washington river protection solutions

CPPO Chemical Protection Program Office

241 AP Tank Farm Public Address System enhances emergency and/or abnormal event response.

(Photo courtesy G. Hanson.)

Tank Operations Contract

Chemical Protection Program Office

May 24, 2018

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

The CPPO *FY2018 Vapors Communication Survey* report is published and available under the CPPO tab located under the Vapors Protection link on the WRPS intranet.

The FY2018-PI MD-033, *Evaluation of Implemented and Proposed Actions in Response to the Hanford Tank Vapor Assessment Report* has been drafted and is in internal review.

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 April, the CPPO released five Notebooks:

- Process for investigating SCBA mask irritation and bottled air incidences
- SCBA equipment evaluation
- Ammonia, Parts 1 and 2
- Implementation of the Vapor Monitoring and Detection System (VMDS)

The use of the Notebooks is tallied via email 'voting' replies sent in response to the distribution email. Since the Notebook may be used weeks after distribution, the data regarding the utilization of individual editions may change over time (and is reflected in updates to monthly reporting). The data through April continues to show that an average of 20 managers each week reported making use of the Notebook.

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 to present vapors-related information to the workforce 552 times. Several of the Notebooks are used by the WRPS training department for the newly revised *Chemical Worker Training.*

The Notebook material is provided in multiple formats and includes a Subject Matter Expert (SME) narrated/video presentation, also posted to the intranet, 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. This data suggests a larger reach than that which is self-reported by the management distribution list. In April, Narrated Notebook files were accessed 341 times – slightly higher than the monthly average of 303 to-date.

