



washington **river**
protection solutions



The picture above is of the first working prototype of the C₂Sense personal ammonia monitor. As a first prototype, a number of improvements to the system will be made before the system goes into production.

*For details on the coming improvements, read [KPP 7](#)
(Picture courtesy of G. Weeks)*

**Tank Operations Contract
Chemical Protection Program Office Weekly Report
October 19, 2017**

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

The CPPO finalized the draft Comprehensive Vapors Actions status dashboard update process. The dashboard is designed to monitor the progress of the draft Comprehensive Vapors Action Plan (CVAP) Key Performance Parameters (KPP) 1 thru 7. The Dashboard is updated monthly and will debut in a later October Weekly Report.

CPPO Oversight and Tracking

CPPO Requests, Production, and Distribution Metrics

Tables 1 and 2 represent the number of vapors-related information products requested from the CPPO, as well as those produced, in the month of September. The three month trend and the Fiscal year-to-date totals are also shown.

Table 1. CPPO Vapors Information Products Requested FY2017

CPPO Vapors Information Products Completed FY-17	July	August	September	FY-to-Date Total
Data Report (Monitoring Data)	0	2	3	61
Presentations (includes CPPO Notebook and CVST)	4	5	4	46
CPPO Reports and Weekly Report	5	5	3	51
Information Requests	0	1	0	32
Articles, Summaries, and Message Maps	1	7	1	31
Surveys and Focus Groups	0	1	0	10
Website Requests/Site Updates	1	0	1	28
Videos	0	0	0	1
Monthly Totals	11	21	12	260

Table 2. CPPO Vapors Information Products Completed FY 2017

CPPO Vapors Information Products Requested FY-17	July	August	September	FY-to-Date Total
Data Report (Monitoring Data)	2	14	1	88
Presentations (includes CPPO Notebook)	4	5	4	48
CPPO Reports and Weekly Report	5	5	3	49
Information Requests	0	1	0	36
Articles, Summaries, and Message Maps	2	4	1	58
Surveys and Focus Groups	0	0	0	23
Website Requests/Site Updates	1	0	0	36
Videos	0	0	0	5
Monthly Totals	14	29	9	343

The CPPO continues to see a steady volume of vapors-related information requests. In September, 12 vapor-related information products were completed, including data monitoring reports, the CPPO Notebook, and CPPO Weekly Report. Eighty-three items are currently outstanding, 42 of which are in review status. Several data reports are undergoing re-write due to revisions made in the instrument software library used in preparing the reports.

Table 3. WRPS Vapors Related Communications Distribution and Trend

WRPS Vapors Information Distribution Avenue	July	August	September	FY-to-Date Total
All Employee Email/Meetings & ESHQ Comm.	4	5	2	52
CPPO Notebook*	94	105	76	687
CPPO Report and Weekly Report	4	5	3	40
Fact Sheet & Information	0	0	0	3
Meeting - CVST *	2	1	2	18
Meeting - CVST Sub-team meeting *	4	4	2	38
Meeting - Hanford Advisory Board Briefing *	0	0	0	2
Meeting/Briefing*	12	57	10	149
Meeting -Morning/Pre-Shift Brief* [†]	347	414	347	1823
Presentation*	0	0	0	3
Safety Start	0	0	0	7
SOEN	0	0	0	16
Solution Article	3	4	3	38
Survey and Focus Group	0	0	0	2
Tours*	2	2	0	22
Website/Individual Inquiry	0	0	0	5
Vapors Weekly Update or Website Post	7	61	8	372
Video	0	0	0	1
Monthly Totals	479	658	453	3278

* Face-to-face communication †Morning/Pre-Shift Brief expanded to include field personnel interactions

The total number of documented WRPS vapors-related communications provided to the workforce is shown in **Table 3**. The data for September includes 453 vapors-related communications which continue to be led by the CPPO Notebook, the plan-of-the-day (POD) meetings, items posted to the HanfordVapors.com website, and meetings/briefings with the workforce. This month saw a reduction in web posts and POD briefings.

The FY2017 trend for providing vapors communications to the workforce is shown in **Figure 1**. Cumulative totals by month show that 3278 were delivered through the end of September - largely through briefings and face-to-face interactions with the workforce.

