

Authored By: John Atchison	<b>Blanchard Refining Company LLC Galveston Bay Refinery</b>	Doc No.: REW-000006-GB Rev No: 0
Doc Custodian: Environmental Supervisor		Refinery Environmental Work Procedure
Approved By: Eric Kaysen	<b>ENV-14 Maintenance, Start-up, and Shutdown (MSS) Activities – Vacuum and Air Mover Trucks</b>	
Date Approved: 7/26/2021	Next Review Date: 8/31/2026	Effective Date: 8/20/2021

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## 1.0 Purpose

This practice outlines the requirements that apply to vacuum and air mover truck operations at the Galveston Bay Refinery and Galveston Bay Refinery Docks and should be used concurrently with GBR-HESS-PR-18 Safe Use of Vacuum and Pneumatic Trucks for safe and compliant use of this equipment.

## 2.0 Scope

This procedure applies to all activities involving planned and/or predictable maintenance use of vacuum and air mover truck activities to capture air emissions data required by the MSS permit. Septic trucks are exempt from this procedure and the equipment used to perform the change outs.

## 3.0 Procedure

### 3.1 Roles and Responsibilities

Galveston Bay Refinery site personnel and contractors with MSS responsibilities shall understand their job function within the scope of the MSS Activities - Vacuum and Air Mover Trucks Procedure.

- 3.1.1 Operations: Operations monitor MSS performance through the Safe Work Permit and Job Safety Analysis process ensuring that risks are assessed for each vacuum truck and/or air machine job that is performed in their area of responsibility.
- 3.1.2 Maintenance: Maintenance personnel will monitor MSS performance through the permitting process ensuring that risks are assessed for each vacuum truck and/or air machine job that is performed in their area of responsibility.
- 3.1.3 Carbon Contractors: The carbon contractor will be responsible for supplying an adequate supply of carbon for change outs to ensure that work can progress at a reasonable pace with minimal delays.

Carbon loading and unloading from vacuum trucks and air machines roll-off boxes will occur at the West End Waste Storage Facility. The Galveston Bay Refinery carbon contractor will complete a log for all carbon canister change outs each month detailing when the carbon was changed in each container. At a minimum the form shall contain the date, time and canister identification number. This log shall be delivered to the MSS SME by the 5th working day of every month.

The carbon contractor shall provide a copy of their procedures for the change outs and copies of training records for any employee using the carbon change out equipment.

- 3.1.4 Vacuum/Pneumatic Truck Contractors will be responsible for the following:
  - 3.1.4.1 Maintain and inspect their equipment
  - 3.1.4.2 Perform air emission monitoring as required by the MSS permit
  - 3.1.4.3 Daily calibration of air emission monitoring equipment
  - 3.1.4.4 Maintain vacuum and air mover truck transfer records
  - 3.1.4.5 Ensure that their employees are trained on air emission monitoring equipment
  - 3.1.4.6 Ensure that their employees are trained on the operation of the carbon absorption systems.
  - 3.1.4.7 Ensure employees are trained on required documentation for tracking of records required by the MSS Permit and provide copies of the recordkeeping to the Environmental Department by the 5th working day of each month.
  - 3.1.4.8 Provide an adequate supply of liquid scrubbing material appropriate for the job

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and the change out of that liquid material ensuring that any spent absorbing solution is discharged into a closed container, vessel or system.

- 3.1.4.9 The vacuum truck vendor will notify the on-site roll-off contractor to procure or remove a carbon roll-off box from a job site.
- 3.1.4.10 Sample ports must be labeled appropriately on any carbon absorption system used. If canisters are swapped due to breakthrough the new sample ports must be labeled appropriately.
- 3.1.4.11 Carbon boxes must be labeled and marked as spent or usable along with the company name and date last used including the last air emission results.
- 3.1.5 On-Site Roll-off Contractor: The on-site roll-off contractor will be responsible for moving roll-off containers of carbon to and from the actual job site.
- 3.1.6 Subject Matter Expert (SME): The MSS SME will ensure that proper documentation and training is provided to Galveston Bay Refinery site personnel which are identified as personnel associated with vacuum and air mover trucks and placed in the VTA training module.
  - 3.1.6.1 The MSS SME will ensure that appropriate procedures are updated as required.
  - 3.1.6.2 The MSS SME will ensure that all air emission documentation is gathered from the appropriate vacuum, air mover, or third-party vendor and air emissions are tracked on a 12-month rolling average to ensure that emission caps are not exceeded. The air emissions spreadsheet will also provide documentation for BWON emissions for use in the TAB report.
  - 3.1.6.3 The MSS SME will ensure that training records are submitted by the vacuum truck vendors.

