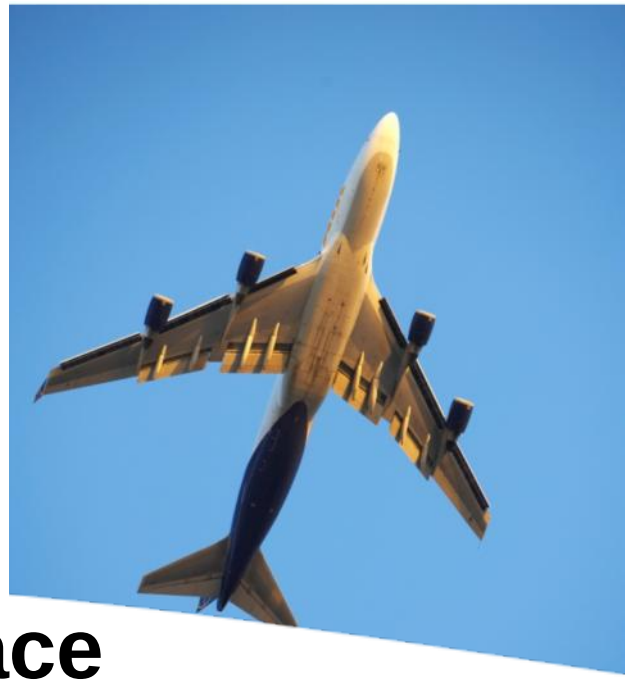
Honeywell

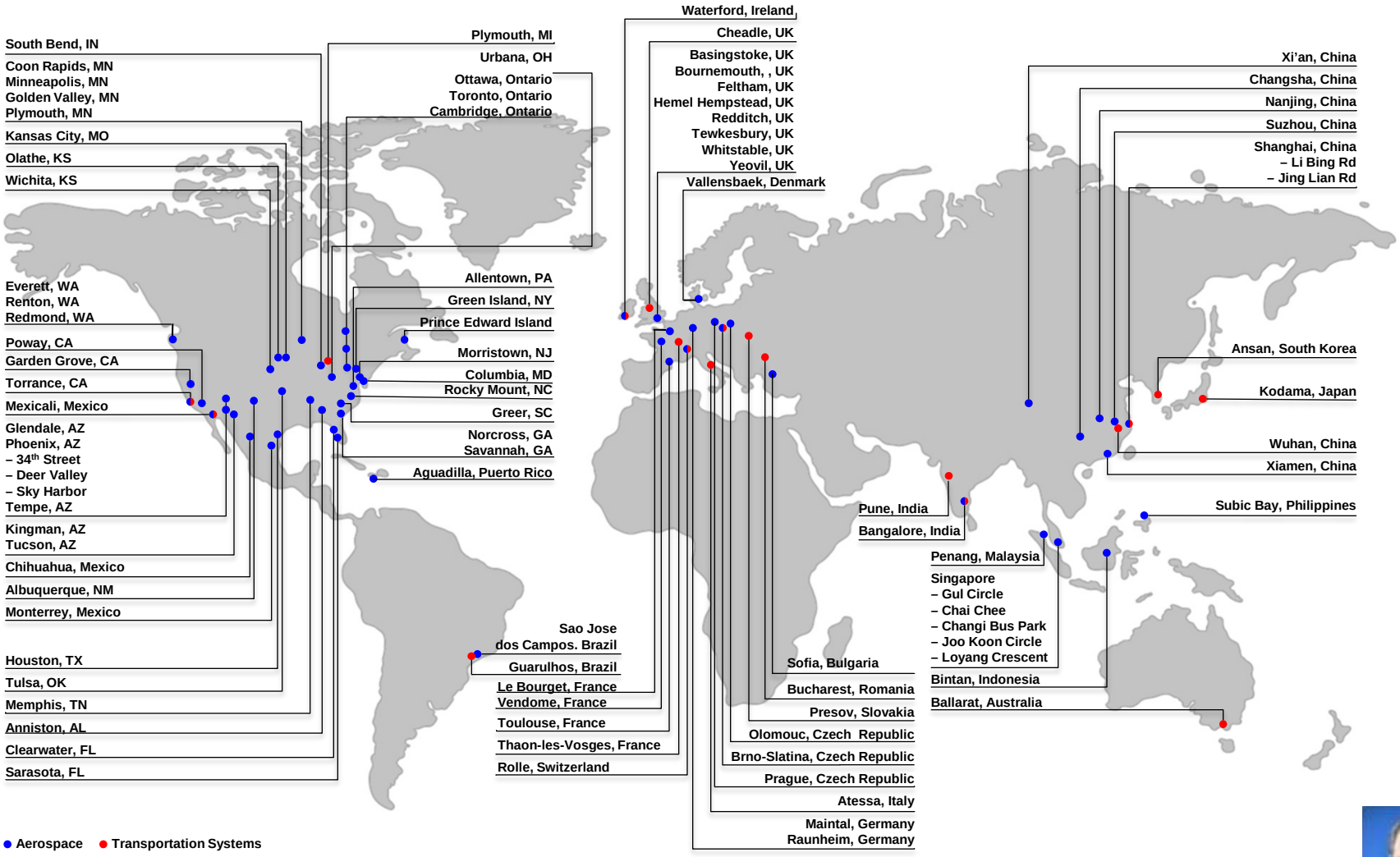


Honeywell Aerospace
Air Permit Review Process

Gregory Bopp: Dir. Compliance Assurance & Mgt. Systems, HON Aerospace
Cristian Dumitrescu: Principal Engineer, HON Aerospace
Scott Johnson: Sr. Air Engineer, HON Aerospace
Shawn Kumar: Consultant, Engineering Alliance, Inc.

Aerospace Global Footprint

42,000 employees at 125 manufacturing, engineering & service sites



$13B in Revenue

HSE&F Vision and Mission

Vision

Integrated business partner providing ***unparalleled*** HSE&F value and ***uncompromising*** commitment to employee health and safety and environmental stewardship.

Mission

Protect people and the environment through the capabilities of our global talent and the strength of our HSE & Facilities Management Systems.

HOS Identified as the Vehicle to Deliver on Vision and Mission

Why Do I Need a Permit Review Process?

- A permit is the primary tool regulators use to determine compliance
  - What do regulators (inspectors) look at when they come to your site?
    - Air Emissions: Permit sources current and accurate?
    - Waste Water: Sample results meeting limits?
    - Stormwater: Best Management Practices in place?
    - Hazardous Waste: Meeting generator requirements?
    - Radiation: Current registrations, labeling, testing and safety checks?
    - Other: Food Safety, Fire Department, Facilities?

- *The best way to understand your permit requirements is by conducting a structured permit review.*

Regulators have the responsibility to evaluate compliance- typically, spelled out in a permit.

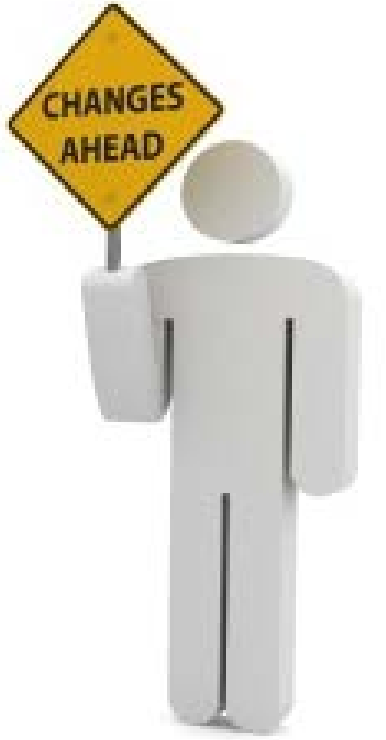
Permit Review Process: Key Points

- Identify your critical permits
  - How many can be reviewed and who is qualified to do so?
  - Don’t forget Hazardous Waste Generation.
- Set realistic review schedules (permit scope)
  - For example, reviewing a Title V Permits may take more time than some others.
  - This is about quality and not quantity.
  - Do a good job the first time (if you miss something, it usually means you had clarification; perhaps, in the form of a violation).
- Conduct a line-by-line review of your permit
  - Mark up the permit in a contrasting color.
  - If you can’t do a good enough job yourself, hire a consultant to do it for you.
  - Be prepared to *engage your regulator.*

Your permit: a living document you understand and refer to.

Permit Review Process: Key Points

- Document the *tasks and actions* required in your permit
  - Ask: *how do we do this, who does it, is it clear*?
  - Don't forget to document the details (like: renewal dates 180-days prior to expiration, fee payment dates).
  - Are there opportunities to simplify the requirements of the permit? If so, there may be a Regulatory Engagement opportunity.
- "Go See" for yourself to confirm compliance with permit requirements
  - "Go See" how tasks and actions are done in practice.
  - Is everyone is on the same page (HSE, Operations, Facilities)?
  - Ask: *what is at standard and how do we make compliance visible*?
- Document opportunities for improvement
  - Close out corrective actions quickly.
  - Maintain key requirements in an HSE Calendar or PM schedule.
  - Share learning opportunities with others to avoid errors elsewhere.



Documenting Tasks and Actions

Task Action Permit Spreadsheet:

- Document the Improvement Needed from the Permit Review
  - Identify key requirements, tasks and actions to assure compliance
  - Revisit your line-by-line permit review
  - Focus on process and method to improve and verify compliance

Permit Review Task/Action Documentation Sheet

Date	1/1/2012		
Site	Honeywell Aerospace - ABC Location		
Permit Reviewed	Waste Water Discharge Permit		
Reviewer	HSE Engineer		
HSE Manager Approver	Site HSE Manager		
Approver Date	3/31/2012		
No.	**Significant Task Identified or Required**	**Process Used to Demostrate Compliance**	**Verification Method in Place OR Improvement Needed**
1	Sample Metals Monthly for parameters in the permit	Sampling schedule and criteria posted and responsible persons identified to take and submits samples to lab	HSE engineer reviews sampling completed monthly to schedule. Posted scheduled in WWTP kept up-to-date.
2	Renew Permit 180-days from expiration	Permit is required to be renewed on 1/1/2014. HSE Compliance Calendar has an entry to renew and submit permit by 11/30/13, 1-month in advance of the due date.	HSE Compliance Calendar reviewed and entry for renewal exists and is current.
3	Pay Annual Water Discharge User Fee	Fee is due by 2/15 every year.	HSE Engineer is responsible for paying fee and this task is in the compliance calendar
4	Complete Quarterly Discharge Monitoring Report	DMRs due the 15th day after each quarter.	WWTP Manager completes form by 5th and HSE Manager reviews by the 10th and submits per HSE Calendar and Standard Work.
5			
6			
7			

Create a formal document that clearly explains the process used to demonstrate compliance.

