-Demand or Other Positive-Pressure Mode (e.g., open/closed circuit)	–	–	10,000	10,000	–

Notes:

1. Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.
2. The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program including training, fit testing, maintenance, and use requirements.
3. Air-purifying respirators may not be used in oxygen deficient atmospheres.
4. This APF category includes filtering facepieces, and half masks with elastomeric facepieces.
5. Only full-facepiece respirators are to be used in contaminant concentrations that produce eye irritation.
6. Any supplied-air respirator may be used in an oxygen deficient atmosphere where the oxygen content is above the oxygen deficient IDLH limits.
7. Only a full facepiece pressure demand SCBA or combination full facepiece pressure demand SAR with auxiliary self-contained air supply may be used in unknown IDLH or oxygen deficient IDLH atmospheres.

8. The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a Workplace Factor or Simulated Workplace Factor study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.
9. These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 Subpart Z, employers shall refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134.