Authored By: John Atchison	**Blanchard Refining Company LLC** **Galveston Bay Refinery**	Doc No.: REW-000007-GB Rev No: 0
Doc Custodian: Environmental Supervisor	**ENV-15 Maintenance, Start-up, and Shutdown and TAR – Equipment Depressurizing, Degassing and Emptying**	Refinery Environmental Work Procedure
Approved By: Eric Kaysen		
Date Approved: 7/26/2021	Next Review Date: 8/31/2026	Effective Date: 8/20/2021

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1.0 Purpose

The purpose of this practice is to define the requirements for depressurizing, degassing, emptying, and placing into service equipment scheduled for a planned maintenance, start-up, and shutdown (MSS) and/or turnaround (TAR) activity to reduce emissions of VOC to atmosphere. These activities are regulated under the Maintenance, Start-up & Shutdown air emissions NSR Permit issued to the Galveston Bay Refinery and Refinery Docks. AU2 unit MSS activities are also regulated by SSMP guidelines specified in National Emission Standards for Hazardous Air Pollutants (NESHAP) as referenced in HSSE Practice ENV-11 Startup, Shutdown, and Malfunction Plans (SSMP) for Regulated Units.

The MSS air emissions permit requires the site to account for and sum all air emissions generated from planned or predictable MSS and TAR activities on a rolling 12 month basis.

2.0 Scope

Process equipment or facilities containing VOC must be depressurized and degassed to an air emissions controlled recovery system or a control device until air emissions sampling indicates that the VOC concentration is less than or equal to 10% of the LEL or the requirements per the site's safety policy (whichever is lower) using an approved air emissions monitoring device and monitoring procedure.

3.0 Procedure

3.1 Roles and Responsibilities

3.1.1 MSS SME

Shall ensure data is complete, collected from Asset Coordinators as directed and summarized on a 12 month rolling average.

3.1.2 HON SME

Shall ensure environmental monitoring data is complete, required boxes are checked for AU2 activities, and collected from Asset Coordinators as directed.

3.1.3 Unit Operations

Shall be responsible for depressurizing, empting, degassing, and placing equipment back into service for MSS and TAR activities. Unit operations shall also be responsible for taking & recording all required air emission monitoring results.

3.1.4 Asset Coordinator

Shall be responsible for collecting and submitting recordkeeping information to the MSS SME by the 5th working day of the following month that activities occurred.

3.1.5 Area Team Leads

Shall ensure the required Unit Operator activities are completed when required in accordance with the MSS air emission permit.

3.1.6 Unit Optimization Engineers

Are responsible for providing estimated emissions to Environmental Department at least 10 days prior or as soon as practicable to initiating planned activity involving flaring. Final emissions calculations must be provided within 10 days following the completion of the planned activity.

3.2 General Requirements

3.2.1 All liquids from hydrocarbon process equipment or storage vessels must be removed to

the maximum extent practicable prior to opening or degassing and/or performing maintenance. Liquids must be drained to a closed vessel unless configuration of the equipment does not allow liquid to be drained to a closed system. In this case, the liquid can be emptied into an open container such as a pan, bucket, etc. as long as the open container is closed or emptied within one hour of the liquid being drained into the container.

3.2.2 Prior to opening for maintenance, the pressure in the vessel / equipment should be reduced to less than 5 psig.

3.2.3 Facilities to be degassed shall not be vented directly to atmosphere except as necessary to establish isolation of the work area or to monitor VOC concentration following controlled depressurization. If venting directly to atmosphere during these instances, venting shall be minimized and actions recorded. The control device or recovery system used shall be recorded with the estimated emissions from controlled and uncontrolled degassing. All records shall be delivered to the Environmental MSS SME for recordkeeping purposes.

NOTE: if material being vented to a flare includes Benzene, be aware the hourly MSS permit limit for the refinery is 28.3 lbs/hr after combustion. This needs to be considered when planning maintenance activity.

3.2.4 Venting directly to atmosphere except as necessary to verify an acceptable VOC concentration and establish isolation of the work area is unacceptable until the VOC concentration has been verified to be less than 10% of LEL or equivalent per the site safety practice.

Maintenance on the following specific equipment where the isolated system volume are typically less than 30 cubic feet will be tracked using maintenance orders (MO).

3.2.4.1 Pump repair/replacement.

3.2.4.2 Fugitive component (valve, pipe, flange) repair/replacement

3.2.4.3 Compressor repair/replacement

3.2.4.4 Heat exchanger repair/replacement

3.2.4.5 Vessel repair/replacement

3.2.4.6 For MSS activities not listed above, the emissions associated with that activity shall be recorded and include at least the following:

3.2.4.6.1 The process unit including the emission point number and common name of the process unit.

3.2.4.6.2 The type of planned MSS activity and the reason for the activity.

3.2.4.6.3 The common name and the facility identification number, if applicable, of the facilities at which the MSS activity and emissions occurred.

