washington river protection solutions

CPPO Chemical Protection Program Office

The A Farm Exhauster, fabricated in FY2017, is currently located in Blackfoot, Idaho, at the manufacturer's facility. Projects is working on the ducting installation and pad design/installation preceding the exhauster's installation. (Picture courtesy Mark A.) More in KPP 4.

Tank Operations Contract Chemical Protection Program Office Fiscal Year 2018, 1st Quarter Summary

January 12, 2018

The CPPO 1st Quarter Summary is a description of WRPS's Fiscal Year (FY) 2018 scope and activities performed in support of the ongoing vapors efforts.

1. STATE of VAPORS-RELATED ACTIVITIES

At the end of FY2016, Washington River Protection Solutions LLC (WRPS) was completing Phase 1 of the *Implementation Plan for Hanford Tank Vapor Assessment Report Recommendations* (WRPS-1500142), the plan developed to address Tank Vapors Assessment Team (TVAT) recommendations. The TVAT recommendations, stakeholder feedback, and no less than five external assessments culminated into a draft comprehensive vapor management strategy, the *Comprehensive Vapor Action Plan* (CVAP), which remains in draft. The strategy focuses on realizing the vision that all workers on the Hanford Central Plateau continue to be protected by, and actively embrace, this comprehensive approach to vapors management so that workers both ***are safe and feel safe***. The draft CVAP defines and institutionalizes chemical vapor protections to mitigate the potential for vapor incidences. The draft CVAP defines eight key performance parameters (KPPs) that WRPS uses to monitor and measure progress and success. The eight KPPs are:

1. Establish a comprehensive vapor management communication plan, engagement processes, and effectiveness measurements.
2. Maintain the *Industrial Hygiene Chemical Vapor Technical Basis* document 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.
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.
4. Complete engineering control concept demonstrations for Strobic Air Tri-Stack® and NUCON® International Inc. thermal combustion concepts in support of unrestricted work boundaries.
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.
6. Institutionalize a tank operations stewardship program that minimizes required tank farm personnel entries and establishes parameters for locating ancillary personnel and offices.
7. Provide options to promote the hierarchy of controls for chemical vapor respiratory protection beyond current use self-contained breathing apparatus.
8. Support medical program enhancements in conjunction with responsible Hanford Site organizations and establish update to WRPS process/procedures.

The CPPO has published 53 Weekly Reports since its October 20, 2016, debut. Initially organized around WRPS's progress on the TVAT recommendations, its reporting format was restructured to reflect the comprehensive vapors mitigation approach as envisioned in the draft CVAP on March 16, 2017. This 1st Quarter Summary is the CPPO's 11th Weekly Report for FY2018, and the draft CVAP KPPs continue to serve as the focus and organizing principles of the CPPO Weekly Report updates. Significant progress was made in all draft CVAP KPPs in FY2017, and the progress is summarized in the CPPO *Fiscal Year 2017 Annual Summary*, published October 5, 2017.

The draft CVAP, developed by WRPS and the Department of Energy (DOE) Office of River Protection (ORP), includes actions that address the recommendations made by TVAT and the other external assessments performed through FY2017. Significant progress has been made to address these recommendations. As shown in **Table 1** below, the current estimate is that 43 % of the deliverables addressing the recommendations have either been **Completed** or **Field Work Completed**. In order to validate the status, the CPPO has undertaken an exercise to review the status of each recommendation. The recommendations status columns in **Table 1** below are defined as follows:

- **Completed** - The scope and deliverable(s) (i.e. final report or documentation) addressing the recommendation is complete and closed. CPPO has validated deliverable(s) 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.

The data in **Table 1** shows that of the 337 total recommendations, 43% of the recommendations have been addressed. Thirty-one percent have been verified **Completed** and are considered closed; 12 % have the **Field Work Completed** and are awaiting final deliverables (i.e. documentation) to close. CPPO has validated that 9% have ongoing actions; they are **In Progress**. Forty-eight percent of the recommendations have yet to be reviewed and statused by the CPPO. The recommendations that are **Pending Validation** are primarily FY2018 scope. The CPPO has prioritized reviewing the FY2017 scope and deliverables with the understanding that the review of the FY2018 scope deliverables will be more effective later in the fiscal year. The *CVAP Action Status Report – Summary* and the *CVAP Action Status Report – Detailed* are available to the workforce on the Intranet. Updated monthly, the reports are housed on the Vapors Protection Tab.

Table 1. External Assessments Recommendations Status

Report	Recommendations Status As of January 8, 2017*				
	Total	Completed	Field Work Complete	In Progress	Pending Validation
CTEH	23	2	2	3	16
EA-32	28	4	6	2	16
NIOSH	54	6	8	6	34
OIG	3	3	0	0	0
TVAT	117	70	7	4	36
VMEP	43	4	6	6	27
Other	69	14	13	9	33
Total	**337**	**103**	**42**	**30**	**162**

*** The second VMEP report recommendations are not included in this table**

FY2018 was heralded by the October 10, 2017, *Industrial Hygiene Flash* describing full-face air-purifying respirators (FFAPR) use in ventilated farms, as supported by the independent third party review team, Stoneturn Consultants (STC). The next day, Mr. Steve Killoy was named manager of Environmental, Safety, Health & Quality (ESH&Q) Chemical Protection Integration, and before the week was out, the Office of Enterprise Assessments (EA-32), with the determined support of CPPO, was in possession of the dozens of draft CVAP documents they had requested in advance of their October 30 visit. As the 1st Quarter of FY2018 came to a close, a *Message from Mark, News from the Project Manager* all-employee email announced that WRPS and HAMTC had agreed to use of FFAPR in SY Tank Farm. "Soon, workers will be allowed to access SY Farm wearing a Scott full-face air-purifying respirator equipped with either the Scott 7422-SC1 (Chemical-multipurpose) or the Scott 7422-SD1 (Chemical-multipurpose/P100) cartridges," reported the December 7, 2017, email signed by both Mr. Mark Lindholm and Mr. Jeff McDaniel, WRPS President and Project Manager, and HAMTC President respectively.

EA-32, DOE's independent assessor, captured the attention of the CPPO and KPP owners from September to November as EA-32's requests for documents and meetings, in concert with their two, week-long visits, were accommodated. EA-32's presentation, *Follow-Up Assessment of Progress on Actions Taken to Address Tank Vapor Concerns at the Hanford Site*, referred to as *Follow-Up Assessment*, was delivered to Sr. Management and other interested parties on November 16, 2017. EA-32's observations were invoked during the November 29, 2017, Chemical Vapors Solution Team (CVST) meeting. The ESH&Q Chemical Protection Integration Manager, reading the *Follow-Up Assessment*, shared EA-32's observation that, "[t]he amount

and timeliness of vapors-related info has improved dramatically…," in large part due to CPPO. A part of the CPPO's mission, as captured in Draft KPP 1, is to "establish a comprehensive vapor management communication plan, engagement processes, and effectiveness measurements, "to which EA-32 acknowledged CPPO's "outstanding improvements in evaluating the effectiveness of communications" and their "[e]fforts to improve trust/credibility via obtaining outside expertise (CTEH)."

During the 1st Quarter, WRPS continued to work towards institutionalizing a disciplined and rigorous approach to chemical vapors management within the IH Program, and to update and improve the IH Chemical Vapor Technical Basis, the details of which are captured in draft **KPPs 2 and 3**. In its out brief, EA-32 recognized many successes within IH since its last assessment at Hanford. Successes recognized included hiring, training, and qualifying dozens of IHTs, the 3rd party reviews of the IH Program elements, and the Health Process Plan (HPP). EA-32 gave a nod to the engineering controls successes described in draft KPP 4, Strobic Air made ready to perform a factory acceptance test (FAT) in FY2018, and many engineering-scale testing plans for NUCON Thermal Oxidation were developed in the 1st Quarter. EA-32 observed that the Vapors Monitoring Data System (VMDS) functional requirements document had proven challenging, as had the implementation of the VMDS and the quantitative risk assessments (QRAs). For this 1st Quarter Summary, the ESH&Q Chemical Vapors Integration Manager has described succinctly WRPS's draft KPP 5 current status and path forward. "Workers have expressed a belief that SCBA use has increased musculoskeletal injuries," reported the EA-32. KPP 7 offers more information on SCBAs, cartridge testing, and the encouraging 3rd party review of the cartridge testing.

2. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

1st Quarter Summary (Fiscal Year 2018)

In keeping with its FY2018 mandate, the CPPO oversaw many chemical protection activities in the 1st Quarter, including providing reports and summaries to the HanfordVapors.com website.

In the 1st Quarter of FY2018, CPPO provided outstanding presentations for field organizations through the CPPO Notebook, including many presentations written by the Center for Toxicology and Environmental Health (CTEH) professionals and CPPO Subject Matter Experts. A full index of the CPPO Notebook can be found in Appendix A.

CPPO now reports on all the efforts that are made to incorporate worker feedback into the ways in which WRPS does business. A summary of worker feedback is provided in KPP 1.

An FY2017 CPPO initiative, Tank Vapors Representatives (TVRs), was launched in July. The TVR, tasked with attending all CVST meetings, are responsible for reporting the meeting's events to their respective teams. CPPO hosted a focus group with the TVRs at the beginning of the 1st Quarter. The TVRs met for an hour-long conversation focused on their roles and responsibilities. The CPPO Manager facilitated the conversation, and in addition to the CVST Co-Chairmen, several people representing ORP, the Vapor Management Expert Panel (VMEP), and WRPS ESH&Q were present. CPPO received a write-up of recommendations and observations from a member of the VMEP. The CPPO worked with the CVST Co-chairs to disposition the recommendations. As a result, at the end of the 1st Quarter, TVRs had found a home as an entity in the CVST Communications Sub-committee.