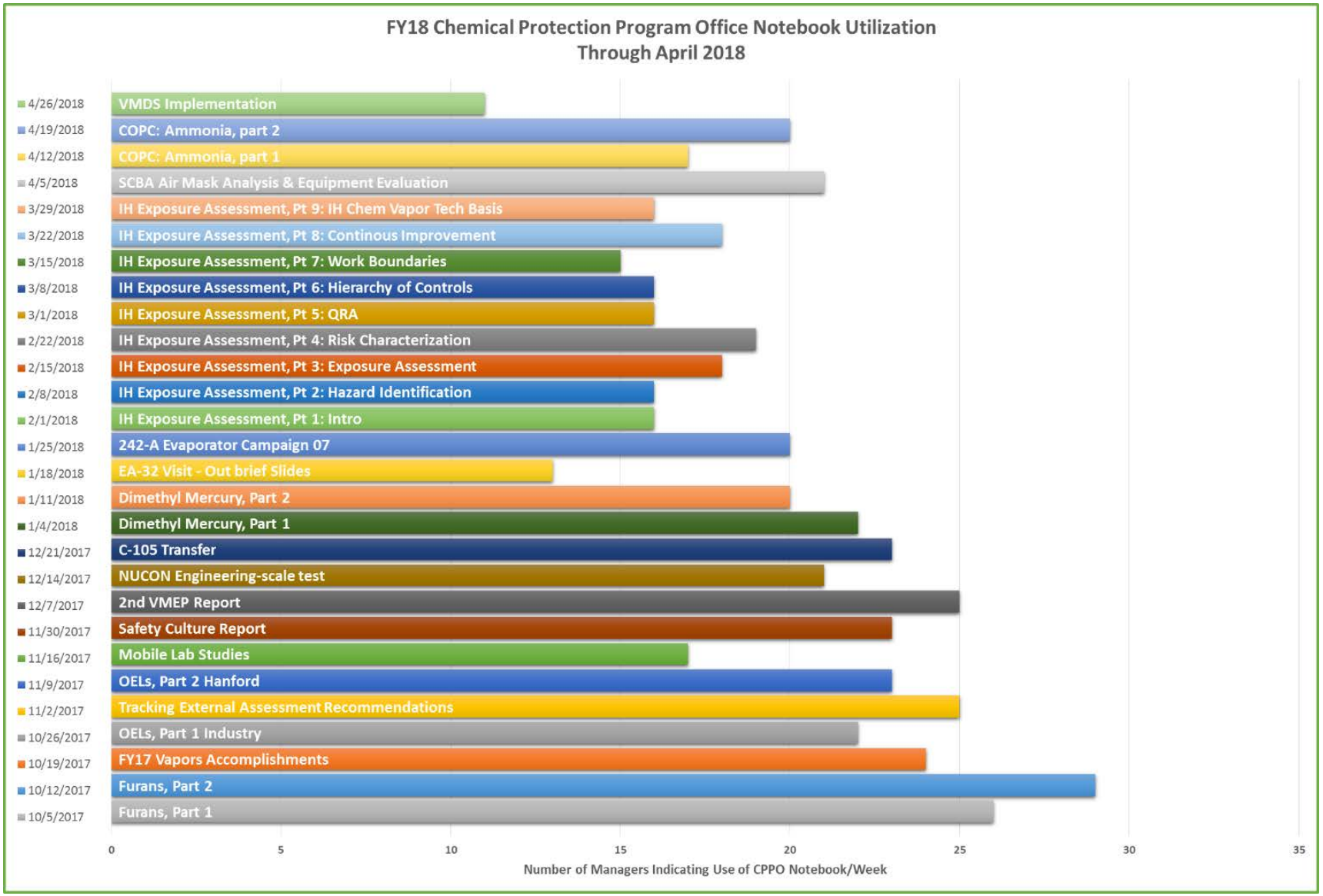

Figure 1. FY18 CPPO Notebook Utilization through April 2018

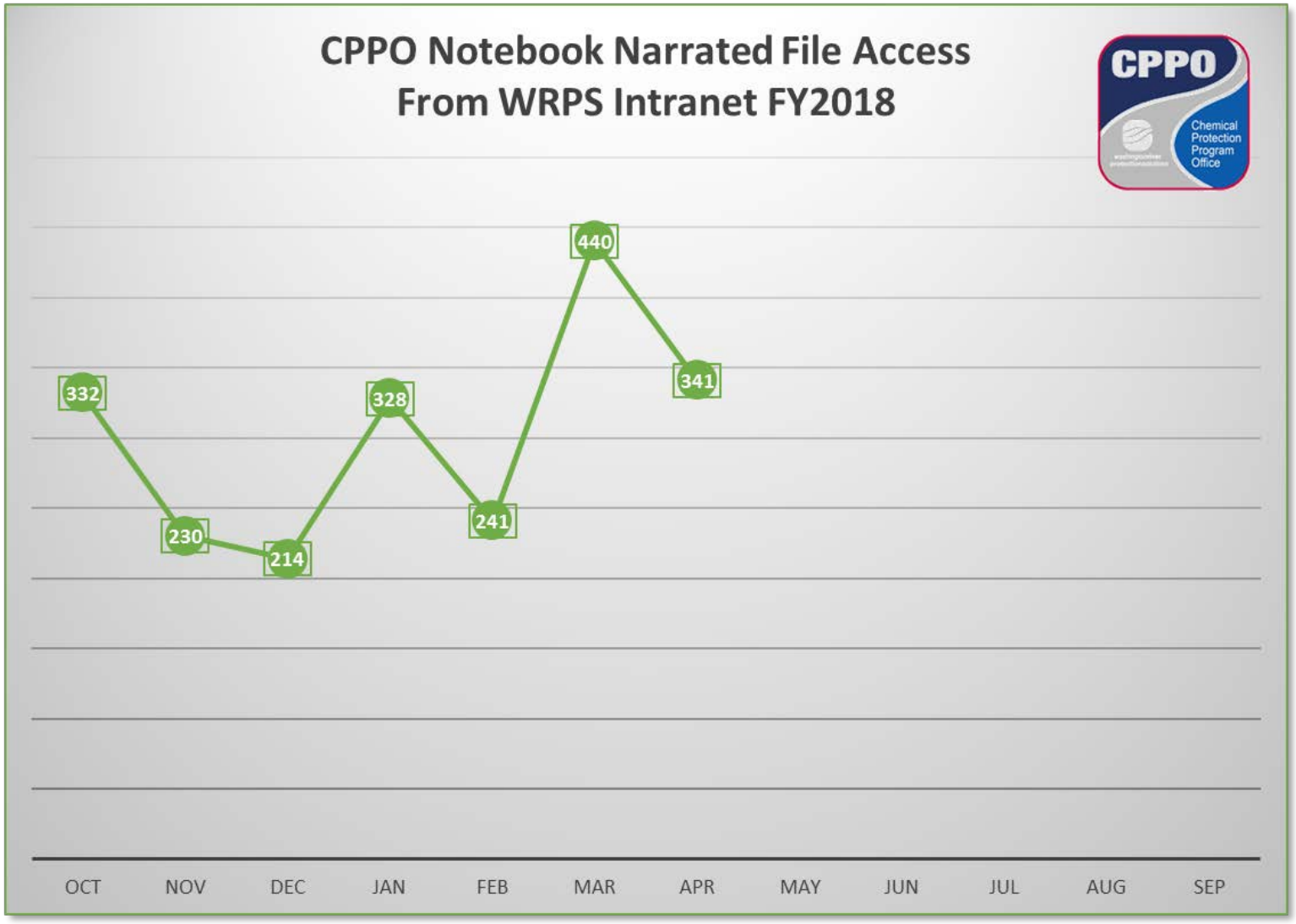

Figure 2. CPPO Notebook Narrated File Access from WRPS Intranet FY2018

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 over the course of April, and the three month trend is shown in **Table 1**. Data reports are reduced as VMDS reporting efforts transitioned to supporting turnover for full-time operations. The CPPO 2nd Quarter was produced and delivered this month, and five 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	February	March	April	FY-to-Date Total
Data Report (Monitoring Data)	6	5	1	**21**
Presentations (includes CPPO Notebook and CVST)	4	5	5	**29**
CPPO Reports and Weekly Report	4	4	3	**25**
Information Requests	0	0	0	**1**
Articles, Summaries, and Message Maps	0	1	0	**11**
Surveys, Focus Groups, and Recommended Actions	0	0	0	**5**
Website Requests/Site Updates	1	0	2	**3**
Videos	0	0	0	**0**
Monthly Totals	**15**	**15**	**11**	**95**

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 April is slightly higher from the prior month. The data include 524 documented vapors-related communications. Plan-of-the-day (POD) meetings remain the primary source of vapors-related information provided to the workforce, followed by the CPPO Notebook.

