washington river protection solutions

CPPO Chemical Protection Program Office

Pictured is the new mobile laboratory in action, working to fingerprint the onion odor at a local onion farm, August 2018. *(Photo courtesy of G. Weeks)*

Tank Operations Contract

Chemical Protection Program Office

August 30, 2018

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

The Chemical Protection Program Office began the process of updating the metrics behind the CVAP Dashboard for Fiscal Year (FY) 2019. Work continues on the evaluation of the status of external assessment recommendations, with the bulk of the effort anticipated to conclude in FY2018.

The report has been drafted on the CPPO-led focus group sessions, during which tank farm workers were asked to evaluate the effectiveness of vapors information. The final report, including observations and recommendations for improving the effectiveness of vapors information, is anticipated to be distributed before the end of FY2018.

CPPO Oversight and Tracking

CPPO Notebook

The CPPO Notebook is distributed on a weekly basis to aid managers in providing vapor-related information to staff on current topics of interest. In July, the CPPO released four Notebooks:

- Parts two through four of the four-part series describing the fundamentals of toxicology and industrial hygiene
- Response to Odors at the Hanford Tank Farms

Managers are asked to reply **Yes** to their email when they intend to use the Notebook with their staff. Since the Notebook may be used weeks after distribution, the utilization data frequently changes over time, and is reflected in updates to monthly reporting. The data through July showed that an average of 19 managers each week reported using the Notebook.

WRPS Manager utilization of the CPPO Notebooks by subject and transmission date is shown in **Figure 1**. Since the beginning of FY2018, the data shows WRPS managers reported utilizing the Notebooks 774 times.

The Notebook material is provided in multiple formats, including an SME narrated/video presentation posted to the intranet, and available to all WRPS staff. **Figure 2** shows the monthly website traffic statistics for visits to the CPPO Multimedia Library since the beginning of the fiscal year. The data suggests a larger reach than that which is self-reported by the management distribution list. In July, Narrated Notebook files were accessed 216 times. The decrease appears to coincide with fewer *Solutions* articles that highlight current Notebooks. Only one *Solutions* article was released for the four-part series on the fundamentals of toxicology and industrial hygiene.