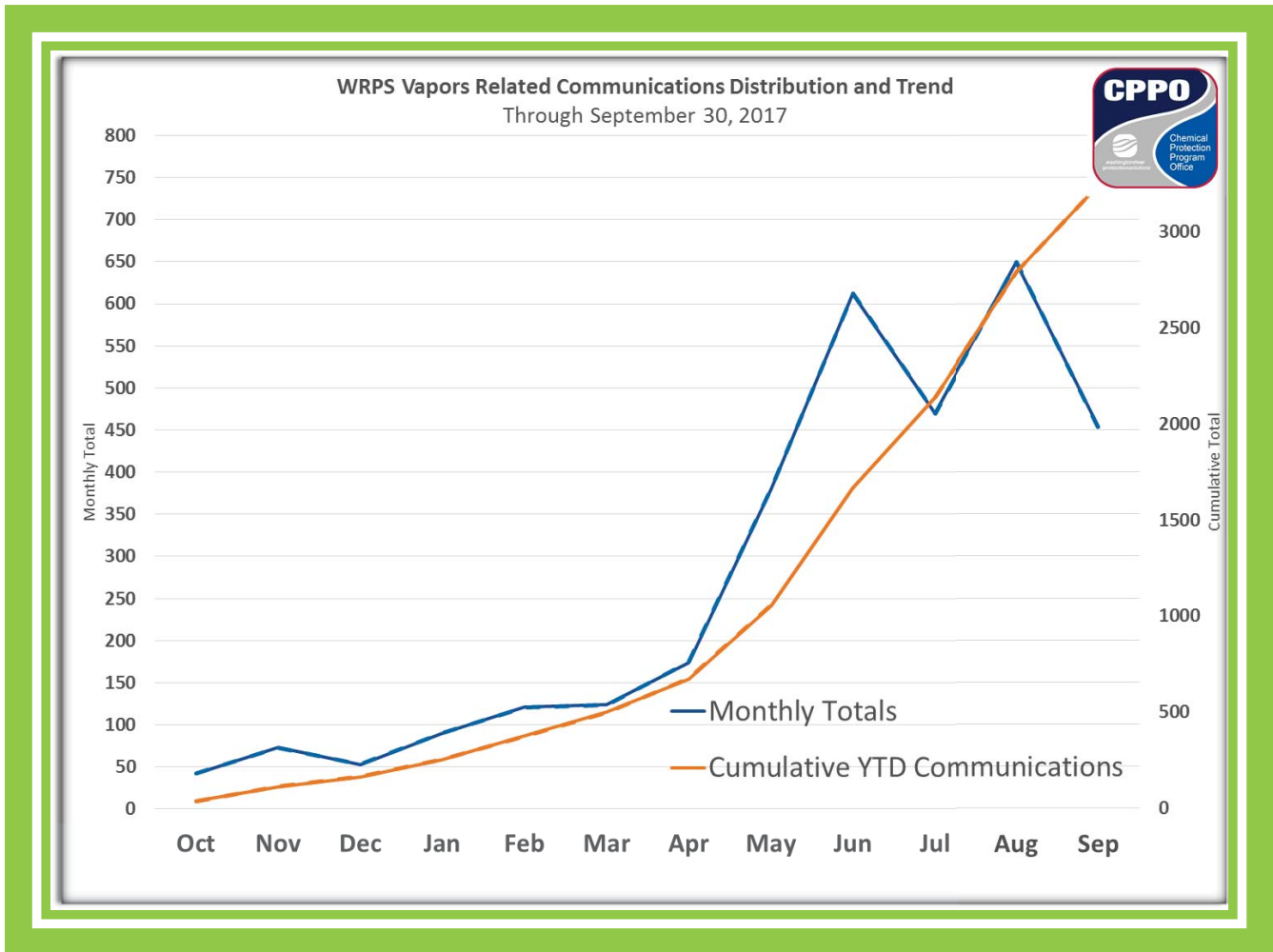


Figure 1. WRPS Vapors Related Communications Distribution and Trend

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

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

CTEH team members developed presentations and reviewed the weekly VMDS reports in preparation for publication to the website last week.

✚ Chemical Protection Engagement: Communications

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

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 end of calendar year 2017.”

Key Performance Parameter 1

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

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.”