## 3.2 General Requirements

### 3.2.1 Background and Safety Considerations

Carbon canisters containing activated carbon beds is a commonly employed air emissions control device used throughout the refining and petrochemical industry to adsorb hydrocarbons from vapor streams to achieve compliance with BWON, MSS and other air regulations. While the operation of activated carbon adsorption is viewed as generally safe, there have been some reports of hot-spot related fires within the industry referred to as "Thermal Excursions". Hot spots are caused by the high heat of adsorption of hydrocarbon to the carbon. To guard against this and other potential hazards, the following guidelines have been developed for monitoring and change-out of carbon canisters.

- 3.2.1.1 Flame arrestors are required for vacuum/pneumatic trucks and trailers using carbon. An appropriate in line flame arrestor, placed in the vapor recovery line between the vacuum/pneumatic truck discharge exhaust and close to the vapor recovery unit, will mitigate or prevent flashback from the vapor recovery unit into the vacuum/pneumatic truck.
  - API RP 2219, 2005 Safe Use of Vacuum Trucks
- 3.2.1.2 Upon completion of vacuuming an acid or base job or transfer the carbon must be replaced on the truck whether spent or not.
- 3.2.1.3 When cleaning a reportable quantity spill, the carbon shall be replaced when benzene breakthrough occurs or when the cleanup is complete. Vacuum trucks shall not leave the facility with used carbon or used liquid scrubbing material unless prior approval has been obtained from Marathon.

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### 3.2.2 Exceptions/Applicability

3.2.2.1 This procedure is applicable to vacuum and air mover truck operations that involve collection of material that is known to contain volatile organic compounds (VOCs).

3.2.2.2 A complete list of materials that these requirements do not apply to is not practical. However, some potential exceptions are noted. Such as, vessels that have been cleaned and gas free for entry and have activities such as sandblasting or refractory removal that was chipped by hand or mechanical means can have the material removed with an air machine that does not require air emission controls as long as the VOC concentration in the vessel remains at 0.0 ppm.

### 3.3 Vacuum and Air Mover Trucks

Vacuum and air mover trucks shall be operated with the following conditions.

3.3.1 All Vacuum and air mover truck air emissions must be routed to two carbon canisters in series with a liquid scrubber system upstream of the carbon and be equipped with a flame arrestor.

3.3.2 A duckbill or equivalent must be used on the equipment fill line intake if the hose end cannot be continuously submerged in the liquid being collected.

3.3.3 The information below is required to be recorded on paper forms MSS-0007 and MSS-0008 and provided to the Environmental MSS SME by the 5<sup>th</sup> working day of each month for all loads from the previous month.

3.3.4 Record the process unit at which the activity is occurring including the equipment identification number and common name of the process unit (and/or equipment) as applicable.

3.3.4.1 Record the reason for and type of planned activity.

3.3.4.2 Prior to initial use, identify if there is any liquid in the truck, if so identify the material.

3.3.4.3 Record the liquid level (volume) prior to initial use.

3.3.4.4 Record the start and completion date and time of each transfer.

3.3.4.5 After each transfer, identify the liquid transferred.

3.3.4.6 Record the duration of any periods when air may have been entrained during the liquid transfer and the reason for operating in this manner.

3.3.4.7 Record the volatile organic compound(s) (VOC) and/or benzene exhaust concentration when starting the transfer, when ending the transfer (while vacuum is engaged).

3.3.4.8 Record the volume in the vacuum truck at the end of the day or the volume that was unloaded as applicable.

3.3.4.9 Record required air monitoring data.

### 3.4 Control Devices

Control devices shall be operated with no visible emissions. The following control devices are required for use on a vacuum and air mover trucks at the Galveston Bay Refinery and Galveston Bay Refinery Docks.

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- 3.4.1 A Carbon Adsorption System (CAS) that consists of two carbon canisters in series and liquid scrubbing system upstream shall be used.
- 3.4.2 Liquid scrubbers upstream of the carbon canisters must be closed systems and spent discharged solution shall be discharge to a closed container, vessel, or system. Chemicals used for liquid scrubbers shall be approved by Marathon through the MOC process and entered into the MSDS database before entry into the facility is allowed.