Honeywell

Permit Review at Honeywell - Overview

AIR QUALITY PERMIT TO OPERATE AND/OR CONSTRUCT

(As required by Title 49, Chapter 3, Article 2, Section 49-480, Arizona Revised Statutes)

ISSUED TO

HONEYWELL ENGINES SYS & SERVICE PHX R&O
1944 E. SKY HARBOR CIRCLE
PHOENIX, AZ. 85034

This air quality permit to operate and/or construct does not relieve the applicant of the responsibility of meeting all air pollution regulations.

THE PERMITTEE IS SUBJECT TO THE SPECIFIC AND GENERAL CONDITIONS IDENTIFIED IN THIS PERMIT.

PERMIT NUMBER: 990201 **REVISION DATE:** 01/05/2015

REVISION NUMBER: 2.0.0.0 **EXPIRATION DATE:** 11/30/2019

Todd Martin

Todd Martin, Non-Title V Permit Supervisor

Any cited regulatory paragraphs or section numbers refer to the version of the rules and regulations that were in effect on the first date of public notice of the applicable Permit Condition unless specified otherwise. However, in the event the rules and regulations are amended during the term of this Permit, the amended rules and regulations shall apply to this Permit. Whenever the term, Control Officer, is used in this Permit it shall be interpreted to mean, Control Officer or designated representative. Where the term "Rule" appears, it shall be construed to mean "Maricopa County Air Pollution Control Regulations" unless otherwise noted.

SPECIFIC CONDITIONS

1. **Allowable Emissions:**
The Permittee shall not allow emissions into the atmosphere in excess of any of the following:

	Daily Emission Limits	Twelve Month Rolling Total Emission Limits
Carbon Monoxide (CO)	79	27,000
Nitrogen Oxide (NO_x)	102	29,000
Volatile Organic Compounds (VOC)	193	69,000
Sulfur Oxides (SO_x)	9	2,400
Particulate Matter <10 Micron Diameter (PM_{10})	27	9,000
Particulate Matter <2.5 Micron Diameter ($PM_{2.5}$)	27	9,000
Any Single Hazardous Air Pollutant (HAP)	9	3,000
Total Hazardous Air Pollutants (HAPS)	13	6,025

a. The 12-month rolling total emissi... summing the emissions over the... emission record on-site for inspect...

b. Upon the request of the Departme... monthly emissions by the number ...

2. **Opacity**
No person shall discharge into the at... other than uncombined water, in excess... any 60-minute period.

a. If any non-compliant visible emiss... shall determine the cause and/or ... action(s) and if necessary, shut do... vapor) exceed the above opacity... Permittee shall shut down the appl... compliance prior to resuming oper...

b. Compliance with the opacity req... conducted in accordance with EPA...

3. **Solvent Handling Requirements:**
The Permittee shall comply with all of t...

a. All cleaning solvent, including sol... containers that are opened only wh...

i. Porous or absorbent materials... in use.

ii. Each container shall be clearl...

b. If any cleaning solvent escapes fro...

i. Wipe up or otherwise remove immediately if in accessible areas.

ii. For areas where access is not feasible during normal production, remove as soon as reasonably possible.

c. Unless records show that VOC-containing cleaning material was sent offsite for legal disposal, it will be assumed that it evaporated on site. [SIP Rule 331 §301]

d. VOC Containment and Disposal:

The Permittee shall not store, discard, or dispose of VOC or VOC-containing material in a way intended to cause or to allow the evaporation of VOC to the atmosphere. Reasonable measures shall be taken to prevent such evaporation which include but are not limited to the following:

i. All materials from which VOC can evaporate, including fresh solvent, waste solvent and solvent-soaked rags and residues, shall be stored in closed containers when not in use, and [Rule 330 §306][SIP Rule 32.C]

ii. Such containers one gallon and larger shall be legibly labeled with their contents. [Rule 330 §306.2][Locally Enforceable Only]

4. **Recordkeeping:**
The Permittee shall keep the 12-month rolling total emissions, as required by Permit Condition 1, onsite and available upon request. The records shall be retained for 5 years. [Rule 241 §302][Locally Enforceable Only]

Solvent Cleaning Operations

5. **Small Cleaners:**
Any non-vapor cleaning machine (degreaser) or dip-tank fitting either of the following descriptions, shall be covered when work is not being processed and shall be subject to the provisions of Conditions 9 and 10 and the recordkeeping requirements:

a. A small cleaner having a liquid surface area of 1 square foot (0.09 square meters) or less, or

b. A small cleaner having a maximum capacity of one gallon (3.79 liters) or less.

6. **Definitions**
For the Purpose of this Permit Section, the following definitions apply:

a. *Cleaning Solvent*: Solvent used for cleaning that contains more than 2.0% VOC by weight and more than 20 grams of VOC per liter.

b. *Conforming Solvent*: A cleaning-solvent having a total VOC vapor pressure at 68°F (20°C) not exceeding 1 millimeter of mercury column.

c. *Low-VOC Cleaner*: Any solution or homogeneous suspension that, as used, contains less than 50 grams of VOC per liter of material (0.42 lb VOC/gal) or is at least 95% water by weight or volume

d. *Sealed System*: An air-tight or airless cleaning system which is operated according to the manufacturer's specifications and, unless otherwise indicated by the manufacturer, meets all of the following requirements:

i. Has a door or other pressure-sealing apparatus that is shut during each cleaning and drying cycle; and

ii. Has a differential pressure gauge that always indicates the pressure in the sealed chamber when occupied or in active use; and

iii. Any associated pressure relief device(s) shall be so designed and operated as to prevent liquid cleaning-solvents from draining out

Honeywell

Permit Review at Honeywell - Overview

E27 | Equipment is not fail-safe to prevent an environmental excursion, however, all alarms w/ response plans are in place to address operational issues.

GEMBA CHECKLIST - Environmental Compliance, Air Emissions			Opportunity for HSE Improvement
Registrations, Permits and Emissions Inventory: regulatory documentation up-to-date and accurate.			
· Air emissions sources have current, required permits or registrations?	Yes	No	
· Is visual management or other method used to demonstrate compliance with air emissions requirements?	Yes	No	
· Are air emissions impact to the environment evaluated and controlled to minimize impact (normal/abnormal conditions)?	Yes	No	
Routine Compliance Inspections and Preventive Maintenance: available, linked to requirements in the Site's Permit.			
· Are there documented inspections and preventive maintenance procedures for air pollution control devices?	Yes	No	
· Are inspections and routine PMs based on manufacturers recommendations carred out and reviewed (calendar)?	Yes	No	
· Has a spare parts list for critical emissions equipment/control devices been created and are these parts available?	Yes	No	
· Is there a system for performing maintenance and PMs and are records available to demonstrate schedule fidelity?	Yes	No	
· Are there documented operating procedures for air emission control equipment or emissions generating equipment?	Yes	No	
Operator or Technician Has Access to Permit: all requirements that apply are identified and understood.			
· Allowable conditions and operating parameters are understood, documented, made visual?	Yes	No	
· Is there a visual control plan that verifies compliace is maintained (log, inventory, inspections)?	Yes	No	

Honeywell

Permit Review at Honeywell - Overview

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Cut | Copy | Format Painter | Paste | Clipboard | Calibri | 11 | Font | Wrap Text | Merge & Center | Alignment | General | Number | Conditional Formatting | Format as Table | Normal 3 | Normal 4 | Normal | Bad | Styles | Insert | Delete | Format | Cells

G10 | HSE Engineer

Permit Review Task/Action Documentation Sheet

Date	9/25/2013
Site	Honeywell Aerospace – Sky Harbor
Permit Reviewed	Air Permit
Reviewer	HSE Engineer
HSE Manager Approver	Site HSE Manager
Approver Date	

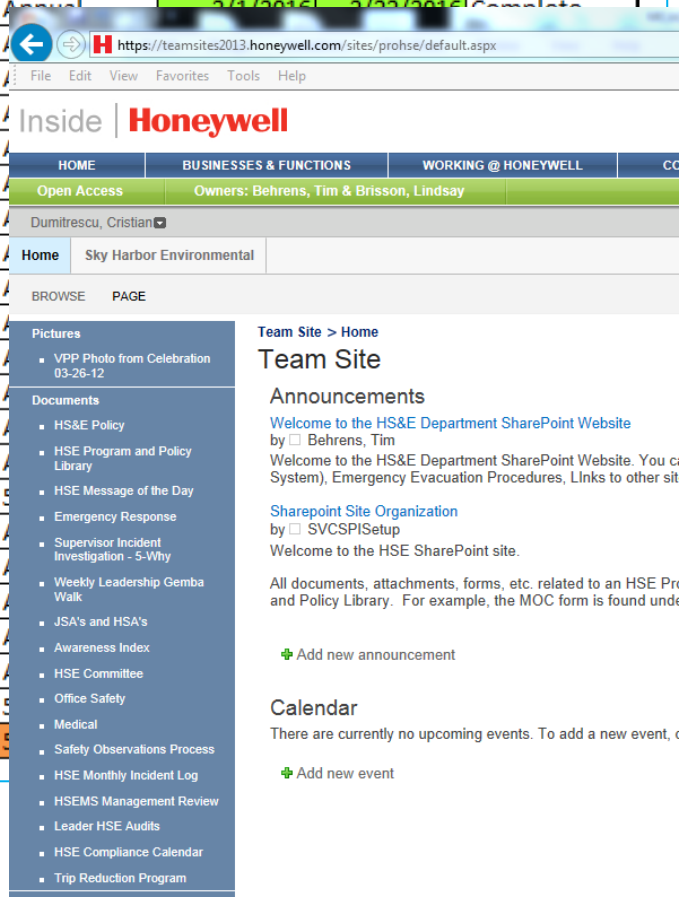
Color Coding For Improvement	
"Color"	Verification in place, No Improvemment Necessary
" "	Minor, Continuous Improvement to Implement
"Orange"	Significant Improvement to Implement
"Red"	Escalated, Requires Compliance Evaluation and Improvement

