



washington **river**
protection solutions



Depicted is a diesel particulate filter with a high-temperature seal, a component of the NUCON® VAU. Its insulation is removed to accommodate testing and repairs. Much more information on NUCON® is in [KPP 4](#). (Photo courtesy of J. Semanas)

Tank Operations Contract
Chemical Protection Program Office
May 10, 2018

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

The CPPO *FY2018 Vapors Communication Survey* report is ready to be published. The CPPO will be tracking implementation of the recommendations in the survey report.

CPPO Oversight and Tracking Hanford Vapors Website



Figure 1. Hanford Vapors Website Statistics

Figure 1 shows the Hanford Vapors website logged over 3,300 views in April 2018, an increase of 9% from the previous month. In April, the website experienced an average of 113 hits per day. The amount of web traffic in April is slightly above the average hits per day for FY2018-to-date (105), but below that experienced in FY2017 (172). C&PR reported 13 new items were posted to the site this month. The

Vapors Weekly Update continues to drive traffic to the site. Articles generating significant traffic in April included the opening of the Hanford Workforce Engagement Center, ¹*Strobic*[®] Air factory acceptance testing, and the *VMDS: Phase 2*.

Data Access Visualization (DAV) Tool

Sub-contracted by the CPPO, Pacific Northwest National Laboratory (PNNL) built and successfully launched the DAV Tool early in FY2018. 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. April 2018 DAV Tool statistics, as provided by Google Analytics, are depicted in **Table 1**.

Table 1. DAV Tool Use Statistics for April 2018: www.TankVaporsExplorer.com

2018	Total Page Views	Most Popular Feature	Second Most Popular Feature	Most Popular Region	Second Most Popular Region	New Users	Returning Users
April	202	Chemical Selection: Chart Type: Headspace/ Source vs. Area specifically 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	Kansas Arkansas California	47%	53%
*April Washington State Breakdown:	1. Total Page Views: 205 Average Session Duration: ~4 min		2. Total Unique Users: 47 Region/Marketing: Yakima-Pasco-Richland-Kennewick: 45 Seattle-Tacoma: 2				
	3. Page views by Region: Yakima-Pasco-Richland- Kennewick: 320 Seattle-Tacoma: 2		4. New vs Returning Users Yakima-Pasco-Richland- Kennewick : New Users: 28 Returning Users: 17				

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

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

Update:

Toxicologist Dr. Chris Kuhlman was the representative CTEH member last week. CTEH continued development of a two-part nitrous oxide CPPO Notebook presentation and communication materials to be used as part of the Full Face Air Purifying Respirator (FFAPR) communication rollout process. CTEH is also supporting the development of a CPPO Notebook presentation regarding the characterization of tank farm vapors. CTEH was part of the team from CPPO who attended a Facilities Maintenance morning meeting and provided a briefing about the CPPO scope, what vapors information products are available, and where to find them.

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

Chemical Protection Engagement: Communications

Update:

Last week's CPPO Notebook is titled *US Department of Energy Office of Enterprise Assessments (EA) Follow-up Assessment*.

Chemical Protection Engagement: Hanford Vapors Website Updates

- [CPPO Weekly Report - March 15, 2018](#)
- [CPPO Weekly Report - March 22, 2018](#)

Chemical Protection Engagement: Effectiveness Measures

Update:

The CPPO *FY2018 Vapors Communication Survey* comments have been dispositioned and the report is ready to be issued.

Chemical Protection Engagement: Worker Feedback

Last week's CPPO Weekly Report described the CPPO Team's meeting with the AN Team during its Plan-of-the-Day (POD) meeting. During that meeting, workers offered the following two suggestions: Send the CPPO Weekly Report in a "WRPS General Delivery" format, similar to *Solutions*, and CPPO members take Tier 3 training to better understand what the workforce is learning in this class.

Chemical Protection Engagement: Workforce Engagement

Update:

The CPPO attended the Facilities Maintenance POD meeting last week, providing a briefing on the CPPO Team, what vapors information products are available, and where to find them. The briefing was followed by a Q&A session during which the workforce provided feedback to the CPPO team. The Facilities Maintenance team was unfamiliar with CPPO, and notebooks were not being presented at their PODs because they were not being flowed down to management running the POD. A recommendation was made to flow down the CPPO Notebook to lower-level managers to allow workers to become more familiar with CPPO and vapor activities.

