washington river protection solutions

CPPO Chemical Protection Program Office

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.)

Tank Operations Contract

Chemical Protection Program Office

May 3, 2018

1. CHEMICAL PROTECTION PROGRAM OFFICE (CPPO) ACTIVITIES STATUS

The CPPO *FY2018 Vapors Communication Survey* draft report has been reviewed and comments are being dispositioned.

CPPO Oversight and Tracking

External Assessments Recommendations Status

The recommendations status columns in **Table 1** below are defined as follows:

- **Complete** - The scope and deliverable(s) (i.e. final report or documentation) addressing the recommendation is complete and closed. CPPO has validated deliverable(s) complete.
- **Field Work Complete** - The scope addressing the recommendation is complete, but the final deliverable(s) is not complete (i.e. final report or documentation).
- **In Progress** - The scope addressing the recommendation is in progress.
- **Pending Validation** - Status of the scope addressing the recommendation and associated deliverable(s) is awaiting initial CPPO review.

Significant progress has been made to address these recommendations. As shown in **Table 1**, the current estimate is that 52% of the deliverables addressing the recommendations are considered **Complete** and closed. CPPO has validated that 64% of the recommendations have been addressed by actions/deliverable that are either **Complete** or **Field Work Complete**. Of the 366 total recommendations:

- 52% have been verified **Complete** and are considered closed.
- 12% are verified as **Field Work Complete** and are awaiting final deliverables (i.e. documentation) to close.
- 36% have ongoing actions and are **In Progress.**

The remaining pending recommendations from the previous month's update have been reviewed and statused by the CPPO. There are no more **Pending** recommendations.

Table 1. External Assessments Recommendations Status

Report	As of April 30, 2018				
	Total	Validated Complete	Field Work Complete	In Progress	Pending*
TVAT	117	88	7	22	0
OIG	3	3	0	0	0
NIOSH	54	20	11	23	0
EA-32	28	16	5	7	0
CTEH	23	16	2	5	0
VMEP I, II	67	23	9	35	0
Other	74	25	11	38	0
Total	366	191	45	130	0

External Assessments Recommendations Status

Vapors Corrective Action Status

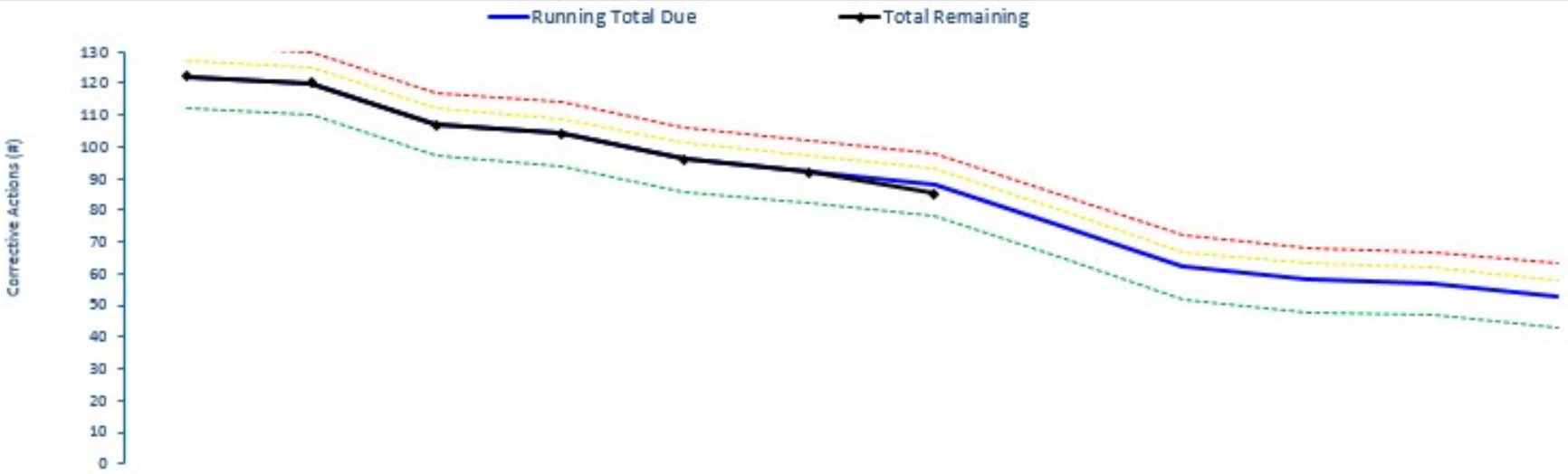
The CPPO tracks vapor-related Problem Evaluation Requests (PER), with the goal of communicating PER resolution status. The 125 draft CVAP actions are captured in the PERs listed below, including the 3 Office of Inspector General (OIG) actions captured in WRPS-PER-2016-2433 thru 2435 and 5 ORP Facility Representative Surveillance (17173-TF) actions captured in WRPS-PER-2018-0551 thru 0554. Sixty-three TVAT actions were completed during Phase I (FY2016) and the OIG actions were completed in FY2017; its completions are documented in the Electronic Suspense Tracking and Routing System (E-STARS). The remaining TVAT actions have been rolled into the draft CVAP. The remaining recommendations from National Institute of Occupational Safety and Health (NIOSH), EA-32, Center for Toxicology and Environmental Health (CTEH), and the VMEP were added to the PER system and corrective actions launched. **Figure 1** below, depicts the status of the draft CVAP total corrective actions and shows that 3 actions were completed early.

