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## Furans

Part 1



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Part 2



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*Center for Toxicology and Environmental Health Drs. Kind and Kuhlman created Furans, Parts 1 and 2, for the WRPS workforce. Available through the weekly CPPO Notebook on October 5 and October 12, 2017.*

**Tank Operations Contract  
Chemical Protection Program Office Weekly Report  
October 12, 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 published its [FY2017 Annual Summary](#). It is available now on [HanfordVapors.com](#).

### CPPO Oversight and Tracking

#### **Cost and Schedule**

Several projects supporting the draft Comprehensive Vapor Action Plan (CVAP) KPPs are currently underway. Procurements are in place and vendors are positioned to support a tight schedule. Year-to-date, \$35.9M (92%) of our revised not to exceed (NTE) value of \$39.1M has been spent. Monthly costs are expected to hold at \$4 M per month going into FY2018. At this rate we expect the NTE to last through October 2017.



Figure 1. FY2017 Costs

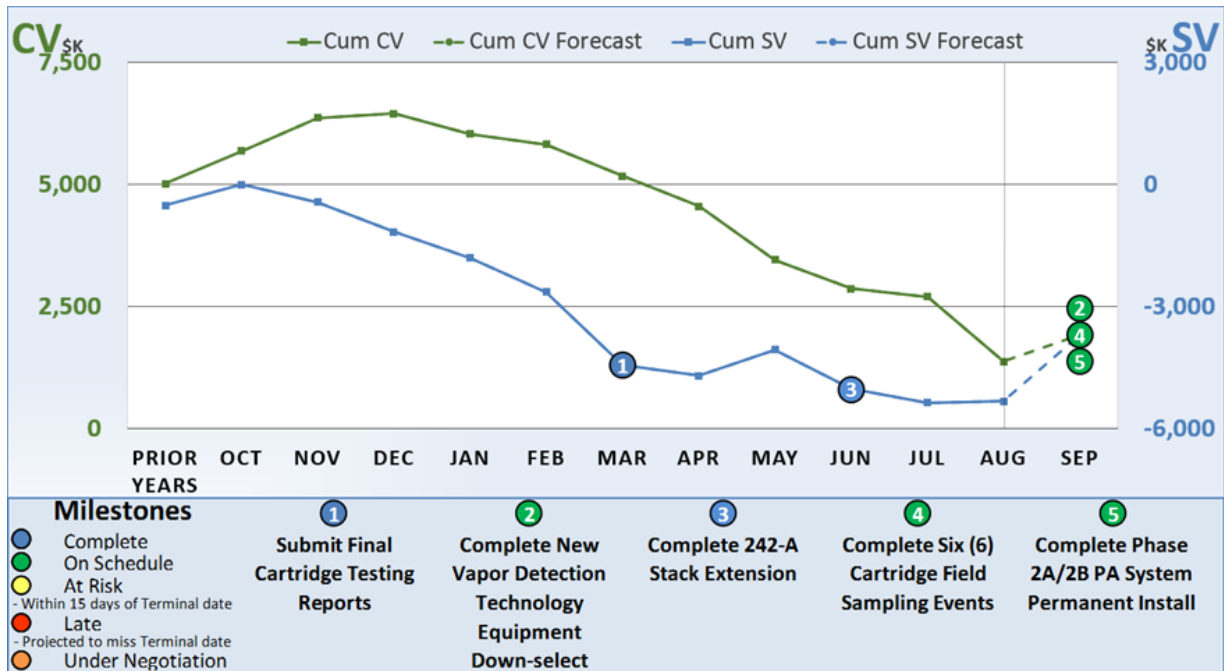


Figure 2. FY2017 Cost and Schedule Variances for the Draft CVAP.

## 2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

### KPP 1. Engagement and Effective Measurement

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

The CPPO engagement and mentoring activities featuring the team from CTEH will continue the initiative in FY2018. Members of the CTEH team will attend Tank Farm (TF) Projects Pre-Job Meetings and Projects IH Team Meetings, continue to develop CPPO Notebooks with topics ranging from EC-07 Industrial Hygiene Data to Dimethylmercury, and assist in answering inquiries from the work force.

#### Chemical Protection Engagement: Communications

The *Vapor Communication Plan* is a requirement of KPP 1 and continues to be reviewed.

The Chemical Vapors Solution Team (CVST) – Communications Sub-committee met on October 2, 2017.

The CVST Cartridge Sub-committee met on October 4, 2017.

**Key Performance Parameter 1**

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

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.

The CPPO Notebook published for September 28, 2017, describes the new Data Access and Visualization (DAV) tool. The October 5, 2017, CPPO Notebook is titled *Furans Part 1*, and was written by the CTEH duo Drs. Kind and Kuhlman. This week’s CPPO Notebook is *Furans Part 2*.

### **Hanford Vapors Website Updates**

- [PNNL-26041 Analysis of Respirator Cartridge Performance Testing on Hanford Tank SY-102](#)
- [PNNL-26131 Analysis of Respirator Cartridge Performance Testing on Hanford Tank A-101](#)
- [PNNL-26180 Analysis of Respirator Cartridge Performance Testing on Hanford Tank BY-108](#)
- [PNNL-26243 Analysis of Respirator Cartridge Performance Testing on the 702-AZ Primary Exhauster for the Hanford AY/AZ Tank Farms](#)
- [PNNL-26254 Analysis of Respirator Cartridge Performance Testing on Hanford Tank AX-101](#)
- [PNNL-26317 Analysis of Respirator Cartridge Performance Testing on a Hanford AN Tank Farm Exhauster Slipstream](#)
- [PNNL-26337 Analysis of Respirator Cartridge Performance Testing on a Hanford AW Tank Farm Exhauster Slipstream](#)
- [Technology Maturation Plan for the Tank Farm Vapors Monitoring and Detection System \(RPP-PLAN\\_59972, Rev. 0\)](#)
- [AP Stack Weekly Report \(Dec. 7-14, 2016\)](#)
- [AP Stack Weekly Report \(Dec. 21-28, 2016\)](#)

- [Mobile Lab PTR-MS Monthly Report February 2017](#)
- [Mobile Lab PTR-MS Monthly Report January 2017](#)

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

#### ✦ [Develop New or Revised Chemicals of Potential Concern \(COPC\)/Occupational Exposure Limit \(OEL\)](#)

**Last update 10/5/2017:** 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 then 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)

#### Key Performance Parameter 2

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

The new and revised documents are making their way through WRAP review and approval. They will be implemented in FY2018.

