washington river protection solutions

CPPO Chemical Protection Program Office

Cartridge Testing Presentation – June 28, 2017 Chemical Vapors Solutions Team meeting.

Tank Operations Contract
Chemical Protection Program Office Weekly Report
& Fiscal Year 2017 Quarter 3 Summary
July 6, 2017

Department of Energy Contract NTE 16-TF-0089

1. State of Vapors Related Activities

Significant progress has been made in all draft Comprehensive Vapor Action Plan (CVAP) Key Performance Parameters (KPP) areas this quarter. IPT members supported several key presentations to the Vapors Management Expert Panel (VMEP) team the week of June 12. Positive feedback was provided by the VMEP regarding the vision established and our progress towards that vision. The CPPO group continues to provide outstanding presentations for field organizations through the CPPO Notebook, and this month's presentation on Human Odor Perception and Chemical Exposure was no exception. In addition, the CPPO group has provided input to the upcoming all-employee safety culture survey. The Industrial Hygiene (IH) Organization is on schedule to update the technical basis, develop a draft IH manual, complete a requirements matrix and gap analysis, and implement a new chemical worker training program. Progress was made in the engineering controls area with the installation of a stack extension for the 242-A vessel vent system, issuance of a technical support contract with Strobic Air, and initial development of plans for moving the NUCON abatement unit to Hanford for further proof-of-concept testing.

Vapors Monitoring Detection System (VMDS) viability studies are nearing completion; stack monitor designs are underway, Quantitative Risk Assessments for three farms are in progress and construction for the installation of permanent public address systems in all tank farms has commenced. The SST stewardship plan kicked off with the order for ingress/egress trailers, the development of a Project Execution Plan, and the selection of a design authority for automation initiatives. The Third Party reviewing cartridge testing, Stone Turn Consultants (STC), convened in Chicago the week of June 12, and several members visited the site the week of June 26. Initial feedback from meetings with STC appear to be very promising for near term use of air purifying respirator/powered air purifying respirator (APR/PAPR) in lieu of self-contained breathing apparatus (SCBA) in ventilated farms. A mockup test of airlines was performed at HAMMER the week of June 19, and additional personal protection equipment (PPE) improvement with SCBA is planned for July and August. A draft report for the compilation of all cartridge testing in FY16 was provided to WRPS by Pacific Northwest National laboratory (PNNL) and is in review.

The project did realize several risks during this reporting period. The vendor supporting the Proton Transfer-Reaction Mass Spectrometry (PT-RMS) project has not kept up with the analysis of data necessary for laboratory studies. WRPS personnel have been working with the vendor to remedy this situation and are looking at alternative options for data analysis. Although the vessel vent stack extension was completed, the project experienced a schedule slip due to as-found conditions in the field. Engineering personnel worked a holiday weekend to develop a plan to remedy the situation and work continued later the following week. Cartridge testing experienced several delays due to resource availability and some procedure/training issues. A meeting was held with applicable management and corrective actions were identified and implemented. The follow-on testing evolution was performed flawlessly. Communication and document release continues to be impacted by litigation issues that require additional legal reviews and considerations. CPPO and WRPS Communications and Public Relations are working with legal to minimize delays in issuing communications and documents.

Overall, the IPT is functioning very well and there is significant work being performed in all of the draft CVAP KPP areas with very good progress. The outlook for the final quarter of the fiscal year is promising with the potential shift to APR/PAPR for significant work scope in ventilated farms, the improvements in the IH documentation/programs, continued improvements in communication, and the installation of a public address system in most of the East Tank Farms.

2. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS Quarterly Summary (Fiscal Year 2017 Q3)

CPPO has facilitated and contributed to multiple WRPS communication efforts, tracked and documented proposed actions to address recommendations from the National Institute for Occupational Safety and Health (NIOSH), Tank Vapor Assessment Team (TVAT), Office of Inspector General (OIG), and Office of Enterprise Assessments (EA-32) external assessments, and lead employee engagement initiatives in support of consolidated vapors communication improvement initiatives.

In the 3rd Quarter of fiscal year 2017, CPPO focused on:

- Improving employee engagement for vapors related activities.
- Ensuring organizational integration within WRPS for vapors related activities.
- Contributing to and tracking of vapors related workforce communication efforts.
- Cross walking planned actions in the draft CVAP KPPs to actions being performed in response to recommendations from NIOSH, TVAT, OIG, EA-32, and Center for Toxicology and Environmental Health (CTEH).

In March, the CPPO performed a **Vapors Communication Workforce Survey** as an employee engagement improvement initiative. Leveraging the information learned in the survey, the effectiveness of vapors communications to the WRPS workforce was further investigated when CPPO hosted a **LEAN Management Event** on *Effective Communication to the Workforce.* In response to the LEAN event feedback, CPPO has initiated assignment of a Tank Vapor Representatives (TVR) to attend Chemical Vapors Solution Team (CVST) meetings. One person per field team will be assigned as the team's TVR. The TVR enhance employee engagement by improving attendance at CVST meetings, and helping to further communicate the information that is shared at the CVST meetings to the rest of their team. CPPO has requested, and both Executive and Senior management is supporting the request, the TVR be provided a work assignment to attend the bi-weekly CVST meeting, take the information from the CVST, and brief their team. In early May, the CPPO team helped re-establish and continues to facilitate the CVAP integrated project team meetings.

On a weekly basis, CPPO published the **CPPO Notebook** and the **CPPO Weekly Report**. The CPPO tracks the vapors related communications WRPS produces and distributes to the workforce and public. That tracking effort is captured in one of the four monthly metrics CPPO produced every

month of this quarter. In addition to the Communications Metric, CPPO also produced Website Statistics, Cost and Schedule, and Corrective Action Tracking.