3.5 Air Contaminant Concentration

VOC and benzene concentration shall be measured using an UltraRAE device meeting all the requirements specified in Method 21 (40 CFR 60, Appendix A) with the following exceptions:

- 3.5.1 The instrument shall be calibrated within 24 hours of use with a calibration gas such that the response factor of the VOC (or mixture of VOCs) to be monitored shall be less than 2.0. The calibration gas and the gas to be measured, and its approximate response factor shall be recorded on MSS Form 0008
- 3.5.2 VOC data recording shall not begin until after 2 times the instrument response time. The following shall be recorded.
  - 3.5.2.1 The date and time of calibration shall be recorded.
  - 3.5.2.2 VOC concentration shall be monitored for at least 5 minutes recording the concentration each minute.
  - 3.5.2.3 The highest measured VOC and/or benzene concentration shall be used to determine breakthrough as defined in Section III.
- 3.5.3 Colorimetric gas tubes that are used to determine benzene concentration shall meet the following requirements:
  - 3.5.3.1 The air concentration measured must be less than 80% of the range of the tube. If the maximum range of the tube is greater than the release concentration (10,000\* mole fraction of the total air contaminates presents that can be detected by the tube) the concentration measured must be at least 20% of the maximum range of the tube.
  - 3.5.3.2 At least 2 colorimetric samples shall be taken at least 5 minutes apart.
  - 3.5.3.3 The following records must be maintained:
    - The tube type
    - Range
    - Measured concentrations
    - Time samples were taken
  - 3.5.3.4 The vacuum truck contractor shall record all required monitoring data on Form MSS-0008 as applicable and provide to MSS SME.

3.6 Sampling

Prior to transfer, vacuum truck contractors shall ensure the job is risk assessed under the Safe Work Permit and Job Safety Analysis process and all associated site safety practices/procedures have been reviewed, understood and complied with as applicable.

- 3.6.1 Ensure the UltraRAE instrument has been calibrated as required within 24 hours of use and documented on form MSS-0008.
- 3.6.2 Prior to start of transfer, sample background concentration and document results on form MSS-0008.
- 3.6.3 At the start of transfer with vacuum engaged; take a VOC and benzene sample

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downstream of the first carbon canister. During VOC sampling, data recording shall begin after two (2) times the instrument response time. Concentration shall be monitored for at least five (5) minutes, recording concentration each minute. Benzene concentration shall be measured using the RAE-Sep colorimetric tube. At least two (2) samples shall be taken at least five (5) minutes apart. Recordkeeping shall be logged on form MSS-0008. The highest concentration shall be used to determine breakthrough.

3.6.4 At the end of loading transfer, take a VOC and benzene sample downstream of the first carbon canister. During VOC sampling, data recording shall begin after two (2) times the instrument response time. Concentration shall be monitored for at least five (5) minutes, recording concentration each minute. Benzene concentration shall be measured using the RAE-Sep colorimetric tube. At least two (2) samples shall be taken at least five (5) minutes apart. Recordkeeping shall be logged on form MSS-0008. The highest concentration shall be used to determine breakthrough. If the duration of the transfer is 12 hours or longer, sampling shall be performed every 12 hours in addition to sampling at the start and end of each transfer.

3.6.5 More frequent sampling to determine breakthrough/efficiency of air emission control devices can be conducted by the vendor; however, this is not required. Additional sampling must be recorded and performed as required above.

3.6.6 Upon breakthrough, hoses must be swapped from the primary canister to the secondary canister essentially making the secondary canister the primary canister. Note this change in canisters including the date and time on MSS form 0008 next to the breakthrough concentration. Once complete, work may continue, and sampling will continue every 12 hours.

**NOTE:** The original primary canister must have the carbon changed out on the vehicle within 24 hours and documented on MSS form 0007.

3.6.7 If dual carbon canisters are used without a liquid scrubber, then sampling must be performed every hour until the job is complete or breakthrough occurs.

3.6.8 Forms and documentation must be submitted to the MSS SME by the 5th working day of the following month that work was performed.

### 3.7 Required Documentation

3.7.1 Form: MSS 0006 – Sample MSS Carbon Canister Change-Out Log

3.7.2 Form: MSS 0007 – MSS Vacuum Truck Form

3.7.3 Form: MSS 0008 – MSS Vacuum Truck Calibration and Monitoring Log

## 4.0 Definitions

4.1 **Vacuum Truck** – A vacuum truck is a tank truck that has a pump and a tank. The pump is designed to suck liquids, sludges, slurries, or the like from a location into the tank of the truck.

