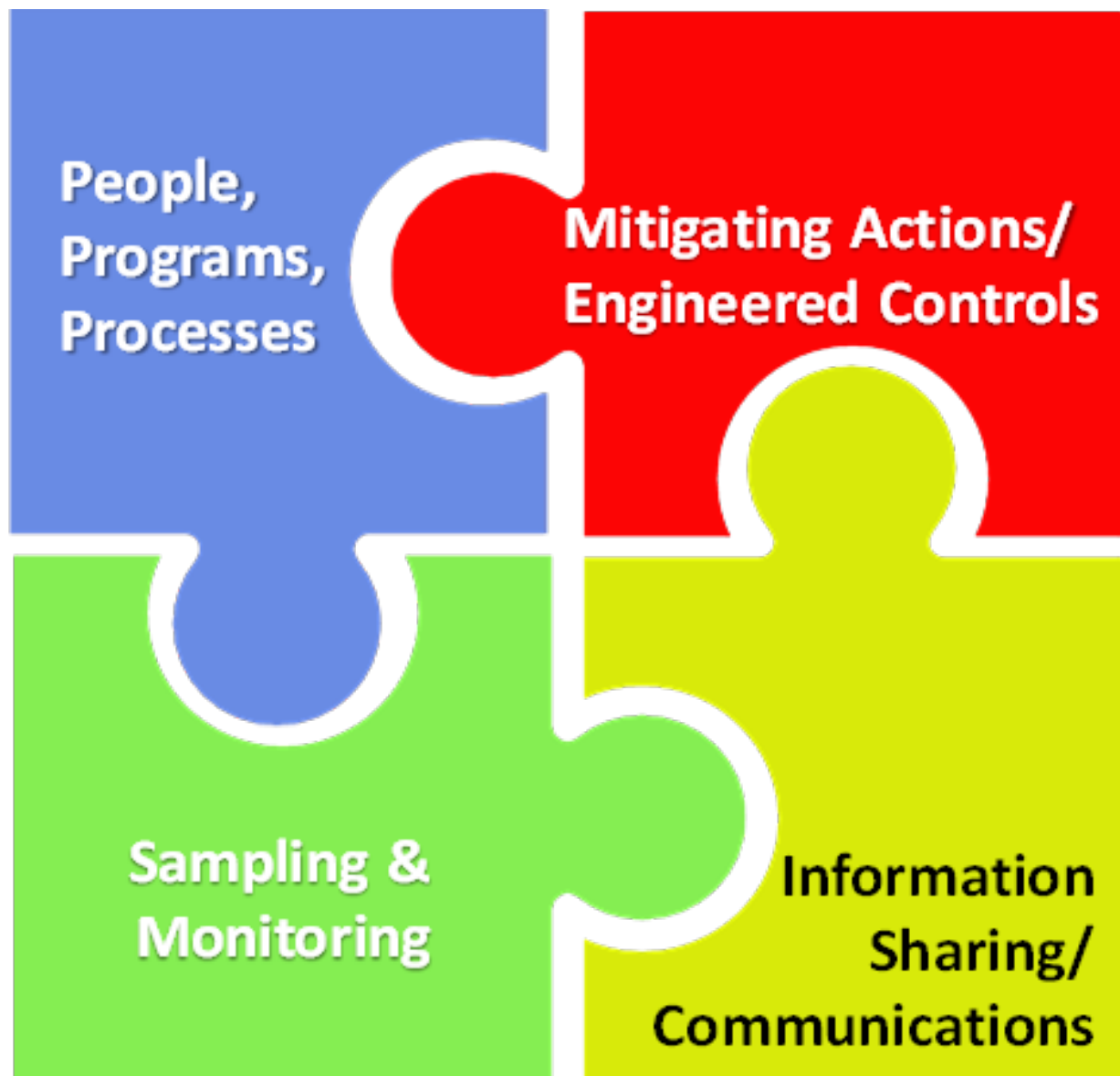




washington **river**  
**protection** solutions



WRPS Integrated Chemical Vapor Hazard  
Control Program  
**Fiscal Year 2019, 1<sup>st</sup> Quarter Summary**  
Published: January 24, 2019



At the end of Fiscal Year (FY) 2016, Washington River Protection Solutions LLC (WRPS) was completing Phase I of the *Implementation Plan for Hanford Tank Vapor Assessment Report Recommendations* (WRPS-1500142), developed to address Tank Vapors Assessment Team (TVAT) recommendations. The implementation plan actions were originally planned to occur in two phases. Phase I was completed at the end of fiscal year FY 2016. During the latter part of Phase I, multiple assessments were conducted on the progress of the implementation plan and/or the overall Industrial Hygiene (IH) program, including those conducted by the National Institute for Occupational Safety and Health (NIOSH), Office of Inspector General (OIG), Center for Toxicology and Environmental Health, LLC (CTEH), and DOE-Office Environment, Safety, and Health Assessments (EA-32). Assessment results, feedback from stakeholders, and the Phase II actions were incorporated into a comprehensive vapor management strategy, focusing on the vision that all workers on the Hanford Central Plateau continue to be protected by the comprehensive approach to vapors management, and that workers **are safe and feel safe**. The *Comprehensive Vapor Action Plan* (CVAP), as the plan became known, presented the new implementation strategy, and replaced the *Implementation Plan for Hanford Tank Vapor Assessment Report Recommendations*.

The CVAP was organized around eight Key Performance Parameters (KPPs):

- ✚ Engagement and effectiveness measurement
- ✚ Industrial hygiene technical basis
- ✚ Industrial hygiene program parity
- ✚ Engineered controls
- ✚ Unrestricted work boundaries
- ✚ Single shell tank stewardship program
- ✚ Chemical vapor respiratory protection hierarchy of controls, and
- ✚ Support medical program enhancements

The Plan was implemented during fiscal years 2017 to 2018.

The Chemical Protection Program Office (CPPO) was established in October 2016. The mission of the CPPO is to provide independent monitoring of vapor action status, and facilitate the flow of clear and transparent information throughout WRPS and to stakeholders to promote understanding of Hanford tank vapors by:

- Providing independent measures of progress to ensure actions achieved the required intent
- Both leading and supporting vapors engagement and communication efforts

From FY 2017 to FY 2018, CPPO delivered KPP 1 of the CVAP: “[e]stablish a comprehensive vapor communication plan, engagement processes, and effectiveness measures,” in part by publishing the *CPPO Weekly Report*. The weekly updated all the KPPs as described in the

CVAP. WRPS's ongoing actions, aimed at managing chemical vapor hazards from the Hanford Tank Farms, are now focused around the outcomes of the CVAP. Instead of describing the outcomes in terms of KPPs, WRPS is now using the following descriptors:

-  **People, Programs and Processes**
-  **Mitigating actions/Engineering controls**
-  **Information Sharing/Communication**
-  **Sampling and Monitoring**

The *CPPO Weekly Report* is now the *WRPS Integrated Chemical Vapor Hazard Control Program Monthly Report*.

# 1. People, Programs, Processes

“People, Programs, and Processes describes actions to ensure employees are qualified and trained, processes are in place to perform work safely, and programs are developed and updated.”

## 🔗 Exposure Assessments

### 1<sup>st</sup> Quarter Summary:

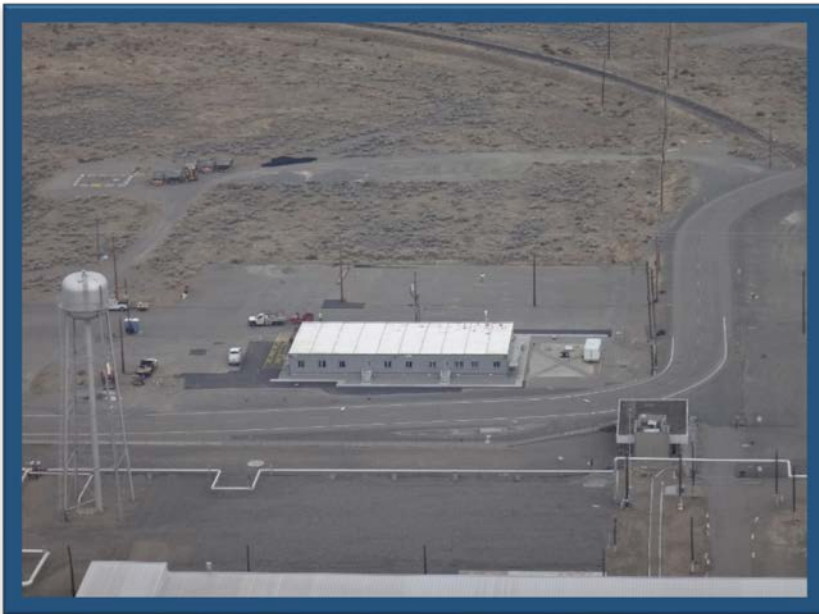
TFC-PLN-34, *Industrial Hygiene Exposure Assessment Strategy*, is the published guideline for developing exposure assessments. TFC-ESHQ-IH-C-69, *Industrial Hygiene Exposure Assessment* procedure, was published on September 4, 2018. Since October, the exposure assessments for A Farm, AW Farm, and AP Farm have been published in Smartplant Foundation (SPF) and are available in Integrated Document Management System (IDMS) and on the IH website. The AX Farm exposure assessment is scheduled to be published in the near future. TFC-PLN-173, *Use of FFAPR in Actively Ventilated Tank Farms*, was revised during the 1<sup>st</sup> Quarter and is currently in Work Flow Review and Approval Process (WRAP). The revision was expanded to include all seven ventilated farms: AN, AP, AW, AX, AY/AZ and SY.

## 🔗 Central Residence for Industrial Hygiene Technicians

### 1<sup>st</sup> Quarter Summary: Final Update

CPPO initiated its weekly updates on the IH Central Residence on November 9,

2017. *Solutions* reported that Building MO-2553, commonly known as the 10-wide, was nearly completed in October 2018. The November CPPO update reported, “progress continued on the balance of the parking lot (striping and bumper installation), the fire protection tie-in at the building, and the installation of interconnecting spool pieces between modular units. The final skirting was installed on November 19.” The IHT Central Residence has since been completed, and its intended residents moved in. The IH Lab is still under renovation as it is outfitted with instruments. **This is the final update for this item.**



**Figure 1. New 10-Wide Industrial Hygiene Personnel and Equipment Trailer – November 2018 (Photo courtesy of L. Parks-Beyer).**

## IH Training




### 1<sup>st</sup> Quarter Summary:

In the 1<sup>st</sup> Quarter of FY 2019, IH added a *ToxiRae Pro Hanford Vapors Fact Sheet* and a *Solutions* article to the ToxiRAE Pro library of published communications. IH presented a *ToxiRAE Pro Field Use* briefing to the IHT and Radiological Control Technician (RCT) first line managers at the November 12, 2018, Monthly Seminar Meeting. Additionally, IH completed a *ToxiRAE Pro Laboratory Preparation & Calibration Training* for all IH Technicians, utilizing TFC-OPS-IHT-028, *Preparation and Field Use of the ToxiRAE PRO System*. They also completed *ToxiRAE Pro Field Use Training* for all On-the-Job Trainer /On-the-Job-Evaluator (OJT/OJE) Qualified IHTs. IH is working on the training plan for FY 2019 to include Part Two of the *Crucial Conversations* course. Additionally, the *ToxiRAE Laboratory Preparation Training* for IHTs is ongoing.

## Health Process Plan (HPP) and Charter 71

### 1<sup>st</sup> Quarter Summary:

The following three HPP or Charter 71 reports were further developed by Pacific Northwest National Laboratory (PNNL) and WRPS since October:

-  ***Hanford Tank Farm Occupational Exposure and Risk Assessment Plan*** (PNNL-25791): This report has been issued to WRPS by PNNL as Revision 1, incorporating WRPS comments. It is in WRPS legal review prior to final issue.
-  ***Proposed Risk-Based Approach for Nitrosamine Chemicals of Potential Concern*** (PNNL-26787): PNNL is completing the editorial review and is preparing the Revision 0 draft for WRPS review.
-  ***Chemical Mixtures and Modeling Recommendations*** (PNNL-27089): PNNL scientists have scheduled a meeting to prioritize the chemicals of potential concern (COPC) for development of Health Code Numbers to be used in calculating health risks from tank vapor chemical mixtures.

## Chemical Worker Training

### 1<sup>st</sup> Quarter Summary:

CTEH toxicologists visited the *Chemical Worker Tier III* training classes in October, November, and December at the conclusion of each week's course. The toxicologists moderated Question & Answer (Q&A) sessions that gave the course trainees an opportunity to get answers to their questions regarding the toxicology and potential health impacts from tank vapor chemicals.