The forecast for delivery of 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 is on track to deliver almost 6,000 vapors-related communications to the workforce in FY2018 - largely through briefings and face-to-face interactions with the workforce.

Table 2. WRPS Vapors Information Distribution Avenue

WRPS Vapors Information Distribution Avenue	February	March	April	FY-to-Date Total
All Employee Email/Meetings & ESHQ Comm.	7	1	2	**24**
CPPO Notebook*	55	73	87	**611**
CPPO Report and Weekly Report	4	4	3	**25**
Fact Sheet & Information	0	0	0	**0**
Meeting - CVST *	1	1	1	**8**
Meeting - CVST Sub-team meeting *	4	4	2	**24**
Meeting - Hanford Advisory Board Briefing *	0	0	0	**0**
Meeting/Briefing*	3	2	3	**21**
Meeting -Morning/Pre-Shift Brief*	346	392	408	**2639**
Presentation*	0	0	0	**0**
Safety Start	0	0	0	**1**
SOEN	5	0	0	**10**
Solution Article	1	2	2	**14**
Survey and Focus Group	0	0	0	**2**
Tours*	0	0	0	**0**
Website/Individual Inquiry †	0	0	0	**0**
Vapors Weekly Update or Website Post	22	2	16	**104**
Video	0	0	0	**0**
Monthly Totals	**448**	**481**	**524**	**3483**

* Face-to-face communication †Data reported with all vapor questions in quarterly metric