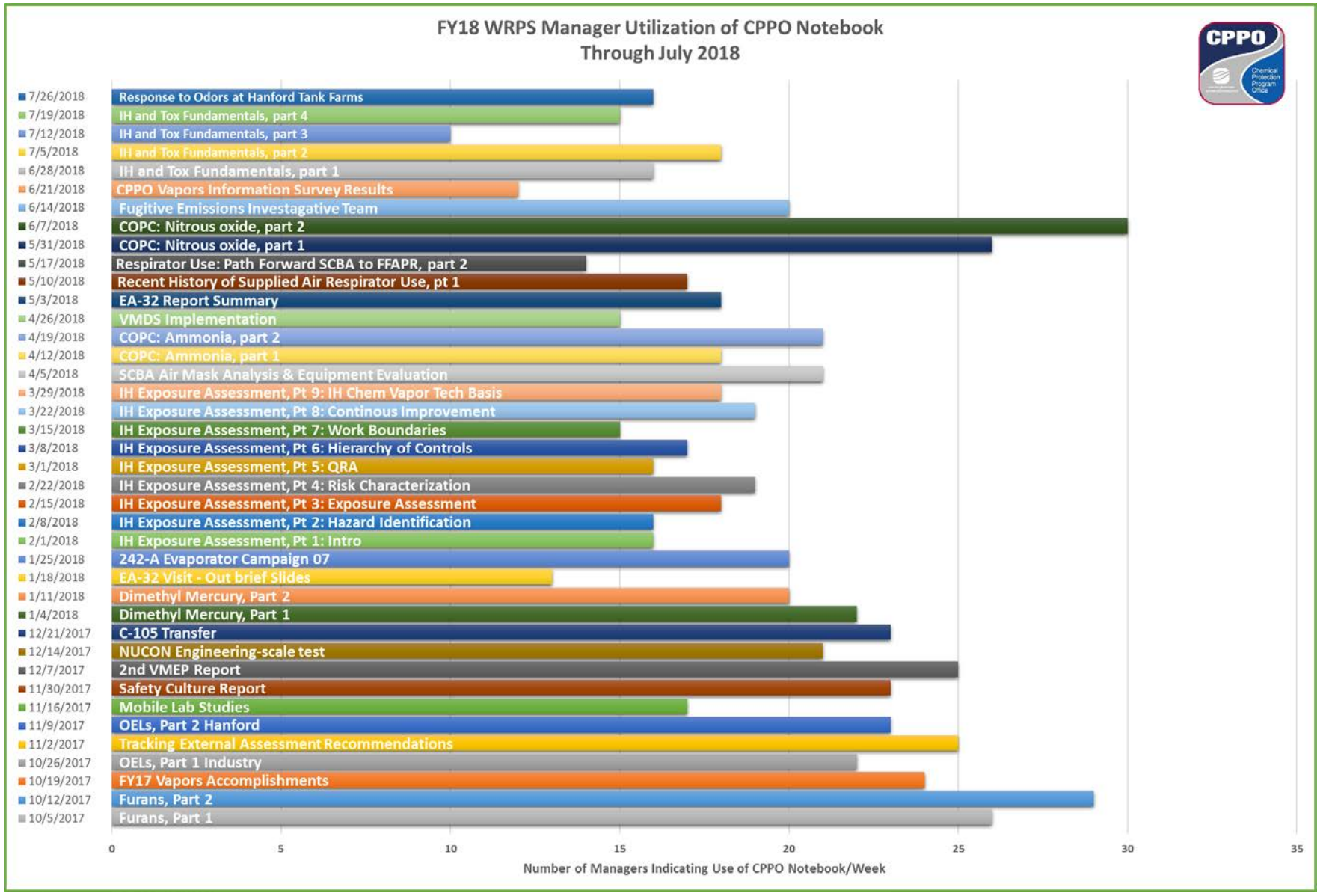

Figure 1. FY2018 Manager Utilization of the CPPO Notebook through July 2018

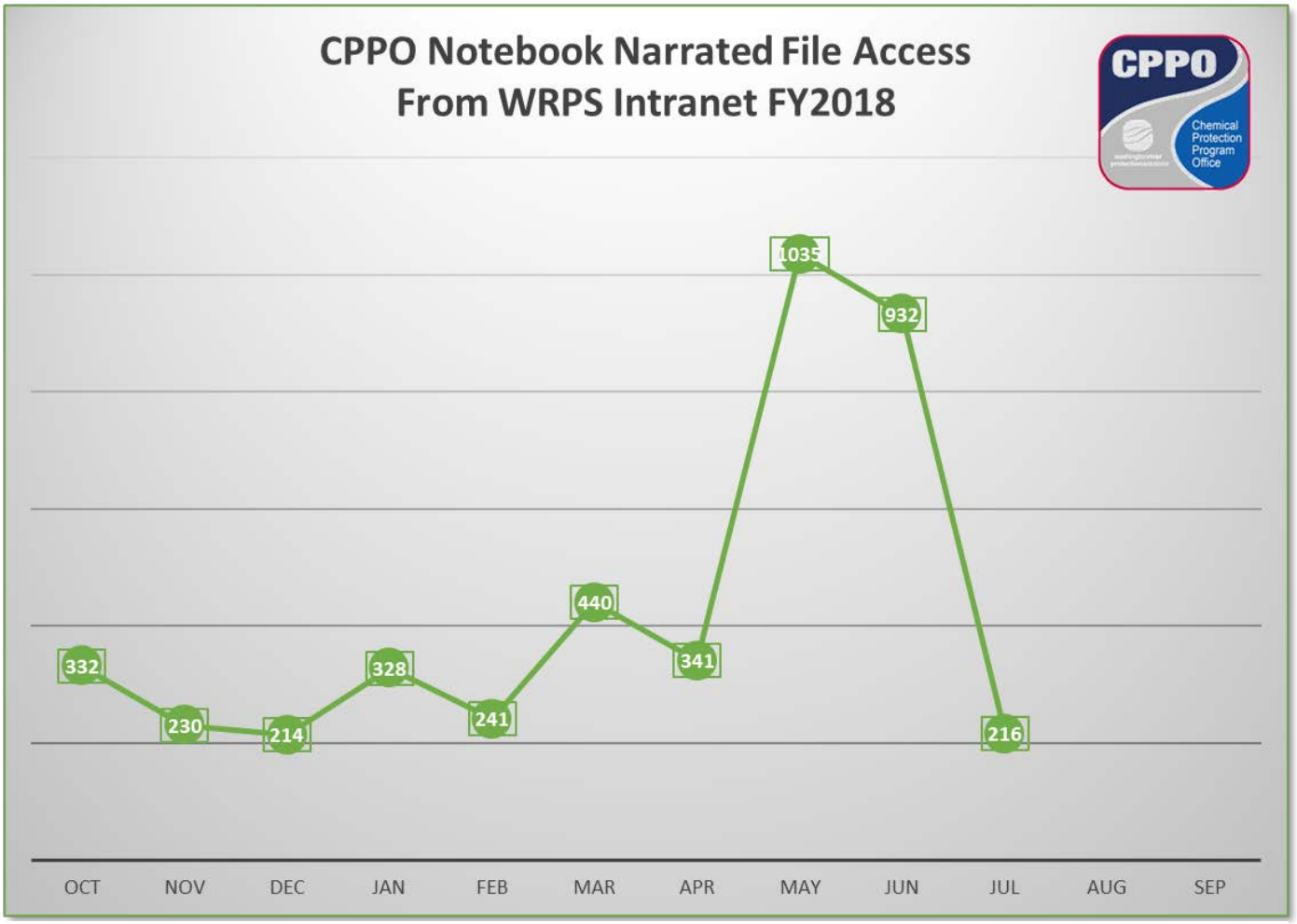

Figure 2. Narrated File Access of CPPO Notebooks from WRPS Intranet FY2018

CPPO Production Metrics

The CPPO summarizes complex, technical vapors-related information and provides monitoring results, report summaries, presentations, a weekly report on WRPS vapors activities, and other information for distribution to the workforce through established mechanisms such as the Solutions newsletter and the HanfordVapors.com website.

The vapor-related materials produced by the CPPO in July, and the three-month trend, is shown in **Table 1**. Data reports are no longer summarized for the website as VMDS reporting has transitioned to supporting turnover for full-time operations. In July, the CPPO produced and provided one Weekly Report and the 3rd Quarter Summary for FY2018. In addition, four CPPO Notebooks were delivered. These materials provide vapors-related information to a variety of audiences and are distributed via email, and internal and external websites.

Table 1. CPPO Vapors Information Products Completed FY2018

CPPO Vapors Information Products Completed FY18	May	June	July	FY-to-Date Total