Tracking TVR attendance is one of the metrics launched by CPPO. TVRs measurably enhanced engagement the 1st Quarter of FY2018 by improving attendance at CVST meetings according to the CVST Chairman. The Chairman's head count consistently totaled 70 people, including TVRs, although the sign-in sheets documented about 10 fewer persons each meeting. During the 1st Quarter of FY2018, TVRs enlivened discussions about vapors, communicated vapors news to their colleagues, and after they requested to be added to the CPPO Notebook distribution list, reported using the notebooks with their teams.

In the 1st Quarter of FY2018, CPPO provided outstanding presentations for field organizations through the CPPO Notebook, including many presentations written by the Center for Toxicology and Environmental Health (CTEH) professionals and CPPO Subject Matter Experts. An index of the CPPO Notebooks offered in the 1st Quarter FY2018 can be found in Appendix A.

Ever mindful of supporting the workforce, the CPPO offers via direct email and HanfordVapors.com, a weekly update on the broad and innovative vapors mitigation efforts mapped out in the draft CVAP. The TVRs were added to the report distribution at their request. The CPPO Weekly Report tracks the vapors-related communications WRPS produces and distributes to the workforce and public. That tracking effort is captured in one of the four metrics CPPO produces every month. In addition to the Communications Metric, CPPO produced Website

Statistics, Cost and Schedule, and Corrective Action Tracking. An index of 1st Quarter CPPO Weekly Reports is in Appendix A.

Additional CPPO activities this quarter included the following:

- Planning and implementation of vapors-related communications which are detailed in the CPPO Look Ahead
- Developing vapors-related information for communication to broad audiences within WRPS
- Engaging in a weekly information exchange with the HAMTC Safety Representatives and members of the workforce
- Reporting on all the efforts that are made to incorporate worker feedback into the ways in which WRPS does business
- Supporting the CVST Source Apportionment and Fugitive Emissions Identification and Investigation Team (SAFEITT), colloquially known as the Fugitive Emissions Sub-committee
- Developing the 2018 Vapors Information Effectiveness Survey
- Performing broad document retrieval activities across WRPS in support of the EA-32 in October and November
- Continuing to develop multiple metrics to support a draft CVAP monitoring dashboard
- Cataloguing hundreds of vapors-related communications, correspondence, CPPO Notebooks, historical documents, photographs, charts, and references for the CPPO Library and IDMS
- Ongoing vapors website maintenance
- Ongoing CTEH field engagement activities with WRPS IH
- Integrating with CVST

CPPO Oversight and Tracking

The Oversight and Tracking section is a revolving schedule of metrics published in the CPPO Weekly Report, the first three of which are featured in the 1st Quarter Summary:

Website Statistics – Week 1

Cost, Schedule, and Spending – Week 2

Communication Productivity – Week 3

Vapors Corrective Action Status – Week 4

1st Quarter Analysis – HanfordVapors.com Website

The Hanford Vapors website logged over 9,400 views in the 1st Quarter of FY2018. In this reporting period, the website experienced an average of 3138 hits per month, and 104 hits per day.

A newly revamped HanfordVapors.com website was rolled out at the beginning of FY2017, resulting in a surge of interest. Consequently, making direct comparisons of the readership data from the 1st Quarter of FY2018 against the same time last year would be misleading. However, the quarterly and monthly readership data for the 1st Quarter of FY2018 strongly mirrors the use of the website CPPO observed in the 2nd Quarter of FY2017: the lowest readership the entire fiscal year. The number of hits on the website pages show a steadily decreasing trend over the course of 1st Quarter Summary. A significant drop in readership occurred from October to December. Dates when the website experienced high traffic continued to correlate to the publication of the Hanford Vapors Weekly newsletter. Other events that were coincidental to higher than normal traffic to the website in the 1st Quarter included odors reported outside of TX Farm and the November 28 event of odors reported inside the instrument facility. Fifty-nine items were reported uploaded to the site during the 1st Quarter of FY2018, refreshing the content at a rate similar to what was measured in FY2017. A compilation of all the 1st Quarter Website updates can be found in Appendix A.

Figure 1. Hanford Vapors Website Statistics

1st Quarter Analysis –Cost and Schedule Metric

Ongoing vapor projects supporting the draft Comprehensive Vapor Action Plan (CVAP) KPPs are still moving forward, while new projects are in the design phase. **Figure 2** shows the 1st Quarter costs per month. It is expected that spending will begin to pick up as procurements start going out to vendors near the end of the 1st Quarter. FY2018 to date, $9M has been spent implementing the draft CVAP KPP's. Ninety percent ($42.6M) of draft CVAP's revised not to exceed (NTE) value of $47.3M has been spent. **Figure 3** shows the FY2017 cost and schedule variances for the draft CVAP.