-  **October 17, 2018:** Drs. Chris Kuhlman and Angela Perez visited the *Chemical Worker Tier III* training class and answered toxicology and



health risk-related questions for 45 minutes. Questions included whether or not all COPCs had occupational exposure limits, the use of ammonia as a real-time leading indicator of potential COPC exposure, and the frequency of tank vapor constituent characterization. A question was asked about the dust releases from the full face air-purifying respirator (FFAPR) filter cartridge. This question was referred to WRPS IH.

- ✚ **October 24, 2018:** Dr. Perez visited the class of about 15 workers and Dr. Mike Lumpkin joined remotely via videoconference. Workers asked about fugitive emissions and odors outside of the tank farm fence lines.
- ✚ **October 31, 2018:** Dr. Lumpkin held a session with about 35 workers. He was asked to compare the level of IH practices (both hardware, processes, and air sampling and monitoring) that CTEH has observed at Hanford with programs implemented at commercial chemical plants and petroleum refineries. Another question was raised as to whether CTEH had analyzed any monitoring data from the recent grout steam release at one of the Plutonium Uranium Extraction Plant (PUREX) facility tunnels. Dr. Lumpkin also discussed the concepts of real-time monitoring for volatile organic chemicals (VOC). He met with individual workers after the session to talk about real-time ammonia stack data as well as CTEH's experience with supporting risk communication with workers exposed to odors and combustion by-products in the commercial railroad industry.

WRPS Training issued an all-employee email on November 27, 2018, titled, *Training Bulletin TB-18-07, Chemical Worker Training Program Change*. “We are going from two to one,” reads the bulletin. “From now on, you only need to complete one *Chemical Worker Training* course to ACE into the tank farms. Course #350538, *Tank Farm Chemical Worker*, (previously known as *Chemical Worker III*) will prepare you to work safely around exclusion zones (formerly VCZs).” The training bulletin reported that over 500 workers completed the classroom training and over 2000 workers completed the web-based training since October 2017.

CTEH toxicologists visited the *Chemical Worker Training*, moderating Question & Answer (Q&A) sessions that give the course trainees an opportunity to get answers to their questions regarding the toxicology and potential health impacts from tank vapor chemicals. In November, CTEH toxicologists interacted with a total of 91 trainees.

- ✚ **November 7, 2018:** Dr. Lumpkin answered toxicology and health risk-related questions for about 25 minutes. Questions included the management decision to use Mine Safety Appliance (MSA) respirators and filters rather than Scott, whether or not CTEH toxicologists had observed biological effects in workers from tank vapor exposures, the

reason for collecting air data in vapor control zones when workers were in FFAPR or SCBA protection, and publicly-available information resources for heavy metal and radionuclide biomarkers and body burden for former DOE and Department of Defense (DOD) workers.




- ✚ **November 14, 2018:** Dr. Lumpkin answered toxicology and health risk-related questions. One worker asked if CTEH was under contract to provide emergency response services like those provided to government and private sector organizations outside of Hanford. Another worker asked if CTEH toxicologists studying the Site Wide Industrial Hygiene Database (SWIHD) data had noticed a difference in measured compounds in the worker breathing zones before and after the installation of exhaust stack extensions.
- ✚ **November 14, 2018:** Dr. Lumpkin answered toxicology and health risk-related questions. One worker asked if skin exposed to tank farm air would result in dermal absorption of tank vapor sufficient to cause adverse effects. Another asked if there were differences in the nitrosamine compounds found in common foods and those found in tank headspaces.

In December, CTEH toxicologists interacted with a total of 26 trainees during their one *Chemical Worker Training* visit on December 19, 2018.

- ✚ **December 19, 2018:** Dr. Chris Kuhlman attended *Chemical Worker Training* lead by Kevin Miller. The session included 26 trainees. The toxicologists reviewed CTEH's support of CPPO and the various communication products developed by CPPO. Workers in attendance inquired about the toxicity of ammonia and mercury. The toxicologists explained the warning properties of each chemical as well as the established OELs. Two IHTs were present who had also attended the CPPO site visit. They expressed satisfaction with the DAV tool and the transparency WRPS is demonstrating by allowing the public to use this tool.

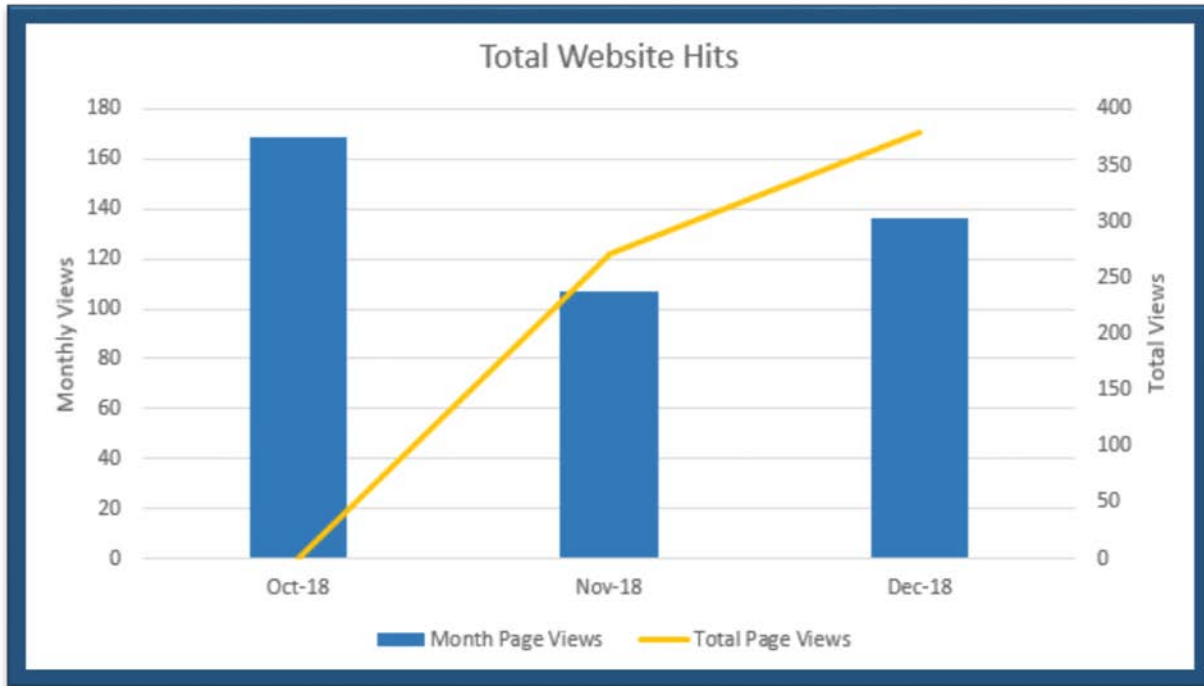
## The Data Access and Visualization Tool (DAV)

### 1<sup>st</sup> Quarter Summary:

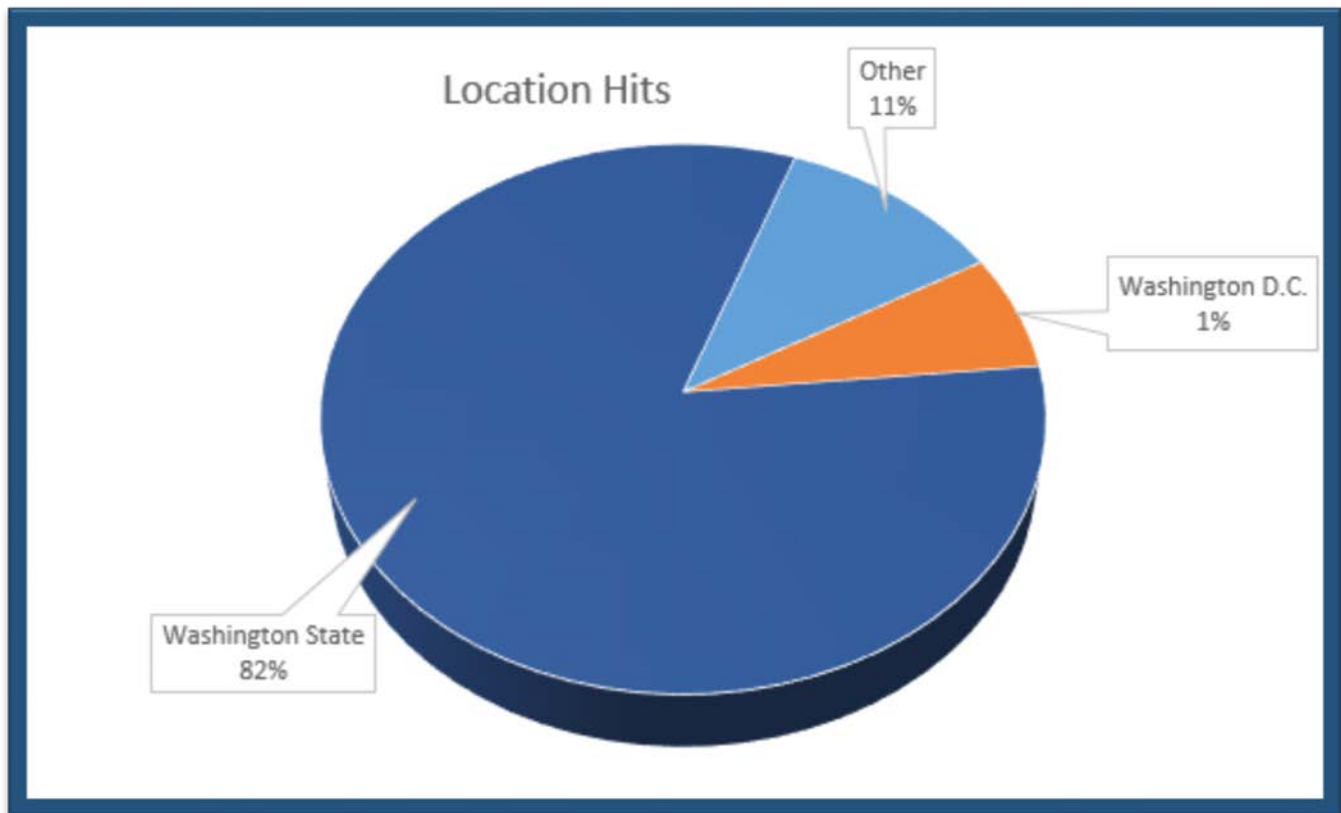
-  **October 2018:** Since the DAV tool was launched in October 2017, data from the more than one hundred thousand chemical samples from IH Sampling has been logged into the SWIHD. In 2018, WRPS worked with PNNL on the second-generation DAV tool, the goal of which was to enhance its capabilities to include the next iteration of data generated by the Vapor Monitoring and Detection System (VMDS). The VMDS equipment is capable of testing air samples 24 hours a day, 7 days a week, providing a detailed look at which chemicals exist in which farms, the levels of each chemical, and in close to real-time. The workforce participated in the development of the tool. Their suggestions on ways to improve the tool's effectiveness were successfully tested and reviewed by management. The enhanced DAV tool will go live after the stack monitors have been turned over to Operations.
-  **November 2018:** The DAV tool is being further enhanced by IH as a tool to refine analytical data. The new development uses Tableau Server and scripting languages to augment critical IH and engineering data analysis functions. The fully automated tool sets are expected to assist qualified IH staff in updating exposure assessments. PNNL kicked off the Internal DAV (IDAV) project and working sessions have been scheduled with WRPS IH Programs to add efficiencies to exposure assessment data analytical process.
-  **December 2018:** PNNL continued to work with IH Staff to build efficiencies in the analytical process.

As shown in **Figure 2**, the DAV tool logged almost 400 views in the 1<sup>st</sup> Quarter of FY 2019. **Figure 3** depicts the locations from which the views originated. Most of the people viewing the DAV tool are local (82 percent). However, one percent of the viewers logged onto the website from the Washington, D.C. area, and 11 percent from elsewhere in the nation. In this quarter, for the first time ever, four views originated from outside the United States.





**Figure 2. Total DAV Tool Website Hits: 1st Quarter, FY 2019**



**Figure 3. Total DAV Tool Location Hits: 1st Quarter, FY 2019**

## **Integrated Sampling & Monitoring Strategy**

### **1<sup>st</sup> Quarter Summary:**

In the 1<sup>st</sup> Quarter, IH established the scope and purpose for the IH 200 Areas Surveillance Strategy and briefed the Office of River Protection (ORP); additionally, IH began drafting a sampling and monitoring strategy for the IH Program.