Data Report (Monitoring Data)	0	0	0	**21**
Presentations (includes CPPO Notebook and CVST)	4	4	4	**41**
CPPO Reports and Weekly Report	4	4	2	**35**
Information Requests†	0	0	0	**1**
Articles, Summaries, and Message Maps	0	1	4	**16**
Surveys, Focus Groups, and Recommended Actions	0	0	1	**6**
Website Requests/Site Updates	0	0	9	**12**
Videos	0	0	0	**0**
Monthly Totals	**8**	**9**	**20**	**132**

Table 2. WRPS Vapors Information Distribution Avenue

WRPS Vapors Information Distribution Avenue	May	June	July	FY-to-Date Total
All Employee Email/Meetings & ESHQ Comm.	3	6	2	**35**
CPPO Notebook*	75	78	59	**823**
CPPO Report and Weekly Report	4	4	2	**35**
Fact Sheet & Information	0	0	0	**0**
Meeting - CVST *	1	1	1	**11**
Meeting - CVST Sub-team meeting *	2	2	3	**31**
Meeting - Hanford Advisory Board Briefing *	0	1	0	**2**
Meeting/Briefing*	5	5	2	**33**
Meeting -Morning/Pre-Shift Brief*	430	384	409	**3862**
Presentation*	0	0	0	**0**
Safety Start	0	3	2	**6**
SOEN	2	9	0	**21**
Solution Article	2	3	1	**20**
Survey and Focus Group	0	0	1	**3**
Tours*	0	0	0	**0**
Website/Individual Inquiry †	0	0	0	**0**
Vapors Weekly Update or Website Post	9	15	13	**141**
Video	0	0	0	**0**
Monthly Totals	**533**	**511**	**495**	**5023**

