Lower Duwamish Waterway Group

City of Seattle/King County/The Boeing Company

PRE-DESIGN INVESTIGATION

QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 2 FOR THE LOWER DUWAMISH WATERWAY MIDDLE REACH – PHASE II SAMPLING FOR THE INLET AT RM 2.2W: ATTACHMENT D – HEALTH AND SAFETY PLAN ADDENDUM

FINAL

For submittal to

U.S. Environmental Protection Agency
Seattle, WA

June 21, 2024

Prepared by

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FINAL

Certification Page

Remedial Design of Middle Reach
Pre-Design Investigation Quality Assurance Project Plan
Addendum No. 2 Attachment D:
Health and Safety Plan Addendum

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Date: 6/17/2024

The information in this Health and Safety Plan has been designed for the Scope of Work presently contemplated by Anchor QEA, Inc. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Anchor QEA. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Anchor QEA only intends this plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

Health and Safety Plan Acknowledgement Form

Project Number: 210075-01.03

Project Name: Lower Duwamish Waterway Middle Reach Remedial Design

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HSP). For non-Anchor QEA employees, this HSP may include company-specific appendices to this plan developed by entities other than Anchor QEA. Non-affiliated personnel may be required to sign the Liability Waiver following this Acknowledgement Form.

Date	Name (print)	Signature	Company

Date	Name (print)	Signature	Company

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TABLES

EXHIBITS

ABBREVIATIONS

AG	acid gas
APR	air-purifying respirator
ASTM	American Society for Testing and Materials International
CHSM	Corporate Health and Safety Manager
COC	chemical of concern
dB	decibel
DOHS	Director of Health and Safety
dw	dry weight
EPA	U.S. Environmental Protection Agency
HSP	Health and Safety Plan
LDW	Lower Duwamish Waterway
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OV	organic vapor
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PDI	Pre-Design Investigation
PFD	personal flotation device
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
QAPP	quality assurance project plan
RM	river mile
RPP	Respiratory Protection Program
TEQ	toxicity equivalent
TWA	time-weighted average
USCG	U.S. Coast Guard
VOC	volatile organic compound

1 Introduction

This Pre-Design Investigation (PDI) Health and Safety Plan Addendum (referred to herein as the PDI HSP Addendum) for the Lower Duwamish Waterway (LDW) middle reach has been developed to guide Anchor QEA worker safety when investigating lead-, mercury-, polychlorinated biphenyl (PCB)-, volatile organic compound (VOC)-, and dioxin/furan-contaminated sediment within the inner portion of the Inlet at River Mile (RM) 2.2W.[1] Subconsultants and subcontractors are responsible for the safety of their workers and are required to maintain their own HSPs. Subconsultant and subcontractor HSPs must be at least as restrictive as this PDI HSP Addendum, and subconsultants and subcontractors must ensure their plans cover the safety precautions necessary for the work they are performing. This document supplements the LDW middle reach PDI HSP (Appendix A of the PDI quality assurance project plan [QAPP] (Windward and Anchor QEA 2022)), referred to herein as the PDI HSP. The PDI HSP should be referenced for all elements not addressed herein.

This PDI HSP Addendum includes the following sections:

- Section 2 describes sediment conditions within the inner portion of the Inlet at RM 2.2W and thresholds for upgrading personal protective equipment (PPE).
- Section 3 describes protocols for respiratory protection and relevant PPE upgrades.
- Section 4 describes air monitoring requirements for the work.
- Section 5 describes the medical monitoring program that applies for field staff working on sampling collection and processing for samples collected within the inner portion of Inlet at RM 2.2W.

[1] Specific samples to which this PDI HSP Addendum apply include those from locations 1596 through 1610.

2 Project-Specific Requirements

This section provides updates to activity-specific levels of protection and air monitoring requirements to be used during sampling activities related to the inner portion of the Inlet at RM 2.2W. These levels of protection and requirements are based on chemistry data presented in QAPP Addendum No. 2 and focus on middle reach chemicals of concern (COCs) presented in Section 4.3.2 of the PDI HSP. Sediments within the inner portion of the Inlet at RM 2.2W include elevated concentrations of lead, mercury, PCB, and dioxin/furan. Table 2-1 presents the maximum concentrations found in the inner portion of the Inlet at RM 2.2W during previous investigations.

Table 2-1
Maximum Concentrations in Existing Data

Chemical	Concentrations
Lead	33,700 mg/kg dw
Mercury	93.8 mg/kg dw
Total PCBs	1,768,000 ug/kg dw
Dioxin/furan TEQ	396 ng/kg TEQ (limited data)

Notes:
dw: dry weight
TEQ: toxicity equivalent

In addition to the COCs listed in Table 2-1, mobile LNAPL (light non-aqueous phase liquid) was detected in one monitoring well located immediately adjacent to the embayment (DOF 2023). Due to the close proximity of this location to the investigation area, VOCs have been considered in the updated levels of protection and air monitoring requirements.

2.1 Activity-specific Level of Protection Requirements

Refer to Section 7 of the PDI HSP for general PPE requirements. Section 2.2 describes the specific air monitoring requirements for each identified work activity, as well as the contaminant thresholds necessitating an upgrade to Level C PPE while conducting work within the inner portion of the Inlet at RM 2.2W (see Table 2-3). As stated in Section 5 of the PDI HSP, during sampling and sample handing activities, work zones will be established to identify where sample collection and processing are actively occurring. Following the established air monitoring action levels in Table 2-3, updated PPE requirements (as stated in Section 3) shall occur if triggered within the sampling zones. The decontamination and support zones will be determined in the field based on air monitoring results, weather, wind, and level of visual and olfactory contamination observed. See Section 5 of the PDI HSP for additional information regarding work zones.

Hearing protection must be worn when loud noises are occurring (i.e., greater than 85 decibels [dB]). Site personnel must maintain proficiency in the use and care of PPE to be worn. Table 2-2 describes the specific means of protection to be worn when Level C PPE is required.

Table 2-2
Project Job Tasks and Required PPE

Job Tasks	Required	PPE Requirements
Sediment core collection and processing	☒	Standard work uniform/coveralls
	☒	Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
	☒	High-visibility traffic safety vest
	☐	Chemical-resistant clothing (check appropriate garments): ☐ One-piece coverall ☐ Hooded one- or two-piece chemical splash suit ☐ Disposable chemical coveralls ☐ Chemical-resistant hood and apron ☐ Bib-style overalls and jacket with hood **Fabric Type**: Tyvek® NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek® if sediments are not obviously contaminated with PAHs or related petroleum products. Rain slickers cannot be effectively decontaminated because of tar/petroleum contamination.
	☐	Disposable inner gloves (latex or equivalent "surgical")
	☒	Disposable chemical-resistant outer gloves **Material Type**: Nitrile
	☐	Chemical-resistant boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots **Material Type**: Rubber or leather
	☐	Puncture-resistant shanks in safety shoes conforming to ASTM F2412-05/ASTM F2413-05
	☐	Metatarsal guards conforming to ASTM F2412-05/ASTM F2413-05
	☐	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	☐	Splash-proof safety goggles
	☒	Safety glasses
	☒	Hard hat (sediment core collection only)
	☐	Hard hat with face shield
	☒	Hearing protectors (**REQUIRED** if site noise levels are greater than 85 dB based on an 8-hour TWA). **Type**: Expanding foam
	☐	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)

Job Tasks	Required	PPE Requirements
	☐	Long cotton underwear
	☒	High-visibility, USCG-approved PFD (if working on any water vessel or without fall protection within 10 feet of water)
	☐	USCG-approved float coat and bib-overalls (e.g., full two-piece Mustang Survival® suit or similar) or one-piece survival suit if combined air and water temperature is less than 90°F
	☐	Half-face APR (OSHA/NIOSH approved)
	☒	Full-face Honeywell© North APR (OSHA/NIOSH-approved) if air monitoring action levels require its use
	☒	**Type of Cartridges to be Used**: ☒ **North 75852P100L or** ☐ **OV/HEPA (if samples are dry)**

Notes:
APR: air-purifying respirator
ASTM: American Society for Testing and Materials International
dB: decibel
OSHA: Occupational Safety and Health Administration
NIOSH: National Institute for Occupational Safety and Health
PAH: polycyclic aromatic hydrocarbon
PFD: personal flotation device
PPE: personal protective equipment
TWA: time-weighted average
USCG: U.S. Coast Guard

2.2 Project Air Monitoring Requirements

Previously, no air monitoring was required at the project site. However, new air monitoring requirements for dust, mercury, and VOCs will be implemented for the inner portion of the Inlet at RM 2.2W as follows:

- Dust monitoring will be conducted during collection and processing activities when dusty conditions are encountered in areas containing dry, potentially contaminated media, and/or when dry, potentially contaminated media are disturbed.
- Air monitoring for mercury will be conducted during collection and processing activities in areas where contaminated media are present and when any metallic media are observed.
- VOC monitoring will be conducted during collection and processing activities in areas where contaminated media are present and where odor or sheen is present.

Monitoring will take place in employee breathing zones and general areas. The breathing zone is the area within a 10-inch radius of a worker's nose and mouth. Upgrade from Level D and/or Modified Level D to Level C PPE will occur if the results of air monitoring reveal that breathing zone action levels have been exceeded. Use of Level C by Anchor QEA staff requires participation in Anchor QEA's Respiratory Protection Program (RPP) (Exhibit A). As stated in Section 2.1, subconsultants and subcontractors are responsible for the safety of their workers and are required to maintain their own HSPs.

Table 2-3 describes the specific air monitoring required for each identified work activity.