Condition No.	Significant Task Identified or Required	Process Used to Demostration of Compliance		Verification Method in Place OR Improvement Needed	Responsibility
1	Any document which is required to be submitted by this Permit or the Rules shall contain certification by a responsible official of truth, accuracy and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.	Ensure referenced certification is included with permit-required submission.		Copy of certification w/submssion.	HSE Engineer
2	Except as provided for in Rule 100, any records, reports, or information obtained from the Permittee pursuant to the County Rules or this Permit shall be available to the public unless the Control Officer has notified the Permittee in writing and unless a person: a. Precisely identifies the information in the permit(s), records, or reports which is considered confidential. b. Provides sufficient supporting information to allow the Control Officer to evaluate whether such information satisfies the requirements related to trade secrets. A claim of confidentiality shall not excuse a person from providing any and all information required or requested by the Control Officer and shall not be a defense for failure to provide such information.	Confirm accuracy Air Permit Equipment List. Submit notification of addition, modification or replacement.		Equipment List w/all regulated, insignificant, trivial and exempt equipment. Date-stamped record of notification addition, modification or replacement.	HSE Engineer
3 a.	Except as provided by the applicable Rules or these Permit Conditions, the Permittee shall not operate any equipment or process unless air pollution controls, required by either this Permit or the Rules, are in place, are operating without bypass, and are operating within their key system operating parameters, as identified in the approved Operation and Maintenance Plans, and in accordance with any other	Ensure air pollution controls are in place on all machinery		Operation and Maintenance Plans	Facilities

Honeywell

How do we keep track of everything?

	A	B	C	D	E
1	HS&E Compliance Calendar - 2016			Last Updated:	5-Jul-16
2	Item/Task	Responsibilit	Frequenc	Start Dat	Due Da	Status
27	Annual - Trend Analysis of Permit Issuers and Permit Errors	Dumitrescu	Annual	1/5/2016	1/24/2016	Complete
46	Annual - Certification of Compliance Report for MACT Subpart (6W)	Dumitrescu	Annual	1/1/2016	1/31/2016	Complete
87	Annual - Tier II Report "Ready for Review"(due to agency on 3/1)	Dumitrescu	Annual	1/2/2016	2/13/2016	Complete
88	Annual - Air Permit Review - use Aero Tool	Dumitrescu	Annual	1/2/2016	2/13/2016	Complete
105	Annual - ERT Equipment Inspections Records Review (SCBAs, etc)	Dumitrescu	A			
106	Annual - Review of ERT HazMat Training Records and Plan	Dumitrescu	A			
114	Annual - Submit Fee for Tier II Report (due 3/1)	Dumitrescu	A			
115	Annual - Tier II Report (due to agency on 3/1)	Dumitrescu	A			
130	Annual - Review TOMP and Slug Plans (Submit to City)	Dumitrescu	A			
158	Annual - Review of ERP	Dumitrescu	A			
172	Annual - Emergency Response Plan Submissions (send Certified Mail Receipt)	Dumitrescu	A			
176	Annual - Review Hazardous Surplus Matls Applicability for PSH	Dumitrescu	A			
188	Annual - ADEQ Facility Registration Fee (Haz Waste) and Industrial Discharge	Dumitrescu	A			
194	Annual - Conduct WW Discharge Permit Review - use the tool (Expires	Dumitrescu	A			
331	Annual - Fire Extinguisher Training	Dumitrescu	A			
361	Annual - Shelter-in-Place training/drill	Dumitrescu	A			
722	Annual - Confined Space Rescue Drill (external - Engines HFD, City PHX), critique	Dumitrescu	A			
730	Annual - Review of Sky Harbor Emergency Response Risk Assessment	Dumitrescu	A			
816	5-Year - 6H Painter training and certification (40 CFR § 63.11173) due Nov 2020	Dumitrescu	5			
832	Annual - Review Air Abatement Pollution Control Equipment Compliance	Dumitrescu	A			
852	Annual - Site Evacuation Drills, one per shift	Dumitrescu	A			
862	Annual - Kaizen and Refresh BOP Calendar Checklists for next year; post to Share	Dumitrescu	A			
872	Annual - Air Quality Administration Fee (Maricopa County)	Dumitrescu	A			
897	Annual - Hot Work Area Inspection Checklist reposting for new year	Dumitrescu	A			
919	5-Year Industrial Wastewater Discharge Permit Renewal (expires June 30 2018),	Dumitrescu	5			
926	5-Year Air Permit Renewal (expires Nov 2019), submit 180 days prior, (May 2019)	Dumitrescu	5			
932						



Honeywell

How do we keep track of everything?

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2	Item/Task	Responsibilit	Frequenc	Start Dat	Due Da	Status
34	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	1/1/2016	1/30/2016	Complete
46	Annual - Certification of Compliance Report for MACT Subpart (6W)	Dumitrescu	Annual	1/1/2016	1/31/2016	Complete
70	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	1/15/2016	1/31/2016	Complete
88	Annual - Air Permit Review - use Aero Tool	Dumitrescu	Annual	1/2/2016	2/13/2016	Complete
128	Annual - Notification of Changes Report (6H)	Dumitrescu	Annual	2/1/2016	2/28/2016	Complete
141	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	2/2/2016	2/28/2016	Complete
147	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	2/15/2016	2/28/2016	Complete
223	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	3/1/2016	3/31/2016	Complete
244	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	3/15/2016	3/31/2016	Complete
293	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	4/1/2016	4/30/2016	Complete
315	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	4/15/2016	4/30/2016	Complete
335	Semiannual - Verify Opacity Certified Emissions Evaluator POC	Dumitrescu	Semiannual	5/1/2016	5/11/2016	Complete
377	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	5/1/2016	5/31/2016	Complete
389	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	5/20/2016	5/31/2016	Complete
432	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	6/1/2016	6/24/2016	Complete
459	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	6/15/2016	6/24/2016	Complete
524	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	7/1/2016	7/31/2016	
537	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	7/15/2016	7/31/2016	
588	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	8/15/2016	8/30/2016	
595	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	8/1/2016	8/31/2016	
670	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	9/3/2016	9/30/2016	
684	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	9/15/2016	9/30/2016	
731	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	10/1/2016	10/31/2016	
750	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	10/15/2016	10/31/2016	
766	Semiannual - Verify Opacity Certified Emissions Evaluator POC	Dumitrescu	Semiannual	11/1/2016	11/11/2016	
794	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	11/1/2016	11/30/2016	
811	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	11/15/2016	11/30/2016	
816	5-Year - 6H Painter training and certification (40 CFR § 63.11173) due Nov 2	Dumitrescu	5-Year	10/1/2016	12/1/2016	
832	Annual - Review Air Abatement Pollution Control Equipment Compliance	Dumitrescu	Annual	11/15/2016	12/15/2016	
872	Annual - Air Quality Administration Fee (Maricopa County)	Dumitrescu	Annual	11/20/2016	12/31/2016	
873	Monthly - Calculate Air Emissions for Previous Month	Dumitrescu	Monthly	12/1/2016	12/31/2016	
901	Monthly - Review Critical HSE PMs	Dumitrescu	Monthly	12/15/2016	12/31/2016	
926	5-Year Air Permit Renewal (expires Nov 2019), submit 180 days prior,	Dumitrescu	5-Year	2/1/2019	5/30/2019	
932						

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We reviewed it, now what?

- HSEMS (Health, Safety and Environmental Management System)
  - Procedure (HSE 305 Air Emissions)
  - Air Permit 990201
  - Self Assessment Tool (SAT)
  - Event Tracking System (ETS)
  - Compliance calendar
  - Self Inspections, Gemba process
  - Permit review
  - Visual management
  - Training
  - Standard work
  - Management of Change
  - Continuous Improvement

HONEYWELL Health, Safety and Environmental Management Systems Level 3 Standard	DOCUMENT OWNER	HSE Dept
	APPROVED BY	HSE Manager
	DATE ISSUED	06/26/2012
Honeywell Aerospace – Phoenix (Sky Harbor Circle) **Air Emissions**	DATE REVISED	3/21/2016
	PROCEDURE NUMBER	HSE 305

Air Emissions

1.0 APPLICABILITY

1.1 This procedure applies to air emission program and associated operations at the Honeywell Aerospace – Phoenix (Sky Harbor Circle), Repair and Overhaul facility

2.0 OVERVIEW

2.1 To provide the minimum program requirements for the management of air emissions

3.0 DEFINITIONS

3.1 Definitions for underlined text are found at the end of this document.

4.0 ROLES AND RESPONSIBILITIES

4.1 HSE Leader

4.1.1 Ensure their employees comply with all Honeywell Phoenix R&O Non Title V Air Permit and regulatory Clean Air Act requirements.

4.1.2 Ensure any related required training is conducted for their respective employees and their training records are maintained.