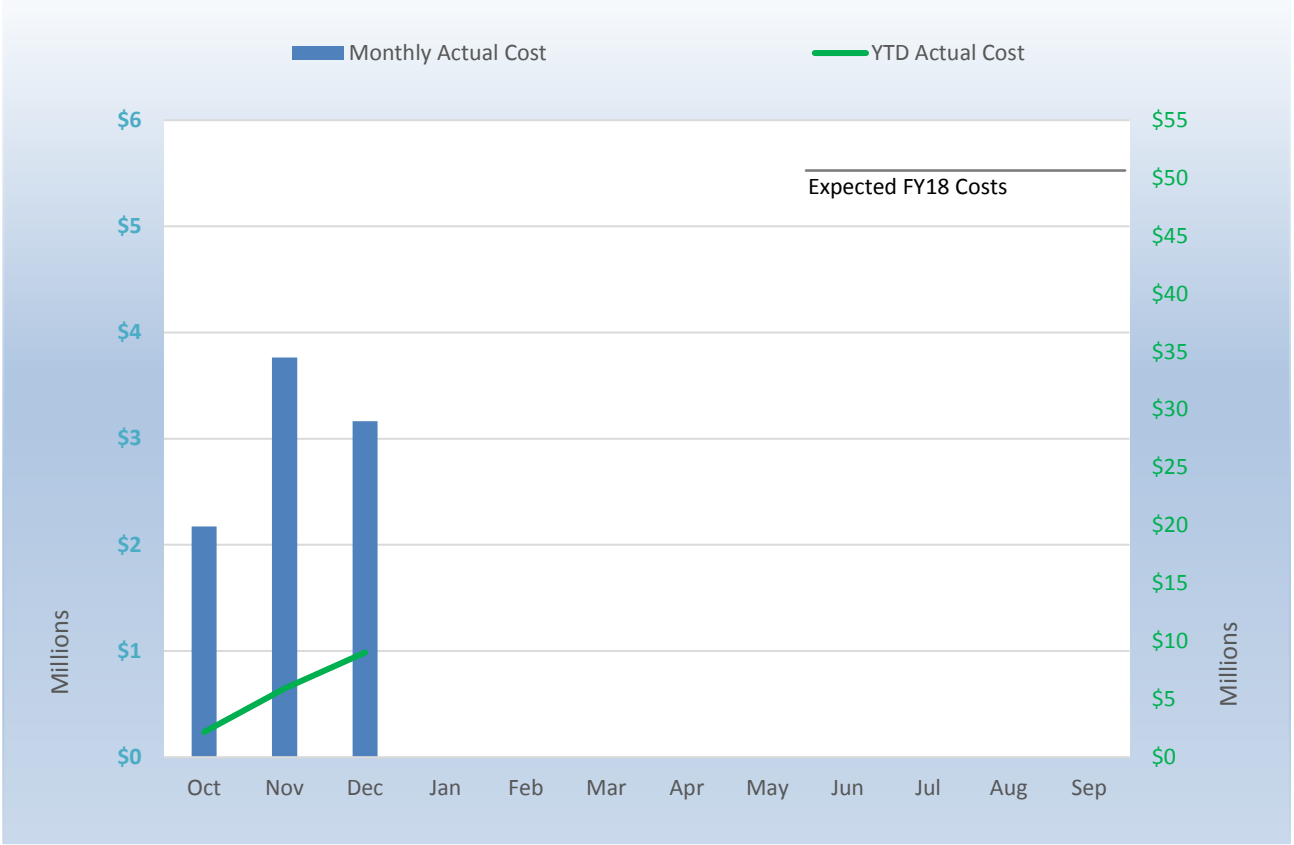

Figure 2. FY2018 1st Quarter Draft CVAP Costs

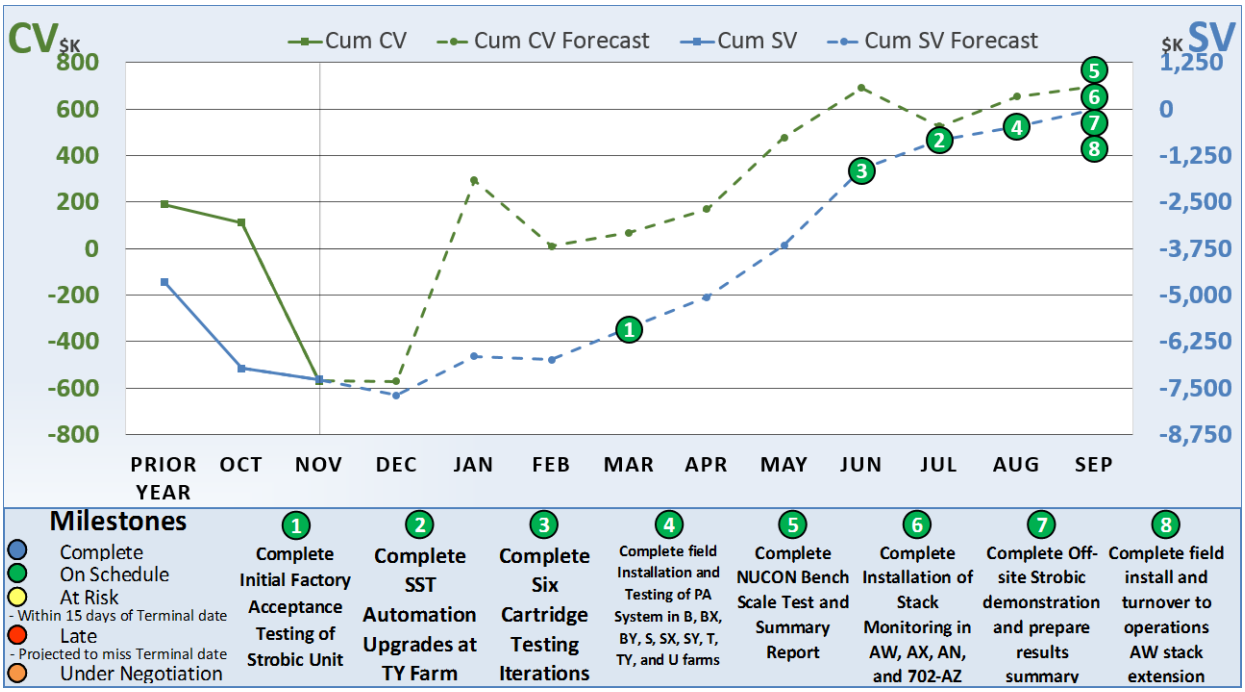

Figure 3. FY2017 Cost and Schedule Variances for the Draft CVAP

1st Quarter Analysis – Communications Metric Data
The CPPO Notebook

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:

- A one-sheet summary of the weekly topic
- A PowerPoint presentation (with speaker notes)
- A video narrated by a technical expert.

Eleven Notebooks were distributed in the 1st Quarter of FY2018 on a range of topics including:

- A two-part series providing education on COPCs: Furans
- FY2017 Vapors Accomplishments
- A two-part series providing information on Occupational Exposure Limits
- A presentation on tracking the status of external assessment recommendations
- Summaries of the 2017 Mobile Laboratory Studies, the Second VMEP report, and the Safety Culture Survey
- An update on the NUCON Vapor Abatement testing, and
- A summary of IH data from the C-105 transfer.

Management's use of the Notebook is determined through self-reporting via email buttons that are provided as part of the distribution each week. In the 1st Quarter of FY2018, the Notebook was reported to have been used 249 times, decreased somewhat from the previous quarter (275 for Q4 FY2017). **Figure 4** shows a decrease in the utilization of this vapors communication tool during the 1st Quarter of FY2018. Some of this can be attributed to the distribution of only three Notebooks in both November and December.

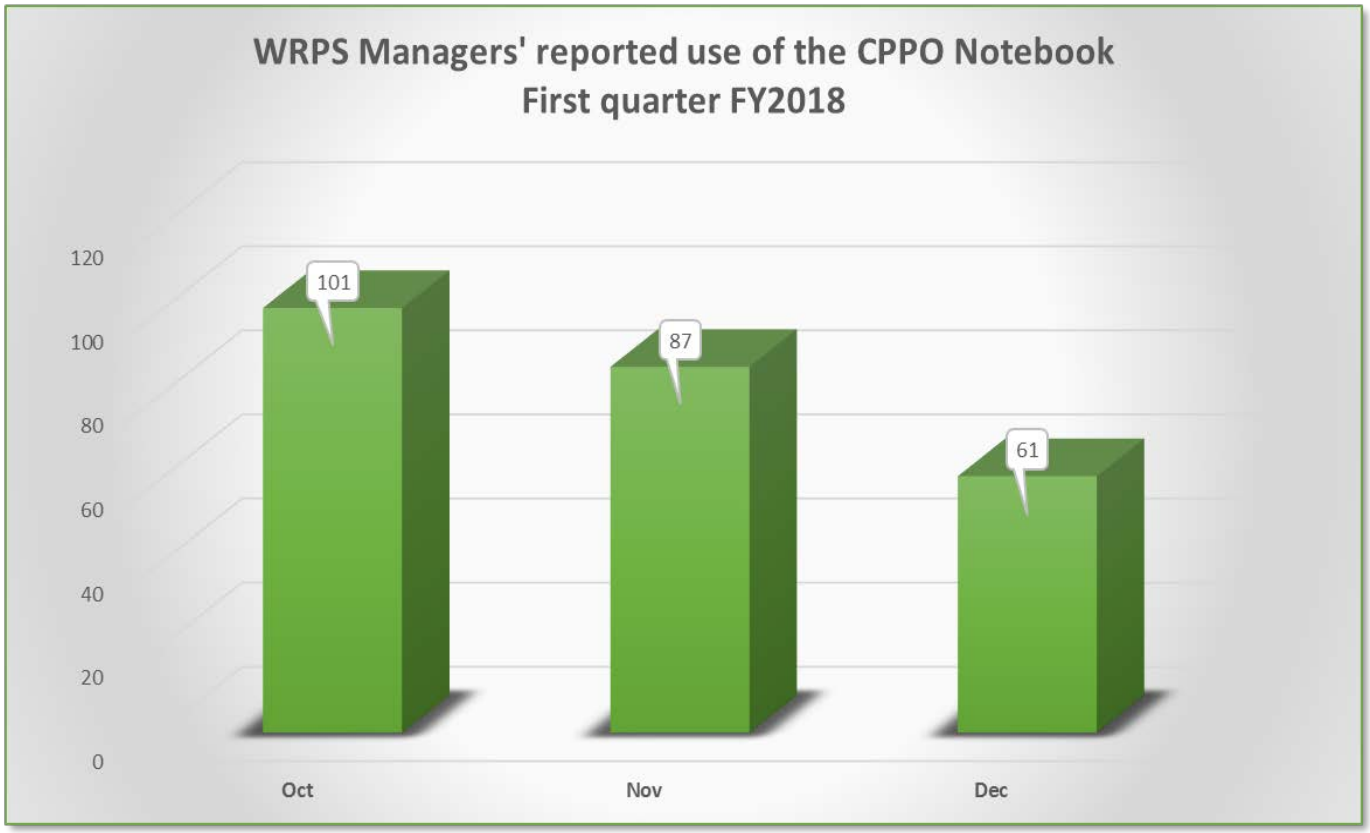

Figure 4. CPPO Notebook Use for 1st Quarter FY 2018

CPPO Requests and Production Metrics

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, 117 vapors-related communications products were **requested** from the CPPO. The total number of items **requested**, shown in **Table 2**, reflect ongoing efforts within the CPPO to review the status of previously request products - and include a reduction of 26 items that have rolled into other actions or were otherwise dispositioned.

Of the 117 vapors-related communications products **requested,** 37 have **been completed** and delivered. **Table 3** shows that the products **provided** during this timeframe primarily consisted of the CPPO Notebook, the CPPO Weekly Report, and data and report summaries.

Table 2. CPPO Vapors Information Products Requested

CPPO Vapors Information Products Requested FY18	October	November	December	FY18 Q1 Total
Data Report (Monitoring Data)	10	4	2	**16**
Presentations (includes CPPO Notebook)	4	4	3	**11**
CPPO Reports and Weekly Report	5	4	3	**12**
Information Requests	4	7	1	**12**
Articles, Summaries, and Message Maps	15	16	9	**40**
Surveys, Focus Groups, and Recommended Actions	7	6	3	**16**
Website Requests/Site Updates	3	1	0	**4**
Videos	3	3	0	**6**
Monthly Totals	**51**	**45**	**21**	**117**

Table 3. CPPO Vapors Information Products Completed FY2018

CPPO Vapors Information Products Completed FY18	October	November	December	FY18 Q1 Total
Data Report (Monitoring Data)	5	0	1	**6**
Presentations (includes CPPO Notebook and CVST)	4	4	3	**11**
CPPO Reports and Weekly Report	4	4	3	**11**
Information Requests	0	0	0	**0**
Articles, Summaries, and Message Maps	0	5	0	**5**
Surveys, Focus Groups, and Recommended Actions	2	2	0	**4**
Website Requests/Site Updates	0	0	0	**0**
Videos	0	0	0	**0**
Monthly Totals	**15**	**15**	**7**	**37**

The CPPO also tracks the distribution of all identified vapors-related communications throughout WRPS. The data for 1st Quarter FY2018 is shown in **Table 4** and indicates that vapors-related information has been shared with the workforce 1439 times in a variety of formats, somewhat reduced from the previous quarter (1590 times in Q4 FY17). This is driven significantly by the Morning Meeting/Pre-Shift Brief that field managers hold with the workforce, followed by CPPO Notebooks and vapors-related updates provided to the WRPS and Hanford Vapor websites. Other events occur less frequently, such as the CVST meeting, but provide targeted vapors-related information to the workforce.

There is an overall reduction in the delivery and use of vapors-related information observed this quarter. 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 vapor concerns appear to be expressed less in the winter months – yet, this merits attention to ensure that WRPS continues to provide timely and transparent vapors-related information to the workforce on an ongoing basis.

Figure 5 depicts the current distribution and trending forecast for FY2018 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 FY2018.