#### ✦ [Health Process Plan](#)

**Last 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
- 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

**Last update 10/5/2017:** 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. Its implementation as computer based training is forthcoming. Chemical Worker Tier 2 has been turned over to a subcontractor to code for computer based training. Mission Support Alliance (MSA) is planning on rolling out the new computer based trainings in October, 2017. Tier 3 training lesson plan is being completed with a pilot class scheduled for 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 Tier 3 training is 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 FY 2018.

#### **KPP 4. Engineering Controls**

##### Exhausters

**Update: A Farm** The first steps in supporting efforts to connect the A Farm tanks and exhausters by the end of FY2018 were started. Last week, a contract was awarded to American Electric for planning equipment removal at A Farm for exhaustor ducting installation. In addition, ARES commenced work on the pad relocation design.

**AX Farm:** Operational Readiness Checklists are being developed for portable exhausters POR-126 and POR-127 to evaluate the operational readiness of people, plant, and procedures. Last week, in support of readiness, the AX cold Operational Acceptance Test (OAT) was approved, while the hot OAT test results were prepared and expected to be approved the week of 10/9.

**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

#### AW Stack Extension

**Update:** 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:** The following was accomplished last week:

TerraGraphics:

PNNL:

- Issued Draft Test Plan for bench-scale testing activities.

WRPS:

- Drafted the Propane Decision Paper, discussing the viability of fuels to support bench-scale testing. Diesel appears to be the preferred fuel.
- Reviewed and provided comments on the PNNL Test Plan for bench-scale testing.

TerraGraphics:

- Reviewed and provided input to the *Propane Decision Paper* prepared by WRPS.
- Identified need to revise statement-of-work in order to support fabrication of electrical equipment.

### **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

#### **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.

transported to HAMMER and used to support demonstrations which occurred throughout the week.

- Performed zero and span calibration checks in support of Ultraviolet Fourier transform infrared spectrometer (UV-FTIR) Phase II testing.
- A representative from Cerex was on-site to support troubleshooting of the UV-FTIR stack monitor.
- For AP-Farm UV-FTIR turnover activities, a meeting was held last week with senior management to confirm 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. Follow-up meetings are planned to help solidify these solutions.

#### Stack and Boundary Monitors

**Update:** Performance Based Incentive (PBI) activities for the year include installation of the AW, AN, AZ and AX stack monitors. Last week, planning activities were initiated to define the installation work scope.

#### Establishing Safe Unrestricted Boundaries

**Update:** 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:** FY2018 activities started off with preparation of the C Farm work package, which is expected to be approved for the week of October 9. Equipment orders were also placed for reader boards, which are currently scheduled to be delivered early in calendar year 2018.

### **KPP 6. Tank Operations Stewardship**

#### Pilot SST Stewardship Program

**Update: Remote Monitoring Equipment:** The Project schedule was prepared and presented at the CVAP Field Execution Schedule (FES) meeting. The schedule provides details on the design, procurement and installation activities for TY Farm. In addition to the schedule, a draft statement-of-work was prepared for procuring an engineering firm needed to support design activities. **FY LEAN 2015 Report/Work Location Evaluations:** The schedule for this activity was also presented at the CVAP FES meeting. Proposals were received and a technical evaluation is being performed to procure the engineering firm that will support this effort.

#### **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:** 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 (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

**Key Performance Parameter 7**  
Provide options to promote the hierarchy of controls for chemical vapor respiratory protection beyond current use self-contained breathing apparatus.



**Figure 3. SY-102 cartridge testing. FY2017**

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, RJ Lee personnel supported tours of the mobile lab near the AP Farm and in conjunction with the HAMMER anniversary celebration on October 4 and October 5, 2017.

#### ✚ Personal Vapor Monitor

**Update:** Heading into FY2018, the goals are to perform on-site testing of the personal vapor monitor. The first phase of on-site testing will consist of staging the monitors adjacent to equipment that will assess the monitor's viability. The second phase will be to have IH technicians wear the monitors to further test its capabilities. Weekly accomplishments included:

- Initial cartridge components from the thermoformer have been received and tested (picture shown below).
- Fabrication of additional prototype devices.
- Continued testing of the prototype units.



Figure 4. C2Sense Prototype continues to evolve.

### **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

**Update:** The subset of the Vapors Mitigation Risk Register this week is shown in **Table 1.**

**Table 1.** 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"> <li>1. Identify key technical resources up front and secure availability.</li> <li>2. Utilize resource loaded schedule where appropriate.</li> <li>3. Coordinate work planning to streamline resource utilization.</li> </ol>	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"> <li>1. Identify key program interfaces early. (Ongoing)</li> <li>2. Engage with program/project managers early. (Ongoing)</li> <li>3. Maintain weekly communication and IPT meetings.</li> <li>4. Incorporate instrumentation (stack monitor) installation into future design of equipment.</li> </ol>	Medium