The Chemical Vapors Solution Team (CVST) met on October 11, 2017. The Oak Ridge Associated Universities’ (ORAU) safety culture survey results were discussed. Included in the findings are the following strengths:

- Good safety environment
- High level of trust in immediate supervisors
- Questioning attitudes are encouraged and exercised
- Workers generally feel safe onsite

The areas for improvement noted by the safety culture survey are:

- General level of mistrust between bargaining units and middle/senior management
- Misuse of the Stop-work process
- Recognized safety issues are slow to be corrected
- No opt-out of vapor related communications

Each of the subcommittees spoke to their work over the last year, and their plans going forward. The New Technology Sub-committee Project Manager, Ron Calmus, reported that the team will:

- Continue to identify new technologies
- Evaluate additional abatement and vapor related technology
- Continue QRAs
- Improve upon the RDOSS & Autosamplers

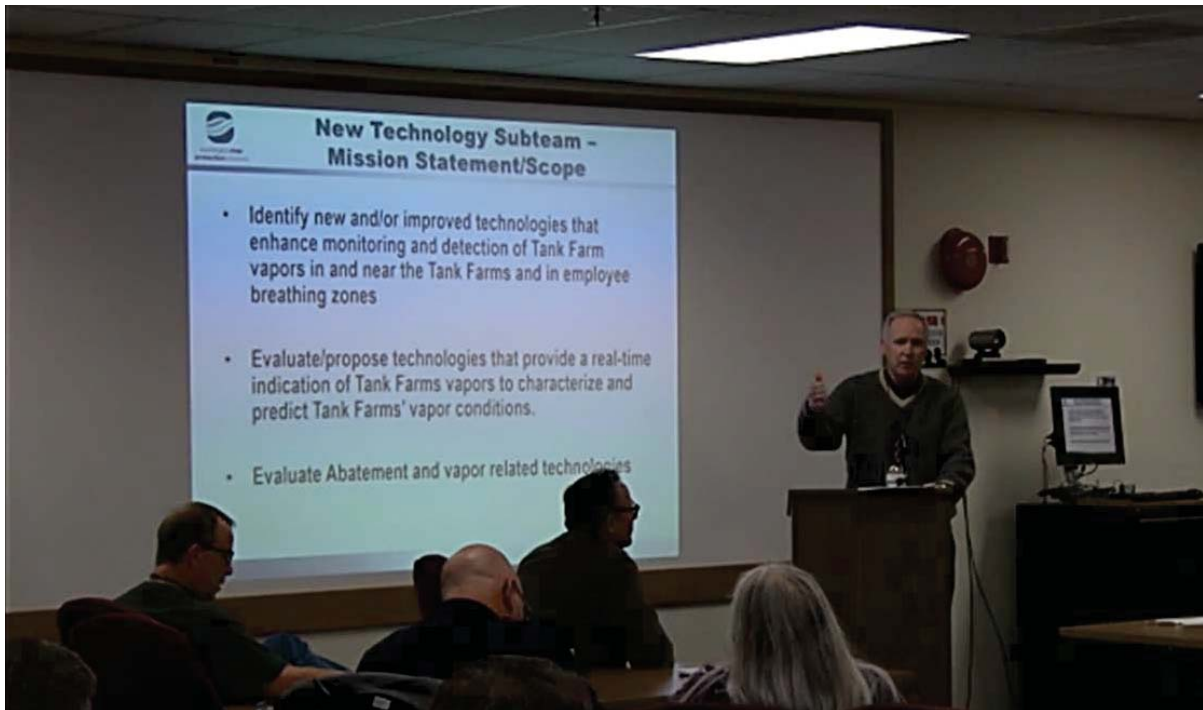


Figure 2. Ron Calmus discussed the accomplishments and plans of the CVST New Technology Sub-committee during the October 11, 2017, CVST meeting.



Figure 3. 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.

The CVST Communications Sub-committee spokesperson, Carrie Jacobs, recognized that CPPO Notebooks serve as a regular vapors briefing to the workforce, and that increased access to subject matter experts as provided by the CTEH team, has further contributed to CVST goals. Additionally, the Communication Sub-committee, chaired by Peter Bengtson, reported that the sub-committee will:

- Continue to be a sounding board for the workforce
- Identify new topics to present
- Increase the effectiveness of communications
- Provide feedback to management



Figure 4. Robert Campbell discussed the accomplishments and plans of the CVST Chemical Cartridge Sub-committee during the October 11, 2017, CVST Meeting.