Table 2-3
Project Air Monitoring Requirements

Instrument*	Job Tasks/Functions	Measurement	Monitoring Schedule[1]	Actions
Dust monitor (measures respirable fraction)	Conduct monitoring when dusty conditions are encountered in areas that contain dry, potentially contaminated media and/or when dry, potentially contaminated media are disturbed. Monitor air in employee breathing zones and general areas. Determine if potentially contaminated materials are migrating off site. Dust concentration action levels are based on downwind minus upwind measurements.	<0.1 mg/m^3 sustained above background in breathing zone	Initially and every 15 minutes while conditions persist	Acceptable; continue work.
		≥0.1 mg/m^3, <1.0 mg/m^3 sustained above background in breathing zone	Continuously	Initiate wetting work area to control dust.
		≥1.0 mg/m^3, ≤5.0 mg/m^3 sustained above background in breathing zone	Continuously	Upgrade to Level C protection, including Honeywell© North full-face respirators with North 75852P100L cartridges or evacuate the work area.[2]
		≥5 mg/m^3 sustained above background in breathing zone	Continuous for 1 minute	Stop work required. Leave work area and contact PM and DOHS for guidance.[3]
Jerome® J405 (measures mercury vapor)	Conduct air monitoring for mercury during activities at locations where contaminated media are present. Make sure that a background reading is taken before the start of activities and periodically thereafter. Continuous monitoring shall occur when any metallic media are observed.	< 0.03 mg/m^3	Initially and when silvery/metallic media are present	Acceptable, continue work.
		>0.03 to ≤0.5 mg/m^3	Continuously	Upgrade to Level C protection, including Honeywell© North full-face respirators with North 75852P100L cartridges or evacuate the work area.[2]
		> 0.5 mg/m^3		Stop work required. Leave work area and contact PM and DOHS for guidance. [3]

Instrument*	Job Tasks/Functions	Measurement	Monitoring Schedule[1]	Actions
PID (11.7*eV lamp) – measures total OVs	Conduct air monitoring for VOCs during activities where contaminated media are present and where odor or sheen is present. Make sure that a background reading is taken before the start of activities and periodically thereafter.	0 to >5 ppm above background in the breathing zone	Initially and every 15 minutes while conditions persist	Acceptable; continue work.
		>5 ppm above background	Continuously (reading for >10 minutes)	Upgrade to Level C protection including full-face respirators with OV, AG, P100 cartridges, or evacuate the work area.
		≥10 ppm in breathing zone	Continuously (reading obtained for any length of time)	Upgrade to Level C protection including full-face respirators with OV, AG, P100 cartridges, or evacuate the work area
		≥25 ppm in the breathing zone		Stop work required. Leave work area and contact PM and DOHS for guidance.[3]

Notes:
*Instruments must be calibrated according to manufacturers' recommendations.

1. Monitoring frequency is from the beginning of each task and at specified intervals thereafter, or when detectable sediment contamination is encountered (as indicated by strong, sustained odor, visual evidence of product, or mercury-discolored sediment).
2. Work must be conducted in accordance with Anchor QEA's RPP. Contact the CHSM for respiratory protection fit testing and air-purifying cartridge change-out requirements.
3. Contact with DOHS and PM must be made prior to continuance of work. A hazard review must be conducted before proceeding with work. Corrective actions may include temporary work stoppage to allow vapors to dissipate and then returning to work if air monitoring data permit. Personnel are to evacuate the work area immediately if they detect any breakthrough (i.e., chemical odors) within the respirator, or if they experience any symptoms of potential exposure, including eye, nose, or throat irritation; headaches, dizziness, light-headedness, drowsiness, or loss of coordination; nausea; etc.

AG: acid gas
CHSM: Corporate Health and Safety Manager
DOHS: Director of Health and Safety
OV: organic vapor
PID: photoionization detector
PM: Project Manager
ppm: parts per million
RPP: Respiratory Protection Program

2.3 Respiratory Protection Training

Anchor QEA employees who use respiratory protection must be trained in accordance with Anchor QEA's RPP, as required by 29 Code of Federal Regulations 1910.134. This training includes the following:

- Medical evaluations of employees required to use respirators
- Fit testing procedures for tight-fitting respirators
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance

See Section 3.1 for additional information.

3 Updated PPE Requirements

3.1 Respiratory Protection Requirements

Respiratory protection devices may be used for protection against particulates and organic vapors (OVs) during the course of an Anchor QEA field project. The need for respiratory protection will be determined by air monitoring results and site conditions, as well as in accordance with Anchor QEA's RPP (contact the Director of Health and Safety [DOHS] with questions). However, engineering and administrative controls must first be evaluated, as they are the primary controls for protection against site respiratory hazards. In the event that engineering and administrative controls are deemed unfeasible, respiratory protection will be required.

The remainder of this section is provided as general reference and summarizes salient points from Anchor QEA's RPP. All respiratory protection will take place in accordance with Anchor QEA's RPP.

3.1.1 Level C Protection Requirements

An upgrade to Level C protection occurs when the results of air monitoring reveal that action levels have been exceeded.

Level C protection, in addition to Level D protection, involves the use of full-face and/or half-face air-purifying respirators (APRs) equipped with cartridges of appropriate type for the airborne hazards and National Institute for Occupational Safety and Health (NIOSH) approved.

Level C protection shall be used in the following situations:

- When there is a recognized need for protection against particulates, OVs, or other airborne contaminants during the course of the project
- During activities where product odors or exposure symptoms are noted

If, during the use of respiratory protection, any unusual odors or other evidence of elevated concentrations of chemicals in the workers' breathing zone is noted, the work shall be stopped, workers shall exit the work area, and the Project Manager (PM) and Corporate Health and Safety Manager (CHSM) shall be contacted for instructions.

3.1.2 Cartridge Change-Out Schedule

Cartridge change-out schedule data are subject to updates by manufacturers at any time. The data provided in this section must be verified prior to HSP finalization on a project-specific basis.

Field personnel must understand the limitations of APRs and the end-of-service life cartridge change-out schedule for the particular type of respirator that will be used. Any questions regarding the site-specific RPP must be directed to the Field Lead and PM.

All cartridges will be changed a minimum of once daily, not to exceed 8 hours, or more frequently if personnel begin to experience increased inhalation resistance. Cartridges will be discarded at the end of each day of use regardless of the length of time used. They are to be disposed of as contaminated PPE. Cartridges will be changed immediately if breakthrough, a chemical warning property (e.g., eye, nose, or throat irritation or odor), or cartridge end-of-life indicator activation occurs. If any of these situations occur, work is to be stopped and the DOHS contacted. All cartridges will be disposed of as potentially contaminated media at the end of each workday or cartridge end-of-life, whichever occurs first.

3.1.3 Level B and A Protection Requirements

An upgrade to Level B or Level A protection occurs when the results of air monitoring reveal that action levels have been exceeded. Anchor QEA employees are not permitted to work in atmospheres requiring Level B or Level A respiratory protection.

3.1.4 Respirator Fit Testing

All Anchor QEA personnel who may be required to wear a negative-pressure APR in the performance of their work duties shall be fit-tested on an annual basis. Employees who wear a respirator for more than 30 days per year shall be enrolled in a medical monitoring program as detailed in Section 5.

Employees shall have the opportunity to handle the respirators and wear them in normal air for a familiarity period prior to fit-testing. On each occasion that employees don a respirator for work purposes, they shall test the piece-to-face seal by use of the following positive and negative pressure tests:

- ***Positive Pressure Test:*** With the exhaust port(s) blocked, the positive pressure of slight exhalation should remain consistent for several seconds.
- ***Negative Pressure Test:*** With the intake port(s) blocked, the negative pressure of slight inhalation should remain constant for several seconds.

APRs shall not be worn when conditions prevent a seal of the respirator to the wearer. Such conditions may be the growth of a beard, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. No employee may wear a beard if it interferes with the fit of the respirator. Also, the absence of one or both dentures can seriously affect the fit of a face-piece, and should be worn at all times that respirators are being used.

3.1.5 Respirator Cleaning, Maintenance, and Inspection

All respirators used on site shall be cleaned and maintained in the following manner:

- Remove filters and cartridges.
- Visually inspect face piece and parts and discard faulty items.
- Remove all elastic headbands.
- Remove exhalation cover and inhalation valves.
- Wash, sanitize, and rinse face piece. Wash any parts that were removed separately.
- Dry the mask. Wipe face pieces and valves.
- Disassemble and clean the exhalation valve.
- Visually inspect face piece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator.
- Replace any questionable or faulty parts.
- Reassemble mask and visually inspect completed assembly.
- Seal mask in plastic bag.

4 General Air Monitoring Requirements

4.1 General Requirements

In general, air monitoring shall be conducted when the possibility of hazardous atmospheres, chemical volatilization, or contaminated airborne dust exists (e.g., from intrusive activities involving contaminated soils or groundwater, developing new monitoring wells, working with wells containing known COCs, confined space entry, or others).

Air movers or other engineering controls shall be used to exhaust or dilute vapors in the sampling zone prior to the use of respiratory protection devices.

Site-specific air monitoring action levels are provided in Section 2.2.

4.2 Real-time Air Monitoring Equipment

Mercury vapor concentrations shall be monitored in the field with a Jerome® J 405. Mercury vapor measurements are usually taken in the breathing zone.

VOCs shall be monitored in the field with a photoionization detector (PID). VOC measurements are usually taken in the breathing zone.

As applicable, airborne dust/particulate concentrations shall be measured using a real-time aerosol monitor (using a scattered light photometric sensing cell) when there are visible signs of potentially contaminated airborne dust. Both area and personal air monitoring readings are to be taken to characterize site activities.

Air monitoring results shall be documented on the Daily Air Monitoring Record form (Exhibit B) or in the field logbook.

4.3 Equipment Calibration and Maintenance

Calibration and maintenance of air monitoring equipment shall follow manufacturer specifications and must be documented. Recalibration and adjustment of air monitoring equipment shall be completed as site conditions and equipment operation warrant. Record all air monitoring equipment calibration and adjustment information on the Daily Air Monitoring Record form (Exhibit B).

4.4 Air Monitoring Action Levels

Air monitoring action levels have been developed that stipulate the chemical concentrations in the breathing zone that require an upgrade in level of PPE.

