

CPPO's June 14, 2018, Notebook describes the Chemical Vapors Solutions Team (CVST) Fugitive Emissions (FE) group investigating the "odor events with an unknown source at the tank farms." Depicted is a map of the area near 4th and Buffalo, which was selected for FE investigation.

Tank Operations Contract
Chemical Protection Program Office
June 21, 2018

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

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

CPPO Oversight and Tracking

Cost and Schedule Metric

Ongoing vapor projects supporting the draft Comprehensive Vapor Action Plan (CVAP) KPPs are still moving forward as planned. **Figure 1** shows the fiscal year-to-date costs per month. FY2018 to date, \$28M has been spent implementing the CVAP KPPs. The delay in the Vapor Monitoring and Data Systems procurements with ¹CEREX[®] have slowed the expected spending, but this is expected to pick up in June as the stack monitors and the IH Trailer procurement arrive. **Figure 2** shows the FY2018 cost and schedule variances for the draft CVAP.

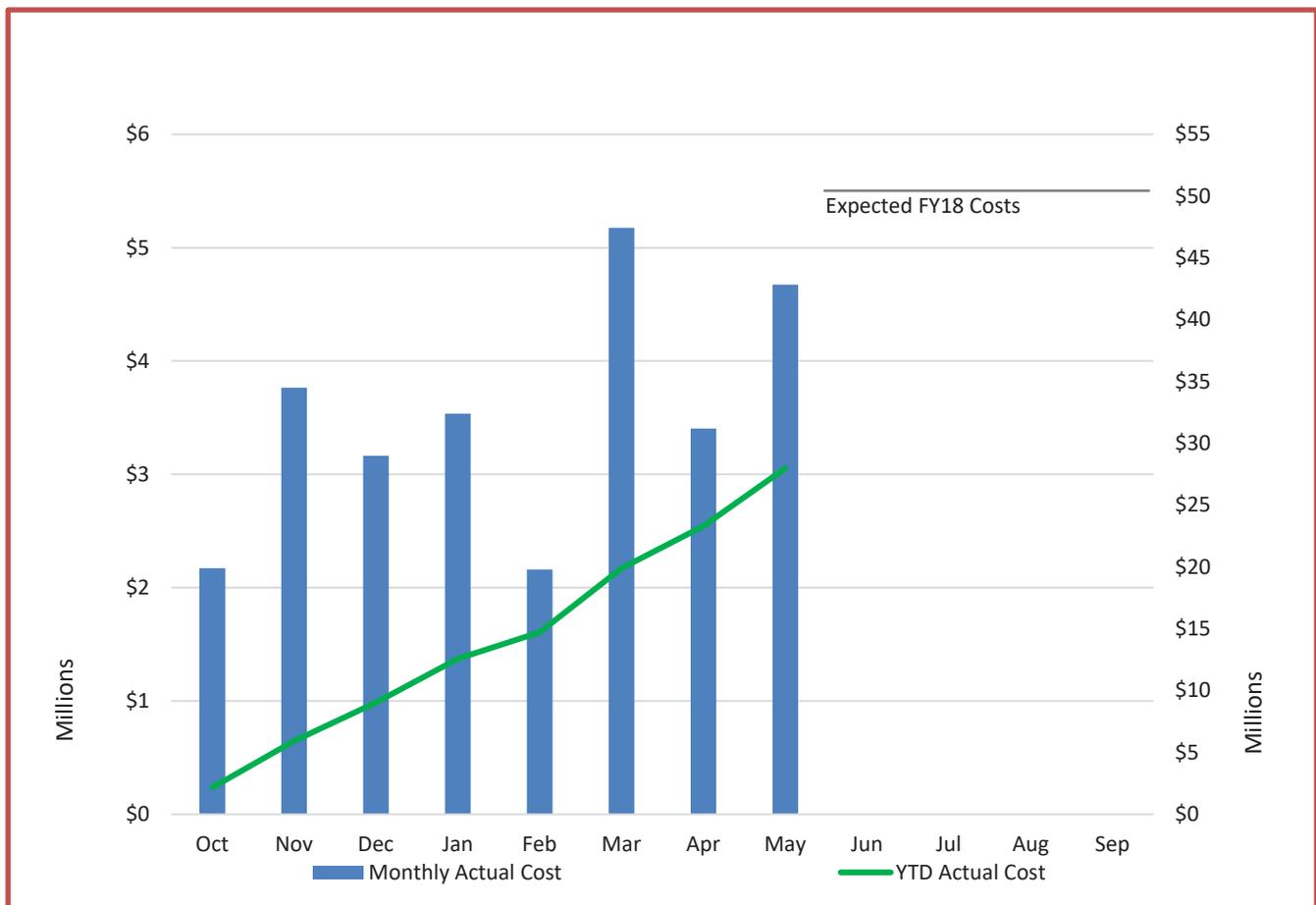


Figure 1. FY2018 Draft Comprehensive Vapors Action Plan Costs

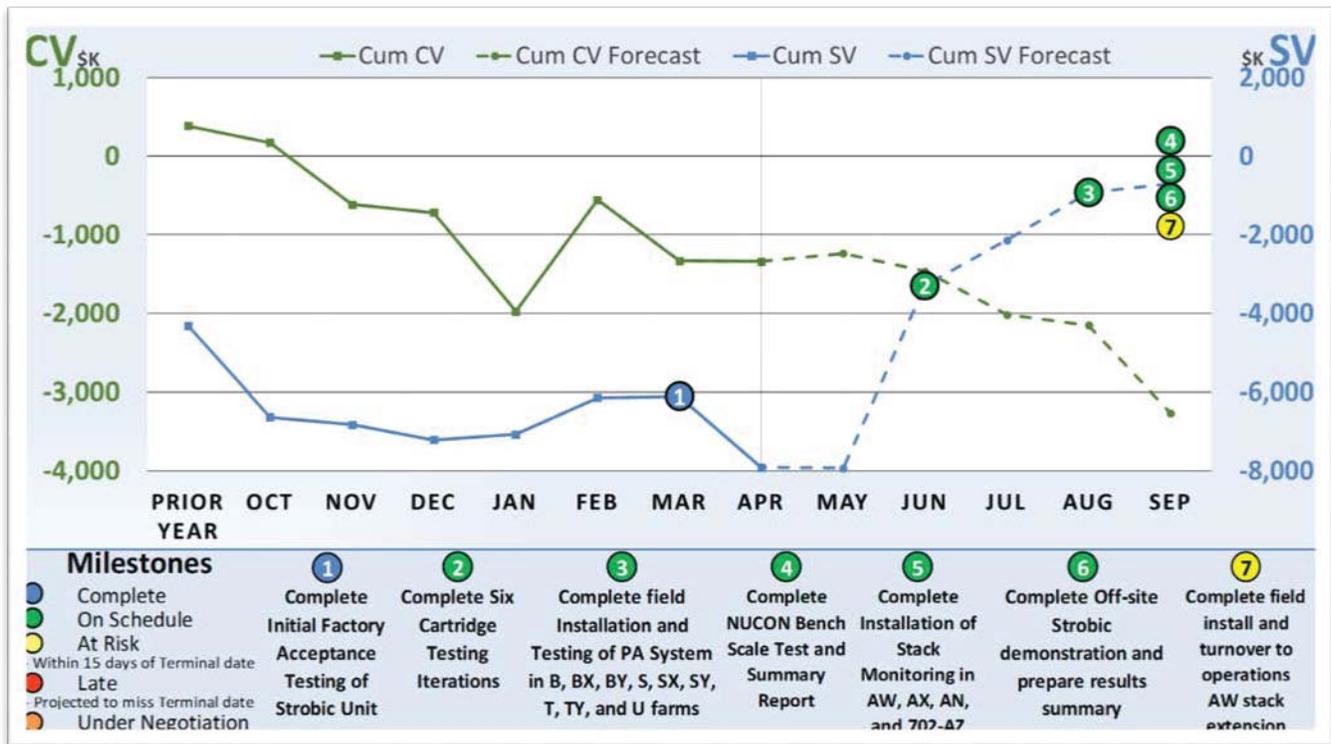


Figure 2. FY2018 Cost and Schedule Variances for the Draft CVAP

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

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

Update:

Toxicologists Dr. Angie Perez and Dr. Christopher Kuhlman were the CTEH representatives on site last week. Dr. Kuhlman attended a plan-of-the day (POD) meeting with Shift Production managers and other subject matter experts to introduce CPPO and available information resources. Dr. Perez and Dr. Kuhlman also attended a radiological control technician POD meeting to discuss CTEH's support in communicating vapors-related information. CTEH continued developing CPPO Notebooks on tank farm vapor chemical characterization and on how air purifying respirator cartridges work. Dr. Perez and Dr. Kuhlman hosted on-site office hours at the CPPO satellite office located in 2750E A230, available to answer toxicology- and vapors-related questions from workers.