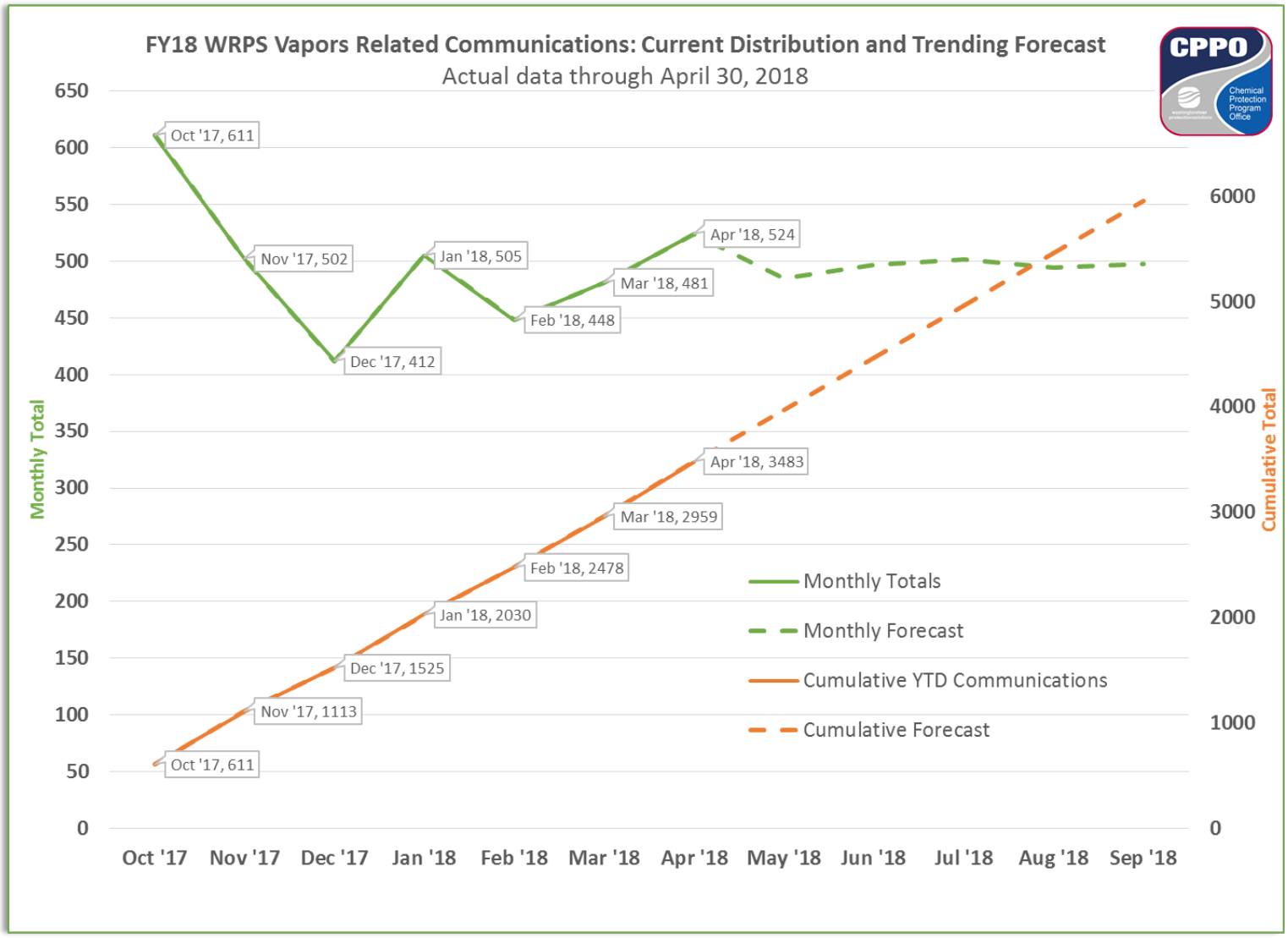

Figure 3. FY18 WRPS Vapors-Related Communications: Current Distribution and Trending Forecast

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

- Chemical Protection Engagement: Center for Toxicology and Environmental Health (CTEH)

Update:

Key Performance Parameter 1
Establish a comprehensive vapor management communication plan, engagement processes, and effectiveness measurements.