Air monitoring action levels are typically set at one-half of the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit, NIOSH Recommended Exposure Limit, or American Conference of Governmental Industrial Hygienists Threshold Limit Values. The rationale for establishing action levels is based on the available data that characterize COCs in site media.

Air monitoring measurements shall generally be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken at levels stated in Table 2-3. Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities.

4.5 Air Monitoring Frequency Guidelines

In general, conduct periodic air monitoring when:

- It is possible that an immediately dangerous to life or health condition or a flammable atmosphere has developed (e.g., confined space entry or intrusive activities).
- There is an indication that exposures may have risen over established action levels, permissible exposure limits, or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with the following situations:
  - Change in site area (e.g., work begins on a different section of the site)
  - Change in on-site activity (e.g., one operation ends and another begins)
  - Change in contaminants (e.g., handling contaminants other than those first identified)
  - Visible signs of particulate exposure from intrusive activities such as drilling, boring, or excavation
  - Perceptible chemical odors or symptoms of exposure
  - Handling leaking drums or containers
  - Working with obvious liquid contamination (e.g., a spill or lagoon)
  - When the possibility of volatilization exists (such as with a new monitoring well or a well containing known COCs).

5 Medical Monitoring Program

This section describes the medical monitoring program that Anchor QEA field personnel must comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

5.1 General Requirements

Anchor QEA employees shall be enrolled in a medical monitoring program in compliance with OSHA standards (29 CFR 1910.120(f)) under the following circumstances:

- If they are involved with any of the following operations:
  - *Cleanup operations* required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the U.S. Environmental Protection Agency's [EPA's] National Priority List [NPL] sites, state priority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained)
  - *Corrective actions* involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 United States Code 6901 et seq)
  - *Voluntary cleanup operations* at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites
  - *Operations involving hazardous wastes* that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR 264 and 40 CFR 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations
  - *Emergency response operations* for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard
- And, if they meet the following criteria:
  - Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year
- In addition, employees are required to be enrolled in the medical monitoring program if they meet any of the following conditions:
  - Wear a respirator for 30 days or more per year
  - Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations

- Are members of a Hazardous Materials (HAZMAT) team

Anchor QEA employees required to be enrolled in a medical monitoring program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by Anchor QEA on the following schedule:

- Prior to assignment
- At least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the PEL or published exposure levels in an emergency
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary

The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

The attending physician shall provide Anchor QEA with a written opinion for each examined employee that contains the following information:

- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardous waste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by Anchor QEA shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical monitoring and other employee-related medical records shall be retained for at least the duration of employment plus 30 years.

5.2 Team Self-Monitoring

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Skin chafing from damp or wet clothing
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE will be modified to address the problem.

6 References

DOF. 2023. Feasibility study report, Industrial Container Services, WA, LLC (former NW Cooperage site). Dalton, Olmsted & Fuglevand, Inc.

Windward, Anchor QEA. 2022. Pre-design investigation quality assurance project plan for the Lower Duwamish Waterway - Middle Reach. Final. Submitted to EPA November 21, 2022. Windward Environmental LLC and Anchor QEA, Seattle, WA.

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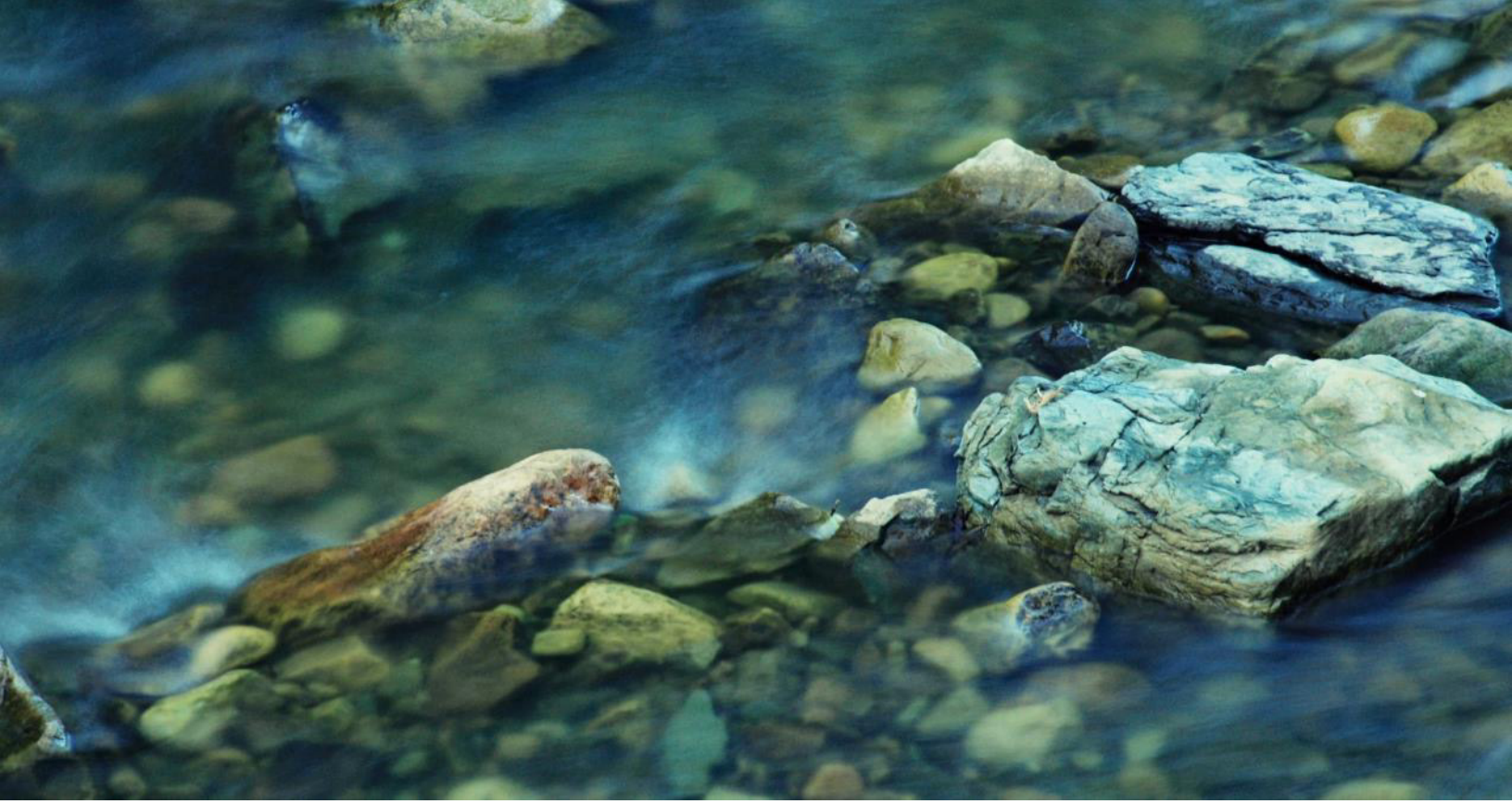
Exhibit A
Anchor QEA Respiratory Protection Program



January 2022

ANCHOR QEA

Respiratory Protection Program
29 CFR 1910.134

PLAYING IT SAFE

Stop Play Record Rewind

January 2022

Respiratory Protection Program
29 CFR 1910.134

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APPENDICES

ABBREVIATIONS

µm	micrometer
ACGIH	American Conference of Governmental Industrial Hygienists
APF	assigned protection factor
APR	air-purifying respirator
ASR	atmosphere-supplying respirator
CFR	Code of Federal Regulations
CL	ceiling limit
CNC	condensation nuclei counter
CNP	controlled negative pressure
COVID-19	Coronavirus Disease 2019
ESLI	end-of-service-life indicator
HASP	Health and Safety Plan
HEPA	high-efficiency particulate air
IAA	isoamyl acetate
IDLH	immediately dangerous to life or health
MUC	maximum use concentration
N/A	not applicable
NIOSH	National Institute for Occupational Safety and Health
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Administration
PAPR	powered air-purifying respirator
PEL	Permissible Exposure Limit
PLHCP	physician or other licensed health care professional
PPE	personal protective equipment
QLFT	qualitative fit test
QNFT	quantitative fit test
RPP	Respiratory Protection Program
RPPC	Respiratory Protection Program Coordinator
SAR	supplied-air respirator
SCBA	self-contained breathing apparatus
STEL	Short-Term Exposure Limit
SWPF	simulated workplace protection factor
USEPA	U.S. Environmental Protection Agency
WPF	workplace protection factor

1 Introduction

This Respiratory Protection Program (RPP) has been prepared as required by Occupational Safety and Health Administration's (OSHA's) 29 Code of Federal Regulations (CFR) 1910.134, "Respiratory Protection."[1] This RPP must be used in conjunction with the site-specific Health and Safety Plan (HASP), as applicable, containing worksite-specific procedures where respiratory protection is used by Anchor QEA, LLC, employees on a required or voluntary basis. This RPP is meant to significantly synchronize with and mutually support site activities conducted by Anchor QEA employees pursuant to 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response." Additionally, 29 CFR 1910.504[2] is used as reference for Voluntary Use of Filtering Facepiece Respirators for Coronavirus Disease 2019 (COVID-19).

Anchor QEA employees are prohibited from entering immediately dangerous to life or health (IDLH) atmospheres or work in areas requiring atmosphere-supplying respiratory protection (i.e., U.S. Environmental Protection Agency [USEPA] Level A or B); therefore, the requirements for use of atmosphere-supplying equipment are not addressed in this program. However, for completeness, and in the event guidance is needed regarding atmosphere-supplying respiratory protection, certain sections of this RPP include pertinent details.