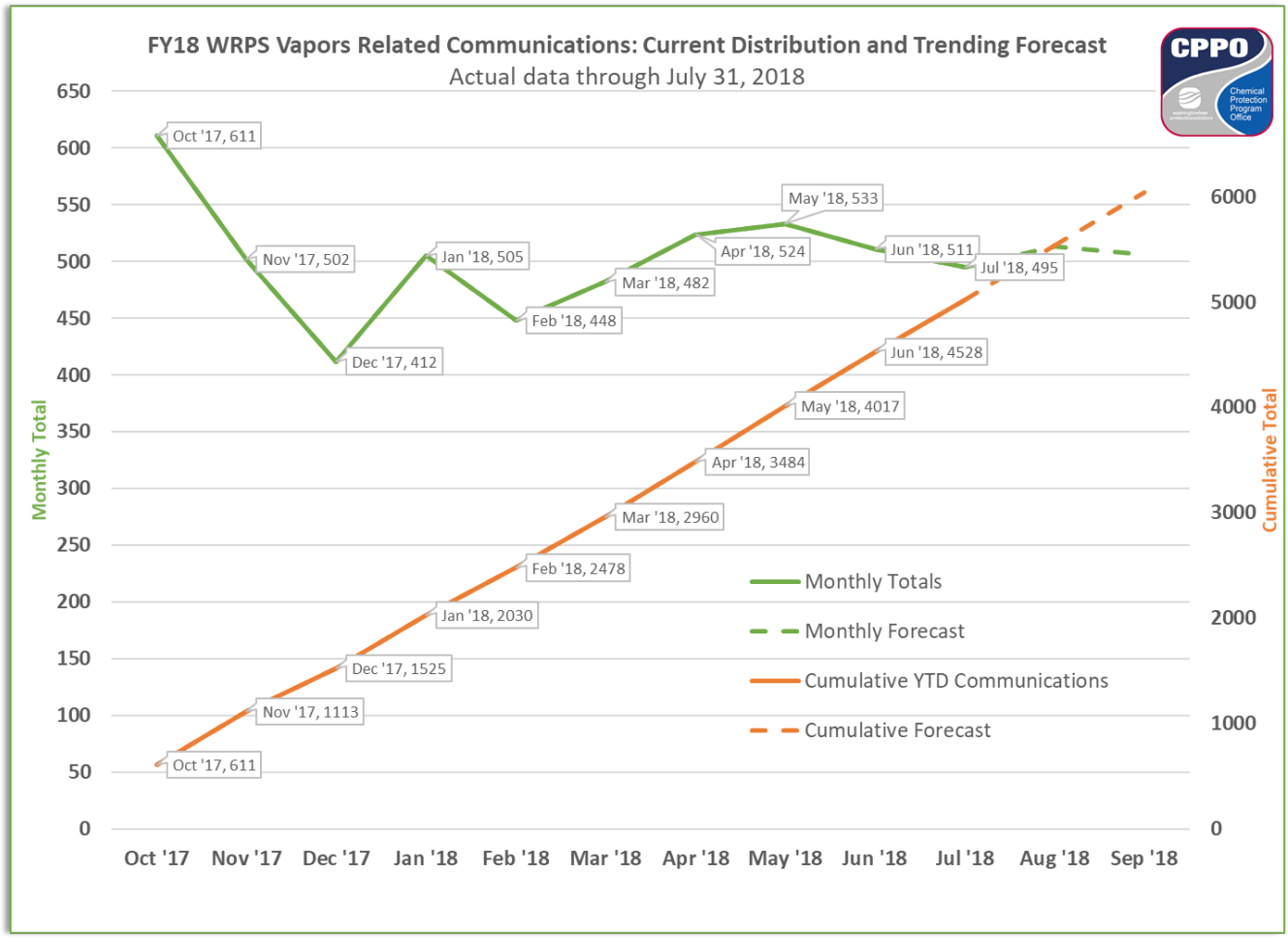

Figure 3. FY2018 WRPS Vapors-Related Communications: Current Distribution and Trending Forecast

WRPS Vapors Related Communications Distribution

The total number of documented WRPS vapors-related communications provided to the workforce in FY2018 to date is shown in **Table 2**. The data for July shows a continued steady rate of around 500 vapors-related communications per month. POD meetings remain the primary source of vapors-related information provided to the workforce, followed by utilization of the CPPO Notebook.