Toxicologist Dr. Michael Lumpkin and Industrial Hygienist Dan Christensen were the representative CTEH members on site last week. CTEH contributed to multiple CPPO Notebook materials and technical summarizations. The CTEH team gathered air sampling data from the EC-06 evaporator campaign for use in preparing a CPPO notebook presentation. The CPPO team, including CTEH staff, met with WRPS training staff to discuss worker feedback on the CPPO Notebooks developed by CTEH and used in the new *Tier 3 Chemical Worker Training*. Going forward, CTEH toxicologists will be available to respond to health-related questions that arise during the weekly *Chemical Worker Training* sessions. Dr. Lumpkin attended an afternoon safety tailgate meeting of approximately 150 electricians where he introduced CPPO and the CPPO Notebook, and answered questions regarding the testing of SCBA bottled air and masks as wells as the health effects of specific tank vapor chemicals. Additionally, CTEH accompanied CPPO to last week's AZ Team Plan-of-the-day (POD) meeting, where they provided a briefing about the CPPO scope, what vapors information products are available, and where to find them.

- Chemical Protection Engagement: Communications

Update:

Last week's CPPO Notebook is titled *Recent History of Supplied Air Respiratory Use at the Hanford Tank Farms – Part 2 - Cartridge Testing and the Path Forward.*

An all-employee email distributed on May 14, 2018, described a change to the AP Farm FFAPR rollout. It read, "[i]mplementaton had been planned for tomorrow [May 15], however due to some delays in the administrative process we are putting the transition on a short pause and will not be implementing the use of FFAPRs tomorrow as planned."

Hanford Tank Vapors, Vapors Weekly Update, published May 15, 2018, reported on the first 242-A Evaporator campaign of the year. "Evaporator operations are critical to successfully managing Hanford's tank waste." *Hanford Tank Vapors* described, "[a] comprehensive industrial hygiene control strategy, reviewed and agreed to by

WRPS' Chemical Vapor Solutions Team and HAMTC leadership, was put in place for the campaign. Direct-reading instrumentation readings in the general work areas during the campaign were well below action and occupational exposure limits."

On May 17, 2018, an all-employee email stated, "Beginning as early as Tuesday, May 22, workers in AP Farm will have the option of using full-face air-purifying respirators (FFAPRs) equipped with filter cartridges for low-hazard non-waste-disturbing work in the AP tank farm rather than supplied-air respirators such as self-contained breathing apparatus (SCBA)."

On May 18, 2018, Shift Office Event Notification (SOEN) stated, "Stop Work on the use of APR until concern regarding cartridge filter media is addressed."

Chemical Protection Engagement: Hanford Vapors Website Updates

- CPPO Weekly Report - April 19, 2018
- CPPO Weekly Report - April 12, 2018 - CPPO FY18 2nd Quarter Summary
- Vapors Weekly Update May 16, 2018

Chemical Protection Engagement: Effectiveness Measures

Update:

The CPPO *FY2018 Vapors Communication Survey* report is issued.

Chemical Protection Engagement: Worker Feedback

No update

Chemical Protection Engagement: Workforce Engagement

Update:

CPPO attended the ST Team POD meeting and provided a briefing (where approximately 25-30 members were in attendance) about the CPPO group and what vapors information products are available and where to find them. The briefing was followed by a Q&A session, where the workforce had only one question which was why the AP Farm FFAPR rollout was being delayed. Although encouraged by management, no additional questions or feedback was provided to the CPPO team. It should be noted that the ST Team is familiar with the CPPO Notebooks as management routinely reviews with them.