The Chemical Cartridge Sub-committee completed numerous cartridge tests this year with additional test to be done in FY2018.

A new CVST sub-committee was announced. Source Apportionment and Fugitive Emissions Identification and Investigation Team Sub-committee Team, under the purview of Jason Vitali, called for volunteers. The committee is actively looking for members, and encourages all trades to attend and provide input. The committee's

goal is to locate, evaluate, and catalog non-tank vapor sources starting with the A corridor. Ron Calmus is also a point of contact for this sub-committee.



Figure 5. Jason Vitali introduces the CVST's newest sub-committee, Source Apportionment and Fugitive Emissions Identification and Investigation Team.

The CPPO Notebook published last week is titled *Furans Part 2*, and was written by the CTEH duo Drs. Kind and Kuhlman. This week's CPPO Notebook is titled *Chemical Vapors Protection Program FY17 Accomplishments*.

Hanford Vapors Website Updates

- [Vapors weekly update Oct. 12, 2017](#)
- [CPPO Weekly Report – Oct. 12, 2017](#)
- [CVST agenda – Oct. 11, 2017](#)
- [CVST agenda – Sept. 27, 2017](#)
- [CVST minutes – Sept. 27, 2017](#)

3. KPPs 2 and 3. IH Technical Basis and IH Program

Develop New or Revised Chemicals of Potential Concern (COPC)/Occupational Exposure Limit (OEL)

Update: WRPS completed the update of RPP-22491, *Industrial Hygiene Chemical Technical Basis*, and developed institutionalizing documents that provide a disciplined and rigorous process to periodically review IH data to identify new or changing information regarding tank vapors. The new information is analyzed in light of current scientific and regulatory information to determine if a new chemical of potential concern (COPC) should be identified. This analytical process determines if a regulatory Occupational Exposure Limit (OEL) exists for the newly identified COPC. Furthermore, the process determines when a new Hanford Tank Farm OEL (HTFOEL) should be created. New documents and procedures developed during FY2017 to maintain and institutionalize the technical basis include:

- TFC-PLN-174, *Chemical Vapors Technical Basis Plan* (New)
- TFC-ESHQ-S_IH-C-67, *IH Chemical Vapor Technical Basis Maintenance* (New)
- TFC-ESHQ-S_IH-C-66, *COPC to COC Evaluation Process* (New)

WRPS and its subcontractors completed a *Chemical Vapors Requirements Flow Down and GAP Analysis* (GAP). Based on the GAP analysis, WRPS developed an IH Manual and developed or revised documents and procedures to institutionalize the chemical vapors aspects of the IH program. The IH Manual (with specific focus given to institutionalizing the Chemical Vapors elements), and the seventeen revised/new implementing documents and procedures, are routing for approval through the WRAP process. These changes will be fully implemented in FY2018

Health Process Plan

Update: 10/5/2017: WRPS created a new Health Process Plan (HPP) review process, TFC-CHARTER-71, *WRPS Internal Review Panel and External Review Panel Process for Review of Health Process Plan Recommendations*. The review process evaluates the HPP recommendations and evaluates the economic and feasibility impacts of implementation. TFC-CHARTER-71 provides recommendations to the Office of River Protection (ORP) regarding the implementation of proposed changes. TFC-CHARTER-71 is the process WRPS is using to evaluate reports on Chronic OELs with Regulatory Basis. It will be the process as well for the following reports from PNNL:

- Furans OELs
- Nitrosamines Risk Analysis

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.

Acute Transient Exposure Concentrations (TECs) with Regulatory Basis
Acute TECs – SOP White Paper
Chronic Nitrile and Dimethylpyridine
Acute TECs
Chemical Mixtures and Modeling Recommendation
Sampling and Analysis Recommendations

✦ Parity Implementation with Established Programs

Update: WRPS made strides in improving parity with other well established programs such as the radiological controls program. WRPS implemented the Enhanced Chemical Hazard Awareness Training (CHAT) developed in 2016, and completed a training evaluation report to capture recommendations from students on improvement. Chemical Worker Tier 1 training is complete. As planned, it is now part of the Tank Operations Contractor Hanford General Education Training program, and available to take immediately. Chemical Worker Tier 2 was turned over to a subcontractor to code for computer based training. Mission Support Alliance (MSA) is planning on rolling out the new computer based training in October, 2017. Chemical Worker Tier 3 training was successfully piloted October 4, 2017. Comments from the pilot class will be incorporated into the lesson plan prior to final approval. The plan is to discontinue enhanced CHAT once the three tiers of training are in service.

