


DOCUMENT RELEASE AND CHANGE FORM			Release Stamp		
Prepared For the U.S. Department of Energy, Assistant Secretary for Environmental Management By Washington River Protection Solutions, LLC., PO Box 850, Richland, WA 99352 Contractor For U.S. Department of Energy, Office of River Protection, under Contract DE-AC27-08RV14800 TRADEMARK DISCLAIMER: Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or any agency thereof or its contractors or subcontractors. Printed in the United States of America.			<div style="border: 2px solid red; padding: 10px; text-align: center;"> <p><b>DATE:</b> <b>Feb 20, 2018</b></p>  </div>		
1. <b>Doc No:</b> RPP-RPT-60438 <b>Rev.</b> 00					
2. <b>Title:</b> Airline Evaluation					
3. <b>Project Number:</b> <input checked="" type="checkbox"/> N/A	4. <b>Design Verification Required:</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
5. <b>USQ Number:</b> <input checked="" type="checkbox"/> N/A RPP-27195	6. <b>PrHA Number</b> <b>Rev.</b> <input checked="" type="checkbox"/> N/A		<b>Clearance Review Restriction Type:</b> public		
<b>7. Approvals</b>					
<b>Title</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>		
Checker	PAUL, GREG	PAUL, GREG	12/19/2017		
Clearance Review	RAYMER, JULIA R	RAYMER, JULIA R	02/20/2018		
Document Control Approval	PORTER, MARY	PORTER, MARY	02/20/2018		
Originator	FULLERTON, KODY A	FULLERTON, KODY A	12/19/2017		
Other Approver	NELSON, BOBBY J	FULLERTON, KODY A for NELSON, BOBBY J <i>J per telecon</i>	12/19/2017		
Other Approver	GEARY, JIM	GEARY, JIM	12/19/2017		
Responsible Manager	PICKLES, TOM R	PICKLES, TOM R	12/19/2017		
<b>8. Description of Change and Justification</b>					
Initial Release					
<b>9. TBDs or Holds</b> <input checked="" type="checkbox"/> N/A					
<b>10. Related Structures, Systems, and Components</b>					
<b>a. Related Building/Facilities</b> <input checked="" type="checkbox"/> N/A		<b>b. Related Systems</b> <input checked="" type="checkbox"/> N/A		<b>c. Related Equipment ID Nos. (EIN)</b> <input checked="" type="checkbox"/> N/A	
<b>11. Impacted Documents – Engineering</b> <input checked="" type="checkbox"/> N/A					
<b>Document Number</b>	<b>Rev.</b>	<b>Title</b>			
<b>12. Impacted Documents (Outside SPF):</b>					
N/A					
<b>13. Related Documents</b> <input type="checkbox"/> N/A					
<b>Document Number</b>	<b>Rev.</b>	<b>Title</b>			
RPP-RPT-59584	00	WRPS - SCBA Equipment Evaluation			
<b>14. Distribution</b>					
<b>Name</b>			<b>Organization</b>		
AIROLDI, JOHN H			AZ TEAM AREA DAY SHIFT		
BLEUZE, MARK T					
CAMPBELL, ROBERT A			SAFETY & HEALTH		
COMSTOCK, CLINT			OPERATIONS MANAGEMENT		
DUNN, CARL R			WORK CONTROL/PM SUPPORT		
ELLINGSON, STEVEN A			BASE OPS TANK FARM SUPPORT		
ENNIS, RICK A			ESH&Q		
FULLERTON, KODY A					
GEARY, JIM			TFP PROJECT MANAGEMENT		
GREGORY, ROB			TANK FARM PROJECTS		
HAMILTON, PEGGY M			SLUICING & HARD HEEL RETRIEVAL		
IVEY, BRIAN IVEY W			SHIFT OPERATIONS		
KECK, AARON H					
KING, DON A			ESH&Q		
LIGHTFOOT, ROY L			TFP RADCON		
LISTON, STEVEN M			SST R & C INDUSTRIAL HYGIENE		
NELSON, BOBBY J			TFP PROJECT MANAGEMENT		
NORTON, ELIZABETH A			ESH&Q		
PEOPLES, CHUCK			TFP FIELD CREW		
PEREZ, JESSE			TFP FIELD CREW OPS		
SAMS, REBECCA J			CONTRACT CHANGES & ADMIN		
SCOTT, DEL			TFP PROJECT MANAGEMENT		
SLAUGH, DON M			ESH&Q		
WAY, KENNETH J					

