Consent Decree (90-5-2-1-10811) – 1:15-cv-00841 RBJ

End of Phase Report for Tank Systems in Group III

April 5, 2018

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Introduction and Purpose

Consistent with the requirements of Paragraph 59 of the Consent Decree ("CD") between the United States, the State of Colorado ("State"), and Noble Energy, Inc. ("Noble"), Civil Action No. 1:15-cv-00841-RBJ, entered by the U.S. District Court for the District of Colorado as final judgment on June 2, 2015, Noble has prepared this Fifth End of Phase Report ("Fifth Report") for Tank Systems[1] associated with Well Production Operations which produced gas into sales lines that, as of August 17, 2014, had line pressures less than 186 pounds per square inch (psi), met the Engineering Evaluation deadline of July 1, 2017, and were not part of the Tank Systems discussed in the First, Second, Third, or Fourth End of Phase Reports. These Tank Systems are also referred to as "Group III" Tank Systems.

The Consent Decree requires an End of Phase Report after the Engineering Evaluation deadline for each group of Tank Systems to provide a public summary of useful information gleaned from Engineering Evaluations, and any modifications to improve capture and control achieved by Vapor Control Systems.

Noble submitted its first End of Phase Report ("First Report") on July 30, 2015. The First Report addressed Tanks Systems that had, as of September 2014, actual uncontrolled annual volatile organic compound ("VOC") emissions of 50 tons per year ("TPY") or more with an Engineering Evaluation deadline of May 1, 2015. Noble received approval of its First Report on December 14, 2015 and in turn made it publically available at jointagreement.noblecolorado.com.

Noble submitted its second End of Phase Report ("Second Report") on January 29, 2016. The Second Report addressed Tanks Systems that were part of the Cross Section Sampling and Analysis with an Engineering Evaluation deadline of July 1, 2015. Noble received approval of its Second Report on March 16, 2016, and in turn made it publically available at jointagreement.noblecolorado.com.

Noble submitted its third End of Phase Report ("Third Report") on July 28, 2016. The Third Report addressed Tanks Systems that were part of the Group I Tanks with an Engineering Evaluation deadline of December 31, 2015. Noble received approval of its Third Report on February 28, 2017, and in turn made it publically available at jointagreement.noblecolorado.com.

[1] Pursuant to Section III of the CD, "Tank System" shall mean one or more tanks that store Condensate and share a common Vapor Control System.

Noble submitted its fourth End of Phase Report ("Fourth Report") on July 28, 2017. The Fourth Report addressed Tank Systems that were part of the Group II Tanks with an Engineering Evaluation deadline of December 31, 2016. Noble received approval of its Fourth Report on February 23, 2018, and in turn made it publicly available at jointagreement.noblecolorado.com.

In some instances, information provided by Noble in its First, Second, Third, and Fourth Reports remains applicable to this Fifth Report. This is due to no material changes to the design and selection of equipment to control Tank System vapors since the previous reporting periods. Where appropriate, Noble has included notations directing the reader to the First, Second, Third, or Fourth Report instead of including identical details in this Fifth Report.

As noted in the First, Second, Third, and Fourth Reports:

1. An Engineering Evaluation is the process of applying an appropriate Engineering Design Standard[2] to determine if the existing Vapor Control System[3] at each Tank System is adequately designed and sized to handle the Potential Peak Instantaneous Vapor Flow Rate ("PPIVFR");[4]

[2] Pursuant to Section III of the CD, "Engineering Design Standard" shall mean an engineering standard developed by Noble pursuant to Paragraph 9 (Engineering Design Standard).

[3] Pursuant to Section III of the CD, "Vapor Control System" shall mean the system used to contain, convey, and control vapors from Condensate (including flashing, working, breathing, and standing losses, as well as any unintentional gas carry-through to Condensate tanks) at a Tank System. A Vapor Control System includes a Tank System, piping to convey vapors from a Tank System to a combustion device and/or vapor recovery unit, fittings, connectors, liquid knockout vessels or vapor control piping, openings on Condensate tanks (such as pressure relief valves ("PRVs") and thief hatches), and emission control devices.