**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.

KPP 4. Engineering Controls

✦ Exhausters

Update: A Farm: The two exhausters were placed in storage in Blackfoot, Idaho, and will be shipped to Hanford later in FY2018. Working to define design constraints for the new exhauster. These include determining the new exhauster location, if duct isolation is necessary, and selecting tank risers for ventilation tie-in.

Figure 6.
A Farm
Exhauster
offsite
storage
(picture
courtesy
Mark A.)



AX Farm: A declaration of readiness was announced as both the POR-126 and POR-127 Operational Readiness Checklists were approved and completed.



Figure 7. A Farm Exhauster offsite storage (picture courtesy Mark A.)

✚ AW Stack Extension

Last update 10/12/2017: Efforts to complete this design package by early 2018 are on-track. The 30% design package was completed and efforts on the 60% were initiated last week.

*Note: A small team was assembled to determine if the AN Exhauster stack could be extended in a manner similar to AW. Efforts are still underway.

✚ Strobic Air Dilution Fan

Update: Efforts are still on-going to award Strobic a fabrication contract. The contract allows Strobic to perform a factory acceptance test in FY2018 to evaluate the capabilities of a mobile, skid-mounted unit to support future Hanford activities.

NUCON Thermal Oxidation Vapor Abatement Unit (VAU)

Update: Bench-scale testing continues to be developed. The following was accomplished last week:

WRPS:

- Presented the *Propane Decision Paper* to the NUCON integrated project team (IPT) for final review and input.
- Evaluated the need for post exhaust treatment, which includes a diesel oxidative catalyst (DOC), diesel particulate filter (DPF) and selective catalytic reduction (SCR) in the prototype test. Sufficient data will be collected during the prototype test to evaluate the need for the DPF and SCR in the final design for field demonstration.

NUCON:

- Obtained cost estimates in support of the WPRS evaluation post exhaust treatment (DOC, DPF, SCR) in the prototype design.

PNNL:

- Presented the Draft Test Plan for bench-scale activities to the NUCON IPT.
- Provided final comments on the NUCON bench-scale testing schedule.

TerraGraphics:

- Reviewed PNNL's Draft Test Plan, with no comments.

KPP 5. Administrative Controls and Monitoring

Permanent Installation of Vapor Monitoring and Detection System (VMDS) Equipment in A and AP Farms

Update: Numerous activities were performed throughout the week, including the following:

- Continued resolving comments on the Phase 2 Pilot-Scale Report.
- The Ultra-Violet-Differential Optical Absorption Spectrometer (UV-DOAS) and Open path Fourier transform infrared spectroscopy (OP-FTIR) units were returned to WRPS from their HAMMER demonstrations.
- The software libraries for both the 506 (OP-FTIR) and 507 (UV-FTIR) units were updated. Revisions to the library are periodically performed to improve accuracy of analysis for analytes.

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

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.

Stack and Boundary Monitors

Update: A draft statement of work was initiated to obtain Cerex services for supporting stack monitoring activities.

Establishing Safe Unrestricted Boundaries

Last update 10/12/2017: Quantitative Risk Assessments (QRA) for A, AP, and AW-Farms are in review with the Office of River Protection (ORP). Six additional QRAs are planned for FY2018 beginning with 242-A Evaporator.

Public Address System

Update: The PA System Project has the C Farm package ready to go. However, work has suffered delays as our subcontractor, FE&C, has been tasked with a different priority in AP Farm for leak detector work. The AP Farm package is being processed, with the work focused on completing the excavation permit. The contract to SAFER is expected to be awarded soon for all 17 reader boards for East and West Areas.

KPP 6. Tank Operations Stewardship

Pilot SST Stewardship Program

Update: *Remote Monitoring Equipment:* A schedule for the design, procurement and installation of TY Farm automation activities was presented in the CVAP Field Execution Schedule (FES) meeting. The schedule currently has design completing in January 2018.

Update: *FY LEAN 2015 Report/Work Location Evaluations:* Efforts continue on a draft SOW to procure engineering services. Scoping activities will be initiated the week of October 16.