The forecast delivery for WRPS vapors-related communications to the workforce in FY2018, including monthly and cumulative estimates, is shown in **Figure 3**. The data trend indicates that, at this rate, WRPS remains on track to deliver around 6,000 vapors-related communications to the workforce in FY2018 - largely through briefings and face-to-face interactions with the workforce.

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

Key Performance Parameter 1

Establish a comprehensive vapor management communication plan, engagement processes, and effectiveness measurements.

CTEH

Update:

CTEH toxicologists interacted with WRPS Subject Matter Experts (SMEs) and worker groups to develop and convey risk communication pieces designed to address workers' health risk concerns. Several topics were discussed while meeting with the Hanford Atomic Metal Trade Council (HAMTC) safety leads. The toxicologists also held a 45-minute question and answer session with about 20 tank farm workers attending the Chemical Worker Tier 3 training. Several CPPO Notebooks were finished and others were developed with Industrial Hygiene (IH) SMEs. The Notebooks answer questions workers have raised regarding respirator cartridge filter principles and the ability of onsite lab methods to identify headspace chemicals. Work continued on CTEH's re-assessment of the IH program's approach to managing tank vapor issues. This re-assessment will be finalized by the end of the fiscal year. CTEH toxicologists are also collaborating with HPMC to produce a state-of-the-science report regarding potential clinical biomarkers for potential COPC exposures.

Chemical Protection Engagement: Communications

Update:

Last week's CPPO Notebook is titled *Air Purifying Filter Cartridges.* This week's Notebook is titled *Chemicals in the Tank Headspace – Part 1: Total Tank Waste Chemical Characterization.*

A CPPO/HAMTC Safety Representative meeting was held on August 22, 2018. Discussed was the upcoming sampling event for Tank A-105 and the extra precautions and mockups the Sampling Team are utilizing due to the high dose rates. Sampling Team contacts were provided to CPPO members so a 'show & tell' of the glove-bag mockup assembly could be arranged. In addition, discussions on the origination of the term 'bolus' were discussed.

- Chemical Protection Engagement: Chemical Vapors Solutions Team (CVST)

  Update:

  The August 22, 2018, New Technology CVST Sub-team meeting was cancelled.

- Chemical Protection Engagement: Hanford Vapors Website Updates
  - EIR-2018-20
  - CPPO Weekly Report 08092018

- Chemical Protection Engagement: Workforce Engagement

  New Updates begin October 1, 2019

KPPs 2 and 3. IH Technical Basis and IH Program

- IH Manual and Technical Basis

  Last update 8/2/2018:

  Since the beginning of the 4th Quarter, the TOC-IH-58435, *Industrial Hygiene Manual*'s updated sections expanded to include Section 5, *Reporting Occupational Exposure, and Medical Monitoring*, which is now on the Industrial Hygiene webpage on the Intranet. Section 6 is renamed and repurposed, and is now titled, *Work Control*. It is in draft review with Department of Energy (DOE) Office of River Protection (ORP). Section 7, *IH Program Administration,* is drafted and is in internal WRPS review. Section 8, *Documents and Records*, is also in draft and in internal WRPS review. TFC-PLN-173, *Use of FFAPR in Actively Ventilated Tank Farms*, is posted on the website for implementation in SY and AP Farms. It is being edited to include AN Farm.

  Key Performance Parameter 2

  Maintain Industrial Hygiene Chemical Vapor Technical Basis and the chemicals of potential concern (COPC). Institutionalize a disciplined and rigorous process for updates to include new scientific findings and enhanced understandings of potential exposures.

  The Industrial Hygiene organization is reporting 100% of the IH workforce has been trained in *Risk Communication Techniques* and ~100% trained in *Crucial Conversations*.