The CPPO served in an advisory capacity, or provided technical support, to many vapors related efforts this quarter, including:

- Meeting with Site staff when requested to address vapors-related questions or concerns.
- Performing tank vapor and industrial hygiene monitoring data analysis.
- Participating in VMDS equipment conceptual design.
- Providing training and education on vapors-related issues.
- Participating in Health Planning Process (HPP) meetings.
- Contributing to the Integrated Vapors Sampling Strategy Data Quality Objective (DQO) process.
- Engaging in a weekly information exchange with the Hanford Atomic Metal Trades Council (HAMTC) safety representatives.

With CPPO as its primary contributor, and responding to a Department of Energy (DOE) critique in April, the HanfordVapors.com website significantly bolstered vapors communication offerings in the third quarter of fiscal year 2017. **Appendix A** catalogues the over one hundred website additions added to the website this quarter. Currently managed by CPPO, the PHOENIX team is finalizing the comments and functions of the **Data Analysis and Visualization (DAV)** Tool.

Additional CPPO activities this quarter include the following:

- WRPS provided status briefings on the development of the CVAP and the Industrial Hygiene program to DOE's Vapor Management Expert Panel (VMEP). The VMEP responded to the briefings with overall positive comments on the status of vapors related activities and programmatic activities, and they indicated they will be drafting a report this summer.
- CPPO continues to develop metrics to support a CVAP monitoring dashboard. Multiple metrics are in various stages of development and review.
- To date, the CPPO Library houses hundreds of communications, correspondence, CPPO Notebooks, historical documents, photographs, charts, and references. CPPO collects and deposit vapors communications into the CPPO Library and IDMS.
- WRPS has contracted Oak Ridge Associate Universities (ORAU) to perform a safety culture survey. Employees will receive a link to the survey directly from ORAU and representatives will be on site to administer hard-copy surveys. Several focus groups will be convened to provide input on WRPS's safety culture. The survey will be conducted in July. The study will provide valuable information regarding communication on vapors and the perceived validity of that communication.

CPPO Oversight and Tracking

The Hanford vapors website logged nearly 5,000 views in June, with the biggest single day on June 13. That day, the site received 815 views as a result of an AOP-015 declared outside of A Farm. Multiple messages were issued and posted to the website, and numerous media inquiries were received as a result. The use of the HanfordVapors.com website increased in the third quarter with an average of 170 hits per month, compared to Q2 with an average of 102 hits per month.

Figure 1. Hanford Vapors Website Activity

3. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

The draft CVAP, and the Key Performance Parameters included in the draft CVAP, forms the basis for the ongoing vapors activities. WRPS is implementing the activities to accomplish the KPPs.

KPP 1. Communications

Chemical Protection Communication

There are currently two vapors related communication plans in development. The *Comprehensive Vapor Management Communication Plan* is a requirement of KPP 1. The *CVAP Communication Plan* is a focused topical plan for communicating the content of

the CVAP. Both plans are currently being reviewed. They include actionable recommendations from the communication effectiveness measurements, as applicable.

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

WRPS has exceeded the commitment for 2017 for a minimum of two communication effectiveness measurements. Thus far, a focus group survey of the HanfordVapors.com website was performed; a CPPO workforce communication survey was performed; and a CPPO Communication to the Workforce LEAN event was completed. All the recommendations from these effectiveness measurements will be rolled into the Comprehensive Vapor Management Communication Plan. In addition, a Safety Culture Survey will include vapors related and communications related inquiries. The survey will be used to support future employee engagement planning. In March 2017, the CPPO performed a vapors communication workforce survey. The *Workforce – Vapors Communications Survey Results* is here. **Table 1** details the communication survey recommendations and status.

Table 1. 2017 Communication Survey Report Recommendations Status

Topic	Recommendations	Status
Information Delivery Methods	Determine why the workforce does not actively use the website and what is required for it to become a valuable resource	Complete – LEAN event
Information Delivery Methods	The senior management expectation should be reiterated that workers be released to attend the CVST,	Using Team Vapor Representative (TVR) at CVST approach instead. Action closed.
Information Delivery Method	A management expectation that one member from each field team attend the CVST, where attendees could rotate if needed, as long as one member from each team is present. These attendees can then disseminate the information to their teammates at their next POD	See LEAN actions status
Vapors Communications - Topics	WRPS should focus on providing information, through the most popular information avenues, on each of the areas of interest identified in the survey	Complete - Incorporate into *Comprehensive Vapors Communication Plan*
Future Assessments	Incorporate questions into SCWE survey	Complete

The CPPO hosted a three day **LEAN Management Event** starting on May 16, 2017, aimed at proposing effective ways to deliver vapors-related information to field workers. The LEAN team consisted of nine staff representing Industrial Hygiene, Radiological Controls,

Maintenance, and four staff from the CPPO. The LEAN team evaluated the WRPS communication avenues, ultimately focusing on person-to-person communication by subject matter experts (SMEs). Additionally, the team evaluated WRPS's feedback loops in order to measure the effectiveness of the recommended approaches.

Actionable recommendations emerged from the event, including improving vapors-related communications in the following areas:

- Training
- Work planning
- Utilizing existing vapor communication avenues such as the CVST
- Adopting the CPPO Notebook more widely
- Increasing the presence of Industrial Hygiene (IH) professionals and other subject matter experts in the field

Vince Eilertson – LEAN Management Event – May 2017

With the endorsement of these efforts by management, the team began the process of implementing the recommendations. The CPPO will continue to monitor the effectiveness of vapor-related communications, and the successful implementation of the endorsed recommendations of the LEAN team.

Table 2. CPPO Communications LEAN Event Recommendations

#	Action Item	Status
1	Include Exposure Assessment Summary (C48) in Work Package	Not started
1a	Modify WORA IH Review to Include CHEA as an Attachment	Not started
1b	Establish Process to put CHEA into IDMS	Complete
2	Modify Pre-Job Checklist Form to include Chemical Vapor/ Hazards	Complete
3	Each Work Team Establish a Team Vapor Representative (TVR) to Attend CVST Meetings and Communicate Back with Teams	In Process
3a	Propose and Present TVR Concept to Rob Gregory and Lou Alcala for Buy-In	Complete
4	Provide IH Vapor Program Status and Updates to Project IH Weekly	Not started
5	Schedule Bi-Weekly IH/SME Field Meetings - Coordinate with Integrated Schedule	Not started
5a	Allocate IH Resources for SME Meeting	Not started

Table 2. CPPO Communications LEAN Event Recommendations

#	Action Item	Status
6	Establish Ticket/E-Form to Track SME/ Vapor-Related Questions	In Process
7	Modify WRPS Intranet to Include Vapors Tab on Header for Vapors Resources (IH Data, CVST, Hanford Vapors)	Complete
8	Initiate Training Request for CHAT to Include Vapor Web-Based Resources & Navigation	Complete
9	Redesign of Vapor Weekly Delivery	In Process
10	Make CPPO Notebook Slides a Mandatory Presentation	Not started
11	Modify Vapors Communications to Include Point of Contact Information	Complete
12	Implement Vapors Awareness Training & Tools for Supervisors – Add to Qual Card	In Process
12a	Initiate Training Request	In Process
13	Schedule Monthly Team Reviews of Lean Event Action Status	In Process

3rd Quarter Communication Highlights

- For a full list of the vapors related communications for the third quarter see Appendix A.
- The **CPPO Notebook** was published 12 times in the 3rd Quarter. For the list of Q3 CPPO Notebook titles, see Appendix A.
- Sue Cange, then- acting EM-1 Director, toured the AP Tank Farm on April 19, 2017, to view WRPS's pilot-scale testing of the Vapors Monitoring & Detection System (VMDS) and associated technologies. During the tour, Kevin Smith, ORP Manager, gave an overview of chemical vapors. Rob Gregory, WRPS Chief Operating

Sue Cange toured the AP Tank Farm

Officer, briefed the tour participants on the status of the draft CVAP.

- The May 1, 2017, *Solutions* publication reported, "WRPS continued to foster communication with its workforce by promoting a safety conscious work environment through email communications, email and video newsletters, events, website communications, and senior management involvement. The Hanford Tank Vapors website is regularly updated with new information and improvement. The website was visited more than 34,000 times during the quarter."
- The May 1, 2017, *Solutions* publication also reported on the design and installation of the strobic-air tri-stack ventilation upgrade for the AW exhaust stack, and WRPS's interfaces with NUCON International as it develops a thermal-oxidation project.
- At the May 24, 2017, CVST meeting, Rob Gregory provided an Overview/Update on vapors related-information, which included cartridge testing report reviews by the independent review team, the communication survey, and dissemination of CVST vapor information back to the field workers; Bobby Nelson presented the Tank Farms Event Notification System (i.e., Public Address System); Doug Greenwell presented the Vapor Protection Plan for C-105 Retrieval, which is scheduled to start in July/August; reviewed CVST Action Items.
- *Solutions* issue 394/June 5, 2017 reported that "[a]fter evaluating 10 Self-Contained Breathing Apparatus (SCBA) models for potential tank farm use, then narrowing the choices to four for testing at HAMMER, an employee committee has selected two models for further testing inside the tank farms this summer. The units are the Air-Pak NxG7 and the ACSi SCBA, both manufactured by Scott Safety, a major provider of respiratory and personal protective equipment."
- Additionally, *Solutions* (Issue 394) described the Lean Management Rapid Improvement Event that was held May 16-18. The goal of the event was to "propose more effective means of exchanging information between chemical-vapor subject-matter experts and the WRPS workforce." Furthermore, *Solutions* reported, "[t]he event, sponsored by the Chemical Protection Program Office (CPPO), focused on finding ways to increase face-to-face communication with subject-matter experts, strengthen the use of the CVST as an effective communication tool, and improve the workforce's access to web-based vapors resources." Importantly, the LEAN event "identified a number of potential improvements and action items, including making the Hanfordvapors.com website easier to navigate, utilizing social media, increasing CVST participation, modifying training curriculum, and changing pre-job checklists. Other improvements include additional training for managers and supervisors, and hiring additional industrial hygiene subject-matter experts to communicate vapors information to the workforce."
- A CVST meeting was held on June 14, 2017, during which Mr. Rob Gregory reported the following:
    - Mediation is ongoing. The next meeting for mediation is scheduled for July 13 and 14
    - The trial date now set for June 2018

  - Cartridge testing will again be performed in SX Tank Farm. The new jig will be used which allows for testing both PAPRs and APRs.
  - PNNL plans to publish the final report on cartridge testing sometime in early July.
  - The third party final report is expected to be issued soon.
- Mr. Kent Smith reported to the CVST meeting attendees on June 14, 2017, stating that Two Evaporator campaigns are planned for this summer. The first is in July and the second is in August.
- The *Solutions* issue 397, published June 26, 2017, reported, "Work continues on WRPS's Vapor Monitoring and Detection System (VMDS) pilot-scale test at Hanford's A and AP tank farms." CPPO Subject Matter Expert, Julian Laurenz, wrote, "The pilot-scale testing will be completed in the near future and will be followed by a period of transition testing. The purpose of the transition phase is to operate the recommended VMDS equipment, and to demonstrate the equipment meets the final design requirements prior to turnover to Operations."
- The *Solutions* issue 397, published June 26, 2017, reported, "A group of WRPS and subcontractor tank farm workers underwent two days of training and mock-up exercises in the use of portable air-line breathing systems last week at HAMMER." Furthermore, "An in-farm trial is planned for later this summer, and a decision is pending on additional training to potentially expand WRPS s air-line use to additional jobs personnel."

Portable-air-line-breathing training at HAMMER

- This quarter, CPPO distributed a 5 series Notebook titled *Human Odor Perception and Chemical Exposures.* Dr. John Kind, Principle Toxicologist for CTEH, authored this informative presentation. Find a list of the CPPO Notebook Q3 distributed presentations here.

Hanford Vapors Website Updates

In April, a Department of Energy (DOE) critique of the Hanford Vapors website fueled the energetic website activity. In its review, DOE noted the need for improved resources on the Employee Resources tab, and the need to represent new activities and updated vapors data and reports. The critique also noted the appearance of a decline in vapors activities as evidenced by the Weekly Vapors publication's focus on overall tank farm accomplishments and completion of engineering and construction upgrades. WRPS responded to the critique promptly by uploading to the website CPPO's at-the-ready communications on vapors, including redacted AOP-015 event investigations, Weekly Reports, weekly VMDS reports, RJ Lee Group Mobile Lab weekly reports, and AOP-015 table summaries. The CVST was quick to respond to the call for website improvements by making immediately available its charter, meeting agendas, and

meeting minutes. For a full accounting of the website's 3rd Quarterly posts, see Appendix A.

Two new option buttons, one linking to the CVST and the second linking to the Chemical Protection Program Office (CPPO) page, have been added to the Hanford Vapors Employee Resources page.

Data Analysis and Visualization Tool (PHOENIX)

Mr. Chris Holst Presents DAV Tool - CVST Meeting – June 2017

In early March, the project finished Phase I which was to demonstrate and deploy a data explorer with site data. This quarter, the Data Analysis Visualization (DAV) team met with the prospective testers to show the system's progress to date. Full scale testing began on June 8, 2017. The system is on schedule to go live at the end of September. Mr. Chris Holst updated the CVST attendees on the Data Acquisition and Visualization Tool (DAV), formerly known as PHOENIX, on June 14, 2017. He reported that the database was developed in direct response to feed-back from NIOSH. NIOSH wanted to see regular communication of tank farm data that is relevant and understandable to the worker and the public. To fill this identified need, WRPS developed a database that presents tank farm data in an understandable manner, achieved by displaying data in graphs, charts and data summaries. DAV is searchable by:

- Individual chemical (i.e. Ammonia and/or furans)
- Multiple chemicals (including all COPCs or individually)
- Time frame
- Farm
- Sub section of farm

KPPs 2 and 3. IH Technical Basis and IH Program

Develop New or Revised COPCs/OELs

3rd Quarter Summary: WRPS subcontracted TerraGraphics, teamed with Dade Moeller, to revise and update RPP-22491, *Industrial Hygiene Chemical Vapor Technical Basis,* and the related COPC list. In the 3rd Quarter, the subcontractor completed the requirement and document reviews, and the GAP analysis. A template for the revised tech basis, which includes a revised COPC listing based on recommendations from Pacific Northwest National Laboratory (PNNL), has been developed. The Tech Basis and COPC update are expected to be finalized by the end of FY2017.

Institutionalizing the Vapors Program with the IH Program Requirements

3rd Quarter Summary: TerraGraphics and Dade Moeller, were subcontracted to develop an Industrial Hygiene (IH) Program Manual focusing on the Chemical Vapor Programs, as well as revising the existing IH standards and implementation procedures. During the 3rd Quarter, the structure and contents of the draft IH manual was compiled into an Excel spreadsheet, which is in management review for completeness and accuracy. The project is slated for completion by the end of FY2017.

Health Process Plan

3rd Quarter Summary: The 3rd Quarter Summary of the PNNL Health Study Roadmap describes the schedule for FY2017 Health Process Project. The following reports are currently undergoing review by WRPS staff:

- Chronic OELs with Regulatory Basis
- Furans OELs
- Nitrosamines Risk Analysis
- Acute Transient Exposure Concentrations (TECs) with Regulatory Basis
- Acute TECs – SOP White Paper

The following reports are awaiting draft completion prior to WRPS review:

- Chronic Nitrile and Dimethylpyridine
- Acute TECs
- Chemical Mixtures and Modeling Recommendation
- Sampling and Analysis Recommendations
- 2017 COPC Update

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.

Each of these reports contributes to the total body of knowledge on the properties, hazards and exposure limits of the COPC list constituents. In total, 62 chemicals are undergoing evaluation for both chronic and acute hazards. All reports are expected to be finalized and submitted to WRPS by the end of FY2017.

The DQO sub-teams have met about twice a week to complete Steps 1 thru 5 (and part of Step 6), which are:

- Task 1: Schedule
- Task 2: Establish Tank Operations Assessment Team.
- Task 3: Establish an External Peer Review Health Panel.
- Task 4: Implement Routine Analysis and Screening Process for Updating COPCs.
    - Task 5: Establish Acute/Transient and Chronic Exposure Action Levels.
- Task 6: Evaluate Computational Approaches for Predicting Exposure and Delivered Dose.
- Task 7: Database Implementation and Management.

The following sub-teams have completed these steps:

- IH Tech Basis Update
- Leading Indicators
- Dispersion Modeling

The Off-gas Abatement Equipment sub-team met and went through the first three steps of the DQO. At that point, the data that was identified to support the task were primarily physical properties, such as flow-rates, temperature, and humidity. The sub-team decided that this data need is outside the scope of the Integrated Sampling Strategy DQO.

The DQO Project Manager met with Environmental management, QA, and others on June 7. Two items worth noting:

- Environmental compliance group will pursue a separate path for collecting emissions data for Environmental compliance purposes. Therefore, Environmental data need is no longer part of the scope of this DQO.
- The need for a QA Project Plan will be discussed with IH management. The plan is to have the DQO address the appropriate type and quantity of data, and the Quality Assurance Project Plan (QAPP) address the necessary quality for the data to be collected. QA indicated that internal resources are not available for preparing the QAPP so it will likely to be sub-contracted.

The DQO leader will be working with the statisticians to complete the DQO Step 6 for all sub-teams. When all sub-teams have completed Steps 1-6, the full DQO team will get together for a couple of meetings. At these meetings, each sub-team lead will present the results of the first 6 DQO steps for their data use, and answer any questions from the full DQO team.

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.

Database Implementation and Management

3rd Quarter Summary: In FY 2016, PNNL developed a database to review and update the COPC list and associated OELs. See Task 7, Health Process Plan, for the latest update.

Leading Indicators

3rd Quarter Summary: The Leading Indicators team devoted its 3rd Quarter efforts to supporting the integrated vapors data collection data quality objective (DQO) process. The project is scheduled to be completed by March, 2018.

Parity Implementation with Established Programs

3rd Quarter Summary: Chemical Worker Tier 1 training has been reviewed and is in the process of being coded for computer based training for use in HGET. Additional feedback and comments will be included in final product prior to release.

Chemical Worker Tier 2 has had the storyboard created and is currently under review by the Training review team (IH, Management). Chemical Worker Tier 2 is being designed to address facility specific issues and applications with a target audience of those individuals who work around the tank farms but will not enter them. Chemical Worker Tier 2 & 3 are being develop concurrently, and are on scheduled to be in place by year end, however the current focus is on completing and implementing Tier 1.

Other Items

Enhanced CHAT continues to be well received. Over the last 3 months (April-June), 5 initial classes and 9 refresher classes have been taught.

An accelerated training plan has been created for the new 35 IHTs that will be coming on board. The first group's orientation was held July 3, 2017.

New IH professionals are coming on board to help IH Programs as needed with the Chemical Vapors.

IH Programs has brought on an Intern that is helping to review procedures for inclusion in the next phase of the IH Manual (FY18).

IH Rounds & Routines procedure has been streamlined to be more efficient and is now under final review prior to implementation.

On May 18, 2017, WRPS, CHPRC, HAMMER, and Labor held an IHT Training Program kickoff meeting, the goal of which is to "[d]esign, develop and implement an IHT fundamentals and continuing training program that will educate and develop independently competent and highly effective IHTs who are trusted and respected by the workforce." Expected to be launched in September 2017, the Industrial Hygiene Fundamentals course curriculum may include:

- Laws and Standards
- Math unit conversions and statistics
- Chemistry
- Physiology, anatomy, and toxicology
- Respiratory protection and PPE
- Industrial hygiene documentation
- Personal and area monitoring
- Using an industrial hygiene database

KPP 4. Engineering Controls

242-A Evaporator Stack Extension

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.

3rd Quarter Summary: The 242-A Evaporator vessel vent exhaust stack extension was designed, fabricated and installed this past quarter. In May, the design and fabrication of the exhaust stack were completed. The design extended the exhaust stack from about 63 feet above grade to 111 feet above grade and included a lightning protection system. In early June, a crane was stationed in the 242-A parking lot and construction forces were mobilized in preparation for stack extension installation. The old stack was removed, a template was set in place and the anchor holes for the new stack were drilled. In late June, the new 242-A Evaporator vessel vent exhaust stack installation was completed in time to support startup of evaporator campaign EC-06 on July 1st.

242-A Stack Installation – June 2017

Exhausters

3rd Quarter Summary: The new exhausters for 241-A Tank Farm have been designed and fabrication is underway. The design includes increased stack heights and the anticipated delivery date is September 2017. In addition, the new 241-SY Tank Farm exhauster design, scheduled to be complete by the end of FY17, is on-going and approximately 80% completed. A request-for-proposal has been released to procure construction support with award anticipated for next quarter.

Strobic Air Dilution Fan

3rd Quarter Summary: An investigation into abatement technologies began in earnest in the first quarter of FY17 and included Strobic Air Dilution Fan technology. At the end of Q2, the statement of work (SOW) for the Strobic Air contract was approved and in late May the subcontractor staff was on-site for tours and meetings with WRPS team members. Strobic Air staff provided an overview of their technology and reviewed functional requirements with project personnel. Strobic Air is developing the fan design, with preliminary reviews on-going, for the 241-AW Tank Farm primary exhaust system. Completion of the design is scheduled for next quarter.

Strobic Air Dilution Exhaust System

NUCON Thermal Oxidation Proof-of-Concept

3rd Quarter Summary: An investigation into abatement technologies began in earnest in the first quarter of FY17 and included NUCON International Thermal Oxidation System. NUCON developed a novel thermal oxidation process that is based on the internal combustion engine. By the end of Q2, NUCON had submitted a project schedule. The company resolved the issues identified in early

Mr. George Weeks attended the Proof-of-Concept testing in Columbus, Ohio.

testing and acquired the instrumentation needed to complete the Proof of Concept test in early May. The tests successfully demonstrated the destruction or removal of greater than 95% of the chemical vapors fed to the system. Preliminary analyses indicates that the destruction/removal efficiencies were quite good, ranging from 82% for furans to ≥ 96% for formaldehyde, pyridine/toluene, ammonia, and mercury. Uncertainties in the results are yet to be evaluated and limitations in the test apparatus at NUCON has led to a recommendation that the proof-of-principle tests be repeated in FY17 in Richland where a more thorough and controlled test can be performed to ultimately advise a decision to move on to a full-scale technology demonstration. An integrated project team is being established to prepare for delivery of the system and manage additional prototype testing needed to resolve these limitations. In addition, work was initiated on a Technical Readiness Assessment and Technology Maturation Plan for the NUCON system.

NUCON Lab System that Generates Vapors

KPP 5. Administrative Controls and Monitoring

Permanent Installation of VMDS Equipment in A and AP Farms

3rd Quarter Summary: Pilot-scale testing of the Vapor Monitoring and Detection System (VMDS) continued throughout the 3rd Quarter, although a three-week interruption in data collection occurred from 4/26/17-5/17/17 as the result of a pre-scheduled electrical outage in AP-Farm. Other outages also occurred during this time period in order to support equipment modifications needed to optimize the VMDS. Data collected during the 3rd Quarter is being used to review the viability of VMDS equipment and determine their path forward. The results of these viability reviews will be used to plan and schedule the removal, layout, and storage of equipment not anticipated for continued VMDS testing. Current indications are that all the spectrographic units and meteorological stations will be recommended for final VMDS implementation. The equipment least likely to be recommended for final VMDS implementation include the SAFER Systems Real-Time Software, RAE units, SKC Haz-

Scanner and Gastronics Fixed Instrument Skids. An update on current VMDS activities was captured in a site-wide presentation released by the CPPO organization.

Stack and Boundary Monitors

3rd Quarter Summary: During the 3rd Quarter, efforts focused on the design of numerous stack monitors. Design efforts were initiated with Cerex on a preliminary design for the ultraviolet Fourier transform infrared spectrometer (UV-FTIR) units that will be installed on the 702AZ and AN-Farm stacks. In parallel, specifications for the infrastructure of these UV-FTIR monitors were also developed. Efforts were also initiated on the AW-Farm stack monitor design. The boundary monitors will become focal in FY2018 after the individual stack monitoring activities are complete.

Establishing Safe Unrestricted Boundaries

3rd Quarter Summary: 3rd Quarter activities focused on initiating upgrades to the Air Pollutant Graphical Environmental Monitoring System (APGEMS), which is a Pacific Northwest National Laboratory (PNNL) software used in establishing safe unrestricted boundaries. A contract was awarded for PNNL to upgrade APGEMS to model wind field resolution for tank farm applications and to model plumes from multiple sources simultaneously. A kick-off meeting was held between WRPS and PNNL in late April to initiate upgrade activities and discuss the scope, schedule and expectations. 3rd Quarter activities focused on establishing software Quality Assurance (QA) requirements and preparing the Software QA plan. A revised draft of the AP Tank Farm Basis of Design for Chemical Vapor Detection and Alarming was provided by Kenexis this week. The revision incorporates a significant change in how maximum concentrations are estimated during ventilation interruptions and during waste disturbing activities. The new model is more realistic and limits maximum concentrations based on equilibrium vapor solubilities (Henry's Law).

Public Address System

3rd Quarter Summary: Installation activities of the Public Address (PA) system were initiated in June, with the goal of completing installation for AW, AP, A/AX, AY, AZ, AN, and C Farms by the end of FY2017. Federal Engineers and Constructors was awarded a construction contract to support the PA installation efforts which were started at AW and AN-Farms during the 3rd Quarter. A contract for design of the FY2018 PA systems was awarded to ARES.

KPP 6. Tank Operations Stewardship

Pilot SST Stewardship Program

3rd Quarter Summary: Scoping activities were started for TY-Farm during the 3rd Quarter; a walkdown of the area was completed in June. The walkdown identified the need to perform TY-Farm mock-up testing. The purpose of the mock-up is to demonstrate that level and temperature equipment can be integrated with the existing tank farms systems. Efforts for purchasing mock-up equipment were started.

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

3rd Quarter Summary: To date, 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 3rd party has reviewed PNNL's reports on the tanks, and has been very complementary of the testing methodologies. PNNL has developed a summary report for the eight tests, a draft of which, has been sent to WRPS management for comment and review. A new cartridge test apparatus (jig) was built this quarter, and is in service. It was used at SX Farm on June 16-18. The new jig is capable of testing cartridges from other manufacturers and the PAPR cartridges. Tests were conducted on Scott APR, MSA TL PAPR, and 3M Breath easy PAPR Cartridges during the 3rd Quarter. Testing will continue in SX Farm June 30 – July 2. The next round of testing is slated for AW-102 air-lift circulator (ALC) operation. Additionally, the third party is writing its final report on the cartridge testing conducted thru June 2017. The final report and the third parties recommendations in expected in the fourth quarter.

Key Performance Parameter 7

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

Mobile Laboratory

3rd Quarter Summary: The Mobile Lab completed numerous sampling campaigns during the 3rd Quarter. In late April, data was collected from the AN-101 to AN-106 tank transfer. In early June, the A-103 passive breather filter was sampled and in late June, monitoring of the AP-Farm stack and generators around the 200 East Area were completed. In addition to work area samples, non-Hanford background measurements were completed, and reference gas measurements were conducted for sixty-five compounds in an effort to compare measured values with calculated values.

Personal Vapor Monitor

3rd Quarter Summary: C_2Sense, Inc. is developing a personal ammonia sensor under funding from DOE-EM. During the 3rd Quarter, C_2Sense presented a proposal to finish developing the personal ammonia monitor; a kickoff meeting held in late April to initiate activities. The initial prototype testing was completed soon thereafter with positive results. The device's limit-of-detection was observed to be significantly lower than the tank farms occupational exposure limits. Testing also indicated that repeated exposures to high concentrations of ammonia resulted in the sensor becoming saturated. C_2Sense has begun working to resolve this issue. The circuit boards for the device were assembled and successfully demonstrated real-time monitoring using an Android application.

Prototype of the Personal Ammonia Monitoring System

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 Risk Weekly Update

The subset of the Vapors Mitigation Risk Register this quarter is shown in **Table 3.**

Table 3. Vapors Mitigation Risk Register

CVAP ID Number	Current Status	Handling Actions	Current Risk Level
004 Integration with other key projects more complex than expected.	Integration of field execution for VMDS in SY farm and AW stack monitoring, Coordination of turnover to farm operations for Tank Farm PA system project, Completing of 242-A Stack Extension prior to EC-06.	1. Identify key program interfaces early. 2. Engage with program/project managers early. 3. Maintain weekly communication and IPT meetings.	Medium

007 Excessive Work Stoppages	Multiple work stoppages were realized this quarter with multiple days of lost time due to; Hanford site range fire, septic pumping stand down, PUREX tunnel collapse, and AOP-15s.	1. Plan for work stoppages based on historical data. 2. Additional Communications to workforce. 3. POD vapors updates. 4. Move work off shift to minimize impacts from recovery. 5. Modify shift schedules to lower risk of AOP15s.	Medium
009 Resources not available when required.	Over the past quarter, additional Industrial Hygiene resources have been necessary, requisitions are opened to hire additional IH resources. RJ Lee group has had issues with subcontractor availability to complete reporting of mobile PTR-MS. Beryllium controls implementation affected resource availability for head space sampling activities.	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. 4. IH hiring requisition 5. Special training for IH techs to speed onboarding. 6. IH resource usage evaluations.	Medium
026 3rd Party Evaluation and/or Subcontractor Testing Cause Delay	Chemical Cartridge Testing – Receipt of 3rd Party Reviews are inconsistent. Communication between stakeholders and WRPS need to be clarified by upper management.	1. Engage 3rd Party and/or Subcontractor leadership in communicating status.	Medium
032 Litigation Prevents Communication with workforce	Risk was identified this quarter and development of solutions are ongoing.	1. Engage with CTO Technology Management and Field Solutions to develop data handling and interrogation infrastructure.	High

032 Litigation requires legal scrutiny of communications with workforce.	Ongoing litigation is impacting the communication of planned vapors program activities to be released. Currently the risk is realized and ongoing.	1. Continue to prepare communication documents and releases 2. Coordinate and communicate with WRPS legal team early and often. 3. Communicate all allowable data and information to the workforce in lieu of vapors program plans.	High

Appendix A

Hanford Vapors Website FY 2017 3rd Quarter Updates			
Non-Personal Headspace/Source Sampling Data Pre-2008			
A Farm Headspace	AY Farm Headspace	C Farm Headspace	T Farm Headspace
A Farm Source	AZ Farm Headspace	C Farm Source	T Farm Source
AN Farm Headspace	B Farm Headspace	S Farm Headspace	TX Farm Headspace
AN Farm Source	BX Farm Headspace	S Farm Source	TX Farm Source
AP Farm Headspace	BX Farm Source	SY Farm Headspace	TY Farm Headspace
AP Farm Source	BY Farm Headspace	SY Farm Source	TY Farm Source
AW Farm Headspace	BY Farm Source		U Farm Headspace
AW Farm Source			U Farm Source
AX Farm Headspace			
AX Farm Source			
Non-Personal Headspace/Source Sampling Data 2008 to 2017			
A Farm Headspace	AY Farm Source	C Farm Headspace	T Farm Headspace
A Farm Source	AZ Farm Source	C Farm Source	T Farm Source
AN Farm Source	B Farm Source	S Farm Source	TX Farm Headspace
AP Farm Source	BX Farm Headspace	SX Farm Headspace	TX Farm Source
AW Farm Source	BX Farm Source	SX Farm Source	TY Farm Source
AX Farm Headspace	BY Farm Headspace	SY Farm Headspace	U Farm Source
AX Farm Source	BY Farm Source	SY Farm Source	
Percent of OEL Pre-2008			
A Farm percent OEL	AN Farm percent OEL	C Farm percent OEL	S Farm percent OEL
AP Farm percent OEL	AW Farm percent OEL	SX Farm percent OEL	SY Farm percent OEL
AX Farm percent OEL	AY Farm percent OEL	T Farm percent OEL	TX Farm percent OEL
AZ Farm percent OEL	B Farm percent OEL	TY Farm percent OEL	U Farm percent OEL
BX Farm percent OEL	BY Farm percent OEL		
Percent of OEL 2008 – 2017			
A Farm percent OEL	AN Farm percent OEL	AP Farm percent OEL	S Farm percent OEL
AW Farm percent OEL	AX Farm percent OEL	AY Farm percent OEL	T Farm percent OEL
AZ Farm percent OEL	702-AZ percent OEL	B Farm percent OEL	U Farm percent OEL
BX Farm percent OEL	BY Farm percent OEL	C Farm percent OEL	BY Farm percent OEL
C Farm percent OEL	SY Farm percent OEL	TX Farm percent OEL	SX Farm percent OEL
VMDS Pilot-Scale Testing Data			
DRI Weekly Report	November 30, 2016 -	December 7, 2016	
DRI Weekly Report	December 7, 2016 -	December 14, 2016	
DRI Weekly Report	December 14, 2016 -	December 21, 2016	

VMDS Pilot-Scale Testing Data (continued)			
DRI Weekly Report	December 21, 2016 -	December 28, 2016	
DRI Weekly Report	December 28, 2016 -	January 4, 2017	
DRI Weekly Report	January 4, 2017 -	January 11, 2017	
DRI Weekly Report	January 11, 2017 -	January 18, 2017	
UV-DOAS Weekly	November 30, 2016 -	December 7, 2016	
UV-DOAS Weekly	December 7, 2016 -	December 14, 2016	
UV-DOAS Weekly	December 14, 2016 -	December 21, 2016	
UV-DOAS Weekly	December 21, 2016 -	December 28, 2016	
UV-DOAS Weekly	December 28, 2016 -	January 4, 2017	
UV-DOAS Weekly	January 4, 2017 -	January 11, 2017	
UV-DOAS Weekly	January 11, 2017 -	January 18, 2017	
OP-FTIR Weekly	December 14, 2016 -	December 21, 2016	
OP-FTIR Weekly	December 28, 2016 -	January 4, 2017	
OP-FTIR Weekly	January 4, 2017 -	January 11, 2017	
OP-FTIR Weekly	January 11, 2017 -	January 18, 2017	
VMDS Weekly Report	March 8, 2017 -	March 15, 2017	
RJ Lee Mobile Lab Weekly Reports			
Mobile Lab Weekly Report 1.1		Mobile Lab Weekly Report 1.2	
Mobile Lab Weekly Report 1.3		Mobile Lab Weekly Report 1.4	
Mobile Lab Weekly Report 1.5		Mobile Lab Weekly Report 2.1	
Mobile Lab Weekly Report 3.1		Mobile Lab Weekly Report 3.2	
Mobile Lab Weekly Report 3.3		Mobile Lab Weekly Report 3.4	
Mobile Lab Weekly Report 4.1		Mobile Lab Weekly Report 4.2	
Mobile Lab Weekly Report 4.3			
AOP-015 Table Summary Data Reports			
June 10, 2016	702-AZ	July 12, 2016	AP
August 3, 2016	AY	November 30, 2016	AX
December 1, 2016	2715-AW	January 25, 2017	AP
January 26, 2017	702-AZ		
AOP-015 Event Summary Reports			
EIR-2017-01	EIR-2016-06	EIR-2015-13	EIR-2014-10
EIR-2017-02	EIR-2016-09	EIR-2015-14	EIR-2014-11
	EIR-2016-10	EIR-2015-18	EIR-2014-17
	EIR-2016-11	EIR-2015-24	EIR-2014-18
	EIR-2016-15	EIR-2015-30	EIR-2014-20
	EIR-2016-17	EIR-2015-33	EIR-2014-24
	EIR-2016-19	EIR-2015-35	EIR-2014-25
	EIR-2016-20	EIR-2015-46	EIR-2014-26
	EIR-2016-21		EIR-2014-29
	EIR-2016-22		EIR-2014-30