WRPS Vapors-related Communications Distribution and Trend

Table 4. WRPS Vapors Information Distribution Avenue

WRPS Vapors Information Distribution Avenue	October	November	December	FY18 Q1 Total
All Employee Email/Meetings & ESHQ Comm.	9	3	1	**13**
CPPO Notebook*	101	71	61	**233**
CPPO Report and Weekly Report	4	4	3	**11**
Fact Sheet & Information	0	0	0	**0**
Meeting - CVST *	2	1	1	**4**
Meeting - CVST Sub-team meeting *	4	4	4	**12**
Meeting - Hanford Advisory Board Briefing *	0	0	0	**0**
Meeting/Briefing*	7	4	1	**12**
Meeting -Morning/Pre-Shift Brief*	415	367	301	**1083**
Presentation*	0	0	0	**0**
Safety Start	0	0	0	**0**
SOEN	1	4	0	**5**
Solution Article	2	2	2	**6**
Survey and Focus Group	1	0	0	**1**
Tours*	0	0	0	**0**
Website/Individual Inquiry	0	0	0	**0**
Vapors Weekly Update or Website Post	22	11	26	**59**
Video	0	0	0	**0**
Monthly Totals	**568**	**471**	**400**	**1439**

* Face-to-face communication

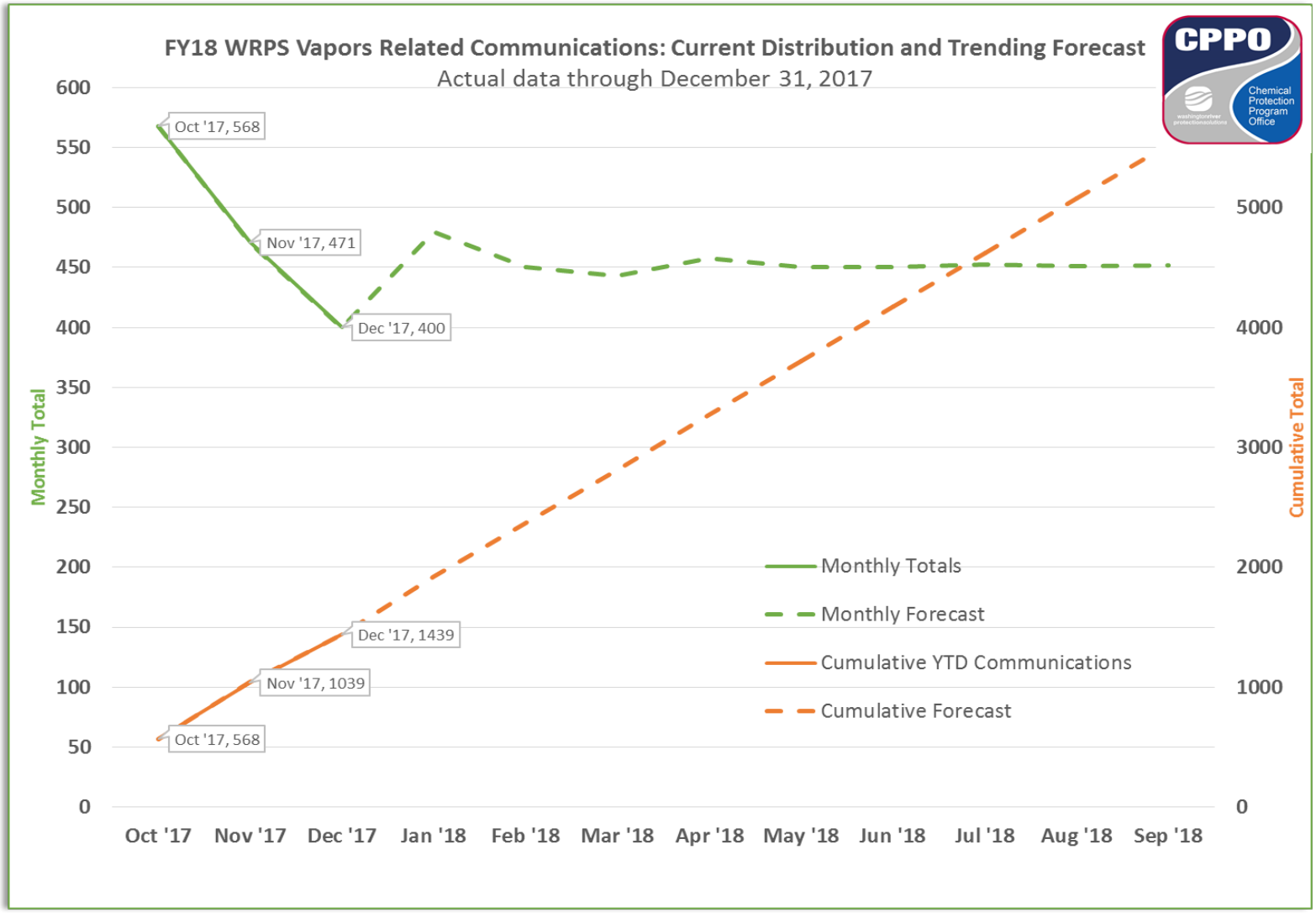

Figure 5. FY2018 WRPS Vapors Related Communications Distribution and Trending Forecast

3. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

During their 1st Quarter visit to WRPS, EA-32 acknowledged CPPO's efficacy in answering the draft **KPP 1** goals; engage the workforce and measure the effectiveness of those engagement activities.

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

Key Performance Parameter 1

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

The CPPO initiated engagement and mentoring activities featuring the vast experience and knowledge of the CTEH team. The CTEH team attended onsite staff meetings, select pre-job meetings, and activities with WRPS Industrial Hygiene Professionals (IHP) and Industrial Hygiene Technicians (IHT). The CTEH team is knowledgeable on the draft CVAP actions, general toxicology, and are trained emergency responders. The inquiries/topics of interest included nitrosamines, furans, and IH sampling plans. They created many CPPO Notebooks, including IH and Occupational Exposure Limits (OELS) Parts 1 and 2 and Furans Parts 1 and 2.

Figure 6. Dr. John Kind of CTEH discusses Dimethylmercury during a CVST Meeting

Figure 7. CTEH created IH and Occupational Exposure Limits (OELs) Part 1: Industry for the CPPO Notebook

Chemical Protection Engagement: Chemical Vapors Solutions Teams

The CVST **Communications** Sub-committee met 5 times the 1st Quarter of FY2018. It met on October 2, October 16, November 6, November 27, and December 11, 2017.

The CVST **Chemical Cartridge** Sub-committee met 4 times the 1st Quarter of FY2018. It met on October 4, November 15, December 6, and December 20, 2017.

The CVST **New Technologies** Sub-committee held 2 meetings the 1st Quarter of FY2018. It held meetings on November 8 and December 13, 2017.

A new CVST Sub-committee, Source Apportionment and Fugitive Emissions Identification and Investigation (SAFEIIT), colloquially known as the **Fugitive Emissions Team**, held their kick-off meeting on October 31, 2017. The sub-committee also met on November 14 and December 6, 2017.

Figure 8. Carrie Jacobs described the accomplishments of the CVST Communication Sub-committee to the October 11, 2017, CVST meeting, including recognizing CPPO's Notebook as an important contribution to the workforce's "regular briefings," a Communication Sub-committee goal.

Chemical Protection Engagement: 1st Quarter Communication Highlights

The *Vapor Communication Plan* is a requirement of KPP 1. Implementation of the plan is ongoing.

On October 4, 2017, WRPS SST Retrievals Manager sent an all-employee email on the "Residual Waste from AY-102 Annulus to Primary Tank." The email communicated that the industrial hygiene (IH) controls "used will be typical of DST-DST waste transfer activities, including:

- Backshift and weekend operation
- Readerboards will be placed informing personnel that a waste transfer is in progress
- Enhanced IH monitoring/sampling"

An October 6, 2017, all-employee email, *Message from Mark*, looked back at "our accomplishments over the past 12 months." Safety performance, waste retrieval, the VPP Innovation Award, and WRPS's many charitable contributions to our community were some of the successes he noted. Additionally, he described the Chemical Vapors Program initiatives as essential to performing work safely, and acknowledged the role CPPO played in 2017 in meeting the challenge of vapor-related communications and overseeing chemical protection initiatives.

An all-employee *Industrial Hygiene Flash* was issued on October 10, 2017. The communication reviewed cartridge testing efforts and results over the last year. In conclusion, the Industrial Hygiene Flash stated, "[m]oving forward, WRPS will continue to work with HAMTC and building trades. Individual hazard assessments are being completed for actively ventilated tank farms, with a targeted completion date [at the] end of calendar year 2017."

An all-employee announcement published on October 11, 2017, informed the workforce that Mr. Steve Killoy "has been named manager of Environmental, Safety, Health, and Quality (ESH&Q) Chemical Protection Integration. In this new role, Steve will be the primary interface for Comprehensive Vapor Action Plan (CVAP) activities – both internally and with the DOE Office of River Protection."

"Six Hanford workers have declined precautionary medical evaluation after reporting odors outside of TX Farm" read the all employee email issued on October 18, 2017. The email described how "[t]he employees were preparing to perform electrical maintenance at the time of reported odors and were not in an area that requires use of a supplied-air respirator."

An all employee email updated the odors report on October 19, 2017, reporting that access was restored to the area near TX Farm, and that "…industrial hygiene technicians collected air samples and results were less than the action level of chemicals evaluated." Furthermore, "[n]one of the six workers experienced symptoms…"

An October 26, 2017, all-employee email notified the WRPS workforce that the EA follow-up assessment of the Hanford Tank Farms vapor issues will resume on October 30. "During this period, the EA team will conduct document reviews, observations, interviews, and focus groups."