KPPs 2 and 3. IH Technical Basis and IH Program

IH Manual and Technical Basis

Update:

Industrial Hygiene continues to add to a growing body of IH Technical Basis and IH program updates. TOC-IH-58435, *Industrial Hygiene Manual*, saw updates to Sections 1, 2, 3, and 4, which are complete and have been published to the IH Intranet. Section 5, *Reporting Occupational Exposure and Medical Monitoring*, and Section 6, *Emergency Response*, are on the IH SharePoint for review. The following procedures have been issued:

- TFC-ESHQ-S_IH-C-66, *Identifying Chemicals of Concern in Hanford Tank Farms*
- TFC-ESHQ-S_IH-C-67, *Maintenance of the Industrial Hygiene Chemical Vapor Technical Basis*
- TFC-ESHQ-S_IH-C-48, *Managing Tank Chemical Vapors*
- TFC-PLN-174, *Industrial Hygiene Chemical Vapor Technical Basis Program Plan*
- TFC-ESHQ-S_IH-C-63, *Modeling/Mapping Procedure*
- TFC-PLN-34, *Industrial Hygiene Exposure Assessment Strategy*

IH staff have been routinely updated on the many changes by way of newsletters, management briefings, and all hands meetings. Furthermore, *IH Administrative Procedures and IH Manual* is required reading and was issued February 3, 2018. Required Reading and IH communication for Section 3 of the IH Manual was sent to all IH staff on April 23, 2018. *Risk Communication Techniques* and *Crucial Conversations*, two IH professional development courses, are well underway with approximately 8% of the workforce trained in *Risk Communication Techniques* and 27% trained in *Crucial Conversations*.

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.

Bi-weekly meetings focused on developing exposure assessments are on-going. The meeting is attended by representatives from all line organizations, work control, and work planning. In addition to developing exposure assessment procedures, the group integrates exposure assessment outcomes with work control. The *AP Farm Exposure Assessment* is in IH SharePoint in review.

Health Process Plan (HPP)

Update:

Six of the HPP studies that have transitioned in the TFC-Charter 71 process have been slated to be issued outright as version Rev 0. This decision was made because the exposure limit values presented in the reports are based on established exposure limits provided by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) guidance. These reports include the following: *Proposed_{HTF}OELs for Chronic Exposures – COPCs with Regulatory Guidelines*; *Proposed Acute Exposure Concentration Limits for COPCs with Regulatory Guidelines*; *Proposed_{HTF}OELs for Chronic Exposures - Nitrile Class COPCs and 2,4-Dimethylpyridine*; *Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors*; *Hanford Tank Vapors FY 2017 Chemicals of Potential Concern Update*; and *Hanford Tank Farm Occupational Exposure and Risk Assessment Plan: Health Process Project*. These reports will be issued on a staggered schedule through the summer of 2018. Two additional HPP studies are currently under review by IH to assess the technical and economic impacts of implementing the study recommendations. These studies are *Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern* and *Proposed Occupational Exposure Limits for Furans*.

Leading Indicators

Update:

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

Key Performance Parameter 3

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

Air Dispersion Modeling

Update:

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

Central Residence for Industrial Hygiene Technicians (IHT)

Last update 4/12/2018:

A centralized mobile office (MO) building is slated to house approximately 100 Industrial Hygiene Technicians (IHTs). This new space is designed to be large enough to house the 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. KPP 3 advocates a central location for IHTs that is commensurate with other technician level employees. The trailer design has been approved by Washington State Labor and Industries.

KPP 4. Engineering Controls

A Farm Exhausters

Update:

Over the last two weeks, crews continued construction of the exhauster retaining walls which support the exhauster slab. They completed the installation of the rebar and concrete forms for the walls, adjusted rebar clearances, began assembling piping, and worked on determining appropriate concrete mix to enable pumping the concrete 300-feet (**Figure 2**).

In order to isolate the ventilation ducting seal-loop, the crew successfully filled the A-101 20-inch seal-loop with grout. They mobilized to A-102 for isolation of that seal-loop. These efforts will help maintain tank vacuum and improve visibility during retrieval operations.

To facilitate the expansion of the road between A and AX Farms, a concrete slab was demolished and loaded-out. The slab footprint and areas where bollards were removed were backfilled and compacted. The Vent Pit lid was loaded on an ERDF trailer for disposal and additional backfill/compaction efforts continued.

Key Performance Parameter 4

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



Figure 2. Pictured is an A Farm Exhauster Retaining Wall. The rebar and forms have been installed and are awaiting the concrete. For more, see KPP 4, Engineering Controls. (Photo courtesy of M. Allen.)