<b>DOCUMENT RELEASE AND CHANGE FORM</b>	<b>Doc No: RPP-RPT-60438 Rev. 00</b>
---	--------------------------------------

<b>14. Distribution</b>	
-------------------------	--

<b>Name</b>	<b>Organization</b>
WILHELM, ALAN J	

## INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

### Part I: Background Information

Title: Airline Evaluation	Information Category: <input type="checkbox"/> Abstract <input type="checkbox"/> Journal Article <input type="checkbox"/> Summary <input type="checkbox"/> Internet <input type="checkbox"/> Visual Aid <input type="checkbox"/> Software <input type="checkbox"/> Full Paper <input type="checkbox"/> Report <input checked="" type="checkbox"/> Other <u>Report</u>
Publish to OSTI? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Yes    NA <input type="checkbox"/> <input checked="" type="checkbox"/> JRR
Trademark/Copyright "Right to Use" Information or Permission Documentation	
Document Number: RPP-RPT-60438 Revision 0	Date: December 2017 2/8/18
Author: Fullerton, Kody A	

### Part II: External/Public Presentation Information

Conference Name:	
Sponsoring Organization(s): WRPS	
Date of Conference:	Conference Location:
Will Material be Handed Out? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Will Information be Published? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <span style="float: right;"><i>(If Yes, attach copy of Conference format instructions/guidance.)</i></span>

### Part III: WRPS Document Originator Checklist

Description	Yes	N/A	Print/Sign/Date
Information Product meets requirements in TFC-BSM-AD-C-01?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If product contains pictures, safety review completed?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Lawrence, Hugh K Approved via att. IDMS data file.

### Part IV: WRPS Internal Review

Function	Organization	Date	Print Name/Signature/Date
Subject Matter Expert	WRPS		Fullerton, Kody A Approved via att. IDMS data file.
Responsible Manager	WRPS		Pickles, Tom R Approved via att. IDMS data file.
Other:			

### Part V: IRM Clearance Services Review

Description	Yes	No	Print Name/Signature
Document Contains Classified Information?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If Answer is "Yes," ADC Approval Required  _____ Print Name/Signature/Date
Document Contains Information Restricted by DOE Operational Security Guidelines?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Reviewer Signature:  _____ Print Name/Signature/Date
Document is Subject to Release Restrictions? <i>If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Document contains: <input type="checkbox"/> Applied Technology <input type="checkbox"/> Protected CRADA <input type="checkbox"/> Personal/Private <input type="checkbox"/> Export Controlled <input type="checkbox"/> Proprietary <input type="checkbox"/> Procurement – Sensitive <input type="checkbox"/> Patentable Info. <input type="checkbox"/> OUO <input type="checkbox"/> Predecisional Info. <input type="checkbox"/> UCNi <input type="checkbox"/> Restricted by Operational Security Guidelines <input type="checkbox"/> Other (Specify) _____
Additional Comments from Information Clearance Specialist Review?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Information Clearance Specialist Approval  <div style="border: 1px solid green; padding: 2px; display: inline-block; color: green; font-weight: bold;">APPROVED</div> <i>By Julia Raymer at 9:15 am, Feb 08, 2018</i> _____ Print Name/Signature/Date

**When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)**

A-6003-508 (REV 4)

## INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

### Part VI: Final Review and Approvals

Description	Approved for Release		Print Name/Signature
	Yes	N/A	
WRPS External Affairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. IDMS data file.
WRPS Office of Chief Counsel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. e-mail.
DOE – ORP Public Affairs/Communications	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. e-mail.
Other: ORP OCC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Approved via att. e-mail.
Other:	<input type="checkbox"/>	<input type="checkbox"/>	

Comments Required for WRPS-Indicate Purpose of Document:

The purpose of this report is to document the feasibility of using airline supplied air for work in the tank farms, and the recommendations thereof.

Rush workflow needed, the report is to be released prior to 12/31/17 as a commitment by our COO to have available on the Vapors Website. Contact Bobby Nelson, 373-6722, if issues arise or end date is at risk.

