

STATEMENT OF WORK

Requisition #: 278517

Title: Respirator Cartridge Testing and Technical Analysis

Revision Number: 0

Date: 5/19/2015

Prior SOW or Revision Date: N/A

1.0 Objective

The objective of this Statement of Work (SOW) is to procure respirator cartridge life evaluation services for respirator cartridges manufactured by: Scott Health & Safety, MSA Safety, and 3M Air Purifying Respirator Cartridges.

2.0 Background/Introduction

OSHA 29 CFR 1910.120 part 134 and ANSI Z88.2 require employers to rely upon objective information to determine the cartridge life of air purifying respirators. Washington River Protection Solutions LLC (WRPS) has approached manufactures to determine which specific chemicals have objective test data available for their respirator cartridges, but not all chemicals of potential concern at tank farms, and not all of the unique mixtures, are adequately characterized by available information. Direct testing of the chemical vapors is the most effective way to determine actual chemical break-through times for each brand and type of air purifying respirator cartridge used by WRPS.

3.0 Scope

Lab in the Field Approach under Actual Conditions:

Design four copies of a respirator cartridge test fixture for each brand and type of respiratory cartridge that will be used to continuously draw air through a test cartridge and through an upstream (influent) chamber and a downstream (effluent) chamber that can be sampled continuously for WRPS' 222S lab chemical analysis.

Influent Air Challenge:

Challenge selected air purifying respirators (APR) by drawing a tank headspace vapors continuously through each APR for the anticipated service life of the APR at a flow rate that represents expected breathing rates for affected employees.). This will be accomplished using a large air sampling pump either downstream (negative pressure) or upstream (positive pressure) from the respirator cartridge. The length of each challenge test will be determined based on the contaminant concentrations present and a minimum desired wearing time (change schedule) of at least 2 hours.

Air Sampling:

Air samplers attached to the test fixture will utilize exactly the same methodology that has been used to characterize the workplace environment for industrial hygiene purposes. This consists of approximately 9-11 sampling tubes that will continuously collect a time-weighted-average sample for subsequent laboratory analysis utilizing standard air sampling methods. The upstream (influent) air chamber will be sampled by one set of (9-11) samplers, while the downstream (effluent) chamber is simultaneously sampled by a second set samples.. These samples will be collected by WRPS and analyzed on-site by the 222-S Laboratory. Analytical results will be provided to the vendor for performing their technical analysis of cartridge life.

Data Analysis and Validation:

The results of each analysis of contaminants found in influent air would be averaged to obtain the average challenge level applied for each contaminant of interest. The results of analysis of effluent air (downstream from the cartridge) will be used to assess any breakthrough of contaminants in order to determine the service life for each contaminant under the test conditions. Wherever a contaminant is detected in the effluent, the ratio of the influent concentration to the effluent concentration will be used to estimate protection factors provided by each APR cartridge evaluated. The presence of any contaminant at less than the OEL-in the effluent at the end of the service life will be calculated. Duplicate samples will be analyzed to provide data.

Data Review & Reporting:

Due to the need for strong credibility in interpreting and applying the results of this testing, a nationally recognized expert who has published in peer reviewed science journals on the mathematical modelling of respirator cartridges is required. This expert will develop mathematical models that will allow the prediction of cartridge life and breakthrough times for a range of temperature, humidity and concentrations. These models will be used to develop the final report and recommendations.

4.0 Submittals

A draft report will be submitted for review and comment. The draft report will include recommendations, model methodology and modelling predictions for a range chemical concentrations, humidity and temperatures. Based on the comments submitted, a final report will be submitted. A draft article will be submitted to WRPS suitable for publication in the e Journal of Occupational and Environmental Health (JOEH) or similar journals. WRPS must approve disclosure of data prior to any final publication.

In support of the work scope established in Section 3.0 above, submittals are listed on the Master Submittal Register (MSR).

Submittals shall be provided using the TOC Incoming Letter of Transmittal (form A-6005-315). All transmittal subject headings shall contain, at a minimum, the subcontract number, submittal number, and submittal description.

Submittals shall be provided in electronic format unless available only as a hard copy. Electronic submittals may be sent to TOCVND@rl.gov or delivered via a WRPS designated File Transfer Protocol (FTP) site. Electronic formats must be non-password protected in one of the following formats:

- Microsoft® Office Compatible
- Portable Document Format (PDF)
- Tagged Image File Format (TIFF)
- Graphics Interchange Format (GIF)
- Joint Photographic Experts Group (JPEG)
- Windows Media Video (WMV)
- Moving Picture Expert Group (MPEG)
- Extensible Markup Language (XML)
- HyperText Markup Language (HTML)
- Comma Separated Values (CSV)
- Text (TXT)

5.0 Acceptance Criteria

A written draft and final report with test results, recommendations and modelling to predict a range of temperature, humidity and concentration adjustments.

A draft journal article on the results of this study and the modeling developed based on the test data, for submittal to a peer reviewed publication. The article will include the WRPS Chemical Vapor Project Principle Industrial Hygienist as a co-author.

6.0 Configuration Management and Standards

6.1 Configuration Management Requirements

There are no specific Configuration Management requirements applicable to this SOW.

6.2 Applicable Standards

29 CFR 1910.134 Respiratory Protection

*ANSI Z88.2 American National Standard –Practices for Respiratory Protection.
Appendix D on determining cartridge life.*

7.0 ESH&Q Requirements

7.1 Quality Assurance Requirements

The Subcontractor shall follow standard commercial quality practices.

7.2 Price-Anderson Amendments Act Requirements

This 7.2 section and the General Provisions Article 2.11 entitled, *Price-Anderson Amendments Act (PAAA)*, are both determined to be N/A.

7.3 Special ESH&Q Requirements

Hanford Site access is not authorized for work to be completed under this SOW.

8.0 Verification/Hold Points

N/A

9.0 Reserved

10.0 Work Location/Potential Access Requirements

N/A

11.0 Training

N/A

12.0 Qualifications

The contractor and/or personnel must be the author/co-author of peer reviewed articles on determining respirator cartridge life and performance models with extensive experience in testing respirator cartridges for regulatory agencies, manufactures and industry. Citation on relevant published literature must be provided as proof of qualification.

13.0 Special Requirements

N/A

Use of Government Vehicles

N/A

Government Property

The following consumable items will be shipped for use in fabricating holders. These items do not need to be returned.

- **3M APR Cartridges**
 - **6006 (OV/SD/HC/CL/CD/HF/HS/AM/MA/FM)**
 - **60926 (OV/SD/HC/CL/CD/HF/HS/HE/AM/MA/FM/P-100)**
 - **60929 (MV/CL/HE)**
- **3M Versaflo PAPR Cartridge**
 - **Organic Vapor/acid gas/HEPA**
 - **Amonia/methylamine/HEPA**
- **3M Breathe Easy PAPR Cartridge**
 - **FR-57 (OV/SD/HC/CL/CD/HF/AM/MA/FM/HE)**
- **Scott APR Cartridges 742 Series**
 - **7422-SC1 (OV/AM/MA/CL/HC/SD/CD/HF/FE)**
 - **7422-SD1 (OV/AM/MA/CL/HC/SD/CD/HF/FW/P-100)**

- **7422-ZB1 (MV/CL/P-100)**

- **MSA APR Cartridges**
 - **GME (OV/CL/HC/SD/AM/MA/CD/FM/HF/ND)**
 - **GME/HE (P-100/OV/CL/HC/SD/AM/MA/CD/ND/FM/HF)**
 - **Mersorb/HE (MV/CL/HE)**
- **MSA TL PAPR Cartridges**
 - **80454 (OV/CL/CD/HC/SD/HE)**
 - **80456 (AM/CL/CD/FM/HC/MA/SD/HE)**
- **Drager Escape Respirator**
 - **Parat 4920 Industrial Escape Hood Cartridge**

14.0 Reporting/Administration

Not applicable

15.0 Workplace Substance Abuse Program Requirements

A Workplace Substance Abuse Program is not required for this SOW.