4.2 **Air Mover Truck** – a truck which conveys material, using a high velocity air stream, into a receiving tank. Air mover trucks may not be used to pick up liquid hydrocarbons or hydrocarbon contaminated sludge.

4.3 **Breakthrough** – The highest measured VOC concentration at or exceeding 50 ppm above background or highest measured benzene concentration at or exceeding 1 ppm above background.

4.4 **“Job” and “transfer”** referenced in this document are defined as every load. One truck may have multiple loads in one day. Transfer is when vacuum engaged.

4.5 **MSS SME (Maintenance Start-up & Shutdown Subject Matter Expert)** – An Environmental

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person that can communicate with refinery personnel the rules and regulations that pertain to vacuum and air mover trucks. The MSS SME resides in the Environmental Department.

## 5.0 References

None

## 6.0 Attachments

- 6.1 [ENV-14A MSS-0006 Carbon Change Out Tracking Log](#)
- 6.2 [ENV-14B MSS-0007 Vac Truck Form](#)
- 6.3 [ENV-14C MS-0008 Vacuum Truck Calibration and Monitoring Log](#)

## 7.0 Revision History

Revision Number	Description of Change	Written by	Approved by	Revision Date	Effective Date
0	Original Issue. New integrated site procedure replaces GBR-HESS-ENV-14 and REW-N017-BWON-TC under MOC 93391.	J. Atchison	E. R. Kaysen	7/26/2021	8/20/2021

**Carbon Shipment On Site/Off Site Tracking Log**

**Date:**

<b>Date</b>	<b>Number Spent Carbon Sacks</b>	<b>Number New Carbon Sacks</b>	<b>New Carbon Box ID #</b>	<b>Spent Carbon Box ID #</b>	<b>Spent Carbon Can ID #</b>	<b>New Carbon Can ID #</b>	<b>Other Spent</b>	<b>Other New</b>	<b>Company</b>	<b>Truck Number</b>





**Galveston Bay Refinery  
Maintenance, Start-up and Shut-down - Vacuum Truck Form**

Date: \_\_\_\_\_  
 PR-18a Vacuum Truck Authorization Form #: \_\_\_\_\_  
 Truck Number: \_\_\_\_\_  
 Driver Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Supervisor Name: \_\_\_\_\_

Pipeline Clearing  
 Pipeline Line Number: \_\_\_\_\_  
 Length of Pipeline: \_\_\_\_\_  
 Diameter of Pipe: \_\_\_\_\_  
 Driver signature: \_\_\_\_\_  
 Supervisor Signature: \_\_\_\_\_

Prior to Transfer				
Job Location (Unit)	Reason/Description for/of Planned Activity MO# _____	Associated Equipment Name and Identification	Identify Material in Truck Prior to Transfer (if none, write "none")	Identify Volume of Liquid in Truck Prior To Transfer (if none, write "N/A")
				(bbl)

**Transfer Process<sup>(1)</sup>**

Loading Start Time: \_\_\_\_\_ Loading End Time: \_\_\_\_\_

Air Emissions Control Type <sup>(2)(3)(4)</sup>	Identify Material to be Transferred	Temperature Inside Vessel (If ambient, write ambient)	Volume of Liquid Loaded
( ) CAS (Carbon Canisters) & Upstream Liq. Scrubber ( ) Other ( _____ ) * Choosing "Other" requires prior written approval	Include Percent Water	( _____ ) ( ) °C ( ) °F	(bbl)

If there were any periods of air entrainment with the liquid, identify the duration (total minutes): \_\_\_\_\_

Reason for the Air Entrainment	If There is Air Entrainment, In-Take Line Attachment <u>Must</u> be Used
( ) Removing solids ( ) Skimming oil ( ) ( _____ )	( ) Duckbill ( ) Stinger ( ) Not Applicable (only if <u>no</u> air entrainment)

**After Transfer**

Unloading Start Time: \_\_\_\_\_ Unloading End Time: \_\_\_\_\_  
 (if applicable) (if applicable)

Volume Unloaded from Truck (if unloading)	Volume of Liquid left in Truck After Transfer (if applicable)	Identify Controlled Unloading Area (if unloading)
(bbl)	(bbl)	