AOP-015 Event Summary Reports (continued)			
	EIR-2016-23		EIR-2014-33
	EIR-2016-24		EIR-2014-37
	EIR-2016-25		EIR-2014-46
	EIR-2016-28		
	EIR-2016-34		
	EIR-2016-39		
	EIR-2016-54		
Vapors Weekly Update			
Vapors Weekly Updt.	April 13, 2017	Vapors Weekly Updt	April 20, 2017
Vapors Weekly Updt.	April 27, 2017	Vapors Weekly Updt.	May 4, 2017
Vapors Weekly Updt.	May 11, 2017	Vapors Weekly Updt.	May 18, 2017
Vapors Weekly Updt.	May 25, 2017	Vapors Weekly Updt.	June 1, 2017
Vapors Weekly Updt.	June 8, 2017	Vapors Weekly Updt.	June 13, 2017
Vapors Weekly Updt.	June 13, 2017 (2)	Vapors Weekly Updt.	June 13, 2017 (3)
Vapors Weekly Updt.	June 15, 2017	Vapors Weekly Updt.	June 26, 2017
Chemical Vapors Solution Team Agendas and Meeting Minutes			
Agenda	January 11, 2017	Meeting Minutes	January 11, 2017
Agenda	January 25, 2017	Meeting Minutes	January 25, 2017
Agenda	February 22, 2017	Meeting Minutes	February 22, 2017
Agenda	March 8, 2017	Meeting Minutes	March 8, 2017
Agenda	March 22, 2017	Meeting Minutes	March 22, 2017
Agenda	April 12, 2017	Meeting Minutes	April 12, 2017
Agenda	May 24, 2017	Meeting Minutes	May 24, 2017
The CVST Charter			
CPPO Weekly Reports			
October 20, 2016	October 27, 2016	November 1, 2016	November 10, 2016
November 17, 2016	December 1, 2016	December 8, 2016	December 15,22, 2016
January 5, 2017	January 26, 2017	February 2, 2017	February 16, 2017
February 23, 2017	March 2, 2017	March 9, 2017	March 16, 2017
March 23, 2017	March 30, 2017	April 13, 2017 (Q1, Q2)	April 20, 2017
April 27, 2017	May 4, 2017	May 11, 2017	May 18, 2017
May 25, 2017	June 1, 2017	June 8, 2017	June 15, 2017
WRPS Q3 Communications Other			
April 12, 2017	All-employee Email	Communicated the vapor control strategies put in place in preparation for the weekend supernatant waste transfer between two double-shell tanks, AN-101 and AN-106.	

April 19, 2017	All-employee Email	Communicated the vapor control strategies put in place in preparation for the weekend supernatant waste transfer between two double-shell tanks, AN-101 and AN-106.
April 26, 2017	All-employee Email	Communicated the vapor control strategies put in place in preparation for the weekend supernatant waste transfer between two double-shell tanks, AN-101 and AN-106.
April 27, 2017	All-employee Email	Communicated the vapor control strategies put in place in preparation for future AY-102 visual inspections. To prepare for future video examinations of the AY-102 primary tank, one of the extended-reach sluicers, previously used for waste retrieval, was operated on April 27.
June 1, 2017	All-employee Email	The Tank Farm Projects Team removed the pump from tank AW-106 the first week of June. The team "activated primary ventilation during all the pit-intrusive activities," as well as other vapors management controls during the project.
June 12, 2017	Safety-Start	Communicated WRPS's readiness for the 242-A Evaporator Campaign set to start in early July. The Industrial Hygiene and monitoring plan has been reviewed, agreed upon with HAMTC, and a "Brief the Briefers" meeting was held on June 20, 2017.
June 13, 2017	All-employee email	Reported odors outside A Farm; access to the area was restricted.
June 13, 2017	All-employee email	A second WRPS all-employee email on June 13, 2017, updated employees on the reported odors outside of A Farm; access was restored.
June 13, 2017	All-employee email	A third WRPS all-employee email on June 13, 2017, updated employees on the reported odors outside of A Farm; Air samples taken in the area were at or below background levels. All affected employees were returned to work.
June 13, 2017	Hanfordvapors.com	Mirrored each all-employee email on June 13, 2017.
June 13, 2017	SOEN	Seven shift office notifications regarding AOP-015.
June 27, 2017	All-employee Email	To help minimized noxious odors in some of the more congested areas of 200-East during summer work routines, septic systems are now being pumped between 4 a.m. and 6 a.m. Monday thru Thursday."

June 29, 2017	All-employee Email	Communicated the vapor control plan for the Air Lift Circulator (ALC) operation and evaporator campaign EC-06, performed the first week-end of July.

CPPO Notebooks for Third Quarter

04/06/2017	CTEH Report Summary Presentation
04/13/2017	AY-102 to AP-102 Data Summary – Summary Slide
04/20/2017	Cartridge Testing Update Presentation
04/27/2017	EA-32 Assessment
05/11/2017	Cartridge Test Report Results
05/18/2017	CPPO Vapors Communications Survey Results
05/25/2017	Update on VMDS Equipment Testing –
06/01/2017	Chemical Odor Perception and Chemical Exposures: Part 1
06/08/2017	Chemical Odor Perception and Chemical Exposures: Part 2
06/15/2017	Chemical Odor Perception and Chemical Exposures: Part 3
06/22/2017	Chemical Odor Perception and Chemical Exposures: Part 4
06/29/2017	Chemical Odor Perception and Chemical Exposures: Part 5