- Health Process Plan (HPP)

  Update:

  The following HPP studies conducted by PNNL have been released as final versions under the TFC-Charter-71 process: *Proposed OELs for Chronic Exposures – COPCs with Regulatory Guidelines*, *Hanford Tank Vapors FY 2017 Chemicals of Potential Concern Update*, and *Proposed OELs for Chronic Exposures – Nitrile Class COPCs and*

2,4-Dimethylpyridine, *Proposed Acute Exposure Limits for COPCs with Regulatory Guidelines and Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors*. *Sampling and Analysis Plan* is cleared for release to the public as of last week. The study *Proposed Risk-Based Approach for Nitrosamine Chemical-of-Potential Concern* is being considered further for evaluation of economic impact and technical feasibility. The study *Proposed Occupational Exposure Limits for Furans* will be further evaluated via the Charter-71 process in FY2019.

- Air Dispersion Modeling

Last update 8/2/2018:

The Air Pollutant Graphical Environmental Monitoring System (APGEMS) modeling software (version 1.0) and accompanying report were released in May. The report describes the APGEMS-TF software and presented three tests cases illustrating model performance for simulations involving the AP, AW, and AN Stacks, as well as the 242-A Evaporator. The test cases were selected to provide model predictions of ammonia and mercury air emissions during low, medium, or high wind conditions. The APGEMS-TF software was refined and version 1.1 was delivered to WRPS for acceptance testing. WRPS Engineering and IH are evaluating the software and providing feedback to the PNNL team. Representatives from Process Engineering and Chief Technology Office (CTO) Fugitive Emissions team were trained in the use of APGEMS-TF Version 1.1 last week.

Key Performance Parameter 3

Maintain Industrial Hygiene Program and institutionalize vapor program requirements, best practices and program parity, and complete necessary training to support full implementation at the beginning of FY2018.

- Central Residence for Industrial Hygiene Technicians (IHT)

Last update 8/23/2018:

As of last week, all ten of the trailer sections for the 10-wide were delivered to the 200 East area on 4th Street near 218A across from PUREX. Significant progress has been made in connecting the ten sections to form one large building.

KPP 4. Engineering Controls

- A Farm Exhausters

Last update 8/23/2018:

Exhausters: The rebar foundation for the exhauster slab is installed (**Figure 4**) and the concrete has been poured on east half of the slab (**Figure 5**).

Procurement/Fabrication: Continued procurement of the POR518/POR519 exhauster valve manifold,

Key Performance Parameter 4

Complete engineering control concept demonstrations for Strobic Air Tri-Stack®2 and NUCON®3 International, Inc. thermal combustion in support of unrestricted

manifold support and access platform, ventilation ducting, riser assemblies, duct stand assemblies and concrete blocks.

Figure 4. Installing Rebar and Pouring Concrete for A Farm Exhauster Slab. (Photo courtesy of M. Allen)

Figure 5. Completed Concrete Pour for east side of A Farm Exhauster Slab (Photo courtesy of M. Allen)

AW Stack Extension

Last update 8/23/2018:

The installation of the AW-Farm stack extension continued with the following being accomplished during the reporting period:

- Efforts continued on preparing the non-radiological and radiological permit applications. The radiological permit is with ORP for review while comments from Ecology on the non-radiological permit are being incorporated.
- Efforts continued on stack installation and fabrication activities. Development of the installation work package is dependent on completion of the draft lift plan, which is currently being routed for approvals. Fabrication of the stack extension continues.

AN Stack Extension

Last update 8/23/2018:

During the reporting period, preliminary Design Engineering reviews indicated that the proposed foundation could support extending the stack from 27 feet to 45 feet.

Strobic®4 Air Dilution Fan

Last update 8/23/2018:

Efforts continued on evaluating the test results and data from the recently completed off-site testing of the unit. Some of the test parameters may be re-evaluated to confirm data conclusions.

NUCON® Thermal Oxidation Vapor Abatement Unit (VAU)

Last update 8/23/2018:

Terragraphics

- Terragraphics received comments and began comment-resolution on the 90% Conceptual Design of the NUCON® infrastructure for the field demonstration on BY-108.

NUCON®

- NUCON® continued to provide telephone consulting.