**APPROVED**  
By Julia Raymer at 9:19 am, Feb 08, 2018

**Approved for Public Release;  
Further Dissemination Unlimited**

#### Information Release Station

Was/Is Information Product Approved for Release?  Yes  No

If Yes, what is the Level of Releaser?  Public/Unrestricted  Other (Specify) \_\_\_\_\_

Date Information Product Stamped/Marked for Release: 2/8/2018

Was/Is Information Product Transferred to OSTI?  Yes  No

**Forward Copies of Completed Form to WRPS Originator**

```

- <workflow name="(JRR) RPP-RPT-60438-00 (RUSH)" id="216807111">
- <task name="Clearance Process" id="0" date-initiated="20171220T1257"
  performer="Julia R Raymer" performer-id="164931488" username="h3310581">
  <comments>*RUSH Request* Please approve RPP-RPT-60438, Rev. 0, for
  public release by noon on 12/28/17 (Thursday) in order to meet a
  commitment to their COO to have available on the Vapors Website. POC:
  Bobby Nelson (509) 373-6722 Thank you, Julia Raymer (509) 373-
  0230</comments>
</task>
<task name="Add XML" id="1" date-done="20171220T1257" />
<task name="RUSH - Manager Approval" id="26" date-due="20171221T1257"
  date-done="20171220T1310" performer="Thomas R Pickles" performer-
  id="145154808" username="h3034315" disposition="Approve"
  authentication="true" />
<task name="RUSH - Document Reviewer2" id="38" date-due="20171221T1310"
  date-done="20171220T1352" performer="John C Britton" performer-
  id="63214817" username="h0084103" disposition="Public Release"
  authentication="true" />
<task name="RUSH - Document Reviewer1" id="39" date-due="20171221T1310"
  date-done="20171220T1450" performer="Hugh K Lawrence" performer-
  id="160251932" username="h8155414" disposition="Public Release"
  authentication="true" />
<task name="RUSH - Document Reviewer3" id="37" date-due="20171221T1310"
  date-done="20171227T0803" performer="Stephen B Cherry" performer-
  id="1382719" username="h0374767" disposition="Public Release"
  authentication="true" />
<task name="Doc Owner Clearance Review" id="13" date-due="20171228T0803"
  date-done="20171227T0815" performer="Kody A Fullerton" performer-
  id="183003048" username="h2567143" disposition="Send On"
  authentication="true" />
<task name="Milestone 1" id="24" date-done="20171227T0815" />
- <task name="ORP Document Reviewer1" id="57" date-due="20171229T0815"
  date-done="20180104T1323" performer="Richard A Marshall" performer-
  id="203862915" username="h4535783" disposition="Not Approved"
  authentication="true">
  <reviewer performer="James J Lynch" performer-id="140616966"
  username="h2060765" />
  <reviewer performer="Mark D Silberstein" performer-id="158207236"
  username="h5490246" />
  <comments>Marshall, Rich Document not approved - OCC advised return to
  Steve Cherry for review</comments>
</task>
<task name="Doc Owner Reviews ORP Comments" id="61" date-
  due="20180105T1326" date-done="20180207T1610" performer="Kody A
  Fullerton" performer-id="183003048" username="h2567143" disposition="Send
  On" authentication="true" />
<task name="Milestone 2" id="62" date-done="20180207T1610" />
- <task name="Verify Doc Consistency" id="4" date-due="20180208T1610" date-
  done="20180208T0859" performer="Julia R Raymer" performer-id="164931488"
  username="h3310581" disposition="Cleared" authentication="true">
  <comments>WRPS Legal (Steve Cherry's) and ORP's approval e-mails
  attached.</comments>
</task>
</workflow>

```

**From:** [Marshall, Richard A](#)  
**To:** [Raymer, Julia R](#)  
**Cc:** [^Information Clearance](#)  
**Subject:** RPP-RPT-60438 Airline Equipment Evaluation - revised document - ORP approvals  
**Date:** Tuesday, February 06, 2018 9:48:08 AM

---

Julia,

Below are ORP email approvals for RPP-RPT-60438 Airline Equipment Evaluation.

Previously approved in IDMS by James J Lynch.