AW Stack Extension

Update:

The fabrication of the AW Farm stack extension continued. In the last two weeks, the following was accomplished:

- Efforts continued on preparing the non-radiological and radiological permit application.
- Planning for the foundation and stack installation activities continued. The work package for foundation activities has been approved and will be undergoing an un-reviewed safety question (USQ) review while the work package for installation activities is still developing. In addition, the vendor delivered submittals for fabrication of the stack extension, which are currently being reviewed by WRPS.

AN Stack Extension

Last update 4/12/2018:

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

¹Strobic® Air Dilution Fan

Update:

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

- The *Non-Conformance Report*, created in response to noted shipping damage on the Strobic unit, was resolved and repairs are on-going.
- The test plan, design, and equipment list needed to support off-site testing were completed and efforts are on-going to prepare the test pad.

²NUCON® Thermal Oxidation Vapor Abatement Unit (VAU)

Update:

Activities supporting the engineering-scale testing continued. The following was accomplished over the last two weeks:



Figure 3. NUCON® Instrumentation Trailer

TerraGraphics:

- Test and Design engineers provided support for VAU startup and training activities. This included confirming power requirements and working to repair leaks in the Diesel Particulate Filter (**See Cover Photo**).
- Work continued on the *Technical Demonstration Conceptual Design* for BY-108, including resolving comments from the 60% conceptual design package, and in parallel, work continues on the 90% conceptual design package.

NUCON®:

NUCON® provided technical support for VAU startup and training activities.

PNNL:

Continued developing the analytical equipment needed to support the engineering-scale test (Figure 3). Efforts focused on the following:

- Completing the *Data Management Plan*
- Completing initial calibration of proton transfer reaction-mass spectrometer (PTR-MS)
- Connecting the calibration gasses to the in-trailer instrumentation
- Replacing the Mass Spectrometer on the GC/MS
- Turning over the trailer from crafts to the testing team

PNNL provided technical support for the VAU startup and training activities, including the following:

- Issuing and submitting the *NUCON® Test Plan: Standard Operating Procedure and Worker Safety and Health Exposure Assessment Report*
- Continuing support for the WRPS QA surveillance
- Completing internal sample loop leak test
- Completing heat tracing and installation of the sampling system

PNNL also continued preparing equipment and systems needed to support testing activities, including the following:

- Completing the VAU exhaust leak rate testing
- Completing the installation of the sampling tubes routed to the VAU
- Completing performance testing of the main mass flow controller
- Completing shakedown testing the week of April 30
- Starting VAU testing the week of April 30 (**Figure 4**)

WRPS:

WRPS performed a QA pre-test surveillance on VAU and PNNL documentation.



Figure 4. NUCON® Vapor Abatement Unit and Instrumentation Trailer

KPP 5. Administrative Controls and Monitoring

✚ Permanent Installation of VMDS Equipment in AP Farm

Last update 5/3/2018:

By the end of April, VMDS activities had included the following:

- Efforts to obtain approvals on the *Phase 2 Pilot-Scale Report* draft, a report summarizing the results of the FY2017 pilot-scale activities continue.
- The UV-FTIR installed at AP Farm is in the process of being turned over to Operations. The on-going activities supporting the turnover include the following:

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.

- Completing the final review of the functions-and-requirements (F&R) document, RPP-RPT-60580.
- Continuing to prepare the test plan for startup activities. The draft plan has been completed and reviewed by the SMEs. The next step is for the plan to be reviewed by the Joint Test Working Group.
- Preparing the Material Requisition for the test gases.
- Incorporating comments on uncertainty calculation (RPP-RPT-60669) and preparing to submit for final approval.
- Incorporating comments on calibration gas calculation (RPP-CALC-62150) and submitting for final review and approval.
- Preparing contract to calibrate the UV-FTIR was approved late last week and is now going into the Request for Proposal phase.
- Continuing efforts to complete Operational Readiness Checklist items.

Stack and Boundary Monitors

Last update 5/3/2018:

Activities in progress at the end of April include:

- Performing fabrication and factory acceptance testing of the Ultra Violet Differential Optic Absorption Spectrometry (UV-DOAS) units.
- Approving the 702-AZ and AN Farm stack monitor design revisions.
- Preparing the draft AW and AX Farm stack monitor design packages for review.
- Completing ground scans and crossing lists to support development of the excavation permit for 702-AZ installation.
- Completing ground scans and starting crossing lists to support development of the excavation permit for AN Farm and AW Farm installation activities.
- Procuring equipment to support installation activities.
- Completing fabrication plans for all stack extensions and submitting for internal engineering reviews.
- Developing work packages to support installation of 702 AZ, AN Farm, and AW Farm installations.