Hanford Tank Vapors, published on October 26, 2017, discussed the strengths and opportunities identified during the Safety Culture Work Environment survey conducted in July 2017.

A November 2, 2017, all-employee email informed the WRPS workforce that preparations for a DST-to-DST waste transfer were underway for the weekend of November 4. "Depending upon equipment availability, the sequence of these transfers may change, however, the industrial hygiene (IH) controls will remain [the same]." Reviewed by the Chemical Vapor Solutions Team and HAMTC leadership, the IH controls include backshift and weekend operations, reader boards, supplemental AreaRAEs, and enhanced IH monitoring and sampling during the waste transfers.

The SOEN System alerted the Hanford community of a significant operational issue on November 28, 2017, at 9:13 a.m. when it reported, "Entering AOP-015 for 271AW. All personnel perform orderly exit of 271AW. Access is restricted to 271AW."

The SOEN System alerted the Hanford community of an event investigation initiation on November 28, 2017, at 9:54 a.m. when it reported, "Initiated Event Investigation (EIR-2017-043) for 271AW Instrument Building AOP-015 Event."

The SOEN System alerted the Hanford community of a personnel injury or illness on November 28, 2017, at 10:30 a.m. when it reported, "Three NCOs reported odor concerns at 271AW and were taken to HPMC."

WRPS Communications & Public Relations sent an all-employee email on November 28, 2017, at 11:50 a.m. in which it reported, "Odors reported inside instrument facility."

The SOEN System alerted the Hanford community of a significant operational issue on November 28, 2017, at 2:16 p.m. when it reported, "Sample analysis for the 271AW TF-AOP-015 event has been completed and the results are below action limits. Exiting TF-AOP-015."

WRPS Communications & Public Relations sent an all-employee email on November 28, 2017, at 4:28 p.m. in which it reported an update to, "Odors reported inside instrument facility."

Hanford Vapors, posted to the HanfordVapors.com website on November 28, 2017, at 7:31 p.m. reported on the vapors event stating, "Three Hanford workers were cleared to return to work after receiving precautionary medical evaluations for odors reported today inside the 271AW instrument building near AW Farm."

Solutions, Issue 418, published on December 11, 2017, reported on the CPPO and C&PR collaboration, *Video Tour: The WRPS Intranet.* Presented during a CVST meeting, the tour focuses on three core elements: the WRPS intranet, the hanfordvapors.com website, and the Industrial Hygiene Data Access & Visualization (IH DAV) explorer.

Solutions, Issue 418, published on December 11, 2017, reported, "WRPS and the Hanford Atomic Metal Trades Council (HAMTC) have jointly agreed to allow use of full-face air-purifying respirators (FFAPRs) in Hanford's SY Farm for specific work evolutions. The decision is consistent with the Memorandum of Agreement for use of respiratory protection between WRPS and HAMTC issued in August 2016."

Hanford Tank Vapors, Vapors Weekly Update published on December 14, 2017, reported, "Washington River Protection Solutions (WRPS) and the Hanford Atomic Metal Trades Council (HAMTC) have jointly agreed to allow use of full-face air-purifying respirators (FFAPRs) in Hanford's SY Farm for specific work evolutions. The decisions consistent with the Memorandum of Agreement for use of respiratory protection between WRPS and HAMTC issued in August 2016."

- Chemical Protection Engagement: Hanford Vapors Website Updates

  Solutions, Issue 419, December 18, 2017, reported that "[h] anfordvapors.com is a public website that aims to provide greater understanding of chemical vapors – and associated protective measures – at the Hanford Tank Farms. The site was originally launched in June 2016, but then underwent a major transformation before another rollout in October 2016. It includes content developed by a cross-section of workers at the site who are leaders in their fields of expertise." The Association of Marketing and Communication Professionals recognized WRPS's Communications and Public Relations (C&PR) team by awarding them Gold Awards for the Hanfordvapors.com website, as well as the Solutions newsletter and a safety video. **Appendix A** catalogues over 55 vapors-related communications added the 1st Quarter.

Figure 9. The WRPS Communications & Public Relations team. Front row, L to R: Mark McKenna, Ashlee Watkins, Rob Roxburgh. Back row, L to R: Grant Monrean, Jerry Holloway, John Lawson, Matt Buechler, Peter Bengtson, and Terese Meyer. Not pictured: John Britton.

Chemical Protection Engagement: Data Analysis and Visualization Tool

An enormous accomplishment, instantly affording the workforce and the community both data and visuals, was the October 1, 2017, launched Data Access and Visualization (DAV) Tool. Sub-contracted by the CPPO, Pacific Northwest National Laboratory (PNNL) built and successfully launched the web-based data explorer application. Engaging the user by interactive access to historical and current tank vapor samples, monitoring results, and visual representations of relevant data and contextual information, the DAV Tool promotes transparency. This sophisticated tool avails the data to the user with little technical background, and allows the more technically sophisticated user to drill down to detailed content. The DAV Tool is on the HanfordVapors.com website. DAV Tool statistics, as provided by Google Analytics, are depicted in **Table 5**.

Figure 10. Mr. Chris Holst, CPPO, chairs the DAV Tool Steering Committee, which continues welcoming volunteers. Interested persons please contact the CPPOWRPSCPPO@rl.gov. For more information go here.

Table 5. Google Analytics Data Report October 2017 to December 2017

2017	Total Page Views	Most Popular Feature	Second Most Popular Feature	Most Popular Region	Second Most Popular Region	New Users	Returning Users
October	657	Chemical Selection: Chart Type: Single Chemical Chemical: Ammonia (7664-41-7)	Explorer-Set-Filter Explorer-Set-Filter is where the user is actively filtering on COPC Chemicals or All Chemicals.	Washington State	Illinois California Massachusetts Texas Arkansas North Carolina Virginia	64%	36%
November	619	Chemical Selection: Chart Type: Single Chemical Chemical: Ammonia (7664-41-7)	Search/Select Farm Search/Select Farm is where a user is filtering the data by tank farm name.	*Washington State	Maryland California Massachusetts Texas	67%	33%
December	374	Chemical Selection: Chart Type: Headspace/Source vs. Area Chemical: Mercury (7439-97-6)	Tank Farm Selection Headspace/Source vs. Area for TY-Farm (63) specifically.	**Washington State	Massachusetts Virginia Nebraska	41%	59%

Table 5. Google Analytics Data Report October 2017 to December 2017 (continued)

	***November Washington State Breakdown:** 1. Total Page Views: 571 92% of page views are from Washington State Average Session Duration: ~3 min	2. Total Unique Users: 113 Region/Marketing: Yakima-Pasco-Richland-Kennewick: 102 Seattle-Tacoma: 20	
	3. Page views by Region Yakima-Pasco-Richland-Kennewick: 518 and Seattle-Tacoma: 53	4. New vs Returning Users	
		Yakima-Pasco-Richland-Kennewick	Seattle-Tacoma
		New Users: 102	New Users: 11
		Returning Users: 52	Returning Users: 9
	****December Washington State Breakdown:** 1. Total Page Views: 362 97% of page views are from Washington State Average Session Duration: ~6 min	2. Total Unique Users: 92 Region/Marketing: Yakima-Pasco-Richland-Kennewick: 87 Seattle-Tacoma: 11	
	3. Page views by Region Yakima-Pasco-Richland-Kennewick: 345 Seattle-Tacoma: 11	4. New vs Returning Users	
		Yakima-Pasco-Richland-Kennewick	Seattle-Tacoma
		New Users: 32	New Users: 2
		Returning Users: 55	Returning Users: 2

Google Analytics Data Report: Tank Vapors Cloud Site: www.TankVaporsExplorer.com

Chemical Protection Engagement: Worker Feedback

The HAMTC Safety Representatives/CPPO Interface met 9 times in the 1st Quarter of FY2018. It is always the focus and intention of CPPO and the HAMTC Safety Representatives to afford workers the opportunity to investigate contemporary vapors-activities in this meeting. Worker feedback from this meeting influenced the creation of the CVST Fugitive Emissions Sub-committee, the Fugitive Emission's charter, and influenced the content of CPPO's 2018 vapors information effectiveness survey.

As described in the activities status above, worker feedback opportunity was provided after one of the October CVST meetings, when the Tank Vapor Representatives (TVR) met for an hour-long conversation focused on their roles and responsibilities. The CPPO Manager facilitated the conversation, and in addition to the CVST Co-Chairmen, several people representing ORP, Vapor Management Expert Panel (VMEP), and WRPS ESH&Q were present.

Worker inclusion was the intent of CPPO's appeal to the November 29, 2017, CVST audience for volunteers for a Data Access Visualization (DAV) Tool Steering Committee. The DAV Tool developers had recently finished designing the VMDS explorer, a function that shows the data from the active VMDS readings from fence lines, the area, and the stack monitors. But the expression of the data is quite different in appearance than the Site Wide Industrial Hygiene Database data. The DAV Tool developers will rely on workforce feedback in their design of the visual end-products. The steering committee continues welcoming volunteers. Interested persons please contact the CPPOWRPSCPPO@rl.gov.

Nowhere is worker feedback more easily acquired than in the CVST Communications Sub-committee, which meets the second and fourth Monday of the month. During the November 27 meeting, workers reviewed and critiqued the video "WRPS Website Tour Vapor Resources." Viewer feedback drove editing changes, including slowing the pace of the video to improve understandability. Workers requested the video be distributed in a CPPO Notebook, an action which was taken.