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 *Fugitive Emissions (FE) Investigation Team Activities*.

Solutions, Issue 440, published on June 11, 2018, stated, "[t]he Chemical Protection Program Office (CPPO) has published two new notebooks on nitrous Oxide, a prominent chemical in Hanford's waste tanks." Links to parts 1 and 2 were embedded in the article.

An all-employee email from Rob Cantwell, Manager ESH&Q, was issued on June 11, 2018. Titled, *FFAPRS in AP Farm*, it read, "[b]eginning June 12, workers in AP Farm will have the option to use full-face air-purifying respirators (FFAPRs) equipped with filter cartridges for low-hazard non-waste-disturbing work in the AP tank farm."

On June 12, 2018, *Hanford Tank Vapors, Vapors Weekly Update*, reported, "[s]tarting today, some workers in the AP tank farm will have the option to use full-face air-purifying respirators (FFAPRs) equipped with filter cartridges for low-hazard non-waste disturbing work in the AP tank farm. Workers on other tasks will continue to use self-contained breathing apparatus (SCBA) in the tank farm."

Chemical Protection Engagement: Chemical Vapors Solutions Team (CVST)

The CVST held its monthly meeting on Wednesday June 13, 2018, in which Communications, IH Programs and Technicians, Management, Operations, HAMTC Safety Representatives, Nuclear Chemical Operators, Radiological Control personnel and CPPO, as well as a number of the Team Vapor Representatives (TVR) were in attendance. Rob Gregory, Chief Operating Officer, opened the meeting with a discussion on a high-level *Vapor Project Overview/Update* which included the *Comprehensive Vapor Action Plan (CVAP)*; sampling, monitoring and characterization; modeling; engineered controls (e.g., increased stack height); and real-time monitoring (i.e., VMDS). Mr. Gregory also discussed the status of the settlement agreement which addresses the ongoing litigation activities. Mr. Rob Cantwell, ESH&Q Manager, discussed FFAPR Implementation, which occurred in AP Tank Farm this week and discussed the Stop Work on APR cartridge use due to carbon from the filters coming into the masks. The Stop Work issue was resolved with help from the manufacturer (i.e., Scott) and replacement of the WRPS cartridge inventory. Mr. Dan Wolf, Production Operations IH Manager, provided an enhanced monitoring update which included a review of monitoring data collected over the last 2 years around the A Complex and included direct-reading indication (DRI, 178 sample sets) and personal sampling event (18,000+) results. Mr. Dave

Saueressig, Retrieval Operations Manager, discussed the upcoming waste disturbing activity – AY-102 Transfer, planned for August 2018, which includes a water rinse followed by a caustic addition for corrosion prevention control. Mr. Ken Way, IH Manager, discussed results of the *Leading Indicators* study and how it may apply to the IH Program. Mr. Jason Vitali, CTO Manager, discussed the Fugitive Emissions Sub Team initiative, which is about to begin field screening (i.e., sampling/monitoring) activities around 244-AR (i.e., near 4th and Buffalo) which will help pinpoint where more in-depth activities should occur.

The CVST New Technology Sub-team meeting was held on Wednesday, June 13, 2018. Representatives from Chief Technology Office, CPPO, Nuclear Chemical Operators, and Industrial Hygiene (IH) Programs were in attendance. The team leader acknowledged that since the team identified numerous vapor-related new technologies through the VMDS, which have been tested and are moving to full-time operations, the need for vapor-related new technologies is less crucial. The team leader solicited feedback on how this meeting should be conducted moving forward. The team members provided feedback on revising the charter, whether meetings should be continued or held less frequently, updating the sub-committee information on the CVST site, and our approach for evaluating new technologies moving forward. The team leader said he would review the team's suggestions and provide his input at the next meeting.

Chemical Protection Engagement: Hanford Vapors Website Updates

- Vapors weekly update June 12, 2018
- Odors reported in 242-A pump storage room

Chemical Protection Engagement: Effectiveness Measures

Last update 6/14/2018:

The results of the FY2018 *Vapors Information Effectiveness Survey Report* are being implemented by CPPO. Actions taken in **May and June** in response to the survey recommendations include the following:

- Scheduling site visits to individual worker groups to increase worker access to CTEH experts, increase awareness of the CPPO, and where to locate vapors information
- Working with C&PR to include information on CPPO and the Notebooks in the WRPS facility building monitors
- Including the CPPO Notebooks on reader boards in change trailers
- Including CPPO Notebook summaries with links to the audio file in *Solutions* (one of the top three avenues used by workers to obtain vapors information)
- Including CPPO Notebooks in the Safety Startup
- CTEH office hours at the CPPO satellite office on-site

A second survey/focus group(s), informed by the results of the FY2018 Vapors Information Effectiveness Survey Report, is planned for this summer.

Chemical Protection Engagement: Workforce Engagement

Update:

The CPPPO attended the Shift Production POD meeting, briefing the approximately 25-30 members in attendance about the CPPPO group and what vapors information products are available and where to find them. This was the second of four consecutive meetings with the Shift Production team, which will ensure all shift members have the opportunity to attend the briefing. The briefing was followed by a Q&A session, where the workforce did not have any questions.

Chemical Protection Engagement: Worker Feedback

Update:

The CVST New Technologies team leader solicited feedback from the attendees how the meeting could be conducted moving forward as its chartered purpose has been met. The team members provided feedback on revising the charter, frequency of meetings, updating the sub-committee information on the CVST site, and the approach for evaluating new technologies moving forward. The team leader said he would review the team's suggestions and provide his input at the next meeting.

KPPs 2 and 3. IH Technical Basis and IH Program

IH Manual and Technical Basis

Update:

TOC-IH-58435, *Industrial Hygiene Manual*, saw updates to Section 1, *Introduction*; Section 2, *Practices of the Industrial Hygiene Program*; Section 3, *Reporting Occupational Exposure and Medical Monitoring*, and Section 4, *Tank Waste Chemical Vapors*: Sections 1-4 are issued to the IH website. Section 5, *Reporting Occupational Exposure and Medical Monitoring*, and Section 6, *Emergency Response*, continue in internal review. Required reading and IH communication for Sections 5 & 6 of the IH Manual are prepared.

TFC-PLAN-174, *Industrial Hygiene Chemical Vapor Technical Basis Program Plan*, TFC-ESHQ-S_IH-C-66 *Identifying Chemicals of Concern in Hanford Tank Farms*

are being revised to express the requirements more clearly. TFC-ESHQ-S_IH-C-67 *Maintenance of the Industrial Hygiene Chemical Vapor Technical Basis* is being circulated as required reading.

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.

On June 11, 2018, TFC-PLN-173, Rev. A-3, *Use of FFAPR in Actively Ventilated Tank Farms*, was released. The *AP Farm Exposure Assessment Procedure* is complete and in the final stage of WRAP.

The *Risk Communication Techniques* and *Crucial Conversations* training courses are well underway with ~73% of the Industrial Hygiene workforce trained in *Risk Communication Techniques* and ~100% trained in *Crucial Conversations*.

Health Process Plan (HPP)

Last update 6/7/2018:

Six of the HPP studies that have transitioned in the TFC-Charter-71 process have been slated to be issued outright as version Rev 0. Three studies released at the end of May include *Proposed HTF OELs for Chronic Exposures – COPCs with Regulatory Guidelines* (PNNL-26777); *Proposed HTF OELs for Chronic Exposures - Nitrile Class COPCs and 2,4-Dimethylpyridine* (PNNL-26819); and *Hanford Tank Vapors FY 2017 Chemicals of Potential Concern Update* (PNNL-26820). Two studies scheduled for release in June are *Proposed Acute Exposure Concentration Limits for COPCs with Regulatory Guidelines* and *Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors*. The report *Hanford Tank Farm Occupational Exposure and Risk Assessment Plan* is in review. The studies *Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern*, *Assessing the Potential for Chronic or Acute Health Effects from Exposure to COPC Mixtures*, and *Proposed Occupational Exposure Limits for Furans*, are in review by IH to assess the technical and economic impacts of implementing the study recommendations.

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). WRPS is reviewing the report to consider its potential implementation.

Key Performance Parameter 3

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

Air Dispersion Modeling

Last update 6/7/2018:

Industrial Hygiene submitted its final technical review of *The APGEMS – TF Atmospheric Dispersion Model for Tank Farms Applications* (PNNL-27530) and it was released at the end of May. 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. PNNL delivered version 1.1 of the APGEMS-TF software for installation and testing by WRPS.