[1] 29 CFR 1910.134 available at: https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.134
[2] 29 CFR 1910.504 available at: https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.504

2 Purpose

This RPP ensures that Anchor QEA employees are trained and equipped for work where respiratory hazards are present in the workplace. Specifically, this program provides information related to:

- The administration of this RPP
- Planning and risk assessment for respiratory hazards
- Procedures for selecting respirators for use in the workplace
- Medical evaluations of employees required to use respirators
- Fit testing procedures for tight-fitting respirators
- Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations
- Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators
- Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations
- Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance
- Procedures for regularly evaluating the effectiveness of the program
- Procedures when an employee chooses to use a respirator when one is not required by Anchor QEA

3 Definitions

The following definitions are important terms for employees to know and/or are used in this RPP. Refer also to the list of acronyms at the beginning of this RPP.

Action level means the airborne contaminant concentration which is one-half of the Permissible Exposure Limit.

Air-purifying respirator (APR) means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Approved respirator means any respirator, identified by manufacturer and model, that has been approved by National Institute for Occupational Safety and Health (NIOSH) 42 CFR 84.

Assigned protection factor (APF) means 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 RPP.

Atmosphere-supplying respirator (ASR) means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or **cartridge** means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Ceiling limit (CL) means an exposure concentration that should not be exceeded at any time.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection (e.g., the sorbent is approaching saturation or is no longer effective).

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or **air-purifying element** means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means 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.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual (see also Qualitative fit test and Quantitative fit test).

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High-efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 μm (micrometers) in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue, or both, inside of buildings or enclosed structures that are involved in a fire situation beyond the incipient stage (see 29 CFR 1910.155).

Loose-fitting facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) means the maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and 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 CL. 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.

Negative-pressure respirator (tight-fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Nuisance level means the level of airborne contaminants below one-half the action level of that contaminant and presents no other health or safety hazard.

Occupational Exposure Limit (OEL) means airborne contaminant concentration value that is used to establish acceptable personnel exposures to contaminants. OSHA publishes the Permissible Exposure Limit, NIOSH publishes the recommended exposure limit, and the American Conference of Governmental Industrial Hygienists (ACGIH) publishes the Threshold Limit Value. All these exposure limits are based on an 8-hour work shift, 40-hour work week, and 40-year work life. The values may vary from contaminant to contaminant as well as between publishing bodies. An Health and Safety representative will determine an appropriate OEL based on the chemicals of concern; however, it is most commonly the most stringent value published.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Permissible Exposure Limit (PEL) means an occupational exposure index promulgated by federal or state OSHA that carries the force of law. This value represents the allowable concentration to which it is believed an employee may be exposed to 8 hours a day, 40 hours a week, for a 40-year working life without experiencing adverse health effects.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services described in the RPP.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure-demand respirator means a positive-pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Recommended Exposure Limit means an occupational exposure index and recommended guideline for employee protection published by NIOSH. This value represents the allowable concentration to which it is believed an employee may be exposed to 10 hours a day, 40 hours a week, for a 40-year working life without experiencing health effects.

Respiratory inlet covering means a portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Respiratory Protection Program Coordinator (RPPC) means a person designated by Anchor QEA to administer and supervise the RPP at a local facility or project location. This person will have the necessary training or credentials to execute this task. Currently, the RPPC is Tim Shaner, located in the Daphne, Alabama, office. He is available at 251-375-5282 or tshaner@anchorqea.com.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Short-Term Exposure Limit (STEL) means the acceptable exposure limit to a toxic or an irritant substance over a short period of time, usually a 15-minute time-weighted average.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Threshold Limit Value means an occupational exposure index, published by ACGIH and recognized as an industry guideline, that represents the concentration to which it is believed that nearly all employees may be exposed to 8 hours a day, 40 hours a week without experiencing adverse health effects.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

4 Respiratory Protection Program Administration

The RPP will be administrated by the RPPC on a company-wide basis, with support at the office/project level by those designated by the RPPC (usually the Health and Safety Office Representative or Site Safety Officer [on a project-specific basis]). At the project level, and as applicable, the RPPC will work closely with the project manager and field team to ensure this RPP is enacted and followed as required.

5 Planning and Risk Assessment for Respiratory Hazards

Planning and risk assessment for respiratory hazards will be conducted and documented, prior to inception of field work or a discrete field task, on a project-specific basis by the RPPC and the project manager.

The RPPC will consider project-specific data, including documented or anticipated contaminants of concern present on site. Additional technical resources will be used, such as the *NIOSH Pocket Guide to Chemical Hazards* (NIOSH 2007), Safety Data Sheets, or other published technical data.

The risk assessment will be written and must consider the following:

- Identification of hazards, including respiratory hazards
- The possibility of IDLH conditions—Anchor QEA employees are not permitted to work in IDLH or potentially IDLH atmospheres at any time
- Engineering controls to the extent feasible prior to considering respiratory protection
- The type of personal protective equipment (PPE) required, including specific respiratory protection methods

6 Respirator Selection

On a project- or case-specific basis, the selection of respiratory protection will be evaluated and determined by the RPPC in consultation with, as needed, the Project Manager and/or Site Safety Officer. The use of respirators will occur only after feasible engineering controls are deemed ineffective at mitigating respiratory hazards. As stated previously, Anchor QEA employees are not permitted to work in IDLH atmospheres.

Respiratory protection will be selected based on the following:

- Respiratory hazard(s) to which the worker is exposed
- Workplace and user factors that affect respirator performance and reliability
- Adequacy to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations

All respiratory protection will be NIOSH-approved and will be selected from a range of models and sizes such that the protection is acceptable to and correctly fits the employee.

The selection of respiratory protection will also reasonably estimate employee exposures to respiratory hazard(s) and identify the contaminant's chemical state and physical form. Where Anchor QEA cannot identify or reasonably estimate the employee exposure, the atmosphere will be considered to be IDLH.

6.1 Respiratory Protection Against Gases and Vapors

Respirators for protection against gases and vapors must be either atmosphere-supplying or air-purifying. If the latter is selected, it must be equipped with a NIOSH-certified ESLI or, if there is no ESLI appropriate for conditions, Anchor QEA will stipulate a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The information and data relied upon, the basis for the canister and cartridge change schedule, and the basis for reliance on the data will be provided in the project-specific HASP.

6.2 Respiratory Protection Against Particulates

Respirators for protection against particulates must be either atmosphere-supplying or air-purifying. APRs must be equipped with a filter certified by NIOSH under 30 CFR 11 as a HEPA filter, or with a filter certified for particulates by NIOSH under 42 CFR 84. For contaminants consisting primarily of particles with mass median aerodynamic diameters of at least 2 µm, an APR must be equipped with any filter certified for particulates by NIOSH.

The assigned protection factors, presented in Table 1, must be used to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), the RPPC must ensure that the assigned protection factor is appropriate to the mode of operation in which the respirator is being used.

Table 1
Assigned Protection Factors

Respirator Type[a,b]	Quarter Mask	Half Mask	Full Facepiece	Helmet/ Hood	Loose-Fitting Facepiece
APR	5	10[c]	50	N/A	N/A
PAPR	N/A	50	1,000	25/1,000[d]	25
SAR or airline respirator					
• Demand mode	N/A	10	50	N/A	N/A
• Continuous flow mode	N/A	50	1,000	25/1,000[d]	25
• Pressure-demand or other positive-pressure mode	N/A	50	1,000	N/A	N/A
SCBA					
• Demand mode	N/A	10	50	50	N/A
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	N/A	N/A	10,000	10,000	N/A

Notes:
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 must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

a. Anchor QEA 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.
b. The assigned protection factors in Table 1 are only effective when Anchor QEA implements a continuing, effective RPP, including training, fit testing, maintenance, and use requirements.
c. This APF category includes filtering facepieces and half masks with elastomeric facepieces.
d. Anchor QEA 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 protection factor (WPF) or simulated workplace protection factor (SWPF) 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.

Prior to and for justification of final respiratory protection selection, MUC(s) will be calculated multiplying the above APF by the PEL, OEL, STEL, or CL. Anchor QEA prohibits employee exposure, measured outside the respiratory protection, above the calculated MUC.

7 Medical Evaluations

Anchor QEA employees must be determined to be physically able to perform work in respirators by a PLHCP. Anchor QEA will provide a medical evaluation by a PLHCP to determine the employee's ability to use a respirator, before the employee is fit tested (see Section 8) or required to use the respirator in the workplace. Anchor QEA may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator. Medical evaluations will be conducted to obtain the information in Part A, Sections 1 and 2, of Appendix A; however, this particular form may not be used. Employees' fitness to use respirators will be reviewed annually.

It is anticipated that the medical evaluation to determine fitness to use a respirator will take place during an employee's routine or project-specific occupational health monitoring appointment, but occasionally an employee may visit a PLHCP for the sole purpose of evaluating fitness to wear a respirator. The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire will be administered in a manner that ensures that the employee understands its content. PLHCPs will be informed of the expected type of work, anticipated respirator and PPE required, and other stresses expected to be experienced by the employee during the work.

When warranted, Anchor QEA will ensure a follow-up medical examination is provided to the employee. The follow-up medical examination will include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

8 Fit Testing

Prior to employee use of any negative- or positive-pressure, tight-fitting facepiece, the employee will be fit tested using the same make, model, style, and size of respirator that will be used. Two types of fit testing are permissible, QLFT or QNFT. Fit testing will be conducted using the OSHA-accepted procedures in Appendix B.

An employee will be fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model, or make) is used, and at least annually thereafter. A QLFT may be used only when a fit factor of 100 or less must be achieved for a negative-pressure air-purifying respirator. A QNFT must be used when the required fit factor exceeds 100. Passing fit factor scores for QNFT are equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces.

An additional fit test will be administered whenever the employee reports—or the employer, PLHCP, supervisor, or program administrator makes visual observations of—changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, manager, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

For fit testing, and respirator use in general, the following are prohibited:

- Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function
- Any condition that interferes with the face-to-facepiece seal or valve function
- Corrective glasses or goggles that interfere with the face-to-facepiece seal

Anchor QEA, on a case-by-case basis, will provide at no cost to the employee corrective lens inserts for respirator fit testing and subsequent use. In general, contact lens use is permitted with respirators.