Thanks,

***Rich Marshall***

Public Involvement Specialist  
North Wind Solutions, LLC  
Support Services Contractor to the Office of River Protection  
United States Department of Energy  
Office: 509.376.9767  
Cell: 509.619.3137  
[Richard\\_A\\_Marshall@orp.doe.gov](mailto:Richard_A_Marshall@orp.doe.gov)

---

**From:** Call, Paula K  
**Sent:** Tuesday, February 06, 2018 9:32 AM  
**To:** Marshall, Richard A <[Richard\\_A\\_Marshall@orp.doe.gov](mailto:Richard_A_Marshall@orp.doe.gov)>  
**Subject:** RE: DOCUMENT REVIEW REQUESTED: RPP-RPT-60438 Airline Equipment Evaluation - revised document - CIM review

Rich,

**I reviewed and with this email am approving the RPP-RPT-60438 Airline Equipment Evaluation document for CIM.**

**Thanks,  
Paula**

---

**From:** Silberstein, Mark  
**Sent:** Friday, January 19, 2018 4:03 PM  
**To:** Marshall, Richard A <[Richard\\_A\\_Marshall@orp.doe.gov](mailto:Richard_A_Marshall@orp.doe.gov)>  
**Subject:** RE: DOCUMENT REVIEW REQUESTED: RPP-RPT-60438 Airline Equipment Evaluation - revised document

Approve.


---

**From:** Raymer, Julia R  
**Sent:** Thursday, January 18, 2018 3:17 PM  
**To:** Cherry, Stephen B <[Stephen\\_B\\_Cherry@rl.gov](mailto:Stephen_B_Cherry@rl.gov)>; Marshall, Richard A <[Richard\\_A\\_Marshall@orp.doe.gov](mailto:Richard_A_Marshall@orp.doe.gov)>  
**Cc:** Fullerton, Kody A <[Kody\\_A\\_Fullerton@rl.gov](mailto:Kody_A_Fullerton@rl.gov)>; Silberstein, Mark <[mark.silberstein@rl.doe.gov](mailto:mark.silberstein@rl.doe.gov)>; [^Information Clearance](#) <[InformationClearance@rl.gov](mailto:InformationClearance@rl.gov)>  
**Subject:** FW: Rush Workflow RPP-RPT-60438- RUSH  
**Importance:** High

Hi Steve/Rich,

Please review RPP-RPT-60438, Rev. 0 (attached) and if it looks acceptable, send me your e-mail approvals for public release. Kody Fullerton has made the requested changes (see attached) and I've replaced the file with the corrected version in the IDMS workflow attachments folder. This is one that was not approved in the workflow, therefore e-mail approvals will need to be obtained and added to IDMS. Kody informed me the corrected file has been uploaded to SPF.

---

 ORP Document Reviewer1 Marshall, Richard (h4535783) 01/04/2018 01:23 PM Marshall, Rich  
Document not approved - OCC advised return to Steve Cherry for review

Thank you,

**Julia Raymer**

**Information Clearance**

**509.373.0230 (office)**



**From:** [Cherry, Stephen B](#)  
**To:** [Raymer, Julia R](#)  
**Cc:** [Fullerton, Kody A](#)  
**Subject:** Airline Equipment Evaluation; RPP-60438  
**Date:** Wednesday, February 07, 2018 3:58:32 PM

---

Hi, Julia,

This is to confirm that I have approved the above-referenced document for public release. Thanks again for your help.

Steve



# Airline Equipment Evaluation

**K. A. Fullerton**

**R. J. Nelson**

Nuclear Technical Services, LLC

Date Published

**February 2018**



Prepared for the U.S. Department of Energy

Office of River Protection

Contract No. DE-AC27-08RV14800

**Approved for Public Release;  
Further Dissemination Unlimited**

## Table of Contents

1.0	INTRODUCTION.....	3
2.0	APPROACH.....	3
3.0	SUMMARY – AIRLINE RESULTS.....	4
4.0	CONCLUSIONS AND RECOMMENDATIONS.....	6
5.0	ATTACHMENTS .....	8
	Attachment 1 – WRPS AIRLINE/Supplied air equipment EVALUATION Form.....	9
	Attachment 2 –PHOTOS OF Mockups and FIELD TRIALS .....	11