Tier 3 training is designed for workers that will actually enter the tank farms. The class is an access-controlled entry (ACE) requirement for tank farm entry. This class was successfully piloted on October 4, 2017. The trainees offered many insightful recommendations regarding content and worker perspective. These comments were incorporated.

George Weeks requested feedback from the December 13, 2017, CVST meeting attendees on the NUCON engineering-scale testing, including the selected COPCs to be tested and the sampling locations. In addition, a CPPO notebook on this subject was also released, which solicited this same input from the entire WRPS workforce.

KPPs 2 and 3. IH Technical Basis and IH Program

- IH Manual and Technical Basis

1st Quarter FY2018 Summary:

TFC-PLN-174, *Chemical Vapors Technical Basis Plan*, TFC-ESHQ-S_IH-C-67, *IH Chemical Vapor Technical Basis Maintenance*, TFC-ESHQ-S_IH-C-66, *COPC to COC Evaluation Process*, and other implementing documents and procedures were en route through the Workflow Review & Approval Process (WRAP), when a reviewer identified information that needed further clarification. The process was interrupted, and the documents are being revised. They will be re-submitted to WRAP.

Much progress has been made on the IH Manual. Key sections of the IH Manual have been developed and are in review. Specifically, Section 1: Introduction and Section 4: *Tank Waste Chemical Vapors of the IH Manual,* are developed and in review. The roles and responsibilities associated with Section 1 are planned to be available on the IH website. Additionally, the following procedures are in review:

- TFC-ESHQ-S_IH-C-66
- TFC-ESHQ-S_IH-C-67
- TFC-ESHQ-S_IH-C-48
- PLN-34
- PLN-174
- RPP-22491
- Unrestricted boundary paper

Briefing material is being developed to help facilitate the communication of the changes affecting the exposure assessment process and the management of chemical vapors in the tank farms.

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.

- Health Process Plan

1st Quarter FY2018 Summary:

The following HPP reports have been developed: *Proposed OELs for Chronic Exposures – COPCs with Regulatory Guidelines*, *Proposed Occupational Exposure*

Limits for Furans, Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern, Proposed Acute Exposure Limits for COPCs with Regulatory Guidelines, Proposed OELs for Chronic Exposures – Nitrile Class COPCs and 2,4-Dimethylpyridine, Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors, and Hanford Tank Vapors FY 2017 Chemicals of Potential Concern update. The final study, currently in progress, is *Assessing the Potential for Chronic or Acute Health Effects from Exposure to COPC Mixtures*. This study will incorporate the chemical mixtures modeling, Acute Transient Exposure Concentration (TEC) Standard Operating Procedure (SOP) and Initial Screening, and potential approach to fill gaps in acute TECs and mixture effects. After the IRP's review, the studies will be reviewed by an external expert panel (EEP), finalized, and submittal to WRPS.

- Leading Indicators

1st Quarter FY2018 Summary

During the 1st Quarter, the leading indicators project team evaluated the concentration ratios between COPCs found in the data collected during the previous year's cartridge testing. Ammonia (NH3) is currently the focus of the study due to its prevalence within the tanks. Direct read instrumentation (DRI) Ammonia readings are being compared to ammonia analytical samples to see how each sample type corresponds to concentration and duration of sampling. There were approximately 50 samples from the AP Exhauster and 5 samples from the A 103 Tank with reported concentrations for NH3 and N-Nitrosodimethylamine (NDMA). The clustering of data points from the mobile lab at the AP Exhauster show that the concentrations of both NDMA and NH3 were relatively constant over the 7-day campaign, indicating that ammonia and NDMA may be viable as leading indicators.

- Parity Implementation with Established Programs

1st Quarter FY2018 Summary:

WRPS made strides in the 1st Quarter of FY2018 in improving parity with other well established programs such as the radiological controls program. *Tier 1* training is complete and has been implemented as *Tank Operations Contractor Hanford General Education Training* (TOC GET). It will be included as part of WRPS's all employee annual training. The class provides very basic information on chemicals and chemical odors. *Tier 2* training is designed for workers that may work in the 200 East and West areas, but do not perform work within the tank farm's fence. It is complete. *Tier 3* training is

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 FY 2018.

designed for workers that will actually enter the tank farms. The class is an access-controlled entry (ACE) requirement for tank farm entry. This class was successfully piloted on October 4, 2017. The attendees offered many insightful recommendations regarding content and worker perspective. These comments have been incorporated. Once *Tier 3* training is implemented, it will be taught in the class room, and will eventually take the place of the *Chemical Hazards Awareness Training*. The *IH Fundamentals Training,* still in development, targets industrial hygiene technicians.

- Central Residence for Industrial Hygiene Technicians (IHT)

1st Quarter FY2018 Summary:

Retrieval Industrial Hygiene Technicians (IHT) and their first-line supervisors will be relocated to a centralized mobile office (MO) building. The MO is slated to house approximately 100 workers. According to retrieval field support, this new space will be large enough to house all retrieval IHTs and their first-line supervisors. Plans are to install the MO in 200 East area on 4th Street near 218A across from PUREX. The installed and occupied MO will satisfy KPP 3 for retrieval IHTs. KPP 3 advocates a central location for IHTs that is commensurate with other technician level employees.

KPP 4. Engineering Controls

- A Farm Exhausters

1st Quarter FY2018 Summary:

FY2018 exhauster activities include pouring concrete pads to accommodate exhauster skids, as well as isolating the existing ventilation ducting for all A Farm tanks. Isolation is necessary to establish enough vacuum for tank ventilation.

During the 1st Quarter, design constraints for the new exhauster were defined, including the new exhauster's location and selecting the tank risers for the ventilation tie-in. Early in the 1st Quarter, a contract was awarded to American Electric to remove equipment from A Farm in order to allow the installation of the exhauster ducting, and to isolate existing the A

Figure 11. A Farm Exhauster offsite storage (picture courtesy Mark A.)

Farm ventilation ducting. American Electric has begun mock-up duct-isolating activities; the mock-up must be validated before the legitimate duct-isolation event commences.

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.

After the optimization study was complete, the A Farm Project Team selected the A Farm Exhauster pad location, and ARES, the subcontractor chosen to design the pad's relocation, submitted their preliminary engineering design package in mid-December. An approved design package enables completion of the request for proposal (RFP) for construction of the exhauster pad and exhauster installation. The RFP is being developed. The two exhausters, which were fabricated in FY2017, were shipped and placed in storage in Blackfoot, Idaho. They will be shipped to Hanford when the pad is installed and the preparations complete.

AX Farm Exhausters: The goal for the 1st Quarter of FY2018 was to complete and approve the Operational Readiness Checklists for portable exhausters POR-126 and POR-127 so they could be used to support full-time operations. This was achieved towards the end of October 2017 when a declaration of readiness was announced for both POR-126 and POR-127.

- AW Stack Extension

1st Quarter FY2018 Summary:

The scope of this effort is to extend the stack's current elevation from 27 feet to 60 feet. The 1st Quarter of FY2018 focused on preparing the design package to support the stack extension. Both the 30% and 60% design packages were completed by early December. The final design is started. In addition to design activities, a subcontract was awarded to TerraGraphics in mid-November for dispersion modeling support. The scope of the subcontract is to identify the dispersion (or plume effects) from the stack's current elevation of 27 feet to its new elevation of 60 feet. The draft Plant Forces Work Review (PFWR), which will determine the organization responsible for installation activities, was also started during the 1st Quarter.

- AN Stack Extension

1st Quarter FY2018 Summary:

Engineering evaluations will determine the optimum height required for the stack and whether the existing superstructure can support that stack height increase.

- Strobic Air Dilution Fan

1st Quarter FY2018 Summary:

Early in the 1st Quarter, efforts focused on awarding Strobic a fabrication contract to support the FAT, the purpose of which is to evaluate the capabilities of a mobile, skid-mounted unit to support future Hanford activities. Strobic submitted its proposal for the FAT to WRPS for evaluation and the contract was awarded in late November. WRPS management started efforts to expedite completion of the FAT. After Strobic completes the FAT, the unit will be shipped to Hanford for a field test (off-site demonstration). The SOW for the test plan was approved and submitted for solicitation near the end of the 1st Quarter.

- NUCON Thermal Oxidation Proof-of-Concept

1st Quarter FY2018 Summary:

The engineering-scale test has been designed to answer questions left unanswered by the proof-of-concept tests performed in FY2017. The information collected in the engineering-scale test will support the potential design and permitting of a full-scale unit. This activity is a collaborative effort between WRPS, PNNL, TerraGraphics, and NUCON. WRPS is responsible for overall coordination and management. PNNL is responsible for developing the test plan, securing equipment, and conducting the test. Terragraphics is responsible for infrastructure (trailers, power, etc.), while NUCON is responsible for modifications and delivery of the prototype unit. FY2018 1st Quarter activities are summarized below.

PNNL:

- Began developing a test plan for engineering-scale activities early in the 1st Quarter. The test plan has undergone numerous reviews and comment resolution cycles and is currently with WRPS for final review and approval.
- Began developing the gas-mixture intended to simulate the key chemicals of potential concern (COPCs) encountered in the tank headspace. In early November, COPC gas simulants were evaluated with the gas vendor, which was followed by final selection in late November. Procurement of the COPCs gas simulant was completed the first week of December.
- Identified analytical equipment necessary to support the engineering-scale test. The Ultra-Violet Fourier transform infrared spectroscopy (UV-FTIR), PTR-MS, and pre-concentrator were deemed acceptable to support testing. The PTR-MS was moved to PNNL's Central Lab and functional checks were completed. The pre-concentrator was moved to PNNL's Central Lab the week of December 4 and efforts were started to develop the operational procedure.
- Secured an air permit for the PNNL test facility.