Establishing Safe Unrestricted Boundaries

Update:

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

AW Tank Farms coverage maps have been completed, and the draft coverage maps are in development for the AP and AW Tank Farms.

Public Address (PA) System

Last update 5/3/2018:

Activities during the month of April include the following:

- Continuing activities to support turnover of the second set of PA systems (AW, AN, AP and C Farms). Efforts are focused on completing an Engineering Change Notice (ECN) and finalizing speaker and clarity adjustments.
- Continuing efforts for the next set of PA systems (B, S, T, and U Farms). Both the contract and work packages supporting field activities were approved and released for work to start.

KPP 6. Tank Operations Stewardship

Pilot SST Stewardship Program

Last update 5/3/2018:

Activities completed by the end of April include the following:

SST Remote Monitoring Equipment:

Efforts continued on the TY Farm temperature and surface level design packages with the majority of the ECNs and calculations complete. The detailed scope and schedule for TX Farm design activities was developed and work has been initiated.

FY2015 LEAN Report:

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

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

Update:

On May 3, 2018, a briefing titled *AP Farm: Use of Full Face Air Purifying Respirators (FFAPR)*, *Briefing Package* was delivered to managers. The message to the workforce reads:

SY Farm transitioned from supplied air (SA) to full-face purifying respirators (FFAPR) in December 2017. AP Farm scheduled to transition on May 15, 2018.

Implementation at other actively ventilated tank farms will follow assessment of AP Farm implementation: AY/AZ, AX, AW, AN (*Briefing Package*, pg. 2).

The *Briefing Package* explains further that the transition is consistent with the Memorandum of Agreement between WRPS and HAMTC, workers retain the right

to voluntarily upgrade to supplied air, and all entries in AP Farm require IHT coverage even when using supplied air.

+ Mobile Laboratory

Update:

RJ Lee Mobile Laboratory team members are performing maintenance tasks on the mobile laboratory. The lab was not funded to support the EC-08 Evaporator Campaign, but will be supporting the C₂Sense® data collection from the AP Stack.

+ Personal Vapor Monitor

Update: Since the last update two weeks ago, the ³C₂Sense® field demonstrations were initiated. C₂Sense® data from four detectors and two ground truth instruments were collected from A-103 and A-105 passive breather filters (PBFs).

Instrument readings at the PBFs (air drawn from under the PBFs) showed ammonia concentrations as high as 93 ppm, but concentrations at the C₂Sense® and ground truth ammonia detectors are lower than desired (≤ 2 ppm). The detectors were re-located as close as possible to the PBF, but this did not significantly increase the ammonia concentrations (≤ 3 ppm). The detectors were removed from the field and reconfigured to increase the ammonia concentration being measured.



Figure 5. C₂Sense® System Installed at A-103 Passive Breather Filter (Photo courtesy of E. Morrey.)

The new configuration, developed with input from the workforce, which uses a pump to pull high ammonia concentration air from the PBF and deliver it to an ice chest with detectors enclosed, was constructed and tested in the lab

(Figures 5-7).

Figure 6. (Left) Sample Pump Tubing Running to A-103 HEPA Filter. (Photo courtesy of E. Morrey.)



Figure 7. (Right) Four C2Sensors with Sample Pump and Ice Packs to Maintain Temperature. (Photo courtesy of E. Morrey.)



The ⁴ToxiRAE Pro and ⁵Ventis™ Pro V ammonia badges were received for supporting upcoming field trials, while the ⁶ChromAir® are still on order. The field trial will start with detectors available at the time, with the other detectors being phased into the testing as they are received.

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.

¹Strobic Air is a registered trademark of MPC Inc., Wilmington, Delaware.

²NUCON is a registered trademark of Nucon International, Inc., Columbus, Ohio.

³C₂Sense is a registered trademark by C2Sense, Inc., Cambridge, Massachusetts.

⁴RAE Systems by Honeywell, San Jose, California.

⁵Ventis™ Pro5 Multi-Gas Monitor is a registered trademark by Industrial Scientific in Pittsburgh, Pennsylvania.

⁶ChromAir is registered to Morphix Technologies, Virginia Beach, Virginia.