## List of Terms and Abbreviations

CAT – Construction Acceptance Test

CHPRC – CH2M HILL Plateau Remediation Company

HAMMER – Volpentest HAMMER Federal Training Center

HAMTC – Hanford Atomic Metal Trades Council

HFD – Hanford Fire Department

SCBA – Self Contained Breathing Apparatus

WRPS – Washington River Protection Solutions LLC

SST – Single Shell Tank

DST – Double Shell Tank

## 1.0 INTRODUCTION

WRPS is pursuing actions for vapor mitigation at the Hanford tank farms using a hierarchy of controls (engineering controls, administrative controls, and personnel protective equipment). Among the engineering controls being examined are a new technology for the destruction of vapors, installation of new exhaust systems with higher flow rates and taller stacks, extensions of existing stacks, and acquisition and testing of a high volume, high velocity dilution fan. WRPS has also established special administrative controls for performing waste disturbing activities and has started an activity to reduce entries into the SST farms. Some work in the DST and SST farms will continue to require respiratory protection, and WRPS is pursuing several improvements in the application and use of respiratory equipment. In addition, WRPS has been reviewing alternative SCBA equipment that is lighter and more comfortable to wear. WRPS also considered use of airline equipment to complement the use of SCBA in the tank farms, both in DST and SST Farms.

The purpose of this report is to document the feasibility of using airline supplied air for work in the tank farms, and if a determination is made that airline use is feasible, to determine what work can accommodate that use safely.

## 2.0 APPROACH

A formal, documented evaluation of airline applicability for tank farm work activities, utilizing a group of volunteer, daily and weekly supplied-air users from Building Trades and HAMTC forces (i.e., laborers, teamsters, electricians, industrial hygiene technicians, health physics technicians, field work supervisors, and construction managers), was performed at the Volpentest HAMMER Federal Training Center (HAMMER) followed by in-field testing at the 241-AP Tank Farm in the 200 East Area. Airline equipment (i.e., bottle carts, Ska Paks, masks, hoses, etc.), currently owned by WRPS, was used to ensure a timely evaluation. In addition, the use of a trailer-supported airline system at DOE-RL's 618-10 remediation site was considered as WRPS staff met with Iron Mountain staff to discuss details of their unsolicited proposal to install a "trailer supported" airline system at Hanford.

The approach included the following:

- Met with Iron Mountain to discuss details of its unsolicited proposal to install a "trailer-supported" air supply system, using manifold stations with multiple airline connections, at Hanford. The intent of the meeting was to ensure WRPS fully understood Iron Mountain's concept (note: WRPS ESH&Q and Construction Managers worked at 618-10 during airline use)
- Development of training course 020548, *Tank Farms Airline System Training*, which familiarized or re-familiarized field personnel with the use of airlines in a tank farm environment. The overall objective was for the trainee to demonstrate the ability to inspect, don, complete work safely, respond to emergency situations, and doff industrial hygiene, radiation control, and supplied air respiratory (SAR) equipment while tethered to a breathing airline.
- Completion of training course 020548 in June 2017, which included classroom, hands-on and mock-up training scenarios at the HAMMER facility. During the 16-hour course, multiple mock-entry demonstrations were completed using three mockup scenarios. The first one required instrument gauge recording, traversing several steps, and simulating a filter change out. It also included an 'emergency response to the loss of air' event. The second demonstration required instrument gauge recording, inspection of filters while managing their hoses, and a pit activity

using long-reach tools. The third demonstration required instrument gauge recording, traversing several steps and shoveling dirt from one wheelbarrow to another wheelbarrow.

- Following completion of the training, personnel performed selected field activities on airlines in 241-AP Tank Farm in August 2017. These field activities included performance of WO-261825, *AP Farm DST Flow Monitoring Equipment Installation*, and WO-289359, *AP Farm DST Flow Monitoring CAT*.

Following the training, mockup demonstrations, and field activities, verbal and written feedback was provided by completion of team debriefs and evaluation forms.

### 3.0 SUMMARY – AIRLINE RESULTS

Airline feasibility, for use in tank farms, was evaluated by the end users and based on criteria such as, ease of use, airline management, durability, maintenance and the ability to perform light/moderate/heavy work (Attachment 1). The criteria were rated using the following rating system. Along with the rating system, specific comments could be written to provide additional feedback.