Carbon Use		
Was Breakthrough Encountered? <sup>(5)</sup> (i.e. carbon changed out)	Was Carbon Canister Changed Due to Incompatible Material or Spill?	Carbon Usage
( ) Yes ( ) No	( ) Yes ( ) No	( _____ ) ( ) yds or ( ) lbs

Date Carbon Changed: \_\_\_\_\_ Time Carbon Changed: \_\_\_\_\_

**Footnotes:**

- (1) Each driver will complete a form for every transfer. Note, there may be multiple transfers (loads) in one shift; therefore, multiple forms required to be completed per shift.
- (2) All vacuum truck transfers must be routed to a control device regardless of vapor pressure unless written approval is obtained from Environmental.
- (3) Carbon Adsorption System (CAS) requires a minimum of two (2) carbon canisters in series.
- (4) The associated MSS Vacuum Truck Calibration & Monitoring Log Form: MSS-0008 shall be filled out in conjunction with this form. All forms must be submitted to the MSS SME by the 5th day of every month following the job.
- (5) When breakthrough occurs, waste gas flow shall be stopped until fresh carbon replacement occurs in the spent canister.



**Galveston Bay Refinery**  
**MSS Vacuum Truck Calibration & Monitoring Log in support of MSS and TAR activities**

Responsible Unit/Area: _____	Calibration Technician: _____
MO#: _____	Technician Company: _____
Instrument Identifier: _____	Monitoring Technician: _____
Equipment Being Monitored (i.e. truck number): _____	Technician Company: _____
Primary Canister Number: _____	Secondary Canister Number: _____
Were hoses to canisters or canisters changed due to breakthrough? Yes ( ) No ( )	Date: _____ Time: _____
New Primary Canister Number _____	New Secondary Canister Number _____
Are sample ports labeled correctly as canisters are switched? Yes ( ) No ( )	

*Must provide MSS SME both the RAE Tube and the RAE Instrument/Detector data sheets annually (or for change of equipment).*

Calibration						
Method 21 Instrument? <sup>(a)</sup>	Calibration	Calibration Gas used <sup>(b)</sup>	Gas to be measured	Response Factor	Benzene Tube Type	Range (ppmv)
( ) Yes ( ) No <i>("no" must have prior approval in writing by Environmental)</i>	Date: _____ Time: _____					

Monitoring						
Sample Description <sup>(c)</sup>	Sampling Date <sup>(d)</sup>	Identify Background Concentration (ppmv)	Sample Number	Sampling Time <sup>(e)</sup>	Concentration (ppmv)	Identify the highest Concentration from previous column <sup>(f)</sup>
Upon Commencing Transfer			VOC Sample 1:			
			VOC Sample 2:			
			VOC Sample 3:			
			VOC Sample 4:			
			VOC Sample 5:			
			Benz. Sample 1:			
			Benz. Sample 2:			
Intermediary Sample:			VOC Sample 1:			
			VOC Sample 2:			
			VOC Sample 3:			
			VOC Sample 4:			
			VOC Sample 5:			
			Benz. Sample 1:			
			Benz. Sample 2:			
End of Transfer:			VOC Sample 1:			
			VOC Sample 2:			
			VOC Sample 3:			
			VOC Sample 4:			
			VOC Sample 5:			
			Benz. Sample 1:			
			Benz. Sample 2:			

Comments: \_\_\_\_\_

**Footnotes:**

- (a) VOC concentration shall be measured using an instrument meeting all the requirements specified in EPA Method 21 (40 CFR 60, Appendix A) with the noted exceptions.
- (b) Calibration gas used is required to be such that the response factor of the VOC (or mixture of VOCs) to be monitored shall be less than 2.0.
- (c) For two (2) carbon canisters in series with an upstream liquid scrubber, sampling must occur prior to start of transfer, at the end of each transfer, and every 12 hours depending on the duration of the transfer. Any sampling in addition to the specified frequency must be recorded and sampled per Environmental policies and procedures.
- (d) The instrument must be calibrated within 24 hours of use.
- (e) During VOC sampling, data recording will not begin until after two (2) times the instrument response time. The VOC concentration will be monitored for at least five (5) minutes, recording VOC concentration each minute. During Benzene sampling, the benzene tube must be used in accordance with manufacturer's guidelines and two (2) samples shall be taken at least 5 minutes apart.
- (f) The highest measured concentration will be used to determine breakthrough.