Central Residence for Industrial Hygiene Technicians (IHT)

Last update 6/7/2018:

Proposals to install the centralized mobile office (MO) for the IH Technicians (IHTs) have been received and evaluated. The trailer has been constructed and is currently stored in the Pac Mobile yard in Pasco. The installation site is in the 200 East area on 4th Street near 218A across from PUREX.

KPP 4. Engineering Controls

A Farm Exhausters

Last update 6/7/2018:

Exhausters: Over the last two weeks, crews continued constructing the A Farm exhauster retaining walls. The team poured the south retaining wall and completed the backfill and compaction between the north and south retaining walls, making ready to install the conduit.

A/AX Farm Road Expansion: The construction team backfilled and graded the A/AX Farm expansion road.

Procurement/Fabrication: A material request to procure the POR518/POR519 exhauster valve manifold and the manifold support and access platform was developed.

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

Last update 6/7/2018:

Over the last two weeks, the installation of the AW Farm Stack extension continued. The following was accomplished during the reporting period:

- The non-radiological and radiological permit application continues. The radiological permit is with ORP for review, and the non-radiological permit is with Washington State Department of Ecology for review.

- The stack foundation, fabrication, and installation activities continued. The site has been prepared and excavated for the foundation, with efforts ongoing to install the forms and pour the concrete. The work package for the stack installation activities is still under development, while the fabrication of the stack extension continues.

²Strobic® Air Dilution Fan

Last update 6/7/2018:

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

- The test plan, design, and equipment list, all in support of off-site testing, have been approved.
- Hi-Line repaired the damages to the fan incurred during shipping from the Strobic factory. The unit has been assembled and is ready for testing.

³NUCON® Thermal Oxidation Vapor Abatement Unit (VAU)

Last update 6/7/2018:

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

TerraGraphics:

- Continued to provide test engineering support to PNNL for the engineering-scale testing.
- 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®:

Continued to provide test engineering support to WRPS and PNNL for the engineering-scale test.

WRPS:

WRPS met with PNNL to determine a path forward for solving analytical challenges with N-Nitrosodimethylamine (NDMA), and furans encountered during the engineering-scale test. As part of the path forward, baseline exhaust (sensitivity) samples were collected and analyzed for furans by 222-S and RJ Lee Mobile Laboratory. The results confirmed the existence of furan and interferences in the exhaust gas, making the proton transfer reaction mass spectrometry (PTR-MS) capability of the NUCON® test inadequate for demonstrating furan destruction. Subsequent testing with NO⁺ reagent ion is proving to be successful in eliminating the interferences.

PNNL:

Continued implementing the engineering-scale test plan and performed the following:

- Completed NO⁺ ionization modification on the PTR-MS to facilitate more accurate analysis of 1,3-butadiene & 2,4-dimethylpyridine.
- Completed test which confirms the ability to detect 1,3-butadiene, formaldehyde, 2,4-dimethylpyridine, acetaldehyde and acetonitrile in the exhaust stream at nominally 10% or less of the OEL.
- Completed 2 times (200%) OEL test for acetaldehyde and acetonitrile.
- Provided input to WRPS work plan for resolving identity of Furan & NDMA interferences and subsequent path forward. Testing for the detection of Furan and NDMA at 10% of OEL was completed.

KPP 5. Administrative Controls and Monitoring**Permanent Installation of VMDS Equipment in AP Farm****Update:**

Efforts to obtain approvals on the Phase 2 Pilot-Scale Report, a report summarizing the results of the FY2017 pilot-scale activities, continue into June.

- 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:
 - *The Operational Acceptance Test (OAT) has been split into two separate tests to optimize approval process. The first OAT addresses startup activities where no gas testing is required, while the second OAT addresses startup activities where gas testing is required.*
 - *No-Gas Testing OAT: The draft OAT test procedure was prepared and is currently in review.*
 - *Gas Testing OAT: The draft OAT is currently being prepared.*
 - Continuing to obtain approvals for the uncertainty evaluation (RPP-RPT-60669).
 - The calibration gas calculation (RPP-CALC-62150) was approved.
 - Efforts continued on relocating and replacing the flowmeter, modifying the Human Machine Interface for readout location, preparing the operations, maintenance and calibration procedures, and procuring a vendor for calibration support.

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:

Activities in progress the first weeks in June include:

- Continuing the fabrication and factory acceptance testing of the Ultra Violet Differential Optic Absorption Spectrometry (UV-DOAS) units.
- Continuing to prepare work packages for installation of the 702AZ stack monitors.
- Continuing to review AW Farm stack monitor design package.
- Continuing to review and incorporate comments on the 90% design package for the AX Farm stack monitor.