Key Performance Parameter 6

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

KPP 7. Hierarchy of Controls

Cartridge Testing and SCBA Alternatives

Last update 10/5/2017; next update 10/26/2017: As of August 10, 2017, cartridge testing has been conducted at nine different, specifically selected Double-Shell and Single-Shell Tank locations. Eight of the tests were conducted under static conditions, and one test was conducted during waste disturbing activities. The Third Party has reviewed PNNL's reports on the tanks, and has been very complementary of the testing methodologies. The Third Party stated in its August 9th close out briefing that full-face air purifying respirators

Key Performance Parameter 7

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

(FFAPR) fitted with Scott 7422-SC1 (Chemical – multipurpose) or the Scott 7422-SD1 (Chemical – multipurpose/P100) would provide adequate protection for similar exposure group 1 (SEG1) work activities in the following approved locations:

- AP Farm
- SY-102
- A-101
- 702-AZ
- AN Farm
- AW Farm

Since the out briefing with the Third Party, WRPS and HAMTC are working to complete FFAPR implementation at AP farm. WRPS and HAMTC began implementing FFAPRs at SY-102, A-101 702-AZ, AN, and AW Farms. WRPS still allows workers to wear SCBAs in these locations. It is important to note, the Third Party did not recommend the use of FFAPRs for BY 108 and AX-101. The Third Party reviews of the cartridge testing reports and subsequent comment resolution took much longer than anticipated. This has delayed the transition from SCBA to APR for some work activities in the ventilated farms. A new FFAPR implementation date is likely to be announced in the first quarter of FY2018.

PNNL developed a summary report for the first eight cartridge tests conducted, a draft of which, has been sent to WRPS management for comment and review. A new cartridge test apparatus (jig) was built in the third quarter. It was used for cartridge testing at AX Farm in late August. The new jig is capable of testing cartridges from manufacturers other than Scott, including powered air-purifying respirator (PAPR) cartridges. Thus, testing at AX Farm was conducted on Scott APR cartridges, MSA TL, and 3M Breath easy PAPR Cartridges.

Mobile Laboratory

Update: Last week, efforts focused on issuing a new contract for RJ Lee to support FY2018 activities.

Personal Vapor Monitor

Update: The Cover Photo depicts the first ammonia sensor prototype delivered by C₂Sense. The white item is the sensor chip holder and associated electronics. The black item is an external battery. The sensor chip is the brown card inserted into the holder. **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

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). Five prototypes will be delivered to WRPS by the end of November. Field trials of the new sensor will begin in FY2018. These tests will be conducted in two phases, beginning with static tests at fixed locations where higher ammonia concentrations are expected (e.g. inside vapor control zones, around passive breather filters, etc.). The second phase of the test will put the sensor on five IHTs during normal daily operations. If all works as planned, production devices will be available in FY2019. In addition, the CVST Vapor Technology Sub-team will be doing a survey of commercially available ammonia sensors. If sensors with similar capabilities are identified by the CVST Sub-team, these sensors may also be included in the FY2018 field trial, as appropriate.

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.

4. Vapors Mitigation Program Plan - Top Risks -CPPO Weekly Update

Last update 10/12/2017: The subset of the Vapors Mitigation Risk Register this week is shown in

Table 4.

Table 4. Vapors Mitigation Risk Register

CVAP ID Number	Current Status	Handling Actions	Current Risk Level
022 Procurements Less Than Adequate	Procurement coordination needs to improve between WRPS, Dr. Dai, and MCE. Cerex UV-DOAS design components.	Identify and track project designated high priority procurements for equipment and services.	Medium
009 Resources not available when required.	Lack of design and engineering resources are causing delays in VMDS System Integration, 242-A Stack Extension.	<ol style="list-style-type: none"> 1. Identify key technical resources up front and secure availability. 2. Utilize resource loaded schedule where appropriate. 3. Coordinate work planning to streamline resource utilization. 	Medium
004 Integration with other key projects more complex than expected.	Integration of field work for VMDS implementation and associated execution concerns for SY, A-Farm, and AW stack upgrades. Installation and turnover of PA system to tank farm operations. Incorporate MCE schedule.	<ol style="list-style-type: none"> 1. Identify key program interfaces early. (Ongoing) 2. Engage with program/project managers early. (Ongoing) 3. Maintain weekly communication and IPT meetings. 4. Incorporate instrumentation (stack monitor) installation into future design of equipment. 	Medium