KPPs 2 and 3. IH Technical Basis and IH Program

IH Manual and Technical Basis

Update:

RPP-22491, *IH Chemical Vapor Technical Basis* was approved through SMART Plant. IH staff have been routinely updated on the many changes by way of newsletters, management briefings, and all hands meetings. Furthermore, *IH Administrative Procedures and IH Manual* is required reading and was issued February 3, 2018. Required Reading and IH communication for Section 3 of the IH Manual was sent to all IH staff on April 23, 2018. *Risk Communication Techniques* and *Crucial Conversations*, two IH professional development courses, are well underway. Bi-weekly meetings focused on developing exposure assessments are on-going. The meeting is attended by representatives from all line organizations, work control, and work planning. In addition to developing exposure assessment procedures, the group integrates exposure assessment outcomes with work control. The *AP Farm Exposure Assessment* is in IH SharePoint in review.

Health Process Plan (HPP)

Last update 5/10/2018:

Six of the HPP studies that have transitioned in the TFC-Charter 71 process have been slated to be issued outright as version Rev 0. This decision was made because the exposure limit values presented in the reports are based on established exposure limits provided by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) guidance. These reports include the following: *Proposed $_{HTF}$OELs for Chronic Exposures – COPCs with Regulatory Guidelines; Proposed Acute Exposure Concentration Limits for COPCs with Regulatory Guidelines; Proposed $_{HTF}$OELs for Chronic Exposures - Nitrile Class COPCs and 2,4-Dimethylpyridine; Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors; Hanford Tank Vapors FY 2017 Chemicals of Potential Concern Update;* and *Hanford Tank Farm Occupational Exposure and Risk Assessment Plan: Health Process Project*. Two additional HPP studies are currently under review by IH to assess the technical and economic impacts of implementing the study recommendations. These studies are *Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern* and *Proposed Occupational Exposure Limits* for Furans.

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.

Leading Indicators

Last update 5/10/2018:

Pacific Northwest National Laboratory supported WRPS in improving its chemical vapors hazard management program with research, analysis, development, testing, and technical support focused on better identification and understanding of the vapor hazards. PNNL-27449, *FY18 Leading Indicator Phase 2 Report*, published last month, describes one part of an overall vapors program managed by WRPS, specifically addressing the identification of chemical vapor leading indicators (LIs). The report is part of the toolbox and technical basis used by the WRPS Industrial Hygiene group to devise processes and procedures used to limit worker exposure.

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.

Air Dispersion Modeling

Last update 5/10/2018:

Industrial Hygiene submitted its final technical review of Air *Dispersion Modeling, Revision A;* comments are being dispositioned and publication is pending.
The Air Pollutant Graphical Environmental Monitoring System (APGEMS) modeling software (version 1.0) and accompanying draft report were completed and delivered to WRPS by the Dispersion Modeling Project Team in March. The report describes the APGEMS software and discusses the technical limitations of the current version. Since then, the APGEMS software has been refined, resulting in version 1.1. Test cases are now being run by PNNL using the improved version of the software.

Central Residence for Industrial Hygiene Technicians (IHT)

Update:

A centralized mobile office (MO) building is slated to house approximately 100 Industrial Hygiene Technicians (IHTs). Plans are to install the MO in 200 East area on 4th Street near 218A across from PUREX. The trailer design has been approved by Washington State Labor and Industries. Installation work is in progress.

KPP 4. Engineering Controls

- A Farm Exhausters

Update:

Exhausters: Over the last two weeks, crews continued construction of the exhauster retaining walls which support the exhauster slab. After successfully testing pumping a concrete mix ~300-feet through a metal line (at an off-site facility), the concrete for the exhauster slab retaining walls was poured at the site (**Figures 5** and **6**).

Vent Ducting Isolation: Filled each of the six A Farm tank seal-loops with grout. Isolating the 20-inch seal-loops maintains tank vacuum and provides improved visibility during retrieval. **A/AX Farm Road Expansion**: Removed the light pole located north of A-105 and continued backfill and compaction.

Key Performance Parameter 4

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

Figure 4. Panoramic view of Exhauster Slab Retaining Walls for A Farm Exhausters (Photo courtesy of M. Allen.)

Figure 5. (Right) Focused view of Exhauster Slab Retaining Walls for A Farm Exhausters May 2018 (Photo courtesy of M. Allen.)