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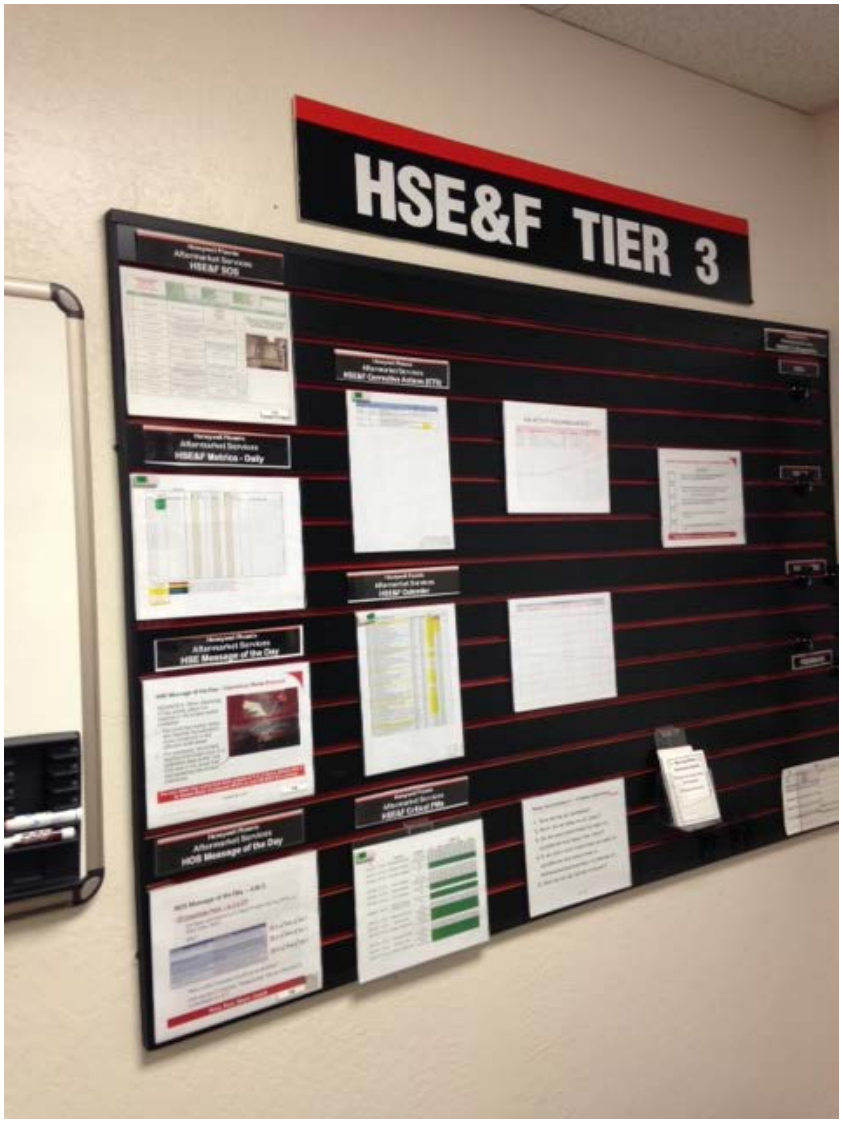
Visual Management at Sky Harbor (HOS)



Thursday, July 14, 2016

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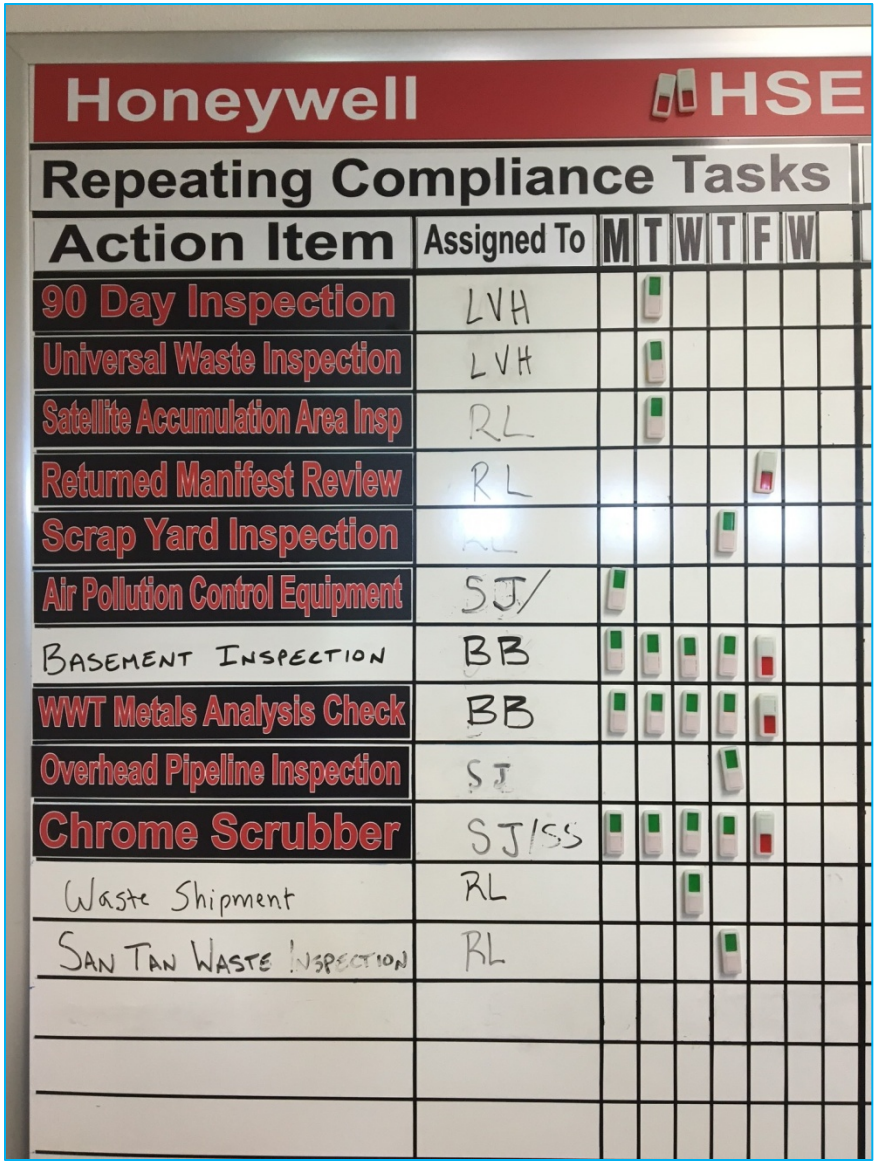
Visual Management at 34th St (HOS)



- Used to track routine tasks
- Discussed daily
- Ownership of task
- Green complete
- Red incomplete
- Ensures critical tasks are performed daily

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Daily Accountability Board at 34th St (HOS)

Honeywell

Compliance Calendar

- Excel Spreadsheet
- Used to track critical permit tasks.
- Compliance calendar tasks are usually permit conditions that must be performed.
- Tracks tasks annually, monthly and weekly.
- Compliance calendar is updated weekly to ensure tasks are completed.
- Able to track issues well before due date.
- Compliance calendar is audited annually to remove non critical tasks, make changes as needed.

Honeywell

Compliance Calendar (Monthly Tasks for Air Permit)

HSE Monthly Compliance Calendar - 2016					January		
HSE Program	Item Description	Frequency	Owner	Instructions/Notes	Due Date	Completion Date	Task Aging
305	Collect and Evaluate Monthly Air Heater Data - CC JJ Jankowski & Andy Akers	Monthly	Scott Johnson	The Air Heater Instructions: Take a monthly reading of the	01/03/16	01/03/16	CLOSED
305	Collect and Evaluate Monthly Boiler Natural Gas Usage - CC JJ Jankowski & Andy Akers	Monthly	Scott Johnson	Instruction: Collect and Evaluate Monthly Boiler	01/03/16	01/03/16	CLOSED
360	Audit-Inspect Chemical Containers and Tanks Insp	Monthly	Scott Johnson	Check the above ground tank and chemical container	01/31/16	01/14/16	CLOSED
360	Monthly Audit of Chemical Storage Inspection Checklist	Monthly	Scott Johnson	Use the chemical container inspection form located on	01/31/16	01/14/16	CLOSED
305	Collect and Evaluate Monthly Chemical Usage from Cribs	Monthly	Scott Johnson	Instruction: Collect and Evaluate Monthly Chemical	01/31/16	01/13/16	CLOSED
305	Collect and Evaluate Monthly Greenhouse Gas Emissions	Monthly	Scott Johnson	Procedure: Enter all GHG emissions data into the	01/31/16	01/13/16	CLOSED
305	Collect and Evaluate Monthly Greenhouse Gas Emissions - San Tan	Monthly	Scott Johnson	Collect and Evaluate Monthly Greenhouse Gas Emissions -	01/31/16	01/14/16	CLOSED
305	Collect and Evaluate Monthly Jet Fuel Usage From Test Cells	Monthly	Scott Johnson	Collect and Evaluate Monthly Jet Fuel Usage from Test Cells	01/31/16	01/14/16	CLOSED
305	Collect and Evaluate Monthly Jet Fuel Usage From Test Cells - San Tan	Monthly	Scott Johnson	Instruction: Collect and Evaluate Monthly Jet Fuel	01/31/16	01/14/16	CLOSED
305	Collect Days & Hours of Operation for 202 Boilers for Previous Month	Monthly	Scott Johnson	Obtain the log for the days and hours of operation for	01/31/16	01/06/16	CLOSED
305	Evaluate Monthly Record Keeping for Title V (solid abrasive consumption)	Monthly	Scott Johnson	Evaluate Monthly Record Keeping for Title V.	01/31/16	01/05/16	CLOSED
305	Evaluate Monthly Record Keeping of ODC Chemicals	Monthly	Scott Johnson	Instruction: Evaluate Monthly Record Keeping of	01/31/16	01/06/16	CLOSED
305	Monthly Records Evaluation of Emergency Generators	Monthly	Scott Johnson	Collect emergency generators files from JLL. Go to	01/31/16	01/06/16	CLOSED
305	Monthly Review of Completed PM's for Scrubbers, Dust Collectors, and Rotoclones	Monthly	Scott Johnson	Monthly Review of Completed PM's for Scrubbers, Dust	01/31/16	01/05/16	CLOSED
305	Perform Monthly Checks on Solvent Tanks	Monthly	Scott Johnson	Perform Monthly Checks on Solvent Tanks	01/31/16	01/14/16	CLOSED

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Continuous Improvement (CI- HOS)

- Always looking to improve.
  - Process
  - Task
  - Form
  - Equipment
- Staff goal is 2 CI's per month.
- State the problem.
- Action taken.
- Results of the action.
  - Reduce time
  - Save money
  - Improve a process or documentation of a process
  - Increase safety

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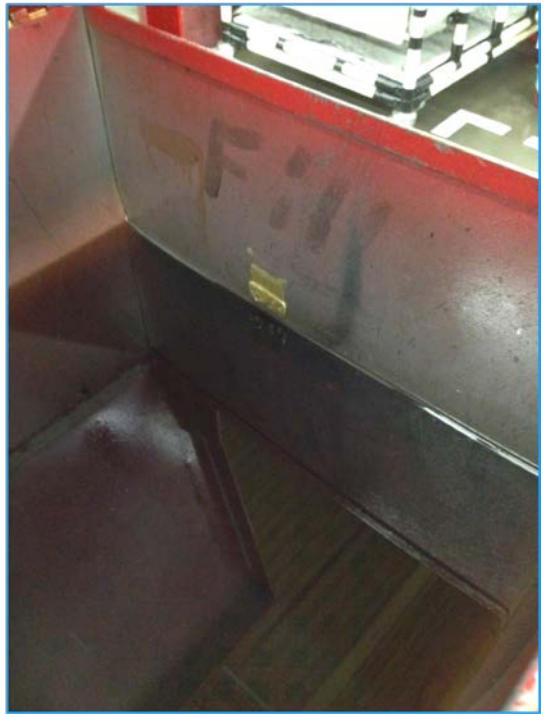
CI- Solvent Tank Fill Markers

Team Leader: Scott Johnson		Team: Scott Johnson	
Operation	Problem	Action Taken	Results
Solvent Tank Fill Markers	•County requires permanent fill line markers and existing tags often fall off due to the solvents affecting the adhesive.	•Added a fill line marker that hangs over the side of the tank and secured with silicone.	Permanent fill line markers and cannot be moved or will fall off allowing full compliance with Maricopa county.



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Management of Change

- Management of change (MOC)
- Process to evaluate any changes that occur on Site.
- All changes to equipment, or personnel go through MOC process.
- Weekly meeting to discuss proposed changes.
- HSE department leads MOC and evaluates changes as a committee.
- Does change pose a compliance risk, health risk, safety risk?
- Does the change affect the Title V air permit?
- Will a modification to permit be required?
- How will the change and the effects of the change be managed?
- Reduces risk of non compliance.

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Management of Change

Management of Change (MOC) Request

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SECTION I – GENERAL INFORMATION

MOC Number: 1721
Date Initiated: 4-27-2016
Date Reviewed: 5/31/16
Initiator: Scott Godley Employee ID: E013134
Project Coordinator: Jeff Cook
Supervisor of Affected Area : Carl Pugliese

Is this change Permanent? ☒ Yes ☐ No
Temporary Change Expiration Date: ____
(Temporary MOC must be reviewed after 30 days)
Is this an Emergency MOC? ☐ Yes ☒ No
Building/Area / Department: 302-1, Dept 47-95

SECTION II – CHANGE CATEGORY / DESCRIPTION / IMPACT

Change – A change is any permanent, temporary or emergency modifications to facility structure and systems, process equipment, procedures, raw materials, and/or processing conditions other than "replacement in kind".

Scope of Work Summary: Purchase and install an Airwolf 3D printer in the cal probe room of the 302 bld.1st floor. This is 120v system with NO LASER. We plan to fabricate a plexiglas housing to put the printer in to address the pinching hazards related to exposed gears and pulleys.

What is the purpose and technical basis for the change: The printer will be used for rapid protyping of instrumentation equipment and measurement probes.

Target Start Date : May 1, 2016 **Estimated Completion Date:** May 31, 2016

Change Category: (Check all that apply)

- ☐ (a) New Chemical - **Initiator must submit an electronic Chemical Approval Request prior to MOC review**
- ☒ (b) New or Modified Equipment, Tooling, or Process/Procedure*
- ☐ (c) New or Modified Utilities, Production Equipment, Facilities Infrastructure (Scrubbers, Dust Collectors, etc.)*
- ☐ (d) New or Modified Procedure, that may affect operator exposure to risk*
- ☐ (e) New or Modified Safety Equipment (Guarding, PPE)*
- ☐ (f) Facility Demolition, Decommission, Renovation, Repair, Replacement
- ☐ (g) Modified or Moved Work Area **Initiator must provide a detailed description of area**
- ☐ (h) Fire Safety and Property Protection change or any installation/modification of fuel-fired units or fuel storage
- ☐ (i) Other (explain)____

* Initiator must provide detailed description prior to MOC committee meeting

SECTION III – Required Actions (Final Determination To Be Completed by MOC Team

	Pre-Modification				Startup
	Required	Person(s) Responsible	Docs Required	Due Date	Action Complete
1. Electrical Arc Flash documents	☐ Yes ☒ No		☐		☐
2. Noise Monitoring	☐ Yes ☒ No		☐		☐
3. Employee Exposure Monitoring	☐ Yes ☒ No		☐		☐
4. Ergonomics Evaluation	☐ Yes ☒ No		☐		☐
5. Contractor Documentation	☐ Yes ☒ No		☐		☐
6. Building Permit	☐ Yes ☒ No		☐		☐
7. Drawings (process/facilities)	☐ Yes ☒ No		☐		☐
8. Design Review	☐ Yes ☒ No		☐		☐
9. Lock, Tag, Try/Line Break Procedure	☐ Yes ☒ No		☐		☐
10. GRC Review	☐ Yes ☒ No		☐		☐
11. Pressure Test or Pressure Vessel	☐ Yes ☒ No		☐		☐
12. Contractor JSA	☐ Yes ☒ No		☐		☐
13. Operational Procedures (SOS)	☒ Yes ☐ No	Scott Godley	☒		☐
14. Honeywell JSA/PPE Assessment	☒ Yes ☐ No	Scott Godley	☒		☐
15. Training	☒ Yes ☐ No	Scott Godley	☐		☐
16. Communication/HOS Change Mgmt.	☐ Yes ☒ No		☐		☐
17. Workstation Guarding Review	☒ Yes ☐ No	David O'Brien	☐		☐
18. Environmental Permits	☐ Yes ☒ No		☐		☐
19. Waste Disposal	☐ Yes ☒ No		☐		☐
20. Chemicals: SDS/New Location	☒ Yes ☐ No	Cindy / Lucky	☐		☐
21. Confined Space	☐ Yes ☒ No		☐		☐
22. Rigging Plan for move of heavy or awkward equipment	☐ Yes ☒ No		☐		☐
23. Add to HSE Critical Equip. List	☐ Yes ☒ No		☐		☐
24. Emergency Procedures/Equipment	☐ Yes ☒ No		☐		☐
25. Asbestos or Lead Testing	☐ Yes ☒ No		☐		☐

Form HSE-410-4.1 (Issue Date 07/07/2015 Rev 3, Rev Date 08/03/2015)
HSE File: 410.4.1

Page 1 of 2

- What is the change?
- Where is the change?
- Does the change require any permits?
- Will it effect an existing permit?
- Who is responsible for the changes?

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Working Air Equipment List

Upton Marquench Furnace T-7	Unknown	Unknown	422	93012007	Unknown	1-EE116
Automatic Carburizing Furnace C-3	Unknown	1/1/1991	422	93007045	Unknown	1-EE112
Carburizing furnace	Unknown	before 1984	422	93007051	Unknown	1-EE112
Holocroft Rotary Furnace H-4	Unknown	4/15/1994	422	93007050	Unknown	1-EE115
Air Heaters (natural gas fired)						
Name, Make, Model, Serial #	Manuf. Date	Date Installed	Building	Maintenance #	Btu/hr)	
Air Heater	Unknown	Unknown	204	93021027	0.44	
Air Heater	Unknown	Unknown	202	93021015	6.57	
Air heater AH1-A	Unknown	Unknown	204	93021001	3.19	
Air heater AH1-B	Unknown	9/1/1962	203	93021002	5.12	
Air heater AH1-C	Unknown	9/1/1962	203	93021003	2.96	
In line heater for C-100	Unknown	Unknown	203	Unknown	2.945	
Air heater (Test Cell C-100)	Unknown	7/1/1973	204	93021007	10.98	
Air heater (Test C116)	Unknown	6/1/1992	204	93021008	10.98	
Air heater (Raypack)	Unknown	Unknown	222	93100019		
Boilers						
Name, Make, Model, Serial #	Manuf. Date	Date Installed	Building	Maintenance #	Btu/hr)	
Natural Gas-fired	Unknown	Unknown	503	93010027	0.35	1-D20
Natural Gas-fired	Unknown	Unknown	403	93020001	0.50	1-Q114
Natural Gas-fired	Unknown	1/1/2001	422	93010039	4.11	1-JJ106
Natural Gas-fired	Unknown	10/1/1999	422	93010038	4.11	1-JJ108
Natural Gas-fired	Unknown	6/1/1994	503	93010026	0.35	1-D20
Natural Gas-fired	Unknown	Unknown	302	93010015	3.28	
Test Cells						
Name, Make, Model, Serial #	Manuf. Date	Date Installed	Building		Max Thruput (gal/hr)	
#666 C-100	Unknown	1956	203		224	verified
#667 C-113	Unknown	1956	203		0.02 (MMBtu)	verified
#668 C-114	Unknown	1956	203		0.028 (MMBtu)	verified
#669 C-116 Turbine Cell	Unknown	1956	203		224	verified
#671 Compressor Cell	Unknown	1956	226		224.3	verified
#691 LACC I	Unknown	1964	202		76.9	verified
#692 LACC II	Unknown	1955	202		76.9	verified
#694 CA 2	Unknown	1955	202		36.5	verified
#801(D-101) APU Cell	Unknown	1956	204		76.9	verified
#802 (8-102) APU Cell	Unknown	1956	204		76.9	verified
#803 (D-103) APU Cell	Unknown	1956	204		76.9	verified
#804 APU Test Cell	Unknown	Unknown	204		76.9	verified
#805 (D-105) APU Cell	Unknown	1956	204		76.9	verified
#806 (D-106) APU Cell	Unknown	1956	204		76.9	verified
#807 (D-107) APU Cell	Unknown	1956	204		76.9	verified
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]

Working Equipment List

Thursday, July 14, 2016

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Critical Air Equipment PMs

					Required Inspections			
Equipment	Maintenance Number	Location	Manufacturer	Model Number	Monthly	Quarterly	Semi Annually	Annually
Scrubber - Chrome	**92415005**	422	Harrington	HPV-77-3D	X			
Scrubber - Cyanide	92415006	422	Harrington	HPV-77-2D	X			
Scrubber - Acid-Alkali	**92415007**	422	Harrington	HPV-67-3D	X			
Scrubber - Nital Etch	**92415013**	422	Harrington	ECH 33	X			
Scrubber - Roof West	**92415019**	422	Harrington	ECH 5 6.5-5LB	X			
Scrubber - Roof East	**92415020**	422	Harrington	ECH 5 6.5-5LB	X			
Scrubber - Nitride	92415026	422	Harrington	ECH1 2-5	X			
Equipment	**Maintenance Number**	**Location**	**Manufacturer**	**Model Number**	**Monthly**	**Quarterly**	**Semi Annually**	**Annually**
Dust Controllers	**92401028**	West of 103	Sulzer Metco	DF04-36 (SME)	X	X		
Dust Controllers	92401428*	422	ICM	HB600				X
Dust Controllers	**92401472**	East of 202	Tenkay	10-D				X
Dust Controllers	**92401825**	West of 422	Donaldson	DF03-10				X
Equipment	**Maintenance Number**	**Location**	**Manufacturer**	**Model Number**	**Monthly**	**Quarterly**	**Semi Annually**	**Annually**
Rotoclone	**92401443**	Southeast of 301	AAF Rotoclone	B				X
*Not in use								
Bold text are items included in Air Permit								

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Weekly Air Equipment Inspections

- Weekly inspections of air pollution control equipment required.
  - Scrubbers
  - Baghouses
  - Rotoclones

- Record data and inspect according to permit conditions.
- Document any tuning to equipment.
- Document out of compliance readings or items for repair.
- Record flow rate, inlet pressures, pH and other required data.
- Visible emissions monitoring (method 9).

Weekly Air Equipment Inspection Form

Honeywell Engines
Fume Scrubber Inspection
Inspections to be completed weekly

Date: **Inspector:** **Shift:**

Maintenance number	Description	Post Location	Differential Pressure ("H_2O)	Diff. Press. Limits ("H_2O)	Flow Meter (gpm)		Required Flow (Total gpm)	Blow down Rate (gpm)	Blowdown Limit (gpm)	Scrubber pH 1 - 6	Inlet Velocity Pressure ("H_2O) .22 - .28	Inlet pressure ("H2O) 3.6"-4.4"	Inspection Time	Comments:
92415005	Buidling 422 Chrome	JJ109		0.3 - 2.3			175 - 225		2-22 gpm					
92415006	Building 422 Cyanide	JJ110-111		0.8 - 2.3			175 - 225		2-22 gpm					
92415007	Building 422 Acid-Alkali	IIJJ113		0.8 - 3.0			150 - 190		2-19 gpm					
92415013	Building 422 Nital Etch Roof Central	EE110		0.5 - 2.0			25 - 50		0.5-1.5 gpm					
92415019	Builiding 422 Roof West	II113		0.8 - 2.8			125 - 180		1-18 gpm					
92415020	Building 422 Roof East	II109		0.8 - 2.8			125 - 180		1-18 gpm					
92415025	Building 422 batch	IIJJ113		1.0-2.5			160-225		2.0-22.0					pH 13-14 LOTO
92415026	Building 422 Nitriding	DD 112		1.0-2.6			35-50		0.1-1.5					pH 1.0-6.0

Comments:

Issues Identified & Corrective Action Required

Out of Range Reading & Equipment	Cause for Out of Range Reading	Corrective Action Performed

Checked by: **Date**

Thursday, July 14, 2016

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Task Action Spreadsheet Review Process (Findings and Follow-Up – Example)

ENGINEERING ALLIANCE, INC.

Engineering Alliance, Inc.
1661 W. Laredo Street
Chandler, Arizona 85224

Telephone: (480) 365-9930
www.eaincglobal.com

TECHNICAL MEMORANDUM

TO:	Mr. Gregory Bopp, CHMM Honeywell Aerospace (Honeywell)	**REF. NO.:**	201615
FROM:	Mr. Prashant Kumar, P.E. / Dr. Rajendra D. Paode, P.E. Engineering Alliance, Inc. (EA)	**DATE:**	March 30, 2016
CC:	Ms. Ann-Marie Pendl Honeywell		
RE:	**Review of Greenhouse Gases (GHG) Emissions Calculation, 3529 Westmoor Street, South Bend, IN 46628 (Site or Facility)**		

INTRODUCTION:

This technical memorandum presents the findings from EA's review of GHG Emissions Calculations prepared by a Honeywell Retained Third Party Consultant for the above-mentioned Site. This technical memorandum has been prepared in accordance with the EA's "Cost Proposal for Completing Review of GHG Emissions Calculation" submitted to Honeywell on March 23, 2015.

The scope of this memorandum is limited to the following:

- Review 2015, 2014, and 2013 GHG Emissions Calculations prepared for the Site and inform Honeywell if there are any errors that may impact the calculated GHG emissions.
- Identify short or long term opportunities that may have a significant impact on the GHG emissions from the Site.

EMISSIONS CALCULATION SPREADSHEET REVIEW AND RECOMMENDATIONS:

The spreadsheet currently utilized by the Site to calculate GHG emissions comprise of seven (7) primary tabs. EA has utilized the 2015 GHG Emissions Calculation Spreadsheet to explain the contents and goal of each of the tabs. In addition, any error(s) identified in the spreadsheet is shown below:

- **Tab 1 Diagram –** This tab shows GHG emissions calculation methodology. It identifies various flow streams. This

- Internal Review
  - ✓ Completed by Honeywell HSE and Third Party
  - ✓ Recommended an In-Depth Fresh Review
- Subsequent Work
  - ✓ Completed In-Depth Review of the on-Site Process
  - ✓ Completed In-Depth Review of the Emission Calculation
  - ✓ Discussed Basis of Calculation with Site Operators
  - ✓ Provided Recommendations of Improvements

Honeywell ENGINEERING ALLIANCE, INC.

Task Action Spreadsheet Review Process (Continual Reinforcement and Verification – Example)

Honeywell	HSE Management System Level 2 Standard	Document Owner	Eugene Thomas
		Approved By	Evan van Hook
		Issue Date	November 25, 2002
Environment Air Emissions		Effective Date	November 25, 2002
		Rev. # & Date	00 November 25, 2002
		Standard #	Envr 3

1.0 APPLICABILITY

1.1 This procedure is applicable to all Honeywell organizations and majority owned subsidiaries worldwide. It establishes minimum requirements that must be met by all organizations.

1.2 In addition to complying with this procedure, organizations must ensure that they are in compliance with all applicable national, state, and local regulations.

1.3 Each Honeywell Strategic Business Group (SBG) must either adopt this procedure or develop its equivalent SBG procedure. The SBG equivalent procedure must be reviewed and approved by the corporate owner of this standard for equivalency.

1.4 Each Honeywell site or organization must customize either this procedure or its SBG's equivalent procedure.

1.5 Each Honeywell site or organization must review this procedure for any conflicts and/or additions with country requirements, and add additional country requirements to the appropriate organization's procedure.

1.6 Whenever a Honeywell Procedure is more stringent than the applicable national, state, and local regulations, the Honeywell Procedure shall apply.

1.7 Honeywell organizations that have determined that this procedure is not applicable to them do not need a site procedure on this topic. The organization must document in its SAT the rationale for determining that this procedure is not applicable

2.0 OVERVIEW

2.1 To provide the minimum program requirements for the management of air emissions.

- Reinforcement Process
  - ✓ Procedures and Checklists Developed for Multi-Media Review
  - ✓ Completed by Implementing Site-Specific Procedures
  - ✓ Frequent Review Completed by Honeywell Staff and Outside Consultants
  - ✓ Self Assessment Process
  - ✓ Review of Plans and Standard Procedures
  - ✓ Sharing Lessons Learned from Other Similar Facilities

Honeywell ENGINEERING ALLIANCE, INC.

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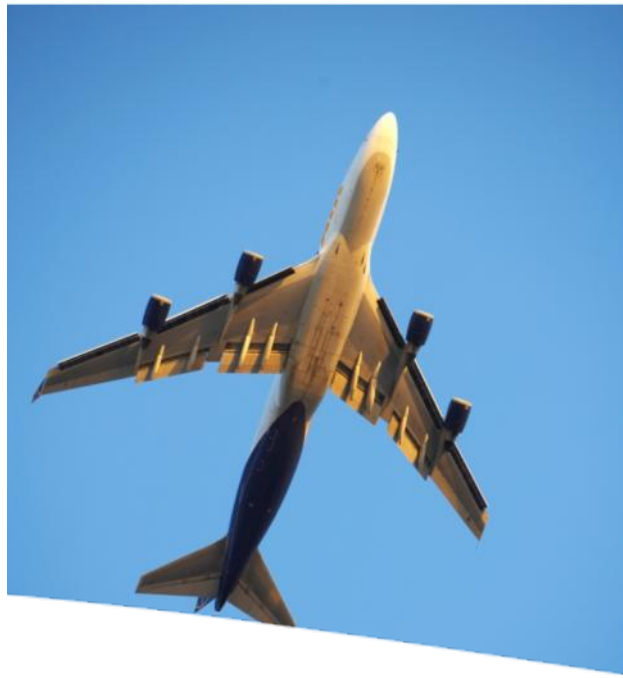


Thank You For Your Attention

Gregory.bopp@honeywell.com

IMPROVING Emission Calculations

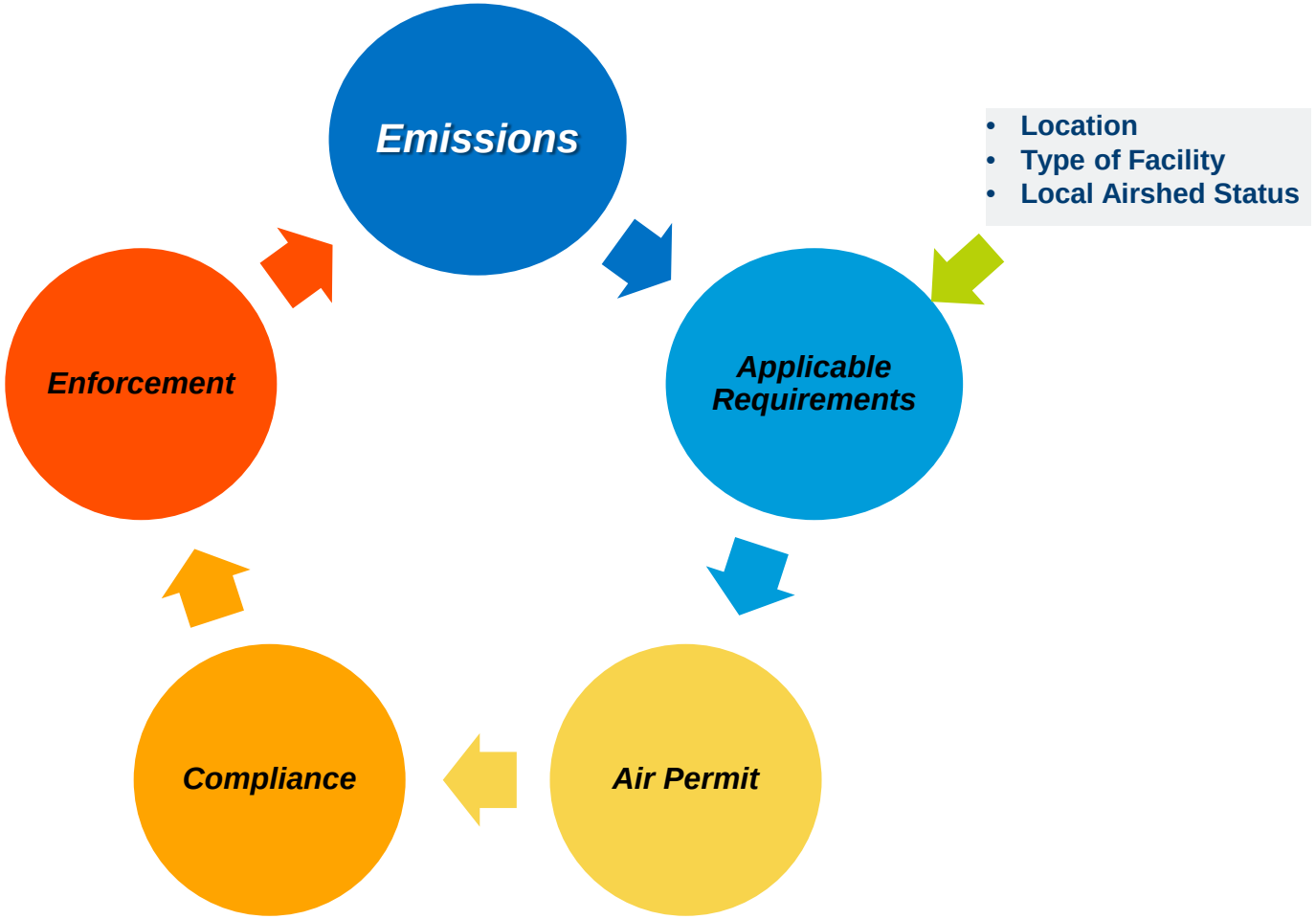
Geetha Shankar/Sean Aldrich

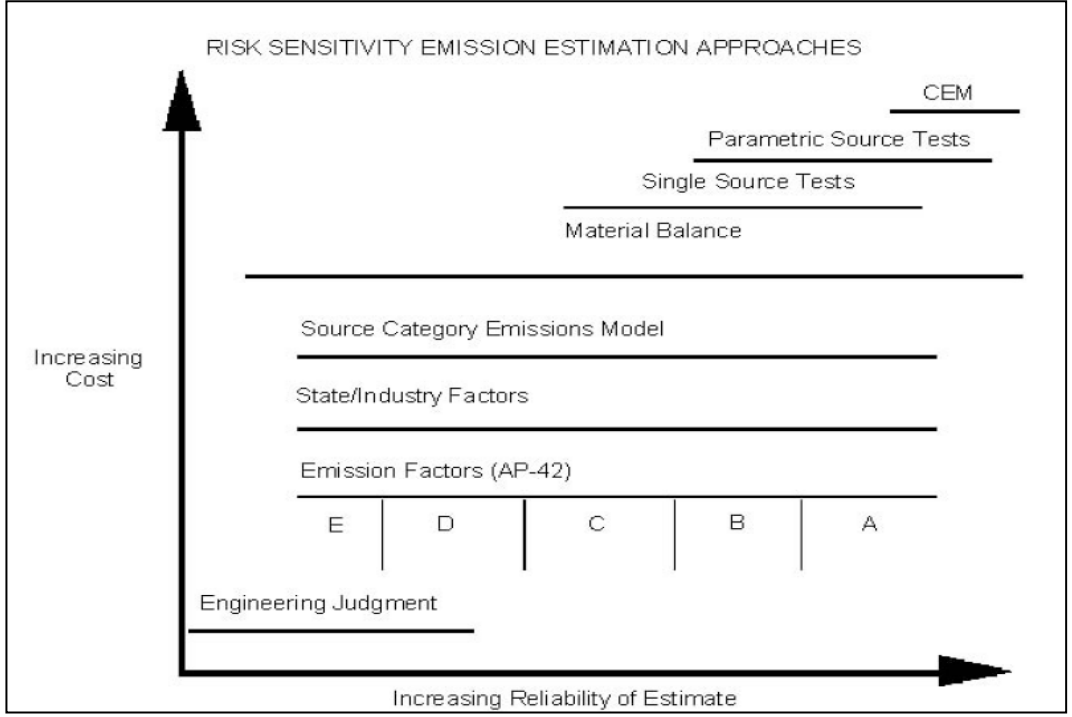
July 14, 2016

Improving Emission Calculations

- Emission Levels directly impact Air Permit Requirements
- Emission Calculation Hierarchy
- Using “Engineering Judgment”
- Using EPA or local Agency Emission Factors
- Using Mass Balance
- Using Periodic Monitoring
- Using Continuous Emission Monitoring
- Intel’s Hybrid Methodology and Exploreintel.com
- Questions

Emission Levels are directly related to Permit Requirements





Emission Calculation Hierarchy

EPA AP-42 Guidance Document

EMISSION CALCULATION METHOD HIERARCHY:

When preparing emission information for your report, the most accurate method for calculating **actual** emissions must be used. The hierarchy listed below outlines the preferred methods for calculating emission estimates (taken from County Rule 280, Section 305.1).

(1) Whenever available, emissions estimates should be calculated from continuous emissions monitors certified under 40 CFR Part 75, Subpart C, or data quality assured pursuant to Appendix F of 40 CFR, Part 60.

(2) When sufficient data obtained using the methods described in paragraph 1 is not available, emissions estimates should be calculated from source performance tests conducted pursuant to Rule 270 in Maricopa County's Air Pollution Control Rules and Regulations.

(3) When sufficient data obtained using the methods described in paragraphs 1 or 2 is not available, emissions estimates should be calculated from material balance using engineering knowledge of the process.

(4) When sufficient data obtained using the methods described in paragraphs 1 through 3 is not available, emissions estimates shall be calculated using emissions factors from EPA Publication No. AP-42 "Compilation of Air Pollutant Emission Factors," Volume I: Stationary Point and Area Sources.

(5) When sufficient data obtained using the methods described in paragraphs 1 through 4 is not available, emissions estimates should be calculated by equivalent methods supported by back-up documentation that will substantiate the chosen method.

MCAQD Annual Air Emission Inventory Guidance

Using “Engineering Judgment”

- Generally considered the least accurate calculation method
- Usually only accepted if there is an historical precedent and/or technical guidance from a respected source
- Be careful in using equations based soley on predicted evaporation rates
  - *Can lead to emissions being greater than actual chemical usage*
- Not a recommended method if using to demonstrate compliance to an emission limit if there is little margin for error

Using Agency Emission Factors

- Published Emission Factors can vary widely on comparisons to actual source test data and this is represented by EPA confidence ratings
  - *A being the best and E being the worst rating*
- Almost always conservative and can greatly overestimate actual emissions in some cases
- Easily defendable and generally less effort by AQ staff to perform calculations
- If a new or modified source is just over a certain emission threshold (i.e. Major Source, BACT, etc.) using Agency Emission Factors, more refined emission calculations should be performed

Using Mass Balance

- Very defendable with accurate recordkeeping
- Keep in mind a source can use purchase records, usage records, and take into account documented waste transfers
  - *Purchases > Actual Usage Data > Actual Usage Data - Waste*
- Understand that mass balance calculations of low volatility chemicals that don't account for waste typically grossly overestimate emissions
- Can become complicated if a particular chemical has many differerent uses in the manufacturing process

Using Periodic Monitoring

- Typically includes Start-up and subsequent 5-yr test results
- Sources can always elect to test more frequently, especially if one of the reasons to conduct source tests is to improve transparency
  - *…but also much higher cost than Emission Factors or Mass Balance*
- Can be normalized to production to account for changes in manufacturing rates between tests
- Every test can be a roll of the dice to some extent and the source has to live with test results until the next compliance test
  - *...but very likely to result in lower emission rate than Emission Factors or Mass Balance*
- There are some inherent limitations in some test methods that need to be considered before testing and when analyzing results

Using Continuous Emission Monitors (CEMs)

- Clearly the most accurate emission calculation methodology
- Sources don’t typicall install CEMs unless it is a requirement or to increase transpareny
- CEMs require the most resources to be properly operated, maintained, and to document compliance
- Many more opportunities for NOVs and malfunctions
- Quality Assurance Provisions 40 CFR 60 Appendix F

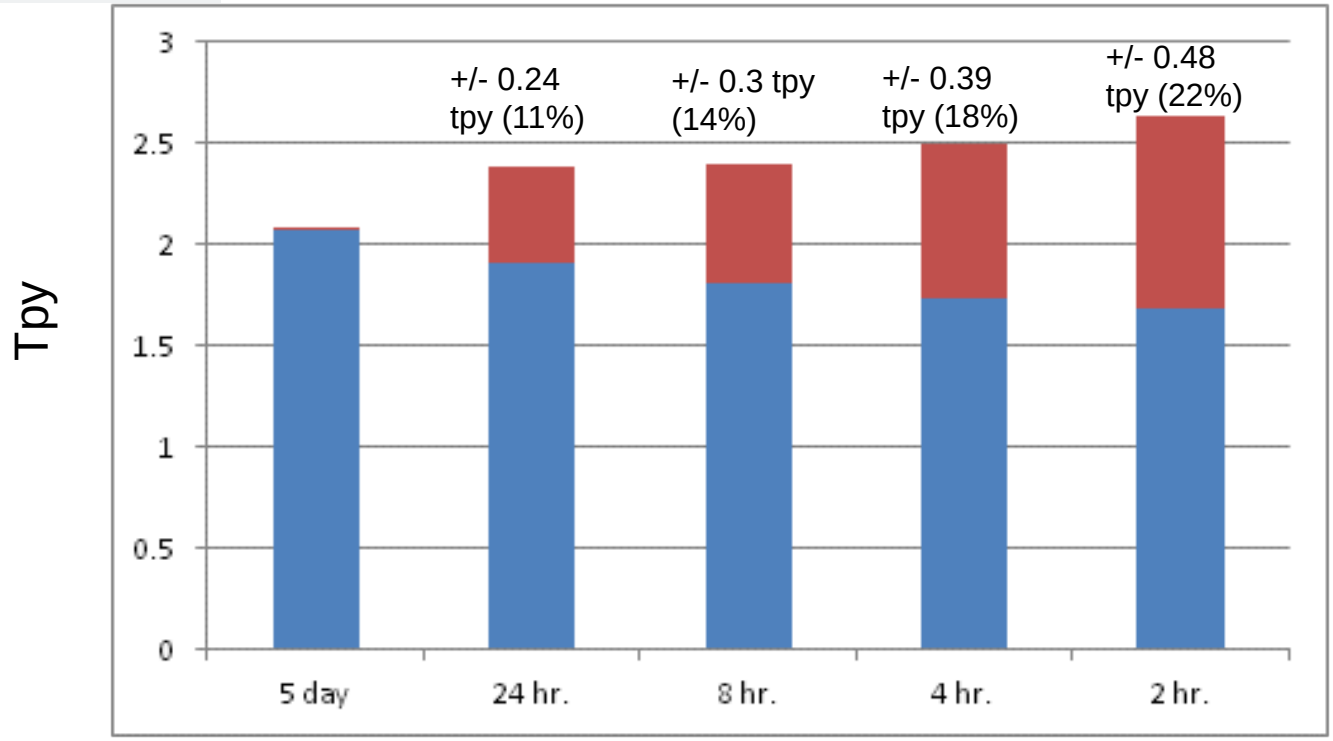
Intel – Hybrid Approach

- Annual or Quarterly Stack Testing
  - Statistical Signifigance – using 8 hr results for annual emission rates
  - 8 hr Fab VOC Abatement (M25a - CH4, CO/NOx) timing based on variability
  - 8 hr Fab Scrubbers (HF, HCl, Cl2, CO, VOC – FTIR/M26a)
  - Normalize to production by Fab activity
  - Can use data for 5-yr Performance Test requirements
- Specific FTIR Tool Testing
  - Low use Organic and Inorganic HAPs not tested
- Mass Balance
  - VOC Fugitives (mostly IPA wipers)
- Manufacturers' Specs
  - Emergency Generators
- 5 Yr Periodic Tests
  - Boilers, Trimix waste systems

Converting Periodic Testing to Annualized Emission Rates

How much impact does time variability have?

Max and min test results from various time blocks, Fab 32



- 24 hr. test period produces variability between highest and lowest readings of only +/- 0.25 tpy (11%)
- Decreasing test period to 2 hrs. results in variability in annual emissions of +/- 0.5 tpy (22%)
- Conclusion: sample period of 1 day or less can provide sufficient accuracy

Figure 12.8
Fab 32S/32 (Constructed 2000/2006)

F32 POU HCl Wet Scrubber

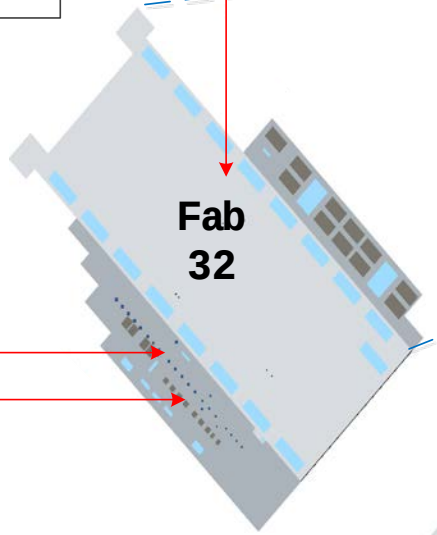
Qty: 1
Manufacturer: Edwards
Model: Helios, HCL501
Year Installed: 2008
CFM: 0.1 (HCl flow)

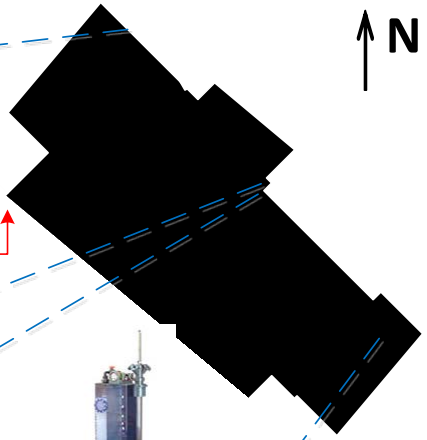
F32S/32 Trimix Catalytic Oxidizer A & B

Qty: 2
Manufacturer: Catalytic Products Int.
Model: PWB2(B)-OX293-0-70
Year Installed: 2011 (#A), 2013 (#B)
CFM: 7,500

F32 RCTO 1-4

Qty: 4 (3 existing, 1 future)
Manufacturer: Munters
Model: IZS-DS2900-TH (3), IZS-DS2946-TH(1)
Intel Number: F32-VOC-138-0(1-3)-120 , TBD (#4)
Year Installed: 2006 (3), Future (1)
CFM: 23,400

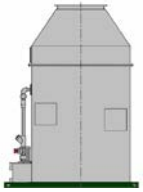




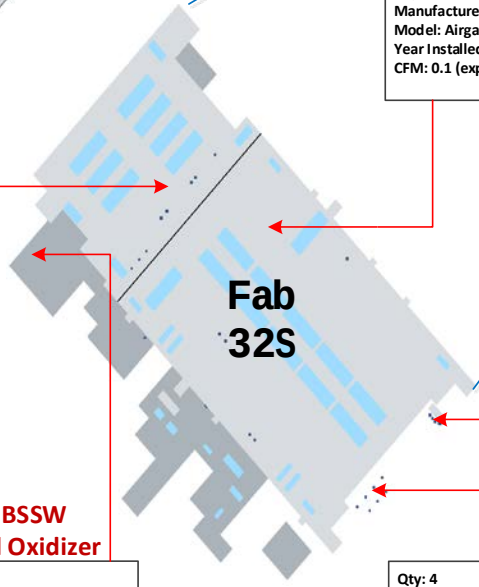
F32S POU HCl Wet Scrubber

Qty: 1
Manufacturer: Ebara
Model: Airgard, SC-501-1-01C
Year Installed: 2015
CFM: 0.1 (expected HCl flow)

F32 Scrub 1-5



Qty: 5
Manufacturer: Ceilcote APC
Model:SPTR-126X126-63
Intel Number: F32-SC-133-0(1-5)-100
Year Installed: 2006
CFM: 55,000



F32S RCTO 1-3

Qty: 3
Manufacturer: Munters
Model: IZS-DS2946-TH (3)
Intel Number: F22-OCF2-VOC-138-(3-5)-120
Year Installed: 2016 (2), 2011 (1)
CFM: 25,000

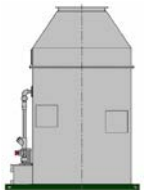
F32S Bridge Scrub 1-4

Qty: 2 (2 existing, 2 future)
Manufacturer: Beverly Pacific
Model: PSH-3860-6
Intel Number: F22-OCB2-SC-133-(1-2)-400, TBD (#3-4)
Year Installed: 2000 (2), Future (2)
CFM: 60,000

F32S BSSW Thermal Oxidizer

Qty: 1
Manufacturer: Catalytic Products Int.
Model: Quadrant SR-300
Serial Number: SK296-1-24
Intel Number: ZSC-296-1-24C
Year Installed: 2011
CFM: 300

F32S Scrub 1-4



Qty: 4
Manufacturer: Beverly Pacific
Model: PSH-3860-5
Intel Number: F22-OCF2-SC-133-(1-4)-100
Year Installed: 2000 (3), 2011 (1)
CFM: 50,000

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QUESTIONS?