3.2.4.6.4 The date and time of the MSS activity and its duration.

3.2.4.6.5 The estimated quantity of each air contaminant, or mixture of air contaminants, emitted with the data and the methods used with good consistent engineering practices.

3.2.4.7 If process equipment is purged with a gas or steam, The locations and/or identifiers where the purge gas or steam enters the process equipment or storage vessel and the exit points for the exhaust gases shall be recorded

(PFD's or P&ID's may be used to demonstrate compliance with the requirement). Documented refinery procedures used to de-inventory equipment to a control device for safety purposes (i.e., hot work, vessel entry procedures, safe equipment preparation guidelines, unit/equipment specific shut-down and start-up procedures) that achieve at least the same level of purging may be used in lieu of the above. The purge gas must have passed through the control device or controlled recovery system for a sufficient period of time in accordance with the applicable site operating procedures before the vent stream may be sampled to verify acceptable LEL reading prior to uncontrolled venting.

3.2.4.8 The sampling point shall be upstream of the inlet to the control device or controlled recovery system. The sample locations and collection systems must be located downstream of the process equipment or vessel being purged. The facilities shall be degassed to a controlled device or controlled recovery system until the VOC is less than or equal to 10% of the LEL.

3.2.4.9 Gases and vapors may be vented directly to atmosphere if the following are met for activities identified in Section 3.2.4:

3.2.4.9.1 It is not technically practicable to depressurize or degas into the process, and;

3.2.4.9.2 There is not an available connection to a plant control system such as a flare, and;

3.2.4.9.3 There is no more than 50 lbs of air contaminant to be vented to atmosphere during shutdown or startup.

3.3 Emission Measurement Monitoring

The MSS permit allows for one of the following air emission monitoring devices below to be used when performing air emission monitoring. Each meter has its own requirements on calibration as described in this section. When needing total VOCs you may use a LEL monitor or the Ultra Rae. If you are monitoring for a specific chemical you will need to use one of the following colorimetric tubes described in this section.

3.3.1 LEL Emission Monitoring

3.3.1.1 The detector shall be calibrated monthly at the Main Warehouse.

3.3.1.2 Each shift shall perform a bump test on each detector.

3.3.1.3 **Records, including the date, time and test results shall be maintained. Record monitoring results on MSS EPA L.E.L. Test Log (ENV-15A). For AU2 unit, check the required box.**

3.3.2 Ultra RAE Emission Monitoring

3.3.2.1 The Ultra RAE shall be calibrated within 24 hours of use at the Main Warehouse.

3.3.2.2 Data recording shall not begin until after two times the instrument response time.

3.3.2.3 The date and time shall be recorded, and the VOC concentration shall be monitored for at least 5 minutes recording the VOC concentration each minute. The highest measured VOC concentration shall not exceed the

specified VOC concentration limit prior to uncontrolled venting.

3.3.2.4 If using a Sep-RAE tube with the Ultra RAE or using a Drager tube you must take at least 2 samples 5 minutes apart using a new tube for each sample. You must record the tube type, range, measured concentrations and the time the samples were taken.

3.3.2.4.1 When using the UltraRae, record monitoring results on MSS EPA Method 21 (Ultra RAE) Test Log (ENV-15B). **For AU2 unit, check the required box.**

3.3.2.4.2 When using a Drager Tube, record monitoring results VOC Concentration Measurement Instrument/Detector Log for Colorimetric Gas Detector Tubes (ENV-15C). **For AU2 unit, check the required box.**

3.3.2.5 Records of the monitoring results shall be sent to the Environmental MSS SME on a monthly basis, no later than the 5th day of the following

3.4 Competencies and Training

Training will be provided to the site through the Virtual Training Assistant (VTA) with and initial training program and an annual refresher.

3.5 Assurance

3.5.1 This practice will be sustained through the compliance task tracking system. Tasks will include the following and new tasks may be added or updated as required.

3.5.1.1 Asset Coordinators are to collect monitoring records on their units and submit to the MSS SME by the 5th working day of the following month that activities occurred.

3.5.1.2 MSS and HON SME's to review practice annually and update as necessary.

3.5.1.3 MSS SME is to review monitoring records and report Title V and DEI deviations quarterly to the Title V SME.

3.5.1.4 HON SME is to review monitoring records and report Title V deviations and DEIs semi-annually to the Title V SME.

3.5.1.5 Review site Normal Operating Procedures (NOPs) to ensure consistency with this practice annually.

3.5.1.6 Review training records on NOPs annually.

4.0 Recordkeeping

Recordkeeping is a requirement of the MSS air permit. All recordkeeping requirements shall be maintained by the Asset Coordinator and delivered to the Environmental MSS SME by the 5th working day of the following month. The following is a list of the recordkeeping that the Environmental Department shall be required to maintain.