Figure 6. (Below) AW Stack Extension: Preparations for concrete footings, May 2018. (Photo courtesy of G. Hanson.)

AW Stack Extension

Update:

The fabrication of the AW Farm stack extension continued. In the last two weeks, the non-radiological and radiological permit application continued to be prepared. Both permits are with ORP for review. Additionally, planning for the foundation and stack installation activities continued. The work package for foundation activities was completed, while the work package for installation activities is still under development. In addition, excavation for the foundation was started and submittals for fabrication of the stack extension were approved.

AN Stack Extension

Update:

Engineering evaluations are being performed to determine the optimum height required for the stack and whether the existing superstructure can support that stack height increase. Modeling was approved last week.

[1]Strobic® Air Dilution Fan

Update:

Efforts focused on the Strobic® Air Dilution Fan off-site testing. The following was accomplished over the last two weeks:

- The test plan, design, and equipment list, all in support of off-site testing, have been reviewed and comments are being incorporated. An important modification was made to the equipment, thus allowing higher flowrates. This was a suggestion incorporated from the comments.
- Hi-Line is repairing the damages to the fan incurred during shipping from the Strobic factory.

[2]NUCON® Thermal Oxidation Vapor Abatement Unit (VAU)

Update:

Engineering-scale testing continued, and the following was accomplished over the last two weeks:

TerraGraphics:

- Test and Design engineers provided support for VAU startup and training activities. Options were provided for replacing oil in the generator, since the oil filter was determined to be a special order, and the oil and oil filter were changed.
- Work continued on the *Technical Demonstration Conceptual Design* for BY-108, including resolving comments from the 60% conceptual design package, and in parallel, work continues on the 90% conceptual design package. WRPS Engineering is finalizing the standards to be used in the design.

NUCON®:

NUCON® provides technical support for VAU activities.

WRPS:

Issued a Contract Change Request to TerraGraphics for additional funds needed to maintain support. In support of the NUCON® test, GC-MS analysis was completed on ambient air samples to identify potential interferences for measuring NDMA, formaldehyde, and furans on the proton transfer reaction mass spectrometry (PTR-MS). Both methyl acetate and ethyl formate were identified as potential

interferences that will present challenges to measuring NDMA with the PTR-MS at the concentrations of interest.

PNNL:

Continued implementing the test plan and performed the following:

- Established ambient air baseline concentrations.
- Completed test for establishing diesel baselines for the sample ports and also collected summa samples from the sample ports for 222-S analyses.
- Conducted the calibration of the exhaust gas flow rate.
- Completed nitrous oxide calibration of the FTIR.
- Completed test which confirms the ability to detect ammonia and nitrous oxide in the exhaust stream at nominally 10% or less of the OEL.
- Completed 2 times OEL test for nitrous oxide and ammonia.
- Completed maximum concentrations tests for nitrous oxide and ammonia.
- Completed test for detection of 1,3-butadiene, formaldehyde and 2,4-dimethylpyridine.
- Completed 2 times OEL test for 1,3-butadiene, formaldehyde, and 2,4-dimethylpyridine.
- Completed installation of the bubbler system for injection.
- Started installation of the pre-concentration system.

KPP 5. Administrative Controls and Monitoring

Permanent Installation of VMDS Equipment in AP Farm

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.

Last update 5/17/2018:

As the second week of May closed, VMDS activities had included the following:

- Efforts to obtain approvals on the *Phase 2 Pilot-Scale Report* draft, a report summarizing the results of the FY2017 pilot-scale activities continue.
- The UV-FTIR installed at AP Farm is in the process of being turned over to Operations. The on-going activities supporting the turnover include the following:
  - Completing the final review of the functions-and-requirements (F&R) document, RPP-RPT-60580. DOE provided administrative comments anticipated to be resolved quickly, allowing for approval of the document.
  - Continuing to prepare the test plan for startup activities. The draft plan has been completed and review by the Joint Test Working Group is next.