Where filtering facepiece respirators (i.e., N95) are used, a fit test will also be required unless exempted from other portions of this RPP.

9 Respirator Use

9.1 Training

Anchor QEA employees who use respirators must be trained at least annually and before using respirators. Many Anchor QEA employees have HAZWOPER training per 29 CFR 1910.120, which includes respirator training. However, all employees who are identified for respirator use will receive supplementary training per 29 CFR 1910.134(k). The RPPC will coordinate this supplementary training, understandable to the employee, which will include at a minimum:

- Why a respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator
- What are the limitations and capabilities of the respirator
- Effective use of the respirator in emergency situations, including situations in which the respirator malfunctions
- How to inspect, put on and remove, use, and check the seals of the respirator
- Procedures for maintenance and storage of the respirator
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators

Employees will be re-trained per 29 CFR 1910.134(k) if the following occurs:

- Changes in the workplace or the type of respirator render previous training obsolete
- Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill
- Any other situation arises in which retraining appears necessary to ensure safe respirator use

If employees desire to use respiratory protection not required by 29 CFR 1910.134 or otherwise by Anchor QEA, the information provided in Appendix C will be provided to the employee by Anchor QEA before respirator use. Lastly, all training records will be maintained by Anchor QEA.

9.2 Use

9.2.1 General

Respirator use requirements, including justification, will also be provided in project-specific HASPs. The RPPC or designee will ensure these procedures are followed. Employees are prohibited from removing respirators in hazardous environments. Employees are prohibited from entering IDLH atmospheres or atmospheres requiring USEPA Level A or Level B respiratory protection.

9.2.2 Facepiece Seal Protection

In addition to the prohibitions in Section 8 concerning face seals, which apply at all times when a respirator may be used, each employee will perform a user seal check each time they put on the respirator using the procedures in Appendix D or procedures recommended by the respirator manufacturer that Anchor QEA demonstrates are as effective as those in Appendix D.

9.2.3 Continuing Respirator Effectiveness

During respirator use, the RPPC or designee will surveille the work area conditions and degree of employee exposure or stress. If the conditions or degree of exposure or stress change such that respirator effectiveness may be affected, the RPPC or designee will reevaluate the continued effectiveness of the respirator.

In the event any of the following occur, the employee must leave the respirator use area:

- Cartridges performance time limits are being approached or ESLI color changes are triggered
- The employee or others determine the need to wash faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use
- The employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece
- The employee needs to replace the respirator or the filter, cartridge, or canister elements

If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, Anchor QEA will replace or repair the respirator before allowing the employee to return to the work area

9.2.4 IDLH Atmospheres and Interior Structural Firefighting

Anchor QEA employees are prohibited from entering IDLH atmospheres, entering atmospheres requiring USEPA Level A or B respiratory protection, or entering interior areas to fight structural fires.

10 Voluntary Use

Anchor QEA may provide respirators at the request of employees when the results of hazard analyses and risk assessments show respiratory protection is not required, and after it has been determined that the respirator use itself will not cause a hazard. If Anchor QEA chooses to provide non-required respiratory protection, employees will be provided Appendix C prior to respirator use, and they will sign Appendix C for their training file.

Should an employee choose to use a non-required respirator, they must first be medically cleared (Anchor QEA will verify this, consistent with the RPP), and the employee must clean, store, and maintain the respirator consistent with this RPP.

When an employee elects to voluntarily use a filtering facepiece respirator (N95 or KN95) for protection from COVID-19, the following will apply.

Filtering Facepiece Respirators provided by employees.

Where employees provide and use their own filtering facepiece respirators, Anchor QEA must provide each employee with the following notice:

"Filtering Facepiece Respirators can be an effective method of protection against COVID–19 hazards when properly selected and worn. Filtering Facepiece Respirator use is encouraged to provide an additional level of comfort and protection for workers even in circumstances that do not require a respirator to be used. However, if a filtering facepiece respirator is used improperly or not kept clean, the filtering facepiece respirator itself can become a hazard to the worker. If your employer allows you to provide and use your own filtering facepiece respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and follow all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the filtering facepiece respirator's limitations.
- Keep track of your filtering facepiece respirator so that you do not mistakenly use someone else's respirator.
- Do not wear your filtering facepiece respirator where other workplace hazards (e.g., chemical exposures) require use of a respirator. In such cases, your employer must provide you with a respirator that is used in accordance with OSHA's respiratory protection standard (29 CFR 1910.134). For more information about using a respirator, see OSHA's respiratory protection safety and health topics page (https://www.osha.gov/respiratoryprotection)."

Filtering Facepiece Respirators provided by Anchor QEA.

Anchor QEA must comply with the following requirements:

Must ensure that each employee wearing a filtering facepiece respirator receives training prior to first use and if they change the type of respirator, in a language and at a literacy level the employee understands, and comprehends at least the following:

- How to inspect, put on and remove, and use a respirator
- The limitations and capabilities of the respirator, particularly when the respirator has not been fit tested
- Procedures and schedules for storing, maintaining, and inspecting respirators
- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators and what to do if the employee experiences signs and symptoms
- How to perform a user seal check

Regarding reuse of filtering facepiece respirators, they should only be reused by the same employee, and only when:

- The filtering facepiece respirator is not visibly soiled or damaged.
- The respirator has been stored in a breathable storage container (e.g., paper bag) for at least 5 calendar days between use and has been kept away from water or moisture.
- The employee does a visual check in adequate lighting for damage to the respirator's fabric or seal.
- The employee successfully completes a user seal check.
- The employee uses proper hand hygiene before putting the respirator on and conducting the user seal check.
- The respirator has not been worn more than 5 days total.

The reuse of single-use respirators (e.g., filtering facepiece respirators) is discouraged.

11 Maintenance and Care of Respirators

11.1 Cleaning and Disinfecting

Anchor QEA-provided respirators will be clean, sanitary, and in good working order. The RPPC or its designee will ensure respirators are cleaned and disinfected.

Respirators, including those owned and used by employees, will be cleaned and disinfected using the procedures in Appendix E, unless the respirator manufacturer has more stringent cleaning and disinfecting procedures. Cleaning and disinfecting will occur at the following intervals:

- As often as necessary to maintain the respirator's sanitary condition
- Between use by different individuals
- After each use (pertains also to emergency and fit testing respirators)

11.2 Storage

Respirators, including those owned and used by employees, must be stored as follows:

- In a manner that will protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals
- In a manner that will prevent deformation of the facepiece and exhalation valve
- Regarding emergency respirators:
  - In an accessible manner
  - In compartments or in covers that are clearly marked as containing emergency respirators
  - In accordance with any applicable manufacturer instructions

11.3 Inspection

Respirators, including those owned and used by employees, must be inspected as follows:

- Check respirator function, tightness of connections, and condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters, or filters
- Check elastomeric parts for pliability and signs of deterioration
- Routine use: inspect before each use and during cleaning
- Emergency use: inspect at least monthly and for proper function before and after each use
  - Additionally, for emergency-use respirators: certify the respirator by documenting the following information on a tag/label affixed to the storage location or by electronic means, until superseded by a later inspection:
    - Date the inspection was performed
    - Name (or signature) of the person who performed the inspection

        - Findings
        - Required remedial action
        - Serial number or other means of identifying the inspected respirator
- Emergency escape only: inspect before carrying into the workplace for use

11.4 Repairs

If a respirator fails inspection or is otherwise found to be defective, it will be replaced, unless repairs are made by the manufacturer or a trained technician.

12 Program Evaluation and Recordkeeping

This RPP will be evaluated annually. Anchor QEA will conduct regular evaluations to ensure the RPP is being administered, as needed, properly on applicable projects. Anchor QEA will regularly consult employees using the RPP to ensure its effective implementation, including assessment of respirator fitness, selection, use, and maintenance.

Anchor QEA will retain written information regarding medical evaluations, fit testing, and the RPP to facilitate employee involvement in the RPP, assist Anchor QEA in auditing the adequacy of the RPP, and provide a record for compliance determinations by OSHA. Fit test information will be retained until a subsequent test is administered. Medical evaluations will be retained for the duration of employment plus 30 years.

13 Reference

NIOSH (National Institute for Occupational Safety and Health), 2007. NIOSH Pocket Guide to Chemical Hazards. Department of Health and Human Services, Centers for Disease Control and Prevention. Publication No. 2005-149. September 2007.

Appendix A
OSHA Respirator Medical Evaluation Questionnaire

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

To the employer: Answers to questions in Section 1 and to question 9 in Section 2 of Part A do not require a medical examination.

To the employee: Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory)

The following information must be provided if you have been selected to use any type of respirator (please print).

1. Today's date: _____ **2. Your name:** _____

3. Your age: *(to nearest year)* _____ **4. Sex:** *(select one)* ☐ Male ☐ Female

5. Your height: _____ ft. _____ in. **6. Your weight:** _____ lbs.

7. Your job title: _____

8. A phone number where you can be reached by the health care professional who reviews this questionnaire: (_____) _____ - _____
(include the Area Code)

9. The best time to phone you at this number: _____ AM / PM *(circle one)*

10. Has your employer told you how to contact the health care professional who will review this questionnaire: *(select one)* ☐ Yes ☐ No

11. Check the type of respirator you will use:
(you can check more than one category)
☐ a. N, R, or P disposable respirator *(filter-mask, non-cartridge type only)*
☐ b. Other type *(for example, half or full facepiece type, powered air-purifying)*

12. Have you ever worn a respirator: *(select one)* ☐ Yes ☐ No

If "yes," what type(s): _____

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Part A. Section 2.

Questions 1 through 9, below, must be answered if you have been selected to use any type of respirator (please select "yes" or "no").

Item No.	Question	Check	
1.	**Do you *currently* smoke tobacco, or have you smoked tobacco in the last month?**	☐ Yes	☐ No
2.	**Have you *ever had* any of the following conditions?**		
	a. Seizures	☐ Yes	☐ No
	b. Diabetes (sugar disease)	☐ Yes	☐ No
	c. Allergic reactions that interfere with your breathing	☐ Yes	☐ No
	d. Claustrophobia (fear of closed-in places)	☐ Yes	☐ No
	e. Trouble smelling odors	☐ Yes	☐ No
3.	**Have you *ever had* any of the following pulmonary or lung problems?**		
	a. Asbestosis	☐ Yes	☐ No
	b. Asthma	☐ Yes	☐ No
	c. Chronic bronchitis	☐ Yes	☐ No
	d. Emphysema	☐ Yes	☐ No
	e. Pneumonia	☐ Yes	☐ No
	f. Tuberculosis	☐ Yes	☐ No
	g. Silicosis	☐ Yes	☐ No
	h. Pneumothorax (collapsed lung)	☐ Yes	☐ No
	i. Lung cancer	☐ Yes	☐ No
	j. Broken ribs	☐ Yes	☐ No
	k. Any chest injuries or surgeries	☐ Yes	☐ No
	l. Any other lung problem that you've been told about	☐ Yes	☐ No

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check	
4.	**Do you *currently* have any of the following symptoms?**		
	a. Shortness of breath	☐ Yes	☐ No
	b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline	☐ Yes	☐ No
	c. Shortness of breath when walking with other people at an ordinary pace on level ground	☐ Yes	☐ No
	d. Have to stop for breath when walking at your own pace on level ground	☐ Yes	☐ No
	e. Shortness of breath when washing or dressing yourself	☐ Yes	☐ No
	f. Shortness of breath that interferes with your job	☐ Yes	☐ No
	g. Coughing that produces phlegm (thick sputum)	☐ Yes	☐ No
	h. Coughing that wakes you early in the morning	☐ Yes	☐ No
	i. Coughing that occurs mostly when you are lying down	☐ Yes	☐ No
	j. Coughing up blood in the last month	☐ Yes	☐ No
	k. Wheezing	☐ Yes	☐ No
	l. Wheezing that interferes with your job	☐ Yes	☐ No
	m. Chest pain when you breathe deeply	☐ Yes	☐ No
	n. Any symptoms that you think may be related to lung problems	☐ Yes	☐ No
5.	**Have you *ever had* any of the following?**		
	a. Heart attack	☐ Yes	☐ No
	b. Stroke	☐ Yes	☐ No
	c. Angina	☐ Yes	☐ No
	d. Heart failure	☐ Yes	☐ No
	e. Swelling in your legs or feet (not caused by walking)	☐ Yes	☐ No
	f. Heart arrhythmia (heart beating irregularly)	☐ Yes	☐ No
	g. High blood pressure	☐ Yes	☐ No
	h. Any heart problem that you've been told about	☐ Yes	☐ No

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check	
6.	**Have you *ever had* any of the following symptoms?**		
	a. Frequent pain or tightness in your chest	☐ Yes	☐ No
	b. Pain or tightness in your chest during physical activity	☐ Yes	☐ No
	c. Pain or tightness in your chest that interferes with your job	☐ Yes	☐ No
	d. In the past 2 years, have you noticed your heart skipping or missing a beat	☐ Yes	☐ No
	e. Heartburn or indigestion that is not related to eating	☐ Yes	☐ No
	f. Any other symptoms that you think may be related to heart or circulation problems	☐ Yes	☐ No
7.	**Do you *currently* take medication for any of the following problems?**		
	a. Breathing or lung problems	☐ Yes	☐ No
	b. Heart trouble	☐ Yes	☐ No
	c. Blood pressure	☐ Yes	☐ No
	d. Seizures	☐ Yes	☐ No
8.	**If you've used a respirator, have you *ever had* any of the following problems?** *(If you've never used a respirator, check the following space and go to question 9)*	☐ Never used	
	a. Eye irritation	☐ Yes	☐ No
	b. Skin allergies or rashes	☐ Yes	☐ No
	c. Anxiety	☐ Yes	☐ No
	d. General weakness or fatigue	☐ Yes	☐ No
	e. Any other problem that may or does interfere with your use of a respirator	☐ Yes	☐ No
9.	**Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire?**	☐ Yes	☐ No

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Questions 10 to 15, below, must be answered if you have been selected to use either a full facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

Item No.	Question	Check	
10.	**Have you *ever lost* vision in either eye (temporarily or permanently)?**	☐ Yes	☐ No
11.	**Do you *currently* have any of the following?**		
	a. Wear contact lenses	☐ Yes	☐ No
	b. Wear glasses	☐ Yes	☐ No
	c. Color blind	☐ Yes	☐ No
	d. Any other eye or vision problem	☐ Yes	☐ No
12.	**Have you *ever had* an injury to your ears, including a broken ear drum?**	☐ Yes	☐ No
13.	**Do you *currently* have any of the following?**		
	a. Difficulty hearing	☐ Yes	☐ No
	b. Wear a hearing aid	☐ Yes	☐ No
	c. Any other hearing or ear problem	☐ Yes	☐ No
14.	**Have you *ever had* a back injury?**	☐ Yes	☐ No
15.	**Do you *currently* have any of the following?**		
	a. Weakness in any of your arms, hands, legs, or feet	☐ Yes	☐ No
	b. Back pain	☐ Yes	☐ No
	c. Difficulty fully moving your arms and legs	☐ Yes	☐ No
	d. Pain or stiffness when you lean forward or backward at the waist	☐ Yes	☐ No
	e. Difficulty fully moving your head up or down	☐ Yes	☐ No
	f. Difficulty fully moving your head side to side	☐ Yes	☐ No
	g. Difficulty bending at your knees	☐ Yes	☐ No
	h. Difficulty squatting to the ground	☐ Yes	☐ No
	i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs.	☐ Yes	☐ No
	j. Any other muscle or skeletal problem that may or does interfere with using a respirator	☐ Yes	☐ No

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Part B.

Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

Item No.	Question	Check	
1.	**In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen?**	☐ Yes	☐ No
	If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions?	☐ Yes	☐ No
2.	**At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals?**	☐ Yes	☐ No
	If "yes," name the chemicals if you know them: _____ _____ _____ _____		
3.	**Have you ever worked with any of the materials, or under any of the conditions, listed below?**		
	a. Asbestos	☐ Yes	☐ No
	b. Silica (e.g., in sandblasting)	☐ Yes	☐ No
	c. Tungsten/cobalt (e.g., grinding or welding this material)	☐ Yes	☐ No
	d. Beryllium	☐ Yes	☐ No
	e. Aluminum	☐ Yes	☐ No
	f. Coal (for example, mining)	☐ Yes	☐ No
	g. Iron	☐ Yes	☐ No
	h. Tin	☐ Yes	☐ No
	i. Dusty environments	☐ Yes	☐ No
	j. Any other hazardous exposures	☐ Yes	☐ No
	If "yes," describe these exposures: _____ _____		

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check	
4.	**List any second job(s) or side business(es) you have:** _____ _____ _____ _____ _____ _____		
5.	**List your previous occupation(s):** _____ _____ _____ _____ _____ _____		
6.	**List your current and previous hobby(ies):** _____ _____ _____ _____ _____ _____		
7.	**Have you been in the military services?**	☐ Yes	☐ No
	If "yes," were you exposed to biological or chemical agents (either in training or combat)?	☐ Yes	☐ No
8.	**Have you ever worked on a HAZMAT team?**	☐ Yes	☐ No
9.	**Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications)?**	☐ Yes	☐ No
	If "yes," name the medications if you know them: _____ _____ _____ _____		
10.	**Will you be using any of the following items with your respirator(s)?**		
	a. HEPA Filters	☐ Yes	☐ No
	b. Canisters (for example, gas masks)	☐ Yes	☐ No
	c. Cartridges	☐ Yes	☐ No

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check	
11.	**How often are you expected to use the respirator(s)?** *(choose "yes" or "no" for all answers that apply to you)*		
	a. Escape only (no rescue)	☐ Yes	☐ No
	b. Emergency rescue only	☐ Yes	☐ No
	c. Less than 5 hours per week	☐ Yes	☐ No
	d. Less than 2 hours per day	☐ Yes	☐ No
	e. 2 to 4 hours per day	☐ Yes	☐ No
	f. More than 4 hours per day	☐ Yes	☐ No
12.	**During the period you are using the respirator(s), is your work effort:**		
	a. *Light* (less than 200 kcal per hour)	☐ Yes	☐ No
	(Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press [1 to 3 lbs.] or controlling machines.)		
	If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.		
	b. *Moderate* (200 to 350 kcal per hour)	☐ Yes	☐ No
	(Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load [about 35 lbs.] at trunk level; walking on a level surface about 2 mph or down a 5-degree grade at about 3 mph; or pushing a wheelbarrow with a heavy load [about 100 lbs.] on a level surface.)		
	If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.		
	c. *Heavy* (above 350 kcal per hour)	☐ Yes	☐ No
	(Examples of heavy work are lifting a heavy load [about 50 lbs.] from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade at about 2 mph; or climbing stairs with a heavy load [about 50 lbs.].)		
	If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.		
13.	**Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator?**	☐ Yes	☐ No
	If "yes," describe this protective clothing and/or equipment: _____		

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check	
14.	**Will you be working under hot conditions (temperature exceeding 77°F)?**	☐ Yes	☐ No
15.	**Will you be working under humid conditions?**	☐ Yes	☐ No
16.	**Describe the work you'll be doing while you're using your respirator(s):** _____ _____ _____		
17.	**Describe any special or hazardous conditions you might encounter when you're using your respirator(s):** *(for example, confined spaces, life-threatening gases)* _____ _____ _____		
18.	**Provide the following information, if you know it, for each toxic substance that may be present when you're using your respirator(s):** Name of the *first* toxic substance: _____ Estimated maximum level per shift: _____ Duration of shift: _____ Name of the *second* toxic substance: _____ Estimated maximum level per shift: _____ Duration of shift: _____ Name of the *third* toxic substance: _____ Estimated maximum level per shift: _____ Duration of shift: _____		

OSHA Respirator Medical Evaluation Questionnaire

Source: 29 CFR 1910.134, Appendix C

Item No.	Question	Check
	The name of any other toxic substances that may be present while using your respirator: _____ _____ _____ _____ _____ _____	
19.	**Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others:** *(for example, rescue, security)* _____ _____ _____	

Appendix B
Fit Testing Procedures

Fit Testing Procedures (Mandatory)

Source: 29 CFR 1910.134, Appendix A

Part I. OSHA-Accepted Fit Test Protocols

A. General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least 5 minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item (A.6). If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.
6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
    a. Position of the mask on the nose
    b. Room for eye protection
    c. Room to talk
    d. Position of mask on face and cheeks
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
    a. Chin properly placed
    b. Adequate strap tension, not overly tightened
    c. Fit across nose bridge
    d. Respirator of proper size to span distance from nose to chin

e. Tendency of respirator to slip
f. Self-observation in mirror to evaluate fit and respirator position

8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix D or those recommended by the respirator manufacturer, which provide equivalent protection to the procedures in Appendix D. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side to side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.
9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache, or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.
10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.
11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.
12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.
13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.
14. Test Exercises.
    a. Employers must perform the following test exercises for all fit testing methods prescribed in this appendix, except for the CNP quantitative fit testing protocol and the CNP REDON quantitative fit testing protocol. For these two protocols, employers must ensure that the test subjects (i.e., employees) perform the exercise procedure specified in Part I.C.4(b) of this appendix for the CNP quantitative fit testing protocol, or the exercise procedure described in Part I.C.5(b) of this appendix for the CNP REDON quantitative fit testing protocol. For the remaining fit testing methods, employers must ensure that employees perform the test exercises in the appropriate test environment in the following manner:
        i. Normal breathing.
        In a normal standing position, without talking, the subject shall breathe normally.
        ii. Deep breathing.
        In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.

iii. Turning head side to side.
Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

iv. Moving head up and down.
Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

v. Talking.
The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

> **Rainbow Passage**
> *When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.*

vi. Grimace.
The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)

vii. Bending over.
The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT or QLFT units that do not permit bending over at the waist.

viii. Normal breathing.
Same as exercise (1).

b. Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General
    a. The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.
    b. The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.
2. Isoamyl Acetate Protocol

    Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

    a. Odor Threshold Screening

        Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

        i. Three 1-liter glass jars with metal lids are required.
        ii. Odor-free water (e.g., distilled or spring water) at approximately 25°C (77°F) shall be used for the solutions.
        iii. The isoamyl acetate (IAA) (also known at isopentyl acetate) stock solution is prepared by adding 1 mL of pure IAA to 800 mL of odor-free water in a 1-liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
        iv. The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
        v. The odor test solution is prepared in a second jar by placing 0.4 mL of the stock solution into 500 mL of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for 2 to 3 minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only 1 day.
        vi. A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.
        vii. The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
        viii. The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the

covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

ix. The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

x. If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

xi. If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

b. Isoamyl Acetate Fit Test

i. The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot-diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.

ii. Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.

iii. After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

iv. A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

v. Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 mL of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

vi. Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.

vii. If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

viii. If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b)(1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

ix. If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.

x. When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

i. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

ii. The test enclosure shall have a 3/4-inch (1.9-cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

iii. The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.

iv. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

v. The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 mL of warm water. It can be prepared by putting 1 mL of the fit test solution (see (b)(5) below) in 100 mL of distilled water.

vi. To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

vii. Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the 10 squeezes, the screening test is completed. The taste threshold is noted as 10 regardless of the number of squeezes actually completed.

viii. If the first response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second 10 squeezes, the screening test is completed. The taste threshold is noted as 20 regardless of the number of squeezes actually completed.

ix. If the second response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of 10 squeezes, the screening test is completed. The taste threshold is noted as 30 regardless of the number of squeezes actually completed.

x. The test conductor will take note of the number of squeezes required to solicit a taste response.

xi. If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

xii. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

xiii. Correct use of the nebulizer means that approximately 1 mL of liquid is used at a time in the nebulizer body.

xiv. The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every 4 hours.

b. Saccharin solution aerosol fit test procedure.

i. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

ii. The fit test uses the same enclosure described in 3.(a) above.

iii. The test subject shall don the enclosure while wearing the respirator selected in section I.A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).

iv. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

v. The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 mL of warm water.

vi. As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.

vii. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20, or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.

viii. After generating the aerosol, the test subject shall be instructed to perform the exercises in section I.A.14. of this appendix.

ix. Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10, or 15).

x. The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.

xi. If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

xii. Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. Bitrex™ (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The Bitrex (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

i. During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

ii. The test enclosure shall have a 3/4-inch (1.9-cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

iii. The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.

iv. Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

v. The threshold check solution is prepared by adding 13.5 milligrams of Bitrex to 100 mL of 5% salt (NaCl) solution in distilled water.

vi. To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.

vii. An initial 10 squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the 10 squeezes, the screening test is completed. The taste threshold is noted as 10 regardless of the number of squeezes actually completed.

viii. If the first response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second 10 squeezes, the screening test is completed. The taste threshold is noted as 20 regardless of the number of squeezes actually completed.

ix. If the second response is negative, 10 more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of 10 squeezes, the screening test is completed. The taste threshold is noted as 30 regardless of the number of squeezes actually completed.

x. The test conductor will take note of the number of squeezes required to solicit a taste response.

xi. If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.

xii. If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

xiii. Correct use of the nebulizer means that approximately 1 mL of liquid is used at a time in the nebulizer body.

xiv. The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every 4 hours.

b. Bitrex Solution Aerosol Fit Test Procedure.

i. The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

ii. The fit test uses the same enclosure as that described in 4. (a) above.

iii. The test subject shall don the enclosure while wearing the respirator selected according to section I.A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).

iv. A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

v. The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 mL of a 5% salt (NaCl) solution in warm water.

vi. As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.

vii. The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20, or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.

viii. After generating the aerosol, the test subject shall be instructed to perform the exercises in section I.A.14. of this appendix.

ix. Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10, or 15).

x. The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

xi. If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

a. General Requirements and Precautions
   i. The respirator to be tested shall be equipped with high-efficiency particulate air (HEPA) or P100 series filter(s).
   ii. Only stannic chloride smoke tubes shall be used for this protocol.
   iii. No form of test enclosure or hood for the test subject shall be used.
   iv. The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.
   v. The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the buildup of irritant smoke in the general atmosphere.

b. Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

   i. The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.
   ii. The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
   iii. The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the

smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

c. Irritant Smoke Fit Test Procedure
    i. The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
    ii. The test subject shall be instructed to keep his/her eyes closed.
    iii. The test operator shall direct the stream of irritant smoke from the smoke tube toward the faceseal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within 6 inches of the respirator.
    iv. If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
    v. The exercises identified in section I.A.14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of 6 inches.
    vi. If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
    vii. Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
    viii. If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: Quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; Quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; Quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General
    a. The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.
    b. The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.
2. Generated Aerosol Quantitative Fit Testing Protocol
    a. Apparatus.
        i. Instrumentation.
        Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.
        ii. Test chamber.
        The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.
        iii. When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.
        iv. The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.
        v. The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.
        vi. The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the

breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least 1/4 inch.

vii. The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.

viii. The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10% variation for the duration of the test.

ix. The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.

x. The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

xi. The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high-efficiency particulate filter) before release.

xii. When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50%.

xiii. The limitations of instrument detection shall be taken into account when determining the fit factor.

xiv. Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

b. Procedural Requirements.

i. When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.

ii. The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.

iii. A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.

iv. Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5% for a half-mask or 1% for a full facepiece respirator.

v. A stable test agent concentration shall be obtained prior to the actual start of testing.

vi. Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.

vii. The test shall be terminated whenever any single peak penetration exceeds 5% for half masks and 1% for full facepiece respirators. The test subject shall be refitted and retested.

viii. Calculation of fit factors.

(a) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.

(b) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., seven exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.

(c) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

a) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

b) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

c) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.

d) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in Equation 1.

Equation 1

$$Overall\ Fit\ Factor = \frac{Number\ of\ exercises}{1/ff_1 + 1/ff_2 + 1/ff_3 + 1/ff_4 + 1/ff_5 + 1/ff_6 + 1/ff_7 + 1/ff_8}$$

where:

ff_1 = fit factor for exercise 1
ff_2 = fit factor for exercise 2
ff_3 = fit factor for exercise 3
ff = fit factor for exercise 4
ff_5 = fit factor for exercise 5
ff_6 = fit factor for exercise 6
ff_7 = fit factor for exercise 7
ff_8 = fit factor for exercise 8

ix. The test subject shall not be permitted to wear a half-mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.

x. Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient aerosol condensation nuclei counter (CNC) quantitative fit testing protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece

negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. Portacount Fit Test Requirements.
    i. Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.
    ii. Instruct the person to be tested to don the respirator for 5 minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
    iii. Check the following conditions for the adequacy of the respirator fit: chin properly placed; adequate strap tension, not overly tightened; fit across nose bridge; respirator of proper size to span distance from nose to chin; tendency of the respirator to slip; self-observation in a mirror to evaluate fit and respirator position.
    iv. Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.
    v. Follow the manufacturer's instructions for operating the Portacount and proceed with the test.
    vi. The test subject shall be instructed to perform the exercises in section I.A.14. of this appendix.
    vii. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.
b. Portacount Test Instrument.
    i. The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is the most important result. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.
    ii. Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this appendix.
    iii. A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled negative pressure (CNP) quantitative fit testing protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Occupational Health Dynamics of Birmingham, Alabama, also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his/her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately 5 seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

a. CNP Fit Test Requirements.
    i. The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.
    ii. The CNP system defaults selected for test pressure shall be set at -15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

    (**Note:** CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

iii. The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.

iv. The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.

v. The employer must train the test subject to hold his or her breath for at least 10 seconds.

vi. The test subject must don the test respirator without any assistance from the test administrator who is conducting the CNP fit test. The respirator must not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the test subject must repeat the fit test.

vii. The QNFT protocol shall be followed according to section I.C.1. of this appendix with an exception for the CNP test exercises.

b. CNP Test Exercises.

i. Normal breathing.
In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.

ii. Deep breathing.
In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.

iii. Turning head side to side.
Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.

iv. Moving head up and down.
Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds

during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

v. Talking.