4.1 Section 3.2.2 – Records of temperature recording.

4.2 Section 3.2.3 – Actions of venting to atmosphere must be recorded. The controlled device or recovery system used must be recorded with the estimated emissions from controlled or uncontrolled degassing.

4.3 Section 3.2.4 - If the volume of equipment is less than 30 cubic feet an MO must be used. An MO

for all equipment would be acceptable.

4.4 Section 3.2.4.6 – Recordkeeping requirements for MSS activities not listed in Section 3.2.4.

4.5 Section 3.2.5. - Identifiers if purged gas is used to clear equipment.

4.6 Section 3.2.7. – If all requirements are met to vent to atmosphere the information must be recorded in the MO.

4.7 Section 3.3. - All air emission monitoring results.

4.8 Section 3.4. – All results for air emission monitoring resulting from opened-ended lines and valves

5.0 Definitions

5.1 ***MSS***

Planned or predictable maintenance, startup, shutdown activities performed at the Galveston Bay Refinery or refinery Docks.

5.2 ***TAR***

Planned turnaround activities

5.3 ***Equipment, process unit, and facility***

Referring to, but not limited to, vacuum trucks, towers, pumps, valves, pipes, flanges, compressors, heat exchangers, and vessels used in support of MSS and/or TAR activities.

5.4 ***Control device or controlled recovery system***

Carbon adsorption system with a liquid scrubber upstream, thermal oxidizer, internal combustion engine, closed refrigerated vapor recovery system, flare or a combination of the above used to control VOCs resulting from MSS or Tar activities.

5.5 ***Monitoring***

The act of air emission monitoring of air contaminate concentration.

5.6 ***VOC***

Volatile organic compound

5.7 ***LEL***

Lower explosive limit

5.8 ***HON SME***

The Hazardous Organic NESHAP (National Emission Standards for Hazardous Air Pollutants) subject matter expert is the contact for any HON questions and all recordkeeping will be sent to this position.

5.9 ***MSS SME***

The maintenance startup & shutdown subject matter expert is the contact for any MSS questions and all recordkeeping will be sent to this position.

5.10 ***MO***

Maintenance order used to track activities, jobs, PMs, and costs in tracking database (SAP).

6.0 Attachments

6.1 ENV-15A MSS EPA LEL Test Log

6.2 ENV-15B MSS EPA Method 21 Test Log

6.3 ENV-15C VOC Concentration Measurement Instrument/Detector Log for Colorimetric Gas Detector Tubes

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-15 under MOC 93391.	J. Atchison	E. R. Kaysen	7/26/2021	8/20/2021

Galveston Bay Refinery
LEL Concentration Measurement Log in Support of
Maintenance, Startup, Shutdown, and Turnaround Activities

Responsible Unit/Area:		MO Number:
Purged equipment ID:		Controlled system being vented to:
Material description being monitored:		Planned maintenance activity:
Purge Start Time:	Purge Stop Time:	Total Duration of Purge (minutes):

Initial testing after equipment has been purged to a closed system

Operator	Date & time of testing:	Gas tester no.	Gas tester function tested this shift?	L.E.L. %
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	
			☐ Yes ☐ No	

Supplemental testing required after 72 hours if equipment is left open and un-blinded

Operator	Date & time of testing:	Gas tester no.	Gas tester function tested this shift?	L.E.L. %
			☐ Yes ☐ No	

AU2 Unit Only (Check one box only)

☐ **TXCR Plant policies/procedures were followed for the handling of wastewaters generated from the emptying and purging of equipment in the AU2 process during temporary shutdown for inspection, maintenance and repair, (i.e., a maintenance turnaround) and during periods which are not shutdowns (i.e., routine maintenance).**

☐ **Check this box if an activity generating wastewater occurred which was not addressed by a referenced procedure, a referenced procedure was not followed, or a referenced procedure needs to be revised. Immediately report the deviation to the environmental on-call personnel and complete the SSMP Form 4 in NOP2-601 HON Compliance.**

Notes:
1. The sampling point shall be upstream of the inlet to the control device or controlled recovery system. The sample locations and collection systems must be located downstream of the process equipment or vessel being purged.
2. Uncontrolled venting cannot occur until L.E.L is less than 10%.
3. Sampling will be performed to determine when uncontrolled ventilation is allowed. Must meet all requirements specific to MSS and/or TAR activities in addition to those specified in this log.
4. Gas tester must be calibrated monthly at Warehouse Safety Equipment Shop and function-tested once per shift with results recorded in gas tester logbook.
5. Any equipment that is left unblinded or isn't capped, plugged, or isolated with a second valve must be retested after 72 hours on a monthly basis (45 day intervals during a TAR). Any leaks identified must be addressed within 24 hours. Leaks are indicated by readings above 10% LEL.