- Incorporating comments on uncertainty calculation (RPP-RPT-60669) and preparing to submit for final approval.
- The calibration gas calculation (RPP-CALC-62150) is undergoing final review and approval.
- The statement of work to procure calibration support for the UV-FTIR was approved and is with procurement for processing.
- Releasing four Material Requisitions for procurement of the test gases.
- Continuing efforts to complete Operational Readiness Checklist items.

Stack and Boundary Monitors

Last update 5/17/2018:

Activities in progress at the end of the second week in May include:

- Performing fabrication and factory acceptance testing of the Ultra Violet Differential Optic Absorption Spectrometry (UV-DOAS) units.
- Submitting the draft AW and AX Farm stack monitor design packages for review.
- Continuing to prepare the AX Farm stack monitor design package for review.

Establishing Safe Unrestricted Boundaries

Last update 5/10/2018:

The *Industrial Hygiene Basis for defining the Unrestricted Work Boundary*, clarifying how WRPS will define work boundaries in and around the Tank Farms, was published on March 28, 2018. This document provides a regulatory basis for the implementation of the Tank Farm boundaries moving forward for the IH Program and provides defense in depth. The walk-downs in support of the AP, AN, A, and AW Tank Farms coverage maps have been completed, and the draft coverage maps are in development for the AP and AW Tank Farms.

Public Address (PA) System

Last update 5/17/2018:

Activities thus far in May include the following:

- Continuing activities to support turnover of the second set of PA systems (AW, AN, AP and C Farms). Efforts are focused on closing out and approving turnover documentation.
- Continuing efforts for the next set of PA systems (B, S, T, and U Farms). Fieldwork at S, SX, and SY Farms was initiated and completed (excavation,

trenching, wiring, and conduit installs) with the exception of standing up the poles and performing final electrical tie-ins. Additionally, the excavation permits for T, TX, and TY Farms is nearing completion. The excavation permit to support U Farm activities is being prepared.

KPP 6. Tank Operations Stewardship

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.

Pilot SST Stewardship Program

Last update 5/17/2018:

Activities completed by the second week of May include the following:

SST Remote Monitoring Equipment:

The TY Farm temperature and surface level design verification report has been completed. The final phase of the TY Farm design is completing MSA network development and installation activities. Efforts continued on the draft TX Farm design; initiated the electrical and mechanical design packages.

FY2015 LEAN Report:

The *SST Stewardship Execution Strategy Document* has been entered into SmartPlant for final reviews and approvals; most approvals have been obtained.

KPP 7. Hierarchy of Controls

Key Performance Parameter 7

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

Cartridge Testing and SCBA Alternatives

Update:

On May 17, 2018, an all-employee email stated, "Beginning as early as Tuesday, May 22, workers in AP Farm will have the option of using full-face air-purifying respirators (FFAPRs) equipped with filter cartridges for low-hazard non-waste-disturbing work in the AP tank farm rather than supplied-air respirators such as self-contained breathing apparatus (SCBA)."

Mobile Laboratory

Update:

The lab will be supporting the $^{3}C_{2}$Sense® data collection from the AP Stack.

Personal Vapor Monitor

Update:

The C_2Sense® field demonstration data collection is ongoing.

- Data from four C_2Sense® units, four [4]ToxiRAE Pro detectors, and two ground truth instruments was collected from the A-103 passive breather filters (PBF). The new configuration, which uses a pump to pull high ammonia concentration air from the PBF and deliver it to an ice chest with detectors enclosed, has produced excellent results with ammonia concentrations from 0 to 200+ ppm. Developed with input from the workforce, adjustments were successfully made to the configuration to reduce the maximum ammonia concentration slightly to within range of the ammonia detectors.
- Efforts continued to obtain calibration certifications on the [5]Ventis™ Pro V detectors from the manufacturer, with plans to incorporate these units into the testing phase after the certifications are received.
- Orders were placed for four [6]GfG Micro IV ammonia detectors.

KPP 8. Medical Support

The scope of KPP-8 is to support RL medical program enhancements in conjunction with other Hanford Site organizations.

Key Performance Parameter 8

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

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