- In support of future permitting activities (beyond FY2018), PNNL started reviewing options for collecting required data.

WRPS:

- A major priority in the 1st Quarter was to prepare and present the *Propane Decision Paper*. A propane-powered NUCON unit was used for the proof-of-concept test. Before proceeding with further testing, the feasibility of using a propane-powered unit in the Hanford Tank Farms was evaluated. The evaluation resulted in numerous safety issues which precluded using propane at the tank farms. The decision paper was used to document the basis for using diesel instead of propane to power the generator. The decision paper was presented to both WRPS and ORP management.
- As a result of switching to diesel, the post-exhaust needs were evaluated during the 1st Quarter. Due to the incomplete combustion of the diesel fuel, trace quantities of some of the COPCs are actually generated in the engine and are measurable in the exhaust. Without proper exhaust treatment, the diesel engine alone would likely fail to meet Destruction and Removal Efficiency targets for the NUCON. Therefore, the decision was made to include a diesel oxidative catalyst (DOC), diesel particulate filter (DPF) and selective catalytic reduction (SCR) in the prototype unit. These will help in destroying the COPCs generated as a result of incomplete diesel combustion and to further destroy COPCs from the inlet air. Sufficient data will be collected during the engineering-scale test to evaluate the need for the DOC, DPF, and SCR in the final design for field demonstration.
- In early November, WRPS sent an RFP to NUCON for a diesel conversion kit design. The diesel conversion kit will contain the DOC, DPF and SCR discussed above. Shortly thereafter, NUCON submitted its proposal, and a technical evaluation was performed. Near the end of November, WRPS awarded a contract to NUCON to proceed with the design of the diesel conversion kit.
- WRPS supported PNNL in its efforts to transfer the UV-FTIR, currently located at tank farms, to PNNL for testing. Also initiated was the procurement documentation to repair and modify the UV-FTIR to operate at 180°C, which is necessary for diesel exhaust.
- George Weeks provided an update on engineering-scale activities at the December 13, 2017, CVST meeting. During the presentation, George requested feedback from those in attendance on the engineering-scale testing, including the selected COPCs to be tested and the sampling locations. In addition, a CPPO notebook on this subject was also released, which solicited this same input from the entire WRPS workforce.
- WRPS continued preparing their technology maturation plan for the NUCON VAU throughout the quarter.

Figure 12. George Weeks provided an update on engineering-scale activities at the last CVST meeting of the 1st Quarter, December 13, 2017.

TerraGraphics:

- Midway through the 1st Quarter, Terragraphics worked on the electrical rack and test trailer procurement documents needed to support engineering-scale activities. In late November, the contract for fabrication of the electrical rack was issued to American Electric. In December, Terragraphics received concurrence from WRPS to issue a contract to Design Space Modular for the rental of the test trailer.
- Near the end of the 1st Quarter, TerraGraphics started work on the Site Selection Criteria and presented the initial criteria at an Integrated Project Team meeting. The criteria was finalized at the meeting and weighting factors were assigned. This criteria will be used to select the tank farm that will support the potential future full-scale integration test (beyond FY2018).

NUCON:

- In mid-November, NUCON submitted a diesel conversion kit design proposal, which was subsequently awarded towards the end of November. NUCON immediately started working on the design and fabrication of the diesel conversion kit. KPP 5. Administrative Controls and Monitoring

WRPS, in coordination with ORP S&H, developed a draft white paper defining the unrestricted work boundary related to tank vapor management. The white paper

offers a technical basis for establishing and controlling vapor control zones, ALARA zone, the unrestricted work boundary, and general worker areas. The definition developed provides a basis for visible and definitive boundaries and, through coordinated evaluation of IH technical data and modeling, will provide a strong basis for establishing control strategies using IH hierarchy of controls that protect these boundaries.

KPP 5. Administrative Controls and Monitoring

- Permanent Installation of VMDS Equipment in A and AP Farms

1st Quarter FY2018 Summary:

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.

In FY2017, WRPS identified viable VMDS components for use in the tank farms. The turnover of AP Farm UV-FTIR to Operations was initiated. The main 1st Quarter activities included the following:

- The *Phase 2 Pilot-Scale Report*, a report summarizing the results of the FY2017 viability assessments used to select VMDS equipment for full-time operations, was prepared. Comments have been resolved and the report is currently in the approval cycle.
- The UV-FTIR, currently installed at AP Farm, is in the process of being turned over to Operations. A functions-and-requirements (F&R) document confirming the use and purpose of the equipment, alarm set points, contingency plans for equipment that goes off-line, and other similar types of operational issues has been drafted. The document provides direction for much of this project moving forward. Reviews of the F&R are currently in progress. Other important turnover activities included preparing key design drawings, starting development of operating and maintenance procedures, developing software and cyber security protocols, and resolution of readiness activities.
- ARES prepared a calculation refining the set point for ammonia. The draft calculation was completed and is currently under review.
- Modification of the Autosampler (Real-Time Detecting, Optimized-Sample-Selection [RDOSS] system) for stack monitoring continued during the 1st Quarter. The RDOSS is fitted with a gas chromatograph flame-ionization detector and Ultra Violet- Differential Optical Absorption Spectrometer; this unit will provide real-time analysis of easily detectable indicator COPCs (e.g., NH3 and mercury), hourly analysis of a suite of COPCs, and also collect targeted laboratory samples for analysis that will provide more accurate detection and characterization of Hanford COPCs. The following activities were performed in the 1st Quarter:

- Determining gas standards for testing is a key component in development of the RDOSS. Initially in the quarter, progress was delayed approximately 1-2 months as a result of modifications required on the testing equipment. This delay will not impact completion of integrated testing activities. In support of developing test gas standards, samples were collected during waste disturbing and quiescent (inactive or dormant) activities at AP Farm. The samples will be analyzed by both the 222-S Lab and an off-site vendor in order to confirm that the sample adequately supports integrated testing. Results are expected early in the 2nd Quarter.
- Design drawings for the test bed manifold and Hanford E-Skid were initiated in the 1st Quarter and are expected to be completed in the 2nd Quarter.
- Procurement of key equipment (probes, pumps, UV-DOAS) needed to support integrated testing was started.
- Preparation of the test plan, which will be used for integrated testing, was started and is currently in review. Efforts are also underway to brief key WRPS IH personnel on the test plan and solicit their feedback.

- Early in the 1st Quarter, the UV-DOAS and Open path Fourier transform infrared spectroscopy (OP-FTIR) units were transported to HAMMER and used to support demonstrations. The equipment was returned to the tank farms after HAMMER demonstrations were completed.
- Efforts are on-going to schedule a meeting between the Chief Technology Office, Projects, and Operations to determine a path forward for VMDS equipment currently in A and AP Farms.
- Performed zero and span calibration checks of VMDS equipment in support of Phase II acceptance testing.
- The software libraries for both the OP-FTIR and UV-FTIR units were updated in October. Revisions to the library are periodically performed to improve accuracy of analysis for analytes.

Stack and Boundary Monitors

1st Quarter FY2018 Summary:

In addition to the turnover of the AP Farm UV-FTIR stack monitor to Operations discussed above, other stack and boundary monitoring activities will be performed. The work scope includes installing stack monitors on the AW, AX (two), AN, and 702-AZ Exhausters. Although installing perimeter monitors and designing stack monitors for the A Farm Exhausters is FY2019 work scope, some procurement activities have begun. The primary 1st Quarter activities included the following:

- Began designing revisions of the 702-AZ, AN, and AW, stack monitors.

- The PFWR was completed for stack monitor installation and the work was awarded to construction forces.
- A key issue during the 1st Quarter was the delayed procurement of the 13 UV-DOAS units. Questions were raised by the WRPS Quality Assurance (QA) department focusing on the ability of the vendor's QA plan to align with WRPS requirements.

Establishing Safe Unrestricted Boundaries

1st Quarter FY2018 Summary:

The scope of work defined in the draft CVAP under KPP 5 is to define unrestricted work boundaries, implement monitoring on active stack ventilation, and unrestricted boundaries in the A Farms, thus providing defense-in-depth. This work scope includes:

- Establishing a basis for defining work boundaries in and around the tank farms
- Completing the permanent installation of VMDS equipment in A and AP Farms
- Installing monitoring equipment on active exhausters (stack monitors) and perimeter monitors along the A Complex corridor and SY Farm
- Completing the installation of the public address (PA) speakers and reader boards throughout the tank farm areas and access points

Coordinated by ORP, a draft paper, tentatively titled *Comprehensive Vapor Action Plan KPP 5 - Defining the Unrestricted Work Boundary,* was developed clarifying how WRPS will define work boundaries in and around the tank farms. This document provides a basis for the implementation of the tank farm boundaries moving forward for the IH Program.

During FY2017, WRPS's subcontractor Kenexis completed three quantitative risk assessments (QRA) designed to assess the probability and likely consequences of an episodic, acute exposure. The QRAs are being evaluated by WRPS and ORP. The subcontractor used a computational fluid dynamics air model; they modeled three tank farm emission sources, including a passively ventilated farm, an actively ventilated farm, and an actively ventilated farm in which one of the five tanks experiences buoyant displacement gas release events (BDGRE). The three QRAs are *A Farm Passive Breather Filters*, *AP Farm Exhauster*, and *AW Farm Exhauster* (including a BDGRE event).