Ratings:

- 5 = Above Expectations
- 4 = Slightly Above Expectations
- 3 = Meets Expectations
- 2 = Slightly Below Expectations
- 1 = Below Expectations
- N/A = If outside of Evaluator's scope of evaluation

In addition to completion of the written rating evaluation forms, a team debrief or post-job was performed at the end of each day. The following are the results/observations from the documented evaluations and team debriefs for the mockup scenarios at HAMMER and the field trails in 241-AP Tank Farm. See Attachment 2 for photos of the mockup training and field trials.

#### Mockup Scenarios at HAMMER Facility

The feedback/observations from the mockup scenarios included:

- The airline system met the users' expectations as long as the task was relatively simple and stationary (i.e., centralized location).
- If the activity was centrally located and a longer duration task, the use of airlines may be prudent. Specific examples mentioned included termination of wiring, hand excavation, and long-term instrument monitoring.
- The use of the airlines was a nice reprieve from wearing SCBA for the same or similar tasks.
- Hose tending/management was a critical support function for workers using airlines. Personnel noted that for every two airlines, that one person would be required to tender/manage the hoses. If there were eight or more hoses then the ratio would increase (e.g, five or six hose tenders). Also, additional 'hose tenders' may be needed based on the number of in-field equipment interferences or hose pinch points.
- Hose tenders utilized SCBAs for ease of movement.

- Personnel were always carrying their coil of hose in one hand which limits how much equipment or instrumentation they can carry to actually perform the job.
- Hose set-up (e.g., marking, sleeving, laying hose out) and hose teardown (e.g., surveying, recoiling) is very time consuming so for short-duration activities the use of airlines is not efficient.
- Due to the rough terrain, hose connections would need to be re-sleeved every day.
- Storage of the hoses following work or at the end of the shift would be critical to prevent debris in the hose connections or deterioration from the environment (i.e., UV-exposure).
- If several people were on airlines at a central location and one person needed to quickly leave (e.g., not feeling well, elevated heart rate, etc.), it may take too much time to untangle hoses to allow for a prompt exit from the area. Rather, a better exit strategy in that situation may be for the individual to disconnect his/her airline and use a Ska Pak to exit the area.
- It was stated that while the mockup area did have some obstacles that required some maneuvering (e.g., pits, stairs, fence posts, etc.), the tank farms have much more aboveground equipment to move hoses around and through. In general, personnel thought that airlines could be used for about 5-10% of the work activities inside the tank farm fence lines.
- As documented in WRPS-MOP-2017-1667, a Senior Manager, observing the mockups, concluded that demonstrations proved that there are certain applications where tethered airlines could be beneficial for operational efficiencies; however, in other areas the airline system would prove to be non-beneficial (e.g., mobile, in-farm operations greater than 50 feet).
- Personnel who used Carri-Air (i.e., SCBA bottle on a cart) were pleasantly surprised and would use it again. They noted that:
  - Pulling the SCBA bottle on the cart was preferred to having the bottle on their backs.
  - Use of a short hose (25') greatly reduced hose management issues.
  - The limited air supply (e.g., utilizes a 1-hr SCBA bottle) was a shortcoming.

#### Field Trials in 241-AP Tank Farm

The field trials in 241-AP Tank Farm were designed to provide users with additional experience on the use of airline systems in a real tank farm environment. Selected routine, low-impact work packages were performed utilizing airlines. Following the successful completion of each work activity, workers, construction managers, and field work supervisors provided their feedback.

WO-261825, *AP Farm DST Flow Monitoring Equipment Installation* and WO-289359, *AP Farm DST Flow Monitoring CAT* were performed utilizing airlines. The crew used the airline during the majority of the CAT testing which occurred over a three to four day period. Feedback from each day varied, but depending on available resources, two to three employees were deployed on airline throughout the day. The following specific observations were made during the CAT testing:

- The crew was able to complete the electrical portions of the CAT testing on airline.
- During the mechanical aspects of the job, users returned to SCBA due to the proximity to other workers and the difficulty of safely managing hoses with the increased personnel traffic.
- Airlines worked well for the small crew (two people) who entered the 241-AP Ventilation Pit (localized work location) to complete the CAT testing. In addition, it was a straight path from

the air supply bottles to the 241-AP Ventilation Pit which eliminated any potential tank farm obstacles or pinch points.

The following general observations were made during performance of both 241-AP Tank Farm activities:

- The feedback received was favorable.
- The users enjoyed the lighter load and the freedom of movement provided by being on an airline, in comparison to regular SCBA use in the farm.
- Set up and ground obstacles often challenged the work evolutions.
- An increase in resources due to hose tendering is a necessity. One hose tender per two lines is recommended and this increased the risk of exposure to more people; however, it might shorten the overall job duration due to longer stay times.
- Some of the users stated that airlines should be used for limited movement activities.

#### 4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the feedback and observations from the airline training, mockup scenarios, and field trials, the following can be drawn:

- **Feedback:** The users reported that they appreciated not having an SCBA bottle on their backs, thus reducing the potential for back strains and sprains. Users also reported that they enjoyed the increased freedom of movement once they got to their specific work location.
  - **Conclusion:** The use of the airline system meets the users' expectations.
- **Feedback:** The work crew used the airline to satisfactorily complete the electrical portion of WO-289359, *AP Farm DST Flow Monitoring CAT*.
  - **Conclusion:** The use of airlines provides another viable alternative to SCBA.
- **Feedback:** Airlines worked well for the small crew (two people) who entered the 241-AP Ventilation Pit (localized work location) to complete the CAT testing. In addition, it was a straight path from the air supply bottles to the 241-AP Ventilation Pit which eliminated any potential tank farm obstacles or pinch points.
  - **Conclusion:** The use of airlines would be beneficial for smaller work crews performing activities in a centralized location.
- **Feedback:** Users stated that for large crew-size activities such as pump replacements and/or pit jobs, increased issues with hose tending and tripping hazards are likely to occur.
  - **Conclusion:** The use of airlines would not be recommended for large crew-size activities.
- **Feedback:** Hose set-up (e.g., marking, sleeving, laying hose out) and hose teardown (e.g., surveying, recoiling) is very time consuming.
  - **Conclusion:** The use of airlines for short-duration activities is not efficient.
- **Observation:** In most cases, personnel using airlines need an attendant in SCBA to support mobility, to tender hoses, to carry materials, and to retrieve forgotten tools and/or equipment needed to complete a task.
  - **Conclusion:** In most cases, personnel using airlines need an attendant in SCBA to complete work activities.
- **Feedback:** It was stated that while the mockup area did have some obstacles that required some maneuvering (e.g., pits, stairs, fence posts, etc.), the tank farms have much more aboveground

equipment to move hoses around and through. In general, personnel thought that airlines could be used for about 5-10% of the work activities inside the tank farm fence lines.

- **Conclusion:** Personnel could use airlines approximately 5-10% of the work activities inside the tank farm fence lines.

The following are the recommendations based on user's feedback and experienced professional's observations and conclusions:

- Add airlines to the list of viable options/tools to be evaluated during the team planning meeting, field walkdown and/or job hazard analysis development, for applicability to perform a specific job task.
- The use of airlines should be considered for activities that have the following attributes: small crew-size, long duration job, centralized work location, when mobility is not required, in low traffic areas, and where there are a minimum of aboveground obstacles.
- Maintain the current WRPS airline equipment inventory (i.e., bottle carts, airline hoses, masks) at present levels to support specific applications within the tank farms.
- Continue to monitor the use of airline applications to support tank farm work activities. If airline use increases and additional inventory and/or options are warranted, then initiate further research into viable options and/or configurations such as recent DOE work at 618-10 Burial Grounds by CHPRC in which they utilized breathing air manifolds located near the work area. Another option would be the potential use of elevated air lines which would eliminate hoses from being entangled with tank farm obstructions.

## 5.0 ATTACHMENTS



RPP-RPT-60438 Rev. 0

**ATTACHMENT 1 – WRPS AIRLINE/SUPPLIED AIR EQUIPMENT EVALUATION FORM**

Product Evaluated: Bottle Cart and Airline for Supplied Air Tank Farms Mockup/Training

**EVALUATOR INFORMATION**

Name:

Job Title:

Contractor:

Date:

 Daily Weekly MonthlyHow often you use SCBA  
or airline for TF work**AIRLINE/SUPPLIED AIR RATING****Rating:****5 = Above Expectations****4 = Slightly Above Expectations****3 = Meets Expectations****2 = Slightly Below Expectations****1 = Below Expectations****N/A = If outside of Evaluator's scope of  
evaluation**

**\*\*\*For comparison purposes during this  
evaluation, please focus comments and  
recommendations on a compare / contrast of  
airline / supplied air use vs SCBA use  
currently implored at WRPS Tank Farms.**

**A Ease of Use / Work Activity Level**

<b>A1</b>	<b>Connect/Disconnect/Hookup:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	-----------------------------------	----------	----------	----------	----------	----------	------------

*Comments:*

<b>A2</b>	<b>Speed of don/doff/reentry:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	-----------------------------------	----------	----------	----------	----------	----------	------------

*Comments:*

<b>A3</b>	<b>Mask Comfort/Strain of Hoses:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	--------------------------------------	----------	----------	----------	----------	----------	------------

*Comments:*

<b>A4</b>	<b>Ability to Perform Light/Moderate Work Activities:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	---	----------	----------	----------	----------	----------	------------

*Comments:*

<b>A5</b>	<b>Ability to Perform Heavy Work Activities:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	--	----------	----------	----------	----------	----------	------------

*Comments:*

<b>A6</b>	<b>Section A Score: (A1 + A2+ A3 + A4 + A5) ÷ (Total Scored A1-A5) =</b>	_____					<b>N/A</b>
-----------	--	-------	--	--	--	--	------------

**B Features**

<b>B1</b>	<b>Regulator Configuration:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	---------------------------------	----------	----------	----------	----------	----------	------------

*Comments:*

<b>B2</b>	<b>Airline Hose Management/Configuration:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
-----------	---	----------	----------	----------	----------	----------	------------

*Comments:*

RPP-RPT-60438 Rev. 0

<b>B3</b>	<b>Ska-Pak Positioning/Comfort:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>B4</b>	<b>Ease of Motion/Visibility:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>B5</b>	<b>Audibility/Hearing/Speaking:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>B6</b>	<b>Section B Score: (B1 + B2+ B3 + B4 +B5) ÷ (Total Scored B1-B5) =</b>	_____					<b>N/A</b>

**EVALUATOR INFORMATION**

Name: \_\_\_\_\_ Job Title: \_\_\_\_\_ Contractor: \_\_\_\_\_ Date: \_\_\_\_\_  
Daily      Weekly      Monthly

**AIRLINE/SUPPLIED AIR RATING**

**Rating:**  
**5 = Above Expectations**  
**4 = Slightly Above Expectations**  
**3 = Meets Expectations**  
**2 = Slightly Below Expectations**  
**1 = Below Expectations**  
**N/A = If outside of Evaluator's scope of evaluation**

**C Durability & Compatibility**

<b>C1</b>	<b>Meets WRPS Field Criteria:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments: Field Criteria refers to the need for WRPS to execute supplied air work at TF</i>						
<b>C2</b>	<b>Maintenance and Laundering:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>C3</b>	<b>Ability to Decontaminate:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>C4</b>	<b>Component Durability:</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>N/A</b>
	<i>Comments:</i>						
<b>C5</b>	<b>Section C Score: (C1 + C2+ C3 + C4) ÷ (Total Scored C1-C4) =</b>	_____					<b>N/A</b>
<b>Total</b>	<b>Total Score All Sections: A6 + B6 + C5 =</b>	_____					
	<i>Comments:</i>						

## ATTACHMENT 2 –PHOTOS OF MOCKUPS AND FIELD TRIALS



Figure 1. Mockup Demonstration at HAMMER – Dragging airlines to work location.



Figure 2. Mockup Demonstration at HAMMER – Using long-reach tools to remove equipment from a pit.



Figure 3. Mockup Demonstration at HAMMER – Untangling airlines.



Figure 4. Mockup Demonstration at HAMMER – Carrying airline towards exit point.



Figure 5. Field Trial in 241-AP Tank Farm Ventilation Pit - Performing *AP Farm DST Flow Monitoring CAT*.



Figure 6. Field Trial in 241-AP Tank Farm - Performing *AP Farm DST Flow Monitoring CAT* in ventilation pit.

RPP-RPT-60438 Rev. 0



Figure 7. Field Trial in 241-AP Tank Farm – Following exit from ventilation pit, exiting tank farm.