PNNL

- PNNL completed the draft A test report entitled, *NUCON Vapor Abatement Unit Performance on Hanford Tank Farm Chemical of Potential Concern*, which captures the test results from the NUCON® engineering-scale test.
- PNNL presented a summary of the NUCON® test report draft to the NUCON® integrated project team.

WRPS

- WRPS reached agreement on contracting strategy for the NUCON® final design.
- WRPS reviewed and provided comments on the 90% Conceptual Design for the BY-108 field demonstration.
- WRPS completed its review of the draft report entitled, *NUCON® Vapor Abatement Unit Performance on Hanford Tank Farm Chemical of Potential Concern*, which summarizes data results from the NUCON® engineering-scale test.

KPP 5. Administrative Controls and Monitoring

Permanent Installation of VMDS Equipment in AP Farm

Update:

Key Performance Parameter 5

Define unrestricted work boundaries and implement monitoring on active stack ventilation and unrestricted work boundaries in the A farms to provide defense-in-depth.

Efforts to obtain approvals on the Phase 2 Pilot-Scale Report continue. For the AP Farm ultra-violet fourier transform infrared spectrometer (UV-FTIR) turnover, numerous activities were on-going during the last two weeks, including the following:

- Completing the Operational Acceptance Tests (OAT) needed to support turnover. The OAT was split into three separate tests to optimize the approval process. The first OAT addresses interim reliability of the system to support startup testing, the second OAT addresses startup activities where no gas testing is required, while the third OAT addresses startup activities where gas testing is required. A status of each OAT is provided below:
  - **Interim Reliability OAT:** Non-linear responses were observed during testing, confirming the need to modify the analytical algorithm before further testing can be performed. Test data has been provided to Cerex, who will perform the algorithm modification. The OAT resumes after the modifications have been completed.
  - **No-Gas Testing OAT**: The draft OAT has been reviewed by the Joint Test Working Group and comment resolution is on-going.
  - **Gas Testing OAT**: Awaiting further development of other support activities before proceeding.
- Efforts also continued on installing the bottle racks, and procuring permeation tubes and calibration gases.

Stack and Boundary Monitors

Update:

702-AZ Stack Monitor: Installation of the 702-AZ UV-DOAS stack monitor continued.

AN Farm Stack Monitor: The UV-DOAS unit was delivered to the site. The site preparation work was completed, and installation of the monitor was started.

AX Farm Stack Monitors: The factory acceptance test has been completed for the UV-DOAS monitors and are scheduled to be delivered in the near future. In addition, site preparation work for the units continued.

AW Farm Stack Monitor: Both the factory acceptance test of the UV-FTIR unit and site preparation work for installation of the UV-FTIR are on-going.

Establishing Safe Unrestricted Boundaries

Last update 8/2/2018:

Signs have been prepared to identify the Industrial Area, Exclusion Zone, and Contamination Reduction Zone. Signs will not be prepared to identify the Support/Administrative Zone or Site Boundary at this time. Meetings have been held with other site representatives informing them of the pending changes to farm signage.

Public Address (PA) System

Update:

Work continued on the B, S, T and U Farms public address (PA) systems over the last two weeks. Functional testing for S, T and U-Farm PA systems was started. B Farm wire installations continue and have been completed for six of the eight tanks. **Figure 6** shows the conduit trench at the B Farm. More installation activities at B Farm are depicted in **Figures 7**,**8**, and **9**.

Figure 6. Trench for PA System conduit at B Farm (courtesy of B. Nelson)

Figure 9. Installed PA System at B Farm Complex (courtesy of B. Nelson)

Figure 8. (Above) Backfill and Concrete Pour of Conduit Trench at B Farm Complex (courtesy of B. Nelson)

KPP 6. Tank Operations Stewardship

Pilot SST Stewardship Program

Update:

The design package for TX Farm was completed.

Mission Support Alliance (MSA) also continued network development activities by installing conduit that will store communications fiber. MSA is experiencing challenges in completing this effort as it's speculated the conduit may be plugged; troubleshooting efforts are on-going.

In addition to these activities, efforts to prepare a statement of work (SOW) for FY2019 activities continued. The SOW will support T-Farm complex construction activities.

Key Performance Parameter 6

Institutionalize a tank operations stewardship program that minimizes required Tank Farm personnel entries; and establishes parameters for locating ancillary personnel and offices.