CPPO Chemical Protection Program Office

Vapor Corrective Action Tracking

[Draft-CVAP Actions (includes OIG Actions)]

Trending Fiscal Year 2018
Month Ending April 2018



Performance Data	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
Current Due (Month)	3	2	13	3	8	4	4	13	13	4	1	4
Number of Completed (Month)	3	2	13	3	8	4	7					
Running Total Due	122	120	107	104	96	92	88	75	62	58	57	53
Total Remaining	122	120	107	104	96	92	85					
CUM Schedule Performance (#)	0	0	0	0	0	0	3					

Figure 1. Vapor Corrective Action Tracking April 2018

Key Performance Parameter 1

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

2. COMPREHENSIVE VAPOR ACTION PLAN Key Performance Parameters

KPP 1. Engagement and Effective Measurement

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

  Toxicologist Dr. Chris Kuhlman was the representative CTEH member last week. CTEH is crafting a two-part nitrous oxide presentation for the CPPO Notebook. CTEH is providing support to the communication of FFAPR rollouts by developing communication materials to be used as part of the communication process. CTEH attended the CVST Communications Sub-team meeting. CTEH was part of the team from CPPO who attended the AN Team Plan-of-the-Day meeting and provided a briefing about the CPPO scope, what vapors information products are available, and where to find them. Additionally, Dr. Kuhlman attended the Parker Lecture Series presentation titled *Radiation and Chemicals at Hanford: 1941 to Present* presented by Dr. Roger O. McClellan at WSU Tri-Cities.

- Chemical Protection Engagement: Chemical Vapors Solutions Teams

  The CVST Communications Sub-team met on April 23, 2018. The meeting focused largely on the communication strategy regarding the FFAPR Implementation.

- Chemical Protection Engagement: Communications

  Last week's CPPO Notebook is titled *VMDS Implementation*.

  On April 25, 2018, an all WRPS employees email was distributed updating the 242-A Evaporator campaign that began last week. "Area direct-reading instrumentation readings in the general work areas during the campaign have been well below action and occupational exposure limits," stated the email. The campaign continues "with approximately 250,000 gallons of waste processed so far."

- Chemical Protection Engagement: Hanford Vapors Website Updates
  - Population Health Trending Summary, Tank Farm Hazardous Waste Worker
  - CPPO Weekly Report - Feb. 22, 2018
  - CPPO Weekly Report - March 1, 2018
  - CPPO Weekly Report - March 8, 2018

- Chemical Protection Engagement: Effectiveness Measures

  The CPPO *FY2018 Vapors Communication Survey* comments are being dispositioned prior to issuing the report.

- Chemical Protection Engagement: Workforce Engagement

  CPPO Team members attended the AN Team Plan-of-the-Day meeting and provided a briefing about the CPPO scope, 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. A recommendation was made to send the *CPPO Weekly Report* in a "WRPS General Delivery" format, similar to *Solutions*. It was also recommended that CPPO members take Tier 3 training to better understand what the workforce is learning in this class. The majority of the Q&A focused around the characterization of tank headspace chemicals and their basis. There were some questions left unanswered, which the CPPO resolves to answer. In addition, a recommendation to prepare a CPPO Notebook on this topic was suggested.

KPPs 2 and 3. IH Technical Basis and IH Program

- IH Manual and Technical Basis

  Last update 4/26/2018:

  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 Section 1, *Introduction;* Section 2, *Practices of the Industrial Hygiene Program;* and Section 4, *Tank Waste Chemical Vapors,* of the *IH Chemical Vapor Technical Basis,* and all have been published on the Industrial Hygiene website. Section 3, *Reporting Occupational Exposure and Medical Monitoring,* is approved and was issued to the IH website too. Section 5, *Reporting Occupational Exposure and Medical Monitoring,* and Section 6, *Emergency Response,* are in internal review. The following procedures have been issued:

  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.

  - 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*

- Health Process Plan (HPP)

Last update 4/12/2018:

The HPP process has transitioned into the TFC-Charter-71, *WRPS Internal Review Panel, and External Review Panel Process for Review of Health Process Plan Recommendations*, which provides for assessing both the technical and the economic feasibility of implementing study findings and recommendations. The following HPP studies have been developed and are being reviewed and revised under the TFC-Charter-71 process: *Proposed OELs for Chronic Exposures – COPCs with Regulatory Guidelines*, *Proposed Acute Exposure Limits for COPCs with Regulatory Guidelines, Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern, Recommendations for Sampling and Analysis of Hanford Waste Tank Vapors,* and *Hanford Tank Vapors FY 2017 Chemicals of Potential Concern Update.* An External Expert Committee (EEC) was convened in March to review and comment on the following studies: *Proposed OELs for Chronic Exposures – COPCs with Regulatory Guidelines*, *Proposed Acute Exposure Limits for COPCs with Regulatory Guidelines,* and *Proposed Risk-Based Approach for Nitrosamine Chemical of Potential Concern.* Three studies, *Proposed Occupational Exposure Limits for Furans,* P*roposed OELs for Chronic Exposures – Nitrile Class COPCs and 2,4-Dimethylpyridine*, and *Assessing the Potential for Chronic or Acute Health Effects from Exposure to COPC Mixtures*, have been developed to Revision A status, and are being held for further development in FY2019.

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.

- Leading Indicators

Last update 4/12/2018:

During the 2nd Quarter, the leading indicators study focused on three candidate compounds: ammonia, mercury, and nitrous oxide. Evaluation methods were developed to compare paired data, data in which two or more samples were taken simultaneously, to various chemical concentrations, including reference concentrations of ½ of the occupational exposure limit (OEL), the OEL, and the excursion limit (3 times the OEL). The leading indicators study draft report (Rev A) was completed and is presently awaiting review and comment by WRPS IH.

- Air Dispersion Modeling

Last update 4/12/2018:

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. It is presently awaiting review and comment by WRPS IH. Three tests cases illustrating model performance were presented by the project team in which actual date-specific meteorological conditions were modeled for the AP, AW, and AN Stacks, as wells as the 242-A Evaporator. The test cases were selected to provide model predictions of ammonia and mercury air emissions during low, medium, or high wind conditions. Further refinements of the APGEMS software are underway.

- 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.

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.

KPP 4. Engineering Controls

- A Farm Exhausters

Last update 4/26/2018:

The A Farm Exhauster pad construction continued over the last two weeks. The exhauster slab retaining wall footings were formed, poured, and cured, and the rebar installation was completed. Rebar and concrete forms for the retaining walls commenced installation. Work on the A Farm ventilation duct isolation made progress as well, as The *High Pressure Low Volume Hand Pump to Isolate the 2" Drain Lines Proof –of- Concept* was largely completed.

- AW Stack Extension

Last update 4/26/2018:

Fabrication of the AW Farm stack extension continued, with the following being accomplished during in the last two weeks:

- Efforts continued on preparing the non-radiological and radiological permit application.
- Efforts started on preparing the foundation and fabrication submittals.

- 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.

- [1]Strobic® Air Dilution Fan

  Last update 4/26/2018:

  Efforts focused on off-site testing of the Strobic air dilution fan, with the following accomplished the last two weeks:

  - The Strobic® unit used in the factory acceptance testing was shipped to Hi-Line in support of the off-site test. Upon inspection, there was some noted shipping damage to the unit and a Non-Conformance Report was prepared. Strobic® gave Hi-Line permission to repair damage.
  - The draft test plan to support off-site testing was submitted for review.

- [2]NUCON® Thermal Oxidation Vapor Abatement Unit (VAU)

  Last update 4/26/2018:

  Development of the engineering-scale testing continued, with the following accomplished over the last two weeks:

  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.
  - Continued work on the Technical Demonstration conceptual design for BY-108. Received initial round of comments on the 60% conceptual design package and started disposition of comments. In parallel, started work on the 90% conceptual design package.
  - Received and resolved final comments on the Site Selection Report, which was subsequently issued.

  NUCON®:

  Nucon provided technical support for VAU startup and training activities.

  PNNL:

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

  - Receiving the Fourier transform infrared spectrometer (FTIR) and preparing for testing.
  - Completing the proton transfer reaction-mass spectrometry functional test, which is ready for testing.
  - Drafting the test procedures, which are nearing completion.

- Completing the *Data Management Plan*.
- Ordering supplies in support of N-nitrosodimethylamine (NDMA) testing.

Completed preparing the injection, sampling and calibration systems.

WRPS:

WRPS issued a contract change request to provide additional funds to maintain work at PNNL. Additionally, WRPS performed a QA pre-test surveillance on VAU and PNNL documentation.

KPP 5. Administrative Controls and Monitoring

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.