Galveston Bay Refinery
VOC (Ultra Rae) Concentration Measurement Log in Support of Maintenance, Startup, Shutdown, and Turnaround Activities

Responsible Unit/Area:		Material description being monitored:
Operator:		Has the Ultra RAE device been calibrated within 24 hours?
Gas tester type & number:		Controlled system being vented to:
Purged equipment ID:		Planned maintenance activity:
Purge Start Time:	Purge Stop Time:	Total Duration of Purge (minutes):

Initial testing after equipment has been purged to a closed system

Date & time of testing:	Background concentration	VOC ppm after 1 minute	VOC ppm after 2 minutes	VOC ppm after 3 minutes	VOC ppm after 4 minutes	VOC ppm after 5 minutes

Supplemental testing required after 72 hours if equipment is left open and un-blinded

Date & time of testing:	Background concentration	VOC ppm after 1 minute	VOC ppm after 2 minutes	VOC ppm after 3 minutes	VOC ppm after 4 minutes	VOC ppm after 5 minutes

AU2 Unit Only (Check one box only)

☐ **TXCR Plant policies/procedures were followed for the handling of wastewaters generated from the emptying and purging of equipment in the AU2 process during temporary shutdown for inspection, maintenance and repair, (i.e., a maintenance turnaround) and during periods which are not shutdowns (i.e., routine maintenance).**

☐ **Check this box if an activity generating wastewater occurred which was not addressed by a referenced procedure, a referenced procedure was not followed, or a referenced procedure needs to be revised. Immediately report the deviation to the environmental on-call personnel and complete the SSMP Form 4 in NOP2-601 HON Compliance.**

Notes:

1. The sampling point shall be upstream of the inlet to the control device or controlled recovery system. The sample locations and collection systems must be located downstream of the process equipment or vessel being purged.
2. Uncontrolled venting cannot occur until VOC is less than 10,000 ppmv.
3. Sampling will be performed to determine when uncontrolled ventilation is allowed. Must meet all requirements specific to MSS and/or TAR activities in addition to those specified in this log.
4. When using an Ultra RAE during sampling data recording will not begin until after two (2) times the instrument response time. Test for at least five (5) minutes, recording VOC ppmv concentration each minute. The highest measurement should not exceed 10,000 ppmv prior to uncontrolled venting.
5. Gas tester must be calibrated within 24 hours at Warehouse Safety Equipment Shop.
6. Any equipment that is left unblended or isn't capped, plugged, or isolated with a second valve must be retested after 72 hours on a monthly basis. Any leaks identified must be addressed within 24 hour.

Galveston Bay Refinery
VOC Concentration Measurement Instrument/Detector Log for
Colorimetric Gas Detector Tubes in Support of MSS and TAR Activities

Responsible Unit/Area:	Date:
Unit Number:	MO:
Equipment Operator:	Operator:
Equipment Monitored:	Instrument Identifier:
Purge Start Time:	Purge Stop Time:
Total Purge Duration (Minutes):	

Sample Set Identification	Sample Number	Sampling Date	Sampling Time	Tube Type	Is the tube used in accordance with manufacturer's guidelines?	Range[a]
	Sample 1:				**yes or no** *(circle one, if answer "no" must use in accordance with manufacturer's guidelines)*	
	Sample 2:					

Sample Number	Measured Concentration[b] (ppmv)	Release Concentration[c] (ppmv)	Basis for determination of Release Concentration[d]	Is the measured contaminant concentration less than the release concentration?
Sample 1:				**yes or no** *(circle one, if answer "no" must meet requirements prior to uncontrolled ventilation)*
Sample 2:				**yes or no** *(circle one, if answer "no" must meet requirements prior to uncontrolled ventilation)*

AU2 Unit Only (Check one box only)

☐ **TXCR Plant policies/procedures were followed for the handling of wastewaters generated from the emptying and purging of equipment in the AU2 process during temporary shutdown for inspection, maintenance and repair, (i.e., a maintenance turnaround) and during periods which are not shutdowns (i.e., routine maintenance).**

☐ **Check this box if an activity generating wastewater occurred which was not addressed by a referenced procedure, a referenced procedure was not followed, or a referenced procedure needs to be revised. Immediately report the deviation to the environmental on-call personnel and complete the SSMP Form 4 in NOP2-601 HON Compliance.**

Notes: _____

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Footnotes:
(a) The air contaminant concentration measured is less than 80% of the range of the tube. If the maximum range of the tube is greater than the release concentration, the concentration measured is at least 20% of the maximum range of the tube.
(b) At least two (2) samples must be taken at least 5 minutes apart.
(c) Release concentration is: 10,000 * moles fraction of the total air contaminants present that can be detected by the tube.
(d) The mole fraction may be estimated based on process knowledge. The Release Concentration and basis for this determination shall be recorded.