## **ToxiRAE Implementation**

### **1<sup>st</sup> Quarter Summary:**

Since October, IH added a *ToxiRae Pro Hanford Vapors Fact Sheet* and a *Solutions* article to the ToxiRAE Pro library of published communications. IH presented a *ToxiRAE Pro Field Use* briefing to the IHT and RCT first line managers at the November 12, 2018, Monthly Seminar Meetings. Additionally, IH completed a *ToxiRAE Pro Laboratory Preparation & Calibration Training* for all Instrument Technicians (TFC-OPS-IHT-028), and a *ToxiRAE Pro Field Use Training* for all OJT/OJE Qualified IHTs. For additional details, see [ToxiRAE](#).

## **Root Cause Analysis (RCA)**

### **1<sup>st</sup> Quarter Summary:**



The RCA Team reviewed and compiled all the past vapor data and vapors-related issues to develop a draft RCA report. An external team reviewed the draft in November, and its revision continued in December. The final report is due in the 2<sup>nd</sup> Quarter, FY 2019.

## 2. Mitigating Actions/Engineered Controls

### AW and AN Stack Extensions

#### 1<sup>st</sup> Quarter Summary:




The scope of this effort is to extend the stack's current elevation from 27 feet to 60 feet. As a result of issues identified during the permitting review process, the schedule for completing the AW Stack extension was extended to FY 2019. The goals for FY 2019 are to complete the field installation and turn over the stack to Operations. Below is a summary of what was accomplished during the 1<sup>st</sup> Quarter:

-  **Stack Installation:** Fabrication of the stack extension was completed in October and delivered on-site in November. The work package to support site construction activities was approved. The activities that could be completed without the permits has been completed. Final installation can be completed when the non-radiological and radiological permits have been approved.
-  **Permitting:** Efforts continued on preparing permits. The radiological permit is currently with the Department of Health for review, while the non-radiological permit is with the Department of Ecology for review.

### A Farm Exhausters

#### 1<sup>st</sup> Quarter Summary:

In FY 2018, construction of the concrete pad was completed. The goals for FY 2019 are to install the exhausters, exhauster valve manifold component, and all the ventilation cold tie-in components. Below is a summary of what was accomplished in the 1<sup>st</sup> Quarter:

-  **Exhausters:** Both the exhauster stack and the exhauster moisture separator installations were completed during the 1<sup>st</sup> Quarter. **Figures 4-6** show the progression of the stack installation, while **Figure 7** shows the moisture separator installation.
-  **Exhauster Valve Manifold:** In the 1<sup>st</sup> Quarter, the exhauster valve manifold concrete pad was completed. Currently, the exhauster valve manifold, valve manifold support and access platform are being fabricated. In parallel with these activities, the documents required to install the exhauster valve manifold, support structure, and access platform are being prepared. The exhauster electrical installation documentation is underway as well.
-  **Procurement/Fabrication:** Many of the exhauster components were fabricated during the 1<sup>st</sup> Quarter, including the work platform

and cover plate, duct stand assemblies, large spray rings, top-hat and hose assembly, duct spool, demister shielding structure, and pre-cast concrete blocks. Deliveries to the site begin in the 2<sup>nd</sup> Quarter, FY 2019.



***Figure 4. A Farm Exhauster Stacks – Preparations for Installation in October 2018 (Photo courtesy of M.Allen.)***



***Figure 5. A Farm Exhauster Installation Activities continue in November 2018 (Photo courtesy of M. Allen.)***

**Figure 6. (Right)**  
**A Farm Exhauster -**  
**December 2018 (Photo courtesy**  
**of M. Allen.)**



**Figure 7. A Farm Exhauster Moisture Separator**  
**Installation (Photo courtesy of M. Allen.)**



## **NUCON<sup>®1</sup> Thermal Oxidation Vapor Abatement Unit (VAU)**

### **1<sup>st</sup> Quarter Summary:**

The current goals for FY 2019 are to start the detailed design of the next generation VAU and tank farm infrastructure, and to apply for environmental permits, as necessary. This is a collaborative effort between WRPS, PNNL, TerraGraphics, and NUCON<sup>®</sup>. Below is a summary of what was accomplished in the 1<sup>st</sup> Quarter:

#### **TerraGraphics:**

- Issued the conceptual and 30 percent design of the NUCON<sup>®</sup> infrastructure for the field demonstration at BY-108.
- Started on the 60 percent design package, and issued a purchase order for an instrument trailer.

#### **NUCON<sup>®</sup>:**

- Received the NUCON<sup>®</sup> VAU that was used to support the on-site engineering-scale test in FY 2018.
- Received a contract from WRPS to support efforts on developing the design for the next generation VAU.

#### **WRPS:**

- Approved contracts for PNNL and NUCON<sup>®</sup> for FY 2019.
- Approved final specifications that provided both TerraGraphics and NUCON<sup>®</sup> guidance to prepare their assigned design products.
- Developed cost estimates needed to support FY 2019 VAU activities. The estimates include funding needed to complete the infrastructure design and permit applications.
- Developed a preliminary list of risks and mitigation strategies for the NUCON<sup>®</sup> VAU FY 2019 scope. One of the identified risks is whether the VAU has sufficient capacity to treat BY-108 vapors to safe levels in the work space if operating multiple tanks. It was confirmed that the current capacity of the VAU (50 cubic feet per minute [cfm]) should be sufficient to draw a measurable vacuum from one tank; however, it may not be sufficient for multiple tanks. The VAU design was evaluated to accept a larger diesel generator (up to 145 cfm), but it was ultimately determined that a flexible VAU system may affect its efficiency. Therefore, it was decided to design the next generation VAU for a capacity of 50 cfm.

#### **PNNL:**

- Demobilized the NUCON<sup>®</sup> VAU used to support the engineering-scale test, and shipped the unit back to NUCON<sup>®</sup>.
- Received the final results of the off-line samples taken during the engineering-scale test and compared them to the on-line



results. The results were included in the first draft of the *NUCON® Vapor Abatement Unit Performance on Hanford Tanks Farm Chemicals of Potential Concern* report currently in review.

## **Strobic®<sup>2</sup> Air Tri-Stack**


### **1<sup>st</sup> Quarter Summary:**

FY 2018 saw completion of both the factory acceptance test and full-scale off-site demonstration test. The unit is being evaluated for future use and updates will be provided when additional information is available.


## **AP Farm Ultra-Violet Fourier Transformer Infrared Spectrometer (UV-FTIR)**

### **1<sup>st</sup> Quarter Summary:**

The goal for FY 2019 is to turn over the AP Farm UV-FTIR to Operations. Below is a summary of what was accomplished in the 1<sup>st</sup> Quarter:

 **Ammonia-Only Turn over:** A number of parallel activities are being prepared in support of the ammonia-only turn over and are discussed below:

- Started designing the bottle racks installation.
- Started reviewing the ammonia-only results and continued interim reliability Operational Acceptance Test (OAT) testing.
- Started the no-gas OAT.
- Instrumentation and Control Engineering continued developing the IDMS interface, and continued reviewing the UV-FTIR software installation plan.
- Continued preparing the maintenance and operating procedures.
- Continued compiling evidence to support the readiness of the UV-FTIR to Operations.

 **Multi-Gas Only Turn over:** A number of parallel activities are being prepared in support of the multi-gas only turn over, including:

- Preparing the OAT procedure to support testing.
- Procuring permeation tubes for calibration and testing.
- Compiling evidence to support the UV-FTIR-to-Operations readiness.

## **Continuous Emissions Monitor Sampler**




### **1<sup>st</sup> Quarter Summary:**

The Continuous Emissions Monitor Sampler, previously called the Autosampler, is scheduled for modification in FY 2019. In October, the contracts were prepared and issued. In November, the scope and schedule for the work were finalized. In December, the work activities were started.

## **Stack Monitor Turnover/VMDS Upgrade**

### **1<sup>st</sup> Quarter Summary:**

In FY 2018, VMDS stack monitors were installed on the AW, AX (2), AN, and 702-AZ exhausters. The goal for FY 2019 is to turn over the monitors to Operations. Below is a summary of the accomplishments realized in the 1<sup>st</sup> Quarter:




-  **Set-point Calculation:** The sub-contract for the set-point calculation was awarded to ARES. ARES started preparing the draft calculations for all the farms in November.
-  **Test Requirements:** Test requirements and OATs for all the farms were started in November.
-  **AX Farm Stack Monitors:** The test plan supporting the interim OAT was drafted; the software development test matrix was started too.

In addition to the turn over activities, the design work for the installation of the ultra violet-differential optical absorption spectrometer stack (UV-DOAS) monitor in A Farm continued.

## **Public Address System (PA)**

### **1<sup>st</sup> Quarter Summary:**

FY 2018 saw the installation and turnover of the west and east area tank farms public address (PA) systems. The focus in FY 2019 is to install all the reader boards associated with the PA system. Below is a summary of the accomplishment of the 1<sup>st</sup> Quarter:

-  **October:** Excavation of the reader board sites was begun. The concrete foundations were placed and backfilled.
-  **November:** All the excavation and foundation work was completed, and approximately 70 percent of the reader boards were installed.
-  **December:** Seventy-five percent of the reader boards were installed (**Figures 8-10**), including the separate solar panels.



***Figure 8. Reader Board and Solar Panel Installation – December 2018 (Photo courtesy of Bobby Nelson.)***

**Figure 9. (Right)  
Reader Board  
and Solar Panel  
Installation  
Complete –  
December 2018  
(Photo courtesy of  
Bobby Nelson.)**





**Figure 10. (Left)  
Complete Reader Board  
and Solar Panel – Rear View –  
December 2018 (Photo courtesy of  
Bobby Nelson.)**

## **SST Farm Automation**

### **1<sup>st</sup> Quarter Summary:**

The purpose of the single-shell tank (SST) Stewardship Program is to identify and evaluate the procedures required for entry into the SSTs, and to determine whether those requirements can be eliminated or reduced. The goals for FY 2019 are to install the remote monitoring equipment at both TY and TX Farms with turn over to Operations. Below is a summary of what was accomplished in the 1<sup>st</sup> Quarter:

-  **SST Remote Monitoring Equipment:** Veolia Nuclear Solutions (VNS) was sub-contracted to perform the work early in the quarter. VNS performed design validations in TX/TY Farm on the liquid-level electrical and mechanical design modifications which were completed in December.
-  **T-Complex Field Construction:** In the 1<sup>st</sup> Quarter, the statement-of-work (SOW) was developed for the T Complex construction (installation) award. The draft SOW was completed in December and will be routed for approvals during the 2<sup>nd</sup> Quarter of FY 2019.

## **FFAPR and PAPR**

### **1<sup>st</sup> Quarter Summary:**

Due to a recurrence of carbon dust from the Scott 7422-SC1 and SD-1 air-purifying respirator cartridges, a Stop Work was put in place in September 2018. All Scott 7422-SC1 and SD1 cartridges were immediately sequestered, and WRPS initiated consideration of other air-purifying cartridges as replacements for Scott products. Stoneturn Consultants (STC), in concurrence with WRPS, stated that Mine Safety Appliances Company (MSA) GME and GME-P100 air purifying cartridges are a protective equivalent to the Scott cartridges for RC1 and RC2 tasks. Accordingly, WRPS trained workers on MSA RPE in a phased manner and procured necessary equipment to implement the STC-concurred path on the use of MSA APR cartridges: GME and GME-P100. MSA APRs were implemented at the SY Farm on Dec 4. The rest of the targeted farms will be on a rolling basis, with deliberation based on availability of equipment and ongoing needs. The required respiratory procedures and forms have been updated and the MSA cartridges have arrived, but the masks have not yet arrived (**Figure 11**). Therefore, limited implementation began the week of December 3, 2018 in SY Farm, with the other actively ventilated farms to follow.





**Figure 11. Mine Safety Appliances (MSA) Ultra Elite Face Piece Ensemble (Photo courtesy of R. Ganapathy.)**



### 3. Information Sharing/Communication

#### Chemical Vapors Solution Team (CVST) Meetings

##### 1<sup>st</sup> Quarter Summary:

###### **October 2018:**

The CVST held a meeting on October 10, 2018. The meeting focused on several areas, including FFAPRs, NUCON<sup>®</sup>, HPMC updates and CVST Sub-team meeting updates.

###### **November 2018:**

The CVST held a meeting on November 28, 2018. The meeting focused on several areas, including:

- A discussion by Rob Cantwell, ESH&Q Manager, on the Settlement Agreement (SA).
- A discussion on the status of FFAPR implementation.
- A discussion on the ongoing implementation and use of the ToxiRAE personal lapel monitor.
- A discussion by Mr. Ron Calmus, Vapor Technology Solutions Manager, on vapor detection at the Hanford Site.
- An update from Mr. Jeff Peterson from Technical & Support Staff Training on the upcoming changes to the *Chemical Worker Tier 1, 2, and 3* courses.
- A discussion lead by Mr. Dan Wolf, Production Operations Safety and Health – East Manager, on the odor event outside of AW Tank Farm. Three employees reported an odor while performing electrical work.
- An update from Dr. Sandy Rock from HPMC on the *2017 Worker Health Trending Report* which is issued and on the website. He also reported on the 2018 report, which is forthcoming.

###### **December 2018:**

The CVST did not hold a meeting in December 2018.

#### CVST Sub-team Meetings

##### 1<sup>st</sup> Quarter Summary:

###### **October 2018:**

- Communications Sub-team: October 29, 2018
- New Technology Sub-team: No Meeting in October
- Fugitive Emissions Sub-team: October 17, 2018
- Chemical Cartridge Sub-team: October 3 and 17, 2018

#### **November 2018:**

- Communications Sub-team: November 12, 2018
- New Technology Sub-team: No November Meeting
- Fugitive Emissions Sub-team: No November Meeting
- Chemical Cartridge Sub-team: No November Meeting

#### **December 2018:**

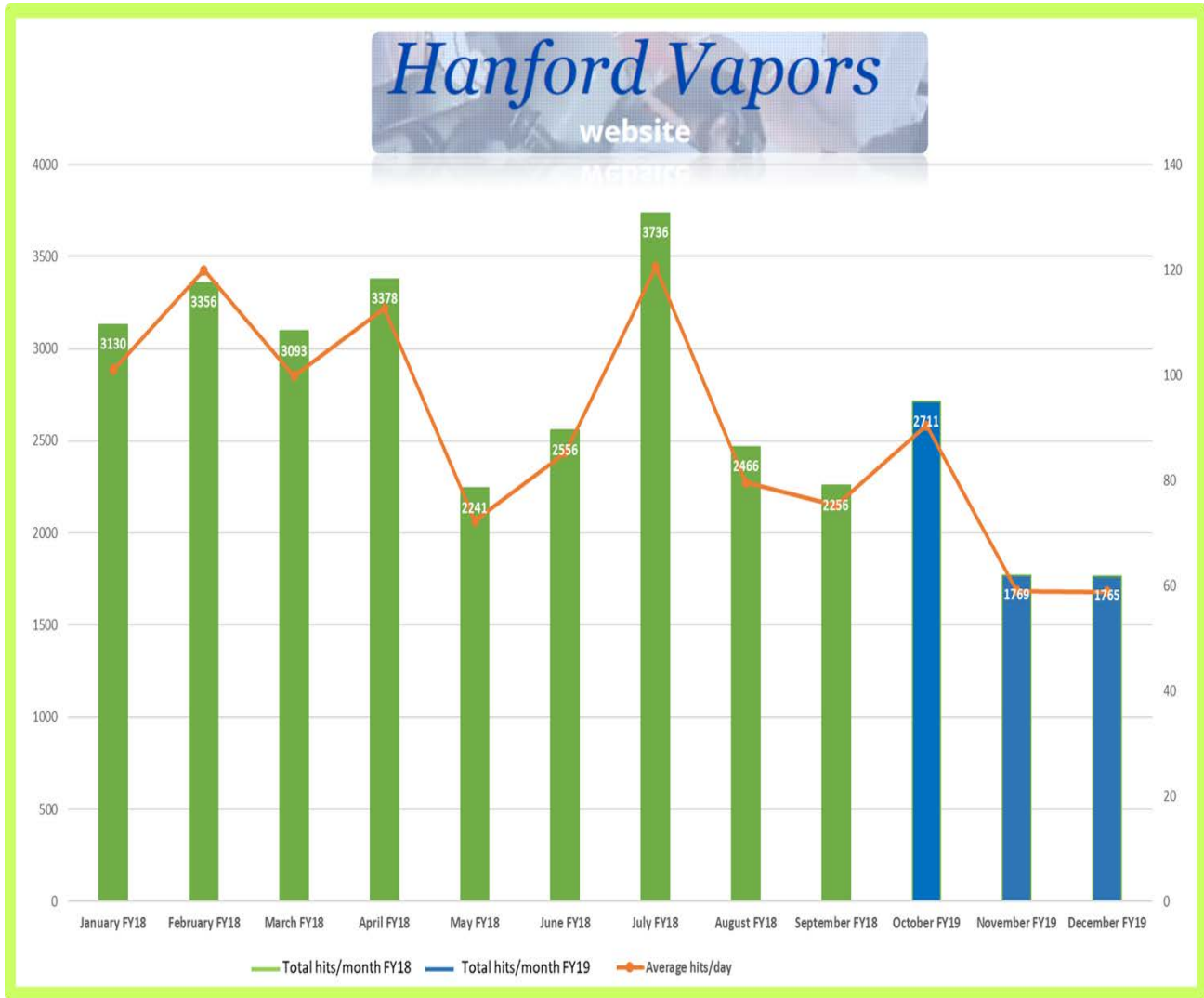
- Communications Sub-team : December 17, 2018
- New Technology Sub-team: No December Meeting
- Fugitive Emissions Sub-team: No December Meeting
- Chemical Cartridge Sub-team: December 5, 2018

### **HanfordVapors.com Metric**

#### **1<sup>st</sup> Quarter Summary:**

The Hanford Vapors website logged over 6,245 views in the 1<sup>st</sup> Quarter of FY 2019. In this reporting period, the website experienced an average of 2081 hits per month, and 70 hits per day.

The quarterly and average monthly readership data for the 1<sup>st</sup> Quarter of FY 2019 decreased by approximately 25 percent from the 4<sup>th</sup> Quarter of FY 2018. The number of hits on the website pages shows a moderate decrease in October, but November and December held steady at approximately 1,750 views. **Figure 12** shows the number of views logged over the past 12 months. The website's high traffic days continued to correlate to the publication of anticipated documents like the *CPPO Weekly Report* and the Settlement Agreement, and odor events.



**Figure 12. 1st Quarter FY 2019 - Hanford Vapors Website – Total Hits**

Ninety-four items, listed below in **Table 1**, were reported as uploaded to the site during the 1<sup>st</sup> Quarter, about two-thirds more than the previous quarter. This is primarily due to the significant number of [Vapor Settlement Agreement](#) documents. In the agreement, WRPS agreed to post to the public website a collection of documents, linked [here](#).

**Table 1. HanfordVapors.com Website Posts – 1st Quarter FY 2019**

A-6004-101, Job Hazard Analysis Checklist	TFC-ESHQ-S_IH-C-05, Respiratory_Protection
FAQ – September 20, 2018	TFC-ESHQ-S_IH-C-07, Heat_Stress_Control
PNNL-27816 NUCON Report Summary	TFC-ESHQ-S_IH-C-17, Employee Job Task Analysis
Problem Evaluation Requests Monthly Reports – October 2018	TFC-ESHQ-S_IH-C-46, Industrial Hygiene Reporting and Records Management
A-6005-593_Rev_4_Respiratory Protection Form	TFC-ESHQ-S_IH-C-47, Chemical Management Process
A-6005-827, Technical Procedure GHA Determination	TFC-ESHQ-S_IH-C-48, Managing_Tank_Chemical_Vapors
A-6007-360, Preventive Maintenance GHA Determination	TFC-ESHQ-S_IH-C-52, Asbestos Exposure Control and Management
Airline Equipment Evaluation	TFC-ESHQ-S_IH-C-53, Occupational Noise Exposure Control and Hearing Conservation
ARPA Posting Commitment Statement	TFC-ESHQ-S_IH-C-54, Laser Safety
CPPO FY18 Annual Summary	TFC-ESHQ-S_IH-CD-38, Evaluation and Procurement of Industrial Hygiene Monitoring Instruments
CPPO Weekly Report – September 13, 2018	TFC-ESHQ-S_IH-D-49, Using Office Ergonomic Assessment Tools
CPPO Weekly Report – September 20, 2018	TFC-ESHQ-S_IH-P-11, Industrial Hygiene Equipment Management
CPPO Weekly Report – September 27, 2018	TFC-ESHQ-S_IH-STD-03, Ergonomics

CVST Meeting Agenda – October 10, 2018	TFC-ESHQ-S_IH-STD-68, Respirable Silica Exposure Control
CVST Meeting Agenda – September 5, 2018	TFC-ESHQ-S_IS-C-02, Personal_Protective_Equipment
CVST Meeting Agenda 11282018	TFC-ESHQ-S_SAF-C-02, Job_Hazard_Analysis
DOE RL-92-36, Rev 1 HR_CHAPTER_03	TFC-OPS-MAINT-C-01, Tank Operations Contractor Work Control
DOE-0359, Rev 2 Hanford Site Electrical Safety Program	TFC-OPS-MAINT-C-02, Pre-Job Briefings and Post-Job Reviews
DOE-343, Rev 3 Hanford Site Stop Work Procedure	TFC-OPS-MAINT-STD-02, Work Planning and Work Instruction Development
EIR-2018-039 (10/24/2018)	TFC-OPS-OPER-C-67, Response to Readily Apparent or General Purpose Facility Odors
Former Worker Medical Screening Program Link	TFC-PLN-01, Integrated Safety Management System
Former Worker Medical Screening Program Link	TFC-PLN-34, Industrial Hygiene Exposure Assessment Strategy
Hanford Vapors Update 11012018	TFC-PLN-41, Integrated Safety Management System Description
NUCON new landing page and image	TFC-PLN-55, Industrial Hygiene Program
NUCON New Landing Page and Image	TFC-PLN-91, Industrial Safety Management Program Plan
Odors Reported Outside of AP Farm – October 5, 2018	TFC-POL-16, Integrated Safety Management System Policy
Odors Reported Outside of U Farm – October 24, 2018	TVIS-A-001
PNNL-27816 NUCON Report	TVIS-AN-001
PNNL-27816 NUCON Report	TVIS-AP-001
PNNL-27816 NUCON Report Summary	TVIS-AW-001
PNNL-SA-139959 NUCON Test Plan TP-71248-001	TVIS-AX-001










Problem Evaluation Requests Monthly Reports	TVIS-AY-AZ-001
Problem Evaluation Requests Monthly Reports – November 2018	TVIS-B-001
Return to Work Policy	TVIS-BX-001
TF-AOP-015 G3 Response to Reported Odors or Unexpected Changes to Vapor Conditions	TVIS-BY-001
TFC-ENG-DESIGN-C-35, Process Hazard Analysis Determination and Technique Screening	TVIS-C-001
TFC-ENG-DESIGN-C-47, Process Hazard Analysis	TVIS-S-001
TFC-ENG-SB-C-06, Safety Basis Development	TVIS-SX-001
TFC-ESHQ-IH-STD-01, Cold Stress	TVIS-SY-001
TFC-ESHQ-IH-STD-03, Exposure Monitoring, Reporting, and Records Management	TVIS-T-001
TFC-ESHQ-IH-STD-08, Lead Control Program	TVIS-TX-001
TFC-ESHQ-IH-STD-11, Carcinogen Control	TVIS-TX-001
TFC-ESHQ-IH-STD-13, Illumination	TVIS-TY-001
TFC-ESHQ-IH-STD-14, Prevention of Illness From Hazardous Biological Agents	TVIS-TY-001
TFC-ESHQ-RP_RWP-C-03, ALARA Work Planning	TVIS-U-001
TFC-ESHQ-RP_RWP-C-04, Radiological Work Permits	Vapors FAQ 09202018



## CPPO Notebook Metric

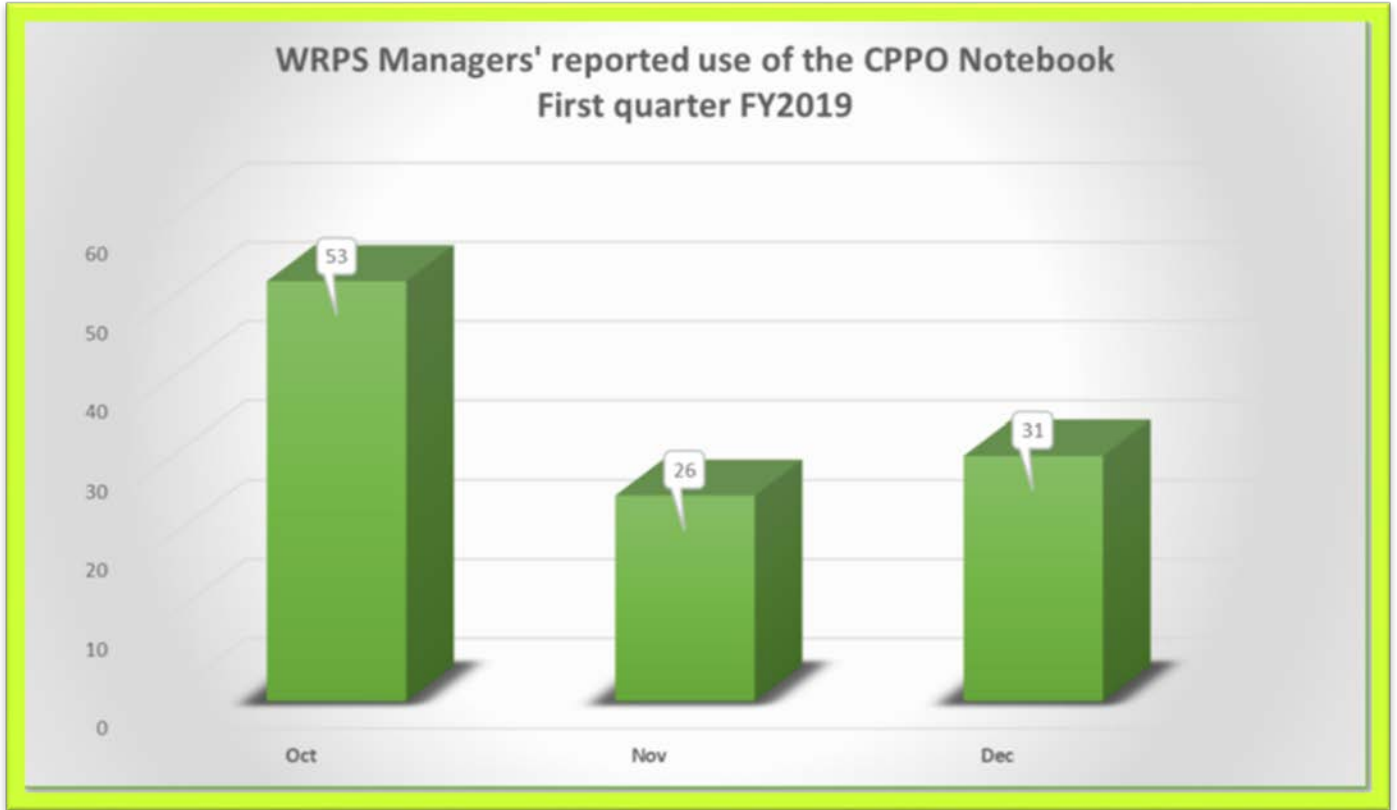
### 1<sup>st</sup> Quarter Summary:

The *CPPO Notebook* was developed as an additional mechanism for managers to share vapors-related information with the workforce. It is delivered on a weekly basis in multiple formats, including a one-sheet summary of the weekly topic, a PowerPoint presentation (with speaker notes), and a video narrated by a technical expert. The following nine notebooks were distributed in the 1<sup>st</sup> Quarter of FY 2019 on a range of topics, including:

-  Air monitoring results from the 242-A Evaporator Campaign (EC-08)
-  An update on the new IH workspace and IH training
-  Atmospheric effects on tank vapors
-  Industrial Hygiene work permits
-  NUCON diesel abatement unit engineering scale test
-  Strobic air system full-scale demonstration test
-  Tank Farms Event Notification System
-  ToxiRAE ammonia monitor
-  Update on A-Farm exhauster installation activities.

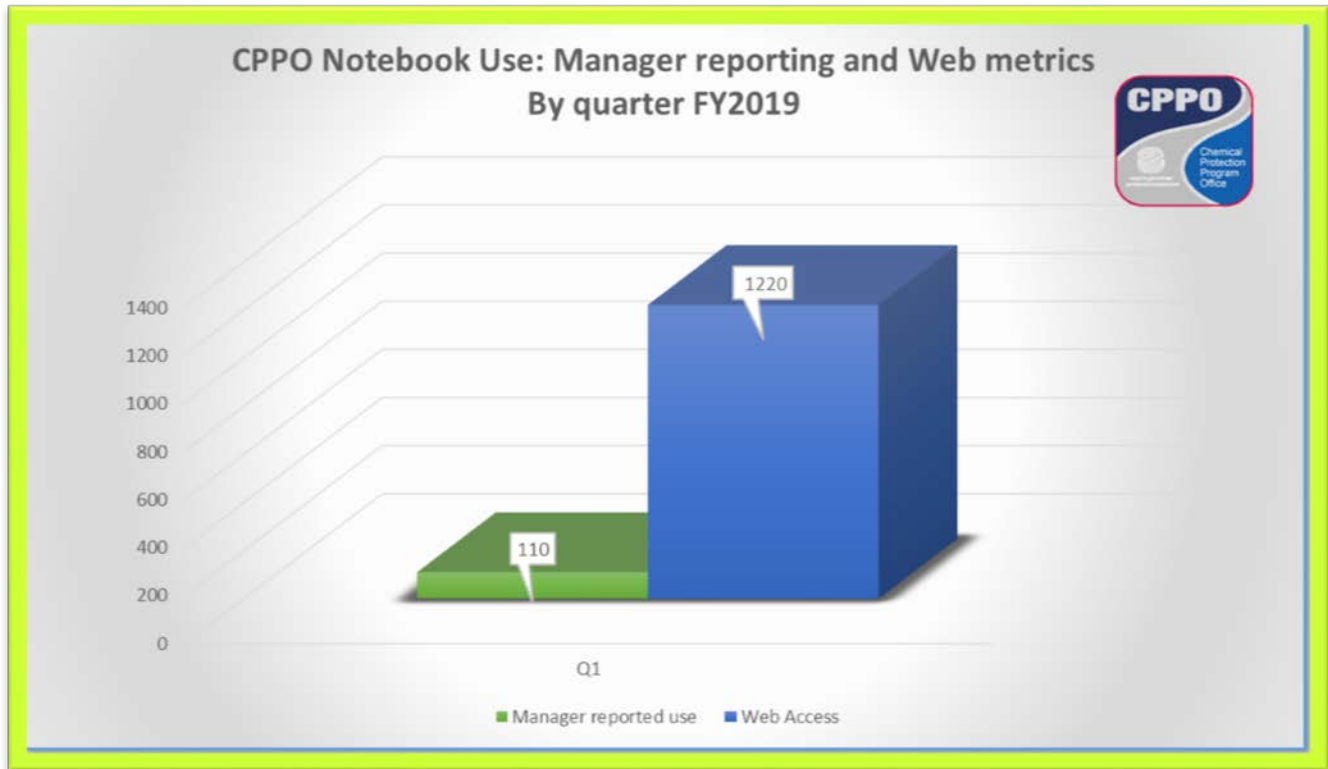
Management's use of the notebook is determined through self-reporting via a yes/no button that is provided as part of the distribution email. In the 1<sup>st</sup> Quarter of FY2019, the notebook was reported to have been used 110 times, decreasing from the previous quarter (258 for Q4 FY 2018). **Figure 13** shows the utilization of the *CPPO Notebooks* during the 1<sup>st</sup> Quarter of FY 2019. Some of this can be attributed to the distribution of fewer notebooks in both November and December due to holiday-related facility closures.

The use of the notebook is a lagging indicator; older editions are often used throughout the year. The *CPPO Notebooks* are also posted on the WRPS internal website, accessible through the Vapors Protection tab, and from the CPPO and CVST webpages. The web data includes all editions of the notebook viewed during the 1<sup>st</sup> Quarter, regardless of when they were originally distributed.



**Figure 13. CPPO Notebook Use – 1st Quarter FY 2019**

**Figure 14** shows both the number of times managers reported using the notebooks this quarter, and the number of times the narrated notebook files accessed from the intranet. Both are down by approximately 40 percent from last quarter.



**Figure 14. CPPO Notebook Use – Managers and Web Access – 1st Quarter FY 2019**

## CPPO Requests and Production Metrics

### 1<sup>st</sup> Quarter Summary:

The CPPO routinely summarizes complex, technical vapors-related information for a general audience and has provided monitoring results, report summaries, presentations, a weekly report on WRPS vapors activities, and other information for distribution through established communication mechanisms such as the *Solutions* newsletter and the HanfordVapors.com website.

At the end of the 1st Quarter, 136 vapors-related communications products were completed by the CPPO. The total number of items completed are shown in **Table 2**. The products provided in the 1<sup>st</sup> Quarter consisted of the CPPO external website requests and updates, field visits, and presentations.

The CPPO tracks the distribution of all identified vapors-related communications throughout WRPS. The data for the 1st Quarter FY 2019 is shown in **Table 3**. The total number of vapors-related communications distributed to the workforce is 1361 in a variety of formats, a fewer number than the last quarter of FY 2018 at 1568. The Morning Meeting/Pre-Shift Briefs, a meeting field managers hold with the workforce, comprise the majority of communication events, followed by HanfordVapor.com updates and the *CPPO Notebooks*. Other events occur less frequently, such as the CVST Meetings and all-employee messages, but provide targeted vapors-related information to the workforce.

Observable this quarter is an overall reduction in vapors-related communications, both in delivery and use. As noted above, some of this may be attributable to the facility-closure and/or reduced staffing over the holidays. It may also be that fewer vapors concerns are expressed in the winter months – this merits continued tracking to ensure that WRPS continues to provide timely and transparent vapors-related information to the workforce on an ongoing basis.

**Table 2. CPPO Vapors Information Products FY 2019**

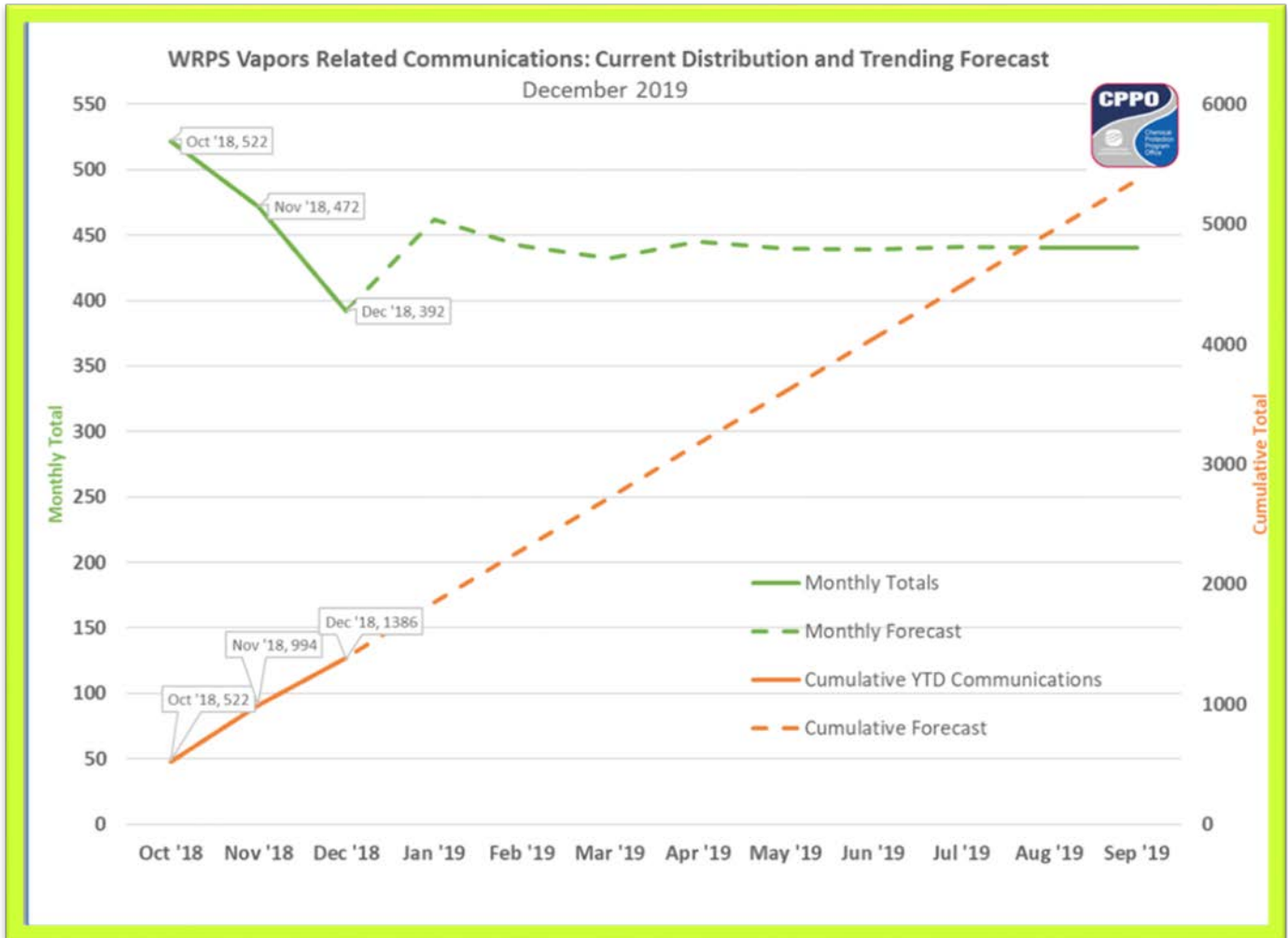
CPPO Vapors Information and Engagement Activities FY19	October	November	December	FY19 Q1 Total
Presentations (includes CPPO Notebook and CVST)	4	4	2	10
CPPO Reports and Monthly/Quarterly/Annual Report	1	1	1	3
Articles, Summaries, and Message Maps	4	2	0	6
Surveys, Focus Groups, and Recommended Actions	1	1	0	2
Website Requests/Site Updates	10	76*	8	94
Videos	0	0	0	0
Field Visits	3	4	7	14
Chem. Worker Training Support	3	3	1	7
<b>Monthly Totals</b>	<b>26</b>	<b>91</b>	<b>18</b>	<b>136</b>

\*Settlement Agreement Documents

**Table 3. WRPS Vapors Information Distribution Avenue – FY 2019**

WRPS Vapors Information Distribution Avenue	October	November	December	FY19 Q1 Total
All Employee Email/Meetings & ESHQ Comm.	7	2	4	13
CPPO Notebook*	43	25	20	88
CPPO Report and Weekly Report	1	1	1	3
Fact Sheet & Information	0	0	0	0
Meeting - CVST *	1	1	0	2
Meeting - CVST Sub-team meeting *	1	0	2	3
Meeting - Hanford Advisory Board Briefing *	0	0	0	0
Meeting/Briefing*	5	0	6	11
Meeting -Morning/Pre-Shift Brief*	437	345	343	1125
Presentation*	0	0	0	0
Safety Start	2	2	1	5
SOEN	2	3	3	8
Solution Article	3	2	3	8
Survey and Focus Group	0	0	0	0
Tours*	0	0	0	0
Vapors Weekly Update or Website Post	11	76	8	95
Video	0	0	0	0
<b>Monthly Totals</b>	<b>513</b>	<b>457</b>	<b>391</b>	<b>1361</b>

**Figure 15** depicts the current distribution and trending forecast for FY 2019 WRPS vapors-related communications. At the current rate of distribution, WRPS is set to exceed 5000 vapors-related communications to the workforce by the end of FY 2019.



**Figure 15. WRPS Vapor Related Communications Distribution/Trending Forecast Avenue – FY 2019**



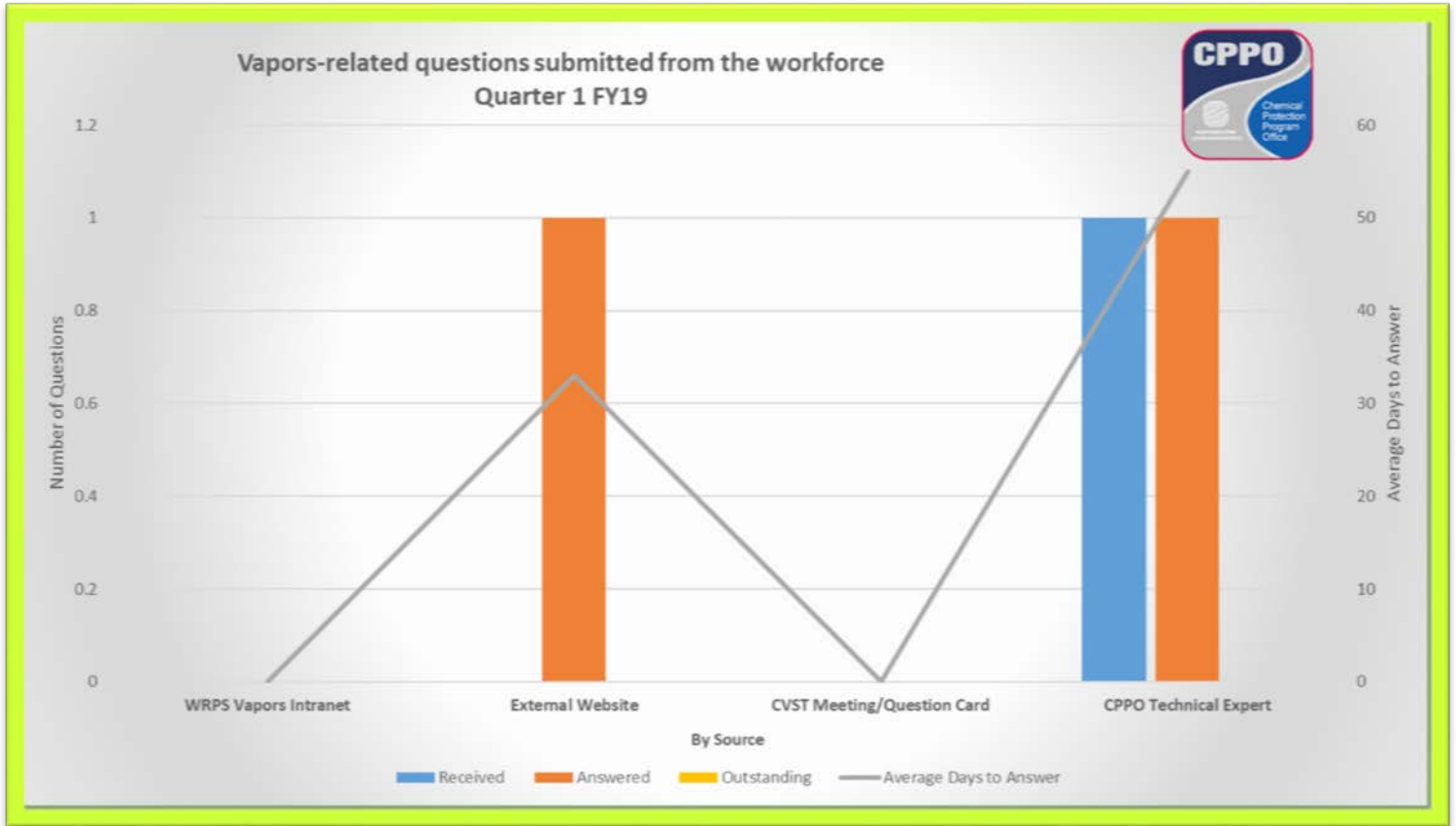
## **Chemical Protection Engagement: Vapors-Related Questions**

### **1st Quarter Summary:**

WRPS established several avenues from which workers can pose vapors-related questions. The WRPS internal website includes a Vapors Protection tab that includes an *Ask Us* link. The CPPO manages the resolution of these submittals. The external HanfordVapors.com website also has a prominent *Contact* tab that provides the user with a mechanism to send a message or ask a vapors-related question. C&PR manages the resolution of these submittals, working with CPPO SMEs. CVST meetings offer another opportunity for workers to ask questions related to vapors, either in person at the meeting, through the use of question card boxes stationed at the meeting, or a follow-up email related to meeting content. The CVST Co-chair coordinates responses to these questions. Finally, questions may be posed directly to a technical expert within the CPPO, either through email or a face-to-face exchange in the field.

The concerted effort that is made to capture the questions and track them through to resolution is reflected in **Figure 16**. The figure provides the total number of questions, and average days to answer them for each question received. Since the numbers are small, the vapors questions are aggregated and reported on a quarterly basis. In the 1st Quarter, one question was received through these channels, compared to 10 questions in the 4th Quarter of FY 2018. Two questions were answered during the reporting period. No questions remained outstanding at the end of the 1st Quarter.

The two avenues from which questions originated this quarter are the external website and the CPPO technical expert engagements. The CPPO technical experts interface with the workforce through multiple worker engagement activities, including site visits with field teams and CTEH toxicologist participation in *Chemical Worker Training*. These interface opportunities provide the workers opportunity to raise vapor related questions that they may not otherwise ask. Additionally, as the CPPO refines the process for receiving and answering questions, the response time is expected to drop. The weighted average for time to answer all questions this quarter was 44 days.



**Figure 16. The 1<sup>st</sup> Quarter Vapors-Related Questions and Days to Answer**

## WRPS Vapors Communications

### **1<sup>st</sup> Quarter Summary:**

October 3, 2018, Industrial Hygiene Communication:

**Subject:** SY, AP, and AN Tank Farm FFAPR Use Update

“Full Face Air Purifying Respirators (FFAPR) was authorized for low-hazard work (Risk Classification [RC] 1 and RC 2) in SY, AP, and AN Tank Farms in December 2017, June 2018, and September 2018 respectively.”

October 4, 2018, All WRPS employees email:

**Subject:** “Odors reported at AP Farm”

“Two Hanford workers declined precautionary medical evaluation this morning after reporting odors at AP Farm. The employees were monitoring farm conditions from the AP Farm instrument building. They were not in an area that requires use of a supplied-air respirator. Workers were instructed to leave the area, and access to the area was restricted.”

October 4, 2018, Hanford Vapors:

**Subject:** None

“Two Hanford workers declined precautionary medical evaluation this morning after reporting odors at AP Farm. The employees were monitoring farm conditions from the AP Farm instrument building. They were not in an area that requires use of a supplied-air respirator. Workers were instructed to leave the area, and access to the area was restricted.”

October 8, 2018, Solutions, Issue 455:

**Subject:** “222-S Lab completes HVAC upgrade”

**Subject:** “CPPPO Notebook published on ToxiRAE”

October 9, 2018, Industrial Hygiene Communication:

**Subject:** “FFAPR Path forward”

WRPS is actively working with SCOTT and NIOSH to resolve the carbon dust issue associated with the SCOTT full-face air purifying respirator (FFAPR) cartridges. In addition, we have been working with the third party independent cartridge testing experts, Stoneturn Consultants (STC) on the issue. STC has recommended WRPS consider filter cartridges from other manufacturers, if the manufacturer can supply breakthrough data for ammonia at various concentrations, temperatures and humidity levels. We have been in contact with MSA and are working with them and STC to gather the necessary data to determine if we can move forward with MSA full-face respirators. We were planning to continue the rollout of FFAPR use to the remaining actively ventilated farms starting Tuesday October 16, 2018. Unfortunately, we are having to postpone the rollout until we resolve the issue with carbon dust from SCOTT brand respirator cartridges or identify an alternative manufacturer.

October 11, 2018, Industrial Hygiene communication:

**Subject:** “Monthly Routine Testing Results – Chemical (Anions) and Bacterial Testing – Respiratory Protection Equipment and Surfaces”

October 22, 2018, Solutions, Issue 457:

**Subject:** “ToxiRAE Pro selected by IH for ammonia monitoring”

**Subject:** “CPPPO Notebook published on results of air monitoring during evaporator campaign”

October 24, 2018, Shift Office Emergency Notification (SOEN) 9:17 am:

**Subject:** “Significant Operational Issues”

“Entered AOP-015 for odors reported outside of U Farm, access to U Farm from 16<sup>th</sup> St. is restricted.”

October 24, 2018, SOEN 10:44 am:

**Subject:** “Significant Operational Issues”

“Sample analysis for the TF-AOP-015 event has been completed and the results are at or below background levels. Exiting TF-AOP-015.”

October 24, 2018, All WRPS employee email:

**Subject:** “Odors reported outside U Farm”

“Six Hanford workers declined precautionary medical evaluation this morning after reporting odors outside the U Tank Farm.”

October 24, 2018, Hanford Vapors:

**Subject:** “Odors reported outside U Farm – Oct. 24, 2018”

“Six Hanford workers declined precautionary medical evaluation this morning after reporting odors outside the U Tank Farm.”

October 30, 2018, Industrial Hygiene communication:

**Subject:** “New Standard – TFC-ESHQ-IH-STD-07, Respiratory Protection”

“WRPS has an updated Respiratory Protection Program that went into effect this week.”

November 12, 2018, Solutions, Issue 460:

**Subject:** *CPPPO Notebook* on Strobic Air System testing published.

November 16, 2018, 11:17 a.m. Shift Office Event Notification:

**Subject:** Entering AOP-015 for odors reported on man-lift outside of AW Farm.

November 16, 2018, 1:32 p.m. Shift Office Event Notification:

**Subject:** Initiated Event Investigation for AOP-015 odors outside AW Farm.

November 16, 2018, 2:47 p.m. Shift Office Event Notification:

**Subject:** Exited AOP-015 for odors outside of AW Farm. IH sample results complete; no readings above background.

November 16, 2018, WRPS Communications & Public Relations:

**Subject:** Odors Reported outside of AW Farm

November 27, 2018, All-Employee Email, WRPS Training:

**Subject:** Chemical Worker Training Program Change

The full text of the all-employee email is available [here](#).

December 3, 2018, Solutions, Issue 462:

**Subject:** “New air-purifying respirators being implemented in SY Farm”

**Subject:** CPPO Notebook on Industrial Hygiene Work Permits

December 3, 2018, Industrial Hygiene Flash:

**Subject:** “APR Restart with MSA Face Pieces and Cartridges”

December 5, 2018, Industrial Hygiene Flash:

**Subject:** “Upcoming AP Exhauster Primary Ventilation Vapor Exclusion Zone Change”

December 7, 2018, Shift Office Event Notification, 1:21 p.m.:

**Subject:** Entered AOP-015 for odors reported outside SX Farm Change Trailer. Area is restricted unless authorized by CSM.

December 7, 2018, Shift Office Event Notification, 3:27 p.m.:

**Subject:** Initiated Event Investigation “SX Farm Change Trailer AOP-015 Event.”

December 7, 2018, Shift Office Event Notification, 3:52 p.m.:

**Subject:** Sample analysis for the TF-AOP-015 event has been completed and the results are below action limits. Exiting TF-AOP-015.

December 10, 2018, Solutions, Issue 463:

**Subject:** CPPO Notebook on Atmospheric Effects on Tank Vapors

December 10, 2018, WRPS Communications and Public Relations:

**Subject:** “Odors reported outside SX Farm change trailer”

December 17, 2018, Solutions, Issue 464:

**Subject:** “New air-purifying respirators being implemented in SY Farm”

**Subject:** CPPO Notebook on Update on the A Farm Exhauster Installation Activities


December 17, 2018, Industrial Hygiene communication:

**Subject:** ToxiRAE Personal Ammonia Sensor Implementation

## Engagement/Site Visits

### 1<sup>st</sup> Quarter Summary:

Early in FY 2018, CPPO completed an employee vapors information effectiveness survey, which found that a majority of the workforce were either unaware of CPPO's job scope or unaware of some of the vapors-related information available. In reviewing the survey results at a CPPO/HAMTC Safety Representative Interface Meeting, it was suggested that CPPO visit the WRPS teams to educate the workforce about CPPO. A dozen teams on site hosted CPPO during plan-of-the-day and morning shift meetings. This workforce engagement activity is an FY 2019 CPPO priority, and will be reported in the *Monthly Report*. Also, the HAMTC Safety Representatives requested that the interface meeting be held three times a month instead of four.

 **October:** CPPO SMEs routinely engage with groups of workers face-to-face to discuss with them the latest tank vapors communications efforts, as well as to answer questions posed by the workers, including the following:

- October 3, 2018: CPPO/HAMTC Safety Representative Meeting.
- October 4, 2018, Dr. Chris Kuhlman met with IH supervisors and other IHTs in 2704HV. They discussed ongoing APR analysis by STC, Scott, and PNNL. They also discussed the ToxiRAE ammonia monitors and workers' questions about the instruments' alarm set points, action levels, and OELs.
- October 11, 2018: Drs. Chris Kuhlman and Angela Perez (CTEH) met with workers at the AP-103 jumper repair pre-job, where they discussed factors of the work that could result in potential vapor exposures. The toxicologists also met with a group of HAMTC Safety Representatives, where a discussion was held regarding FFAPR filter cartridge dust releases.
- October 29, 2018: Dr. Mike Lumpkin (CTEH) attended a pre-job meeting and visited the change trailers at the BY Farm. An issue arose in which rubber pipes used to exhaust electrical generator exhaust were emitting burnt rubber-like odors. The project IHTs and Dr. Lumpkin together explained to workers that volatile compounds coming from the pipes could be smelled at levels much lower than the direct-reading instrument's detection limit, but were present at levels thousands of times lower than levels that would affect health.
- October 30, 2018: The CPPO team visited the 222-S lab. Five people attended. A very interactive Q&A session and feedback session occurred. The 222-S workers were very impressed with the layout of both the Vapors Protection and CPPO websites



(i.e., it was easy to find information). There were also discussions on technology development (i.e., NUCON, Strobic) and insight into how vapors affects 222-S personnel.

- See [Chemical Worker Training](#) for details on additional workforce engagements.

✚ **November:** CPPO SMEs routinely engage with groups of workers face-to-face to discuss with them the latest tank vapors communications efforts, as well as to answer questions posed by the workers, including the following:

- November 7, 2018: Dr. Mike Lumpkin, along with other CPPO team members and IPT staff, met with HAMTC Safety Representatives. Discussed were the new technologies slated for rollout in the near future, as well as the need to clearly communicate the significance of the new technology to keep and help workers feel safe.
- November 14, 2018: CPPO/HAMTC Safety Representative Meeting.
- November 28, 2018: CPPO/HAMTC Safety Representative Meeting.
- See [Chemical Worker Training](#) for details on additional workforce engagements.

✚ **December:** CPPO SMEs and CTEH toxicologists routinely engage with groups of workers to discuss with them the latest tank vapors communications efforts, as well as to answer questions, including the following:

- December 4, 2018: The CPPO Team comprised of SMEs from Engineering, Operations, IH and CTEH's Dr. Angie Perez, attended the CPPO/HAMTC Safety Representatives Meeting. Several topics were discussed, including the anticipated date for PAPR use. Representatives commended the communication roll-out of the ToxiRAE information and recommended this model be used for future IH communications to the tank farm workforce.
- December 5, 2018: The CPPO Team and CTEH's Dr. Lumpkin met with 30 retrieval IHTs. CPPO representatives provided an overview of CPPO and where to find the communication materials produced by the group. The briefing was followed by a Q&A session, during which the workforce provided feedback to the CPPO team. It was noted that the majority of the IHT were unfamiliar with both the CPPO monthly report and the DAV tool, while about half were familiar with the CPPO notebooks. There was interest in the DAV tool, since it contained information that could be of use to the IHT and

workforce. There was a discussion on the rollout of the new personal ToxiRae unit.

- December 12, 2018: Drs. Kuhlman and Perez attended the pre-job meeting for a farm pit cleanout. The toxicologists spoke with workers about the pit cleanout Operations and other ongoing activities on site. Workers mentioned the previous periods of time in Hanford history where respiratory protection was not required and ammonia odors were frequently encountered in the farms. The toxicologists explained ammonia's warning properties and how it is one of the more abundant chemicals present in tank farm headspaces. The workers also discussed beryllium, as a beryllium work permit was issued for the pit cleanout. There was some discussion of difficulties with respirator masks not sealing properly on the face, especially by the eyes. Workers acknowledged that positive pressure SCBAs do offer a level of protection should face seals be momentarily disturbed.
- December 12, 2018: The CPPO Team comprised of SMEs from Engineering, Operations, IH and CTEH's Drs. Kuhlman and Perez attended the CPPO/HAMTC Safety Representatives meeting. There was a discussion regarding a potential data-gap in the analysis of metals (e.g., arsenic, aluminum, etc.) in dust and soil in the tank farms. It was discussed that the types of excavation performed in the tank farms does not produce significant levels of airborne dust; however, wind generated dust was brought up as a potential concern. It was discussed that workers continue to indicate they are unfamiliar with the *CPPO Notebooks*. It was proposed that CPPO representatives should focus on engaging supervisors to promote sharing these educational materials with the workforce. HAMTC representatives acknowledged that the CPPO Notebooks are very good, and that the answers to many of the questions they hear from workers are in these notebooks (such as questions regarding real-time instrumentation's capabilities to detect COPCs). There seemed to be a common theme that the workforce may appreciate seeing more data from IH sampling and monitoring activities in addition to hearing that all results were non-detect or below action levels. The DAV tool was brought up as a useful source of data for the workforce, and it was agreed that increasing awareness of this tool would be helpful. The group wanted to discuss beryllium concerns which are outside the purview of the CPPO SMEs. The concerns were shared with IH including their interest in better understanding the basis of the beryllium: radiation ratio used to guide beryllium sampling in the tank farms. A question was raised

whether there are plans to actively ventilate more of the SST Farms.

- December 17, 2018: Dr. Kuhlman attended the CVST Communications Sub-Team Meeting. Multiple topics were discussed, including a request for more outreach on information regarding the delay in air purified respirator deployment following the carbon dust incidents and supplier change. There was some concern raised regarding whether the new cartridges would have the same performance as those previously tested. A suggestion was made that monthly/quarterly solutions article should be drafted that discusses the answers developed by SMEs for questions received during site engagements. The CVAP communication plan was discussed. Another topic of discussion involved IH's plans to assess hazards associated with mixtures of tank farm COPCs.
- December 18, 2018: The CPPO Team comprised of SMEs from Engineering, Operations, IH and CTEH's Dr. Kuhlman met with 13 retrieval IHTs. CPPO representatives provided an overview of CPPO and where to find the communication materials produced by the group. Those in attendance were unfamiliar with CPPO, but did recognize the name from emails received. Dr. Kuhlman gave an overview of the DAV tool and discussed why ammonia is a frequently monitored compound in the Hanford Tank Farms.
- December 20, 2018: CTEH's Dr. Kuhlman attended a scheduled pre-job meeting. He spoke with several workers at various tables in the room, however no vapor concerns were relayed by these workers.
- See [Chemical Worker Training](#) for details on additional workforce engagements.

## Focus Groups/Surveys

### 1<sup>st</sup> Quarter Summary:

#### October:

- The *FY 2018 WRPS Vapors-Information Worker Focus Group – Report Summary* was issued in October, and can be found on the internal website. The focus group's participants were Hanford Tank Farm field workers, the segment of the workforce most affected by chemical vapors. Participation was voluntary and specific responses are confidential. An action plan was developed to implement many of the recommendations, one of which was to include external references where appropriate in the *CPPO Notebooks*. Another

recommendation was to highlight the professional expertise of the technical staff who prepare and narrate the *CPPO Notebooks*.

- In October, the CPPO published the *Tank Operations Contract Chemical Protection Program Office Fiscal Year 2018 Annual Summary*. The report tracked the status of the CVAP KPPs. It can be found [here](#).
- In October, a new report format was developed for FY 2019 that realigned the information from reporting on CVAP KPPs to support the ‘outcomes’ of the CVAP. This approach will facilitate telling the integrated approach to chemical vapor hazard control.

#### **November and December:**

- To evaluate the effectiveness of vapor information resources to first line supervisors, CPPO will conduct two assessment activities in FY 2019. In November, focus group questions were drafted for discussion and review.

### **AOP-15 Events**

#### **1<sup>st</sup> Quarter Summary:**

##### **October:**

- On October 5, 2018, *Hanford Vapors* and an *All WRPS Employee Email* reported, “[t]wo Hanford workers declined precautionary medical evaluation this morning after reporting odors at AP Farm. Neither reported symptoms. The employees were monitoring farm conditions from the AP Farm instrument building. They were not in an area that requires use of a supplied-air respirator. Workers were instructed to leave the area, and access to the area was restricted. Industrial hygiene technicians gathered samples in the area. None of the monitoring and sampling results exceeded the action level for any chemical detected. Access to the area has been restored.”
- On October 24, 2018, *Hanford Vapors*, and an *All WRPS Employee Email* reported, “[s]ix Hanford workers declined precautionary medical evaluation this morning after reporting odors outside the U Tank Farm. None reported symptoms. The employees were performing maintenance on electrical distribution equipment. They were not in an area that requires use of a supplied-air respirator. Workers were instructed to leave the area, and access to the area has been restricted. Industrial hygiene technicians gathered samples in the area. None of the monitoring and sampling results exceeded the action level for any chemical detected. Access to the area has been restored.”

### 📅 **November:**

- On November 16, 2018, an *All WRPS Employee Email* reported, “[a] Hanford worker was released to return to work after undergoing medical evaluation for odors reported Friday morning outside of Hanford’s AW Farm. Three other workers also reported odors but declined precautionary medical evaluation.” Three Shift Operations Event Notifications (SOENs) were also published on November 16, 2018, describing the AOP-015 event.

### 📊 **External Assessments Recommendation Status**

The recommendations status columns in **Table 3** below are defined as follows:

- 📊 **Complete** - The scope and deliverable(s) (i.e. final report or documentation) addressing the recommendation is complete and closed. CPPO validated the deliverable(s) as complete.
- 📊 **Field Work Complete** - The scope addressing the recommendation is complete, but the final deliverable(s) is not complete (i.e. final report or documentation).
- 📊 **In Progress** - The scope addressing the recommendation is in progress.
- 📊 **Pending Validation** - Status of the scope addressing the recommendation and associated deliverable(s) is awaiting initial CPPO review.

CPPO validated that ninety-five (95) percent of the recommendations have been addressed by actions and/or deliverables that are either **Complete** or **Field Work Complete**. Of the 371 total recommendations:

- 📊 **Eighty-four (84) percent** have been verified Complete and are considered closed.
- 📊 **Eleven (11) percent** are verified as Field Work Complete and are awaiting final deliverables (i.e. documentation) to close.
- 📊 **Five (5) percent** have ongoing actions and are In Progress.

The majority of the remaining recommendations that are **In Progress** are scheduled to be completed in FY 2019. These recommendations are the final actions to complete the reader board testing for the PA system (February 2019), the VMDS to Operations in AW, AP, AY/AZ, AX, and AN Farms (April 2019), the Medical Operations Training Strategy MOP (May 2019), epidemiology study (June 2019), fugitive emissions (October 2019), CVAP external assessment (May 2020), and the aerosol studies (September 2020).

**Table 4. External Assessments Recommendations Status Table**

Report	As of December 31, 2018				
	Total	Validated Complete	Field Work Complete	In Progress	Pending
TVAT	117	99	10	8	0
OIG	3	3	0	0	0
NIOSH	54	43	9	2	0
EA-32	31	26	1	4	0
CTEH	24	22	1	1	0
VMEP I, II	67	60	5	2	0
Other	75	57	16	2	0
<b>Total</b>	<b>371</b>	<b>310</b>	<b>42</b>	<b>19</b>	<b>0</b>






**External Assessments Recommendations Status**



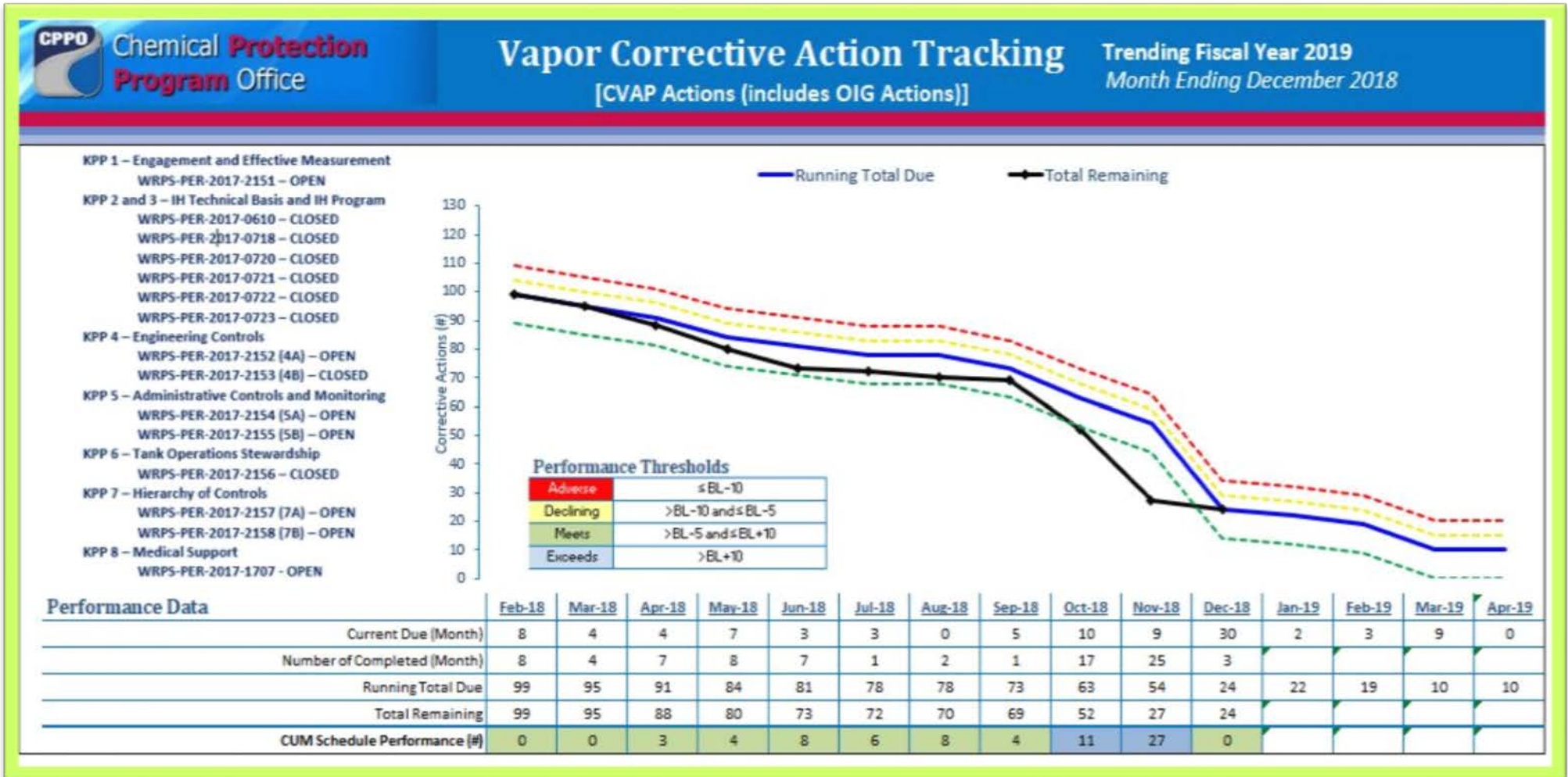
## **CVAP Corrective Actions Tracking Metric**

### **1<sup>st</sup> Quarter Summary:**

The CPPPO tracks vapor-related Problem Evaluation Requests (PER), with the goal of communicating PER resolution status. The performance data in **Figure 15** below are defined as follows:

-  **Current Due** – Current corrective actions due for the month
-  **Number of Completed** – Number of corrective actions completed for the month
-  **Running Total Due** – Total cumulative actions scheduled to be completed
-  **Total Remaining** – Total cumulative actions remaining to be completed
-  **Cumulative Schedule Performance** – Total cumulative actions to be completed to the Running Total Due

The 128 CVAP actions are captured in the PERs listed in **Figure 15** below, including the 3 Office of Inspector General (OIG) actions captured in WRPS-PER-2016-2433 thru 2435 and 4 Office of River Protection (ORP) Facility Representative Surveillance (17173-TF) actions captured in WRPS-PER-2018-0551 thru 0554. Sixty-three TVAT actions were completed during Phase I (FY2016) and the OIG actions were completed in FY2017; its completions are documented in the Electronic Suspense Tracking and Routing System (E-STARS). The remaining TVAT actions have been rolled into the CVAP. The remaining recommendations from National Institute of Occupational Safety and Health (NIOSH), EA-32, CTEH, and the VMEP were added to the PER system and corrective actions launched. **Figure 15**, following a couple corrective action due date extensions, depicts the status of the CVAP total corrective actions and shows that 3 actions were completed in December. CVAP actions are right on schedule. In addition, approximately 45 percent of the total CVAP actions were completed in FY 2018 and of the remaining open actions, approximately 50 percent were completed in the 1<sup>st</sup> Quarter of FY 2019.



**Figure 15. Vapor Corrective Action Tracking**

## 4. Sampling and Monitoring

### Mobile Lab

#### 1<sup>st</sup> Quarter Summary:

The mobile lab completed its four-week fall background study campaign in the 1<sup>st</sup> Quarter of FY 2019, the onset of which began in October. After completing the background study, the mobile lab underwent routine maintenance, as well as switching the Proton Transfer Reaction – Mass Spectrometry (PTR-MS) reagent ions to better detect nitrosamines and furans. The Mobile Lab performed area sampling in support of the AP Stack Monitor calibration runs, and in doing so, established the ability to run Air Pollutant Graphical Environmental Monitoring System (APGEMS-TF) software to facilitate specific lab location during ammonia injections in the AP Stack. The Mobile Lab then underwent maintenance in December, further improving the capabilities of the laboratory instruments in preparation for next quarter's background study.

### Cartridge Test Reports




#### 1<sup>st</sup> Quarter Summary:

Cartridge testing, to support efforts for the switch to full-face air purifying respirator (FFAPR) in the farms, was completed during FY 2018. The results of the testing were presented to the third party reviewers, STC, for review and comment. The review allowed the implementation of FFAPR in the double shell farms with the tested cartridges, but due to issues with facial charcoal dusting, the use of FFAPR is now under a stop work. The cartridge testing effort in the 1<sup>st</sup> Quarter of FY 2019 focused on issuing the AX Exhauster report, titled, *Analysis of Air-Purifying Respirator (APR) and Powered Air-Purifying Respirator (PAPR) Cartridge Performance Testing on a Hanford AX Tank Farm Exhauster*, and were numbered PNNL-27860 Vol. 1 and Vol. 2. Following the issue of the AX Exhauster report, efforts focused on processing the data from BY-108 (PAPR) and BY-110 (APR) field testing. The results were included in a draft report that is in the 30 day review process. The AP Exhauster data is still being processed.

## **Respiratory Protection Equipment and Surfaces: Monthly Routine Testing**




### **1<sup>st</sup> Quarter Summary:**

WRPS has a routine monthly testing program to evaluate randomly-selected Respiratory Protective Equipment (RPE) and surfaces for chemicals and bacteria. This program involves IH wipe sampling on 60 randomly-selected RPE (face pieces and regulators) for chemical and bacterial presence from the three main Mask Issue and Sanitizing Stations (2704 HV, 278 AW, and MO 2256). Samples for chemical content are analyzed at ALS Labs in Salt Lake City Utah. Samples for bacterial content are analyzed at TriCities Labs, Kennewick, WA.

-  **October:** Analytical results from October 2018 testing indicated that there were no instances of chemical disinfectant contamination on any of the RPE tested. Likewise, the results of bacterial testing on RPE and Mask Issue Station surfaces continue to indicate that they are considered exceptionally well-sanitized. Please note that there are no known federal standards or guidelines for “clearance” levels of either chemical (anions) or bacteria on RPE and related surfaces.
-  **November:** Analytical testing results from November 2018 indicated that there were no instances of chemical disinfectant contamination on any of the RPE tested. Likewise, the results of bacterial testing on RPE and Mask Issue Station surfaces continue to indicate that they are considered *exceptionally well-sanitized*. *Please note that there are no known federal standards or guidelines for “clearance” levels of either chemical (anions) or bacteria on RPE and related surfaces.*
-  **December:** Bacterial Testing and Chemical (Anion) Testing was performed, and the data is posted on the WRPS ESH&Q website. Analytical results from December 2018’s testing indicated that there were no instances of chemical disinfectant contamination on any of the RPE tested. Likewise, the results of bacterial testing on RPE and Mask Issue Station surfaces continue to indicate that they are considered exceptionally well-sanitized. Please note that there are no known federal standards or guidelines for “clearance” levels of either chemical (anions) or bacteria on RPE and related surfaces.

## **ToxiRAE<sup>3</sup> Implementation and/or Monitoring Data**

### **1<sup>st</sup> Quarter Summary:**

-  **October:** The October 8 Safety Start, via a CPPPO Notebook, discussed IH's ToxiRAE implementation. The October 22, 2018, *Solutions* newsletter described the ToxiRAE as, "[c]ompact, reliable and easy-to-use." The ToxiRAE, "[u]sed in conjunction with administrative controls, access controls and engineering controls, the ToxiRAE Pro has a personal alarm typically set at 6 parts per million (ppm) ammonia, about one-quarter of the occupational exposure limit (OEL). The alarm sounds if ammonia concentration reaches 6 ppm, at which time the workers will follow the prescribed response actions. The 6 ppm set point was determined based on data collected over several years and various conditions to ensure a conservative and protective response. The devices will initially be used for RC-1 and RC-2 work in actively ventilated tank farms.
-  **November:** IH added a *ToxiRae Pro Hanford Vapors Fact Sheet* and a *Solutions* article to the ToxiRAE Pro library of published communications. IH presented a *ToxiRAE Pro Field Use* briefing to the IHT and RCT first line managers at the November 12, 2018, Monthly Seminar Meetings. Additionally, IH completed a *ToxiRAE Pro Laboratory Preparation & Calibration Training* for all Instrument Technicians (TFC-OPS-IHT-028), and a *ToxiRAE Pro Field Use Training* for all OJT/OJE Qualified IHTs. ToxiRAE was used in the SY Farm emergency drill on November 27, 2018.
-  **December:** "Feedback from the field after completion of a tabletop drill of ToxiRAE ammonia sensor alarms in SY farm indicated the need to provide a demonstration of the different alarms on the ToxiRAE. The ToxiRAE has a number of alarms with unique combination of sounds, lights and vibration," reported a December 17, 2018, *Industrial Hygiene communication*. The videos include *Low Battery Alarm*, *Low Concentration Alarm*, and *High Concentration Alarm*. The videos are located on the WRPS ESH&Q Video webpage. "WRPS IH will be starting to expand the pilot rollout from SY farm to the other actively ventilated farms." Furthermore, reported the communication, "[t]he schedule date for full implementation is by January 31, 2019."

<sup>1</sup>NUCON is a registered trademark of Nucon International, Inc., Columbus, Ohio.

<sup>2</sup>Strobic Air Tri Stack is a registered trademark of Strobic Air Corporation, Bensalem, Pennsylvania.

<sup>3</sup>RAE Systems by Honeywell, San Jose, California.