Establishing Safe Unrestricted Boundaries

Last update 6/7/2018:

The *Industrial Hygiene Basis for defining the Unrestricted Work Boundary*, clarifying how WRPS will define work boundaries in and around the Tank Farms, was published on March 28, 2018. An internal review of the *Industrial Hygiene Basis for defining the Unrestricted Work Boundary* was conducted and a gap analysis performed. A revision to TFC-ESHQ-S_IH-C-48 *Managing Tank Chemical Vapors* was performed to address the gaps and incorporate necessary improvements to the process. C-48 is currently under review and comment resolution.

Public Address (PA) System

Update:

Activities in June thus far 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 resolving switch and filter issues.
- Continuing efforts for the next set of PA systems (B, S, T, and U Farms). Fieldwork at S, SX, and SY Farms were completed (excavation, trenching, wiring, and conduit installs) with the exception of resolving the same switch and filter issues that are impacting the east area PA systems. In addition, the team completed excavating the trench at T Farm and started wiring and conduit installation.

KPP 6. Tank Operations Stewardship

Pilot SST Stewardship Program

Update:

Activities completed as the first week of June include the following:

SST Remote Monitoring Equipment:

Efforts to start MSA network development and installation activities resume as MSA is working contract issues with their construction subcontractor.

The draft 60% TX Farm design package was completed and is currently in review.

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 6/7/2018:

PNNL began circulating its draft report of APR testing performed in SX Farm during June 2017. The report for PAPR cartridge testing conducted at SX-101 and SX-104 was released. Recent cartridge testing data collected from the AX Exhauster has been analyzed and the report is in draft. AW Stack cartridge testing is scheduled this weekend during waste disturbing activities.

SCBA chest straps on order are arriving; inventories increasing.

APR cartridge testing for excess charcoal dust has been completed. The inventory of concern was returned to the manufacturer and replaced with fresher/newer cartridges.

Mobile Laboratory

Last update 6/7/2018:

RJ Lee Mobile Laboratory: The lab is supporting the ⁴C₂Sense[®] data collection from the AP Stack, the AP Stack ammonia spike testing (part of the stack monitor startup), and the evaporator EC-09 campaign.

New Mobile Laboratory: TerraGraphics is in the process of designing and building a new mobile laboratory for lease by WRPS. The new mobile laboratory features enhanced capabilities, including a more sensitive PTR-MS, Ultra-Violet-Differential Optical Absorption

Spectrometer (UV-DOAS), and Fourier transform infrared spectrometer (FTIR). In support of the new van, the CEREX[®] UV-DOAS/FTIR cabinet was shipped to TerraGraphics to be incorporated into the mobile laboratory. The FTIR module was subsequently returned to CEREX[®] for warranty repair on the circuit board.

Key Performance Parameter 7

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

Personal Vapor Monitor

Last update 6/7/2018:

The C₂Sense® field demonstration data collection is ongoing.

- Calibration certifications on the ⁴Ventis™ Pro V detectors were obtained and the instrument was deployed for the field demonstration test.
- Ammonia data from four C₂Sense® units, four ⁵ToxiRAE Pro detectors, four ⁶Ventis™ Pro V detectors, and two ground truth instruments was collected from the A-103 passive breather filters.
- Four ⁷GfG Micro IV ammonia detectors have been shipped from the manufacturer.
- C₂Sense® completed the first version of algorithms for their ammonia detectors that allows conversion of raw conductance signal to ammonia concentration. C₂Sense® also completed a blind comparison of the C₂Sense® ammonia detector results to the AreaRAE results. A substantial amount of the data compared very well, but there was also a substantial amount of false positive responses on the C₂Sense® detector.

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.

¹CEREX® Stack Monitor CEREX trademark by TECAN SP, INC. Baldwin Park, California.

²Strobic Air is a registered trademark of MPC Inc., Wilmington, Delaware.

³NUCON is a registered trademark of Nucon International, Inc., Columbus, Ohio.

⁴C₂Sense is a registered trademark by C2Sense, Inc., Cambridge, Massachusetts.

⁵RAE Systems by Honeywell, San Jose, California.

⁶Ventis™ Pro5 Multi-Gas Monitor is a registered trademark by Industrial Scientific in Pittsburgh, Pennsylvania.

⁷GfG Micro IV Single Gas Detector from GfG Instrumentation, Inc.