KPP 7. Hierarchy of Controls

Cartridge Testing and SCBA Alternatives

Last update 8/2/2018:

IH attended meetings with WRPS management to discuss the status of self-contained breathing apparatus (SCBA) alternatives. Cartridge testing has been completed for FY2018, and the SX-101 and SX-104 APR and powered air purifying respirator (PAPR) reports have been issued. The BY sampling data is being analyzed by PNNL. The headspace comparison/line-loss project data is being analyzed as well.

Key Performance Parameter 7

Provide options to promote the hierarchy of controls for chemical vapor respiratory protection beyond current use self-contained breathing apparatus.

Mobile Laboratory

Last update 8/23/2018:

TerraGraphics completed the design and construction of the new mobile laboratory that WRPS is leasing. The new mobile laboratory's capabilities will be enhanced as compared to their predecessor's mobile laboratory. For instance, TerraGraphics's mobile laboratory will have a more sensitive Proton Transfer Mass Spectrometer (PTR-MS) (Ionicon TOF-6000), UV-DOAS, fourier transform infrared spectrometer (FTIR), flame ionization detector (FID), and photo ionization detector (PID). Furthermore:

- The Factory Acceptance Testing of the new mobile laboratory was successfully completed.
- OAT was performed the last week of July by sampling at 4th and Buffalo.
- Mobile area sampling was performed across the Hanford site.

- The mobile laboratory provided support to the fugitive emissions initiative by sampling the following locations:
  - Around the septic tanks located near the 242-A evaporator
  - Downwind of the septic tanks, near 244-AR
  - In the vicinity of a local onion producer.

Personal Vapor Monitor

Last update 8/23/2018:

Phase III testing of the following personal vapor monitoring devices was completed: C_2Sense®[5], ToxiRAE Pro, Ventis™Pro V[6], and the GfG Micro IV[7] detectors. Phase III testing collected background data for instrument sensitivity calculations. Data analysis for Phase III testing was completed for all monitoring devices except the C_2Sense®. A draft report for the personal vapor monitoring device testing is being prepared as data analysis of Phases I and III of testing reaches completion. C_2Sense® submitted an interim draft report covering data analysis and development of an alpha version of the device algorithm. While the algorithm has improved, false positives in the data reveal that more work is required. C_2Sense® is continuing to enhance the algorithm, and a new revision of the report is expected before the end of FY2018.

Due to limited Radiological Control Technicians (RCT) and IHT support for the remainder of FY2018, IH management decided to stop Phase II C_2Sense testing with the mobile laboratory and proceed directly to report preparation.

KPP 8. Medical Support

Key Performance Parameter 8
Support medical program enhancements in conjunction with responsible Hanford Site organizations and establish update to WRPS process/procedures.

The scope of KPP-8 is to support RL medical program enhancements in conjunction with other Hanford Site organizations. **The last update from HPMC was April 12, 2018, for the 2nd Quarter.**

During the 2nd Quarter:

- The Office of the Ombudsman visit was cancelled. No new visit has been confirmed.
- Discussions continue between the HAMTC President and committee related to revising the Access Control Entry System (ACES) exclusion note in the TFC-BSM-HR_EM-C-10, *Reasonable Accommodations* procedure. No agreement has been reached as of the date of this publication.
- HPMC confirmed that they are currently working on the epidemiology study comparing Tank Farm Vapor Exposures and Non-Exposed Group of Hanford Workers.

[1] RAE Systems by Honeywell, San Jose, California.
[2] Strobic Air Tri Stack is a registered trademark of Strobic Air Corporation, Bensalem, Pennsylvania.
[3] NUCON is a registered trademark of Nucon International, Inc., Columbus, Ohio.
[4] Strobic is a registered trademark of MPC Inc., Wilmington, Delaware.
[5] C_2Sense is a registered trademark by C2Sense, Inc., Cambridge, Massachusetts.
[6] Ventis™ Pro5 Multi-Gas Monitor is a registered trademark by Industrial Scientific in Pittsburgh, Pennsylvania
[7] GfG Micro IV Single Gas Detector from GfG Instrumentation, Inc.