Permanent Installation of VMDS Equipment in AP Farm

Update:

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:
  - 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

Update:

Activities in progress at the end of April include:

- Performing fabrication and factory acceptance testing of the Ultra Violet Differential Optic Absorption Spectrometry 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

Last update 4/12/2018:

When managing risks at Hanford, **administrative controls** are used to change the way workers interact with processes and work that may present a hazard. Work boundaries are an administrative control used to help manage occupational risks. Newly established are facility boundaries as described:

- **Exclusion Zone** – the area where workers are most likely to encounter the hazard at its highest concentrations (previously Vapor Control Zone (VCZ))
- **Contamination Reduction Zone** – The transition area between the exclusion zone and the clean area or support zone (previously Vapor Reduction Zone (VRZ))
- **Support/Administrative Zone** – the location where the "co-located worker" is allowed to perform their work unmonitored
- **Industrial Zone** – This is the fence line of the 200E and 200W areas where workers are made aware of the presence of increasing industrial hazards
- **Site Boundary** – This is the edge of the Hanford site property where public access is restricted

Coordinated with ORP, a draft paper, tentatively titled *Comprehensive Vapor Action Plan KPP 5 - Defining the Unrestricted Work Boundary*, was developed clarifying how WRPS will define work boundaries in and around the Tank Farms. 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. It is in final review by ORP and WRPS IH program staff.

- Public Address (PA) System

Update:

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

Update:

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.

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.

FY2015 LEAN Report:

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

Figure 2. Headspace sampling at BY-108, February 2018. ((Photo courtesy of Ms. Parks-Beyer.)

KPP 7. Hierarchy of Controls

- Cartridge Testing and SCBA Alternatives

Last update 4/12/2018:

During the 4th Quarter of FY2017, WRPS and HAMTC agreed upon the implementation and use of Full-Face Air-Purifying Respirators (FFAPR). In the 1st Quarter of FY2018, WRPS and HAMTC jointly agreed to expand the use of FFAPRs to 241 SY Tank Farm for specific work evolutions. On December 14, 2018, WRPS implemented FFAPRs use in 241 SY Farm, and limited their use to low hazard work during non-waste

disturbing activities (SEG 1 and SEG 2). However, on February 7, 2018, WRPS issued an *IH Safety Flash* entitled "Revision to Use of FFAPR in AP Farm." This *IH Safety Flash* indicated a new report from Stoneturn Consultants (STC), the independent third party reviewer selected by HAMTC, had been received, recommending that WRPS no longer approve the use of FFAPRs in AP Farm. STC's reason for this recommendation is based on the review of sample data collected from within the AP Exhauster (source data) that shows >50x the OEL for NDMA and >8x the OEL for furans. It is important to note that STC's decision does not take into consideration WRPS engineering controls (active ventilation and extended stack height). STC's decision is also based on the lack information on the adequacy of FFAPR cartridges on furans. WRPS and STC are working to a resolution that will take into consideration WRPS engineering controls and cartridge test data. Headspace sampling at BY Farm was completed the weekend of February 9, 2018. On the weekend of February 24, cartridge testing was conducted at BY-108 (**Figure 2**) and BY-110, and included PAPR and APR cartridge testing.

- Mobile Laboratory

Last update 4/26/2018:

RJ Lee Mobile Laboratory worked to resolve issues that prompted a stop work. To implement lessons learned, all previous mobile laboratory operating procedures were combined into a single procedure with a nearly continuous flow. A walk-through of the new procedure was conducted in the presence of WRPS QA and resulted in additional improvements. After the improvements were implemented, the stop work was lifted, sampling in support of the *Spring Background Study* resumed, and the study nears completion.

- Personal Vapor Monitor

Last update 4/26/2018:

Since the beginning of April, the following was accomplished:

- The [3]ChromAir® ammonia badges were received for supporting upcoming field trials, while the [4]ToxiRAE Pro and [5]Ventis™ Pro V 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.
- The WRPS workforce fabricated the mounting plate that will be used to secure the ammonia sensors. The [6]C_2Sense® detectors are communicating with the support of Mission Support Alliance, to the C_2Sense® server via cell phone hot spot, which is a non-permanent configuration.
- The procedures and work packages needed to support the C_2Sense® field trial were completed.
- The IHT training was completed.

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.

[1]Strobic Air is a registered trademark of MPC Inc., Wilmington, Delaware.
[2]NUCON is a registered trademark of Nucon International, Inc., Columbus, Ohio.
[3]ChromAir is registered to Morphix Technologies, Virginia Beach, Virginia.
[4]RAE Systems by Honeywell, San Jose, California.
[5]Ventis™ Pro5 Multi-Gas Monitor is a registered trademark by Industrial Scientific in Pittsburgh, Pennsylvania.
[6]C_2Sense is a registered trademark by C2Sense, Inc., Cambridge, Massachusetts.