The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

vi. Grimace.

The test subject shall grimace by smiling or frowning for 15 seconds.

vii. Bending over.

The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.

viii. Normal breathing.

The test subject shall remove and re-don the respirator within a 1-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

c. CNP Test Instrument.

i. The test instrument must have an effective audio-warning device, or a visual-warning device in the form of a screen tracing, that indicates when the test subject fails to hold his or her breath during the test. The test must be terminated and restarted from the beginning when the test subject fails to hold his or her breath during the test. The test subject then may be refitted and retested.

ii. A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

5. Controlled negative pressure (CNP) REDON quantitative fit testing protocol.

a. When administering this protocol to test subjects, employers must comply with the requirements specified in paragraphs (a) and (c) of Part I.C.4 of this appendix ("Controlled negative pressure (CNP) quantitative fit testing protocol"), as well as use the test exercises

described below in paragraph (b) of this protocol instead of the test exercises specified in paragraph (b) of Part I.C.4 of this appendix.

b. Employers must ensure that each test subject being fit tested using this protocol follows the exercise and measurement procedures, including the order of administration, described in Table 1.

Table 1
CNP REDON Quantitative Fit Testing Protocol

Exercises[1]	Exercise Procedure	Measurement Procedure
Facing Forward	Stand and breathe normally, without talking, for 30 seconds.	Face forward, while holding breath for 10 seconds.
Bending Over	Bend at the waist, as if going to touch his or her toes, for 30 seconds.	Face parallel to the floor, while holding breath for 10 seconds.
Head Shaking	For about 3 seconds, shake head back and forth vigorously several times while shouting.	Face forward, while holding breath for 10 seconds.
REDON 1	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask.	Face forward, while holding breath for 10 seconds.
REDON 2	Remove the respirator mask, loosen all facepiece straps, and then redon the respirator mask again.	Face forward, while holding breath for 10 seconds.

Note:

1. Exercises are listed in the order in which they are to be administered.

c. After completing the test exercises, the test administrator must question each test subject regarding the comfort of the respirator. When a test subject states that the respirator is unacceptable, the employer must ensure that the test administrator repeats the protocol using another respirator model.

d. Employers must determine the overall fit factor for each test subject by calculating the harmonic mean of the fit testing exercises as described in Equation 2.

Equation 2

$$Overall\ Fit\ Factor = \frac{N}{[1/ff_1\ +\ 1/ff_2\ +\ \ldots\ 1/ff_N]}$$

where:

N = number of exercises
ff_1 = fit factor for exercise 1
ff_2 = fit factor for exercise 2
ff_N = fit factor for exercise N

Appendix C
Information for Employees Using Respirators When Not Required Under the Standard (OSHA Appendix D)

Information for Employees Using Respirators When Not Required Under the Standard

Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and follow all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
- Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
- Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
- Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

I have read and fully understand the provisions stated above for Voluntary Use of a Respirator.

Name: _____ Date: _____

Signature: _____

Supervisor Name: _____ Date: _____

Supervisor Signature: _____

Appendix D
User Seal Check Procedures

User Seal Check Procedures

Source: 29 CFR 1910.134, Appendix B-1 (Mandatory)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method, shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

Part I. Facepiece Positive and/or Negative Pressure Checks

A. **Positive pressure check.** Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

B. **Negative pressure check.** Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for 10 seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

Part II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

Appendix E
Respirator Cleaning Procedures

Respirator Cleaning Procedures

Source: 29 CFR 1910.134, Appendix B-2 (Mandatory)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer, as an alternative, may use the cleaning recommendations provided by the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed herein. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in herein (i.e., the procedures must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user).

Part I. Procedures for Cleaning Respirators

Filtering facepiece respirators should only be cleaned by commercially available cleaning equipment and only in rare circumstances as discussed with the RPPC.

A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure- demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
B. Wash components in warm (43°C [110°F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
C. Rinse components thoroughly in clean, warm (43°C [110°F] maximum), preferably running water. Drain.
D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for 2 minutes in one of the following:
    1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately 1 milliliter of laundry bleach to 1 liter of water at 43°C (110°F)
    2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6 to 8 grams ammonium and/or potassium iodide/100 cc of 45% alcohol) to 1 liter of water at 43°C (110°F)
    3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer
E. Rinse components thoroughly in clean, warm (43°C [110°F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
F. Components should be hand-dried with a clean lint-free cloth or air-dried.
G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
H. Test the respirator to ensure that all components work properly.

Appendix F
Filtering Facepiece Respirator Voluntary Use Form (COVID-19 Specific)

Filtering Facepiece Respirator Voluntary Use Form (COVID-19 Specific)

This form is to be used in combination with Appendix C of the RPP (OSHA Appendix D form).

Where employees provide and use their own filtering facepiece respirators, Anchor QEA must provide each employee with the following notice:

"Filtering Facepiece Respirators can be an effective method of protection against COVID–19 hazards when properly selected and worn. Filtering Facepiece Respirator use is encouraged to provide an additional level of comfort and protection for workers even in circumstances that do not require a respirator to be used. However, if a filtering facepiece respirator is used improperly or not kept clean, the filtering facepiece respirator itself can become a hazard to the worker. If your employer allows you to provide and use your own filtering facepiece respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

- Read and follow all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the filtering facepiece respirator's limitations.
- Keep track of your filtering facepiece respirator so that you do not mistakenly use someone else's respirator.
- Do not wear your filtering facepiece respirator where other workplace hazards (e.g., chemical exposures) require use of a respirator. In such cases, your employer must provide you with a respirator that is used in accordance with OSHA's respiratory protection standard (29 CFR 1910.134). For more information about using a respirator, see OSHA's respiratory protection safety and health topics page (https://www.osha.gov/respiratoryprotection)."

Filtering Facepiece Respirators provided by Anchor QEA.

Anchor QEA must comply with the following requirements:

Must ensure that each employee wearing a filtering facepiece respirator receives training prior to first use and if they change the type of respirator, in a language and at a literacy level the employee understands, and comprehends at least the following:

- How to inspect, put on and remove, and use a respirator
- The limitations and capabilities of the respirator, particularly when the respirator has not been fit tested
- Procedures and schedules for storing, maintaining, and inspecting respirators

- How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators and what to do if the employee experiences signs and symptoms
- How to perform a user seal check

Regarding reuse of filtering facepiece respirators, they should only be reused by the same employee, and only when:

- The filtering facepiece respirator is not visibly soiled or damaged.
- The respirator has been stored in a breathable storage container (e.g., paper bag) for at least 5 calendar days between use and has been kept away from water or moisture.
- The employee does a visual check in adequate lighting for damage to the respirator's fabric or seal.
- The employee successfully completes a user seal check.
- The employee uses proper hand hygiene before putting the respirator on and conducting the user seal check.
- The respirator has not been worn more than 5 days total.

The reuse of single-use respirators (e.g., filtering facepiece respirators) is discouraged.

I have read and fully understand the provisions stated above for Voluntary Use of a Filtering Facepiece Respirator (COVID-19 Specific).

Name: _____ Date: _____

Signature: _____

Supervisor Name: _____ Date: _____

Supervisor Signature: _____

FINAL

Exhibit B
Daily Air Monitoring Record Form

Daily Air Monitoring Record

Project Name: _____ **Date:** _____

Project Number: _____ **Location:** _____

Temperature: _____

Conditions: _____

COC	Instrument	S/N	Calibration Date	Calibration Gas/Method	Calibration by
Mercury vapors					
Particulates					
Other:					
Other:					
Other:					
Other:					

Time	Location/Description	Organic Vapor (ppm)	O2%	CG %LEL	Other	Other

Notes:

Completed by:

Printed Name _____ Signature _____ Date _____

FINAL

Exhibit C
Modification to Health and Safety Plan Form

Modification to Health and Safety Plan

Date: June 21, 2024

Project No: 2100075-01.03

Project Name: Lower Duwamish Waterway Middle Reach Remedial Design

Modification: In the inner portion of the Inlet at River Mile (RM) 2.2W of the Lower Duwamish Waterway Middle Reach, personal protective equipment (PPE) will be elevated to Level C, wherein staff will wear a full-face respirator with combination cartridges (mercury vapor/organic vapor/acid gas), when there is a sustained Jerome® J 405 reading of 0.03mg/m^3 or greater in the employee breathing zone or evacuation of the area. Respirator cartridges are to be disposed of as potentially contaminated media at the end of each workday when they are used. A Jerome® J405 reading of 0.5 mg/ m^3 or more above background in the employee breathing zone would require immediate evacuation until levels subside. Work should occur upwind when possible, and dust monitoring should be conducted if dusty conditions are encountered.

Reason for Modification: New area added to the investigation with existing data indicating elevated lead, mercury, total PCB, and dioxin/furan concentrations. Due to mercury within soil at 93.8 mg/kg dry weight, respiratory protection in the form of full-face respirators is being added, as outlined above. The change to Level C PPE requires staff to go through respirator training, medical clearance, and fit testing, utilizing quantitative fit testing for the brand, make, model, and size of respirator they will be wearing prior to the device's use.

Site Personnel Briefed

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Approvals

Field Lead: _____ _____ _____
Printed Name | Signature | Date

Project Manager: _____ _____ _____
Printed Name | Signature | Date