- Public Address (PA) System

1st Quarter FY2018 Summary:

In FY2017, WRPS completed the field installation and functional tests for many of PA systems in the East area tank farms. Activities performed in the 1st Quarter of FY2018 include the following:

- System integration activities were completed in December. Towards the end of the 1st Quarter, efforts focused on finishing the A, AX, AY, and AZ Farm turnover to Operations.
- Early in the 1st Quarter, orders were placed for all reader boards in the East and West areas. In parallel with procurement activities, efforts were started on the design packages for B, BX, BY, S, SX, SY, T, TX, TY, and U Farms. The majority of the farms are at the 90% design levels.

KPP 6. Tank Operations Stewardship

- Pilot SST Stewardship Program

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.

1st Quarter FY2018 Summary:

SST Remote Monitoring Equipment:

The Project schedule was prepared and presented to the CVAP Field Execution Schedule meeting in early October. The schedule provided details on the design, procurement, and installation activities for TY Farm. An engineering contract for the TY Farm automation design was awarded the week of November 6, and work was immediately started with a kick-off meeting the week of November 13. Shortly thereafter, efforts were in full swing for both the TY Farm temperature and surface level designs. Towards the end of November, it was announced that TX Farm would be the second SST farm to be designed. In addition to design activities, bench-scale testing of both the level and temperature indicators were performed and completed during the 1st Quarter and procurement of both temperature and level equipment was initiated.

SST Stewardship Execution Strategy Document (FY2015 LEAN Report):

The Project schedule was prepared and presented at the CVAP FES meeting early in the 1st Quarter. The engineering services contract for preparing this report was awarded to ARES in October and a kick-off meeting was held. A detailed draft outline of the *SST Stewardship Execution Strategy Document* was prepared, which addressed all topics identified in the FY2015 LEAN event, in addition to numerous other activities which may help reduce SST entries. A draft of the document was started mid-November.

Efforts are on-going to assemble a team that will provide the necessary feedback to review this first-of-its-kind document.

Work Location Evaluations:

Originally, this evaluation was to have been performed as part of the SST Stewardship Execution Strategy Document. However, early in FY2018, it was announced that the *Work Location Evaluation Report* would not be included as part of this document. Instead, it would be addressed in a separate correspondence, which was started in FY2017. Management met during the 1st Quarter to review the current draft correspondence, define the remaining scope, and assign responsibility for completing the correspondence.

KPP 7. Hierarchy of Controls

- Cartridge Testing and SCBA Alternatives

1st Quarter FY2018 Summary:

Key Performance Parameter 7

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

The 1st Quarter of FY2018 has seen the fruition of the hard work and effort that went into the air purifying respirator cartridge (APR) testing program by WRPS, PNNL, and STC. STC is the independent 3rd party selected by HAMTC to oversee the cartridge test process and FFAPR implementation. WRPS, HAMTC and STC have agreed FFAPRs, equipped with Scott 7422-SD1 or 7422-SC1 cartridges, are appropriate for use in SY Farm for similar exposure groups 1 (SEG1) and similar exposure groups 2 (SEG2) (non-waste disturbing) work activities. WRPS and HAMTC also agreed that although FFAPRs are effective against tank vapors, the rollout of FFAPRS must be done on a farm by farm basis. A properly completed industrial hygiene hazard assessment, specific to each farm, must support the transition from SCBA to FFAPR. STC is planning to be at WRPS in mid to late January. They will be available to answer questions about the APR cartridge testing process.

The IH assessment for SY Farm was approved, and the rollout of FFAPRs there began December 12, 2017. The hazard assessment for AP Farm is being created. Once it is approved, FFAPR rollout will continue at AP Farm for SEG2 work activities. FFAPR use at AP for SEG1 activities was rolled out in FY2017. Separate IH assessments are concurrently being developed for AY/AZ, AW, AN, and AX Farms.

- Mobile Laboratory

1st Quarter FY2018 Summary:

Throughout the 1st Quarter, efforts focused on determining the FY2018 work scope for RJ Lee. Until the work scope is defined, mobile laboratory activities continue to be on-hold until a new contract is issued.

- Personal Vapor Monitor

1st Quarter FY2018 Summary:

Figure 13. The picture on the left is of the first working prototype of the C_2Sense personal ammonia monitor which was featured on the CPPO Weekly Report cover on October 19, 2017. (Picture courtesy of G. Weeks)

During the 1st Quarter, the first five ammonia prototype sensors were delivered by C_2Sense to WRPS. The white and grey items are the sensor chip holders and associated electronics. The black item is an external battery. The sensor chip is the brown card inserted into the holder. The system has a local alarm that can be set to inform the wearer when the ammonia concentration is above the alarm threshold and provides continuous ammonia concentrations for each tank farm worker to the central shift office.

Initial testing shows the device will detect ammonia at about 250 ppb (0.25 ppm).

As a first prototype, a number of improvements to the system will be made before the system goes into production. Primarily, these improvements will include:

- Reduction in size (the goal is about 25% of the current size)
- Incorporation of the battery inside the unit Incorporation of a local display showing the current ammonia concentration measurement

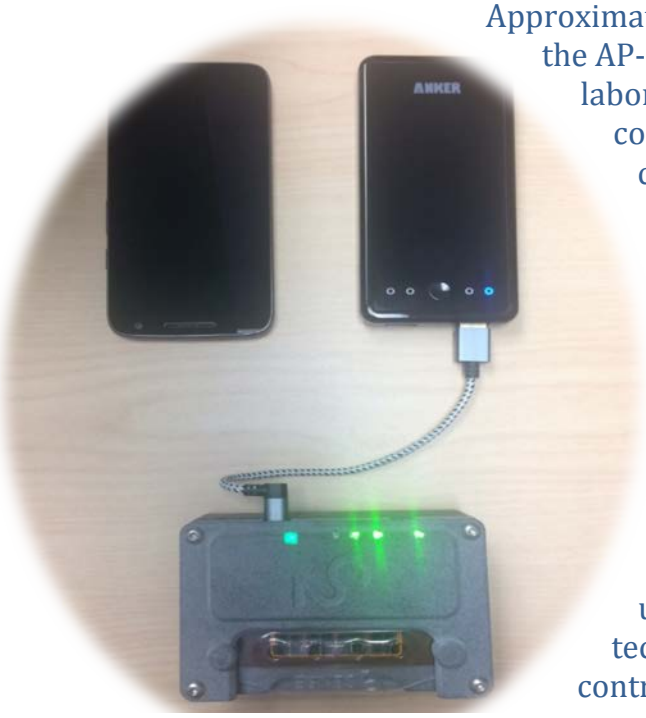

Figure 14. Pictured above is one of the first five working prototype of the C_2Sense personal ammonia monitor. (Picture courtesy of E. Morrey)

Approximately 80 liters of material was collected from the AP-Farm stack to support the C_2Sense laboratory test at RJ Lee, which was successfully completed in November. C_2Sense and WRPS completed review and comment resolution of the technical report summarizing the test activities. A notable omission from the final report was the conversion of raw conductance data from the sensor material to ammonia concentration values.

C_2Sense submitted a proposal for the next phase of the project, which will focus on developing a smaller prototype and providing consulting to support the upcoming field test in the tank farms. A technical evaluation was completed and contracting is proceeding.

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.

Appendix A

FY2018 CPPO NOTEBOOK
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Appendix B

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PNNL-26041	*Analysis of Respirator Cartridge Performance Testing on Hanford Tank SY-102 Test Dates: July 8-10, 2016*		
PNNL-26131	*Analysis of Respirator Cartridge Performance Testing on Hanford Tank A-101 Test Dates: July 8-10, 2016*		
PNNL-26180	*Analysis of Respirator Cartridge Performance Testing on Hanford Tank BY-108 Test Dates: July 15-17, 2016*		
PNNL-26243	*Analysis of Respirator Cartridge Performance Testing on the 702-AZ Primary Exhauster for the Hanford AY/AZ Tank Farms Testing dates: August 26-27, 2016*		
PNNL- 26254	*Analysis of Respirator Cartridge Performance Testing on Hanford Tank AX-101 Test Dates: September 9-11, 2016*		
PNNL-26317	*Analysis of Respirator Cartridge Performance Testing on a Hanford AN Tank Farm Exhauster Slipstream Testing dates: September 30 – October 2, 2016*		
PNNL-26337	*Analysis of Respirator Cartridge Performance Testing on a Hanford AW Tank Farm Exhauster Slipstream Testing dates: September 23–25, 2016*		
RPP-PLAN-59972 Rev. 0	*Technology Maturation Plan for the Tank Farm Vapors Monitoring and Detection System*		
PNNL-25880	*Hanford Tank Vapors COPCs Update*		
PNNL-25892	*Summary of VMDS Bench-Scale Testing (PNNL-25892)*		
PNNL-25790	*Summary of State of Knowledge Assessment: COP/Exposure Limits (PNNL-25790)*		
RPP-RPT-59584	*SCBA Equipment Evaluation Report Summary*		
PNNL-25654, Rev. 1	*Atmospheric Dispersion Modeling*		
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Miscellaneous			
Chemicals of Potential Concern, WRPS-1604188.1 Rev. 1, 9/21/2017			
Updated EA-32 Section under Independent Assessments			
Office of Enterprise Assessments Follow-up Assessment of Progress on Actions Taken to Address Tank Vapor Concerns at the Hanford Site January 2017			
Office of Enterprise Assessments Office of Worker Safety and Health Assessments Follow-Up Assessment of Progress on Actions Taken to Address Tank Vapor Concerns at the Hanford Site Kevin G. Kilp, Acting Director DOE/HQ EA-32 November 16, 2017			
Updated VMEP section under Independent Assessments			
VAPOR MANAGEMENT EXPERT PANEL REPORT, NOVEMBER 2016 Safety and Health Division Office File			