[4] Pursuant to Section III of the CD, "Potential Peak Instantaneous Vapor Flow Rate" shall mean the maximum instantaneous amount of vapors routed to a Vapor Control System during Normal Operations (defined as all periods of operation, excluding Malfunctions, and explicitly including, for storage tanks at well production facilities, liquid dumps from the Separator), including flashing, working, breathing, and standing losses, as determined using the Modeling Guideline (defined as the modeling guideline developed by Noble pursuant to Paragraph 8 (Development of a Modeling Guideline)).

2. Noble's oil and natural gas production operations in the Denver-Julesburg ("D-J") Basin include the use of Condensate[5] tanks, which have the potential to produce vapors from flashing[6] and working and breathing[7] losses;
3. Noble's operations also include the use of produced water storage tanks that may also produce vapors from flashing and working and breathing losses such that the associated emissions are considered by the Engineering Evaluations when they are connected to a Tank System's Vapor Control System;
4. Vapor Control Systems are installed on Noble Tank Systems to route vapors from a Tank System to an emission control device; and
5. Where flashing, breathing, and/or working emissions have the potential to exceed Vapor Control System capacity, Vapor Control System modifications are necessary to ensure proper capture and control of emissions.

For purposes of the Tank Systems covered by this Fifth Report, Noble did not create a general Engineering Design Standard for use at multiple Tank Systems. Rather, Noble used a site-specific Engineering Design Standard to ensure a Vapor Control System was designed and adequately sized for the PPIVFR of the Tank System.

This Fifth Report covers the Vapor Control Systems for 168 Group III Tank Systems[8].

[5] Pursuant to Section III of the CD, "Condensate" shall mean hydrocarbon liquids that remain liquid at standard conditions (68 degrees Fahrenheit and 29.92 inches mercury) and are formed by condensation from, or produced with, natural gas, and which have an American Petroleum Institute gravity ("API gravity") of 40 degrees or greater.

[6] Flashing occurs when Condensate or produced water is dumped from pressurized two-phase and three-phase Separators (Pursuant to Section III of the CD, a "Separator" is a pressurized vessel used for separating a well stream into gaseous and liquid components) into storage tanks, at or near atmospheric pressure, causing vapors to be released or "flashed" into a gaseous state as a result of the pressure drop.

[7] Working and breathing losses are vapors that may be released from Condensate due to liquid level changes and temperature fluctuations.

[8] Of the 684 Tank Systems that were included in the July 28, 2017 Certification of Completion Report, 14 were associated with the Stipulation for Termination of the CD filed with the U.S. District Court of Colorado on July 21, 2017, 166 were certified as complete, and 504 were certified as shut in. Noble incorrectly reported that Tank Systems 833 and 1179, two of the 504 Tank Systems certified as shut in, were shut in during the 5th semi-annual reporting period, bringing the total Tank Systems covered by this Fifth Report to 168. The VCS Modification for Tank System 833 was complete on February 22, 2017, and the VCS Verification was complete on March 30, 2017. The VCS Modification for Tank System 1179 was complete on February 17, 2017, and the VCS Verification was complete on March 30, 2017. Please refer to Section Problems & Solutions of the January 29, 2017 6th Semi-Annual Report for additional details.

As was the case with the First, Second, Third, and Fourth Reports, this Fifth End of Phase Report is also divided into five (5) sections that, based on the best currently available information, address the following:

- Section 1: An overview of the Engineering Design Standard considerations identified in Paragraph 9 of the CD;
- Section 2: A discussion of requirements, constraints, and limitations of operation and/or design parameters for the Tank Systems and Vapor Control Systems;
- Section 3: A summary of design and implementation challenges;
- Section 4: A summary of Vapor Control Systems operations; and
- Section 5: A discussion of any other significant observations associated with the Tank Systems and Vapor Control Systems.

1. Engineering Design Standard Overview

During this reporting period, Noble did not develop a Three Line Pressure Grouping or subset grouping Engineering Design Standard for the Tank Systems. Instead, Noble developed individual site-specific Engineering Design Standards for those Tank Systems covered during this reporting period.

1.1 Vapor Control Technologies

As these considerations did not change, please refer to the First Report.

1.2 Site-specific Construction Constraints

As these considerations did not change, please refer to the First Report.

1.3 Tank-to-combustor piping system design considerations

As these considerations did not change, please refer to the First Report.

1.4 Separator liquid dump characteristics

As these considerations did not change, please refer to the First Report.

1.5 Storage tank headspace

As these considerations did not change, please refer to the First Report.

1.6 Other Vapor Control System design considerations

As a result of considerations identified during Noble's 2016 Third Party Verification, which are set forth in Paragraph 20 of the CD, Noble updated Engineering Evaluations and STEM plans to

incorporate vapor sources from Truck Loadout Control Systems on all applicable Vapor Control Systems. As of December 31, 2017, Noble incorporated all sources of vapor in its calculation of PPIVFR for all remaining Tank Systems.

2. Requirements, Constraints, and Limitations of Operation and/or Design Parameters

As these considerations did not change, please refer to the First Report.

3. Summary of Design or Implementation Challenges Encountered

As was the case with the Fourth End of Phase Report, the Unloading of Produced Water into Tank Truck Loadout Control Systems Implementation Challenge encountered for Group II also applies to the Group III Tank Systems and Vapor Control Systems modified during this reporting period. Noble encountered an additional Design Challenge and three Implementation Challenges applicable to Group III Tank Systems and Vapor Control Systems modified during this reporting period.

Design Challenge:
Revision to the Modeling Guideline

Noble revised the Modeling Guideline during this reporting period. For ease of reference, a copy of the revised Modeling Guideline is attached to this End of Phase Report as Appendix A.

The revisions to the modeling guideline were completed as a result of a finding in the Third-Party Verification Draft Audit Report dated March 30, 2017 issued by SLR International Corporation ("SLR") related to calculating the PPIVFR at banked Tank Systems. SLR's findings noted that in some cases all sources of vapor were not included in the calculation of the PPIVFR (*i.e.*, breathing losses were not incorporated for the non-producing, storage-only bank). While Noble disagreed with SLR's finding, Noble indicated that it did not include the PPIVFR contribution from breathing losses for the tank bank not receiving condensate liquid and flash vapors because it also excluded from consideration any Vapor Control System ("VCS") capacity contribution associated with headspace surge. Noble concluded that by excluding both data points, Noble's Engineering Evaluation considered the worst-case scenario with all condensate liquid and flash vapors producing into one bank of tanks. Nonetheless, Noble subsequently incorporated all sources of vapor into its calculation of PPIVFR. This incorporation has been included in the revised Modeling Guideline.

Implementation Challenge:
Unloading of Produced Water into Tank Truck Loadout Control Systems

As a result of reviewing tank pressure monitoring ("TPM") data and conducting site investigations during the 4th semi-annual reporting period, Noble determined that its current operational procedure for unloading produced water had the potential to create TPM trigger point exceedances. Specifically, the produced water unloading is accomplished by routing the water vapors through the Vapor Control System VCS of Tank Systems to minimize exposure to the potential presence of hydrogen sulfide. At that time, preliminary information suggested that the trigger point exceedances for these instances were associated with inert gases and not VOCs.

Although this implementation challenge is not limited to Group III Tank Systems and does not appear to be associated with a specific line pressure grouping, this challenge was discovered and researched thoroughly during the time period of developing the Fourth Report. Specifically, Noble conducted an internal study during produced water unloading events with a third-party contractor to determine the root cause for these over-pressuring events during the time period of the Fourth Report.

The results of the internal study identified the following as the root cause for these over pressuring events:

- Water hauls differ from oil hauls in that they are completed with vacuum suction methods;
- Observation of the typical tank pressure profile suggested that the over-pressure events are initiated by the exhaust flow rate after the hook-up of the vapor recovery line to the tanker vacuum pump when the vacuum pump is turned on;
- Over-pressure events occur at the onset of vacuum pump activation to evacuate the tanker; prior to any water flow; and
- The over-pressure events that occurred at the study locations indicate that a root cause of the over-pressure events during water hauling is due to the initial exhaust flow from the vacuum pump upon onset of pump down.

Using these internal study results, Noble considered alternative approaches to produced water unloading that would provide for safety considerations while minimizing the likelihood of any TPM trigger point exceedances. These internal discussions included review of alternatives aimed at slowing down the initial rate of exhaust from the vacuum pump as seen by the vapor return line. Through discussions with hauling vendors, it was determined it would not be feasible to implement alternative loadout activities at a specific subset of Noble Tank Systems. During this Fifth Report reporting period, Noble developed an alternative approach to ensure that each Tank System with Tank Truck Loadout Control Systems meets the Engineering Design Standards as discussed below:

- On December 7, 2017, Noble conducted a pilot program that consisted of conducting IR Camera investigations at Tank Systems retrofitted with Tank Truck Loadout Control Systems;
- Investigations were conducted with a water hauler on location. Videos were recorded with an IR Camera while the water hauler was connected to the Vapor Recover Line and pulling a vacuum on the Water Tank;
- If the IR Camera investigation found VOC emissions from the Tank System, Reliable Information was recorded and maintenance, repairs or replacement was conducted on the vapor combustion equipment; and
- Once the vapor combustion equipment was repaired or replaced, a second IR Camera investigation was conducted to ensure no VOC emissions were detected from the Tank System.

Noble estimates that all Tank Systems will be investigated on or before the 8th semi-annual reporting period deadline.

Design Limit and OPS Limit Buffer

Noble has observed that an additional buffer between the design limit and the operating limit is warranted on smaller facilities' Tank Systems tied to vertical wells under two (2) circumstances: (1) sales line pressure increases; and (2) nearby hydraulic fracturing operations by Noble or other O&G operators.

Noble enforces its design limit through the use of automation. Operational limits are enforced by way of pneumatic controllers. If vertical wells experience increased production as a result of nearby hydraulic fracturing operations, the buffer between the design limit and operating limit may become less adequate. Similarly, if low pressure flash gas rates increase due to increasing line pressure, the buffer between design and operating limit may become less adequate.

Thus, Noble is increasing the buffer between the maximum separator pressure and the operational limit in an effort to reduce the opportunity for the wells to load up due to high line pressure or nearby hydraulic fracturing operations. Such buffer increase should further help Noble maintain achievement with applicable performance standards. When the operational limit is reached, and without exceeding the maximum separator pressure, there can be "carryover" pressure as the system equalizes after the controller shuts. This carryover pressure increases with increasing line pressure. By dropping the operational limit 10 psig, the potential to hit the maximum separator pressure is reduced and prevents hard shut-ins. For example:

For a Tank System with a maximum separator pressure of 70 psig (automation device set to shut-in wellhead) and an initial operational limit of 60 psig (pneumatic controller set to prevent

hitting the maximum separator pressure) Noble has adjusted the operational limit to 50 psig (pneumatic controller).

Increased line pressure is not causing a change in the set point of the maximum separator pressure, thus it does not impact the design adequacy of our Vapor Control Systems. As a result our Engineering Evaluations and PPIVFR are not affected by increased line pressure.

Level Control Valve Failure Associated with TPM Trigger Point Exceedances

Liquid level controllers are designed to control the flow of produced fluids from the High Pressure ("HP") vessel to the Low Pressure ("LP") vessel of the High-Low Pressure ("HLP") separator. During the second wave of TPM Tank Systems, level control valve failure was identified as the potential root cause of 11 isolated TPM trigger point exceedances. Specifically, the liquid level controller on certain HLP separators have been staying open for too long, allowing raw gas to flow into the LP vessel, and consequently sending gas to the production tanks. Replacing liquid level controllers is a common maintenance practice for Lease Operators and thus Lease Operators keep a number of level controllers in their vehicles. Noble installs two types of level controllers, a miser-type level control valve and a "SnapTroll" control valve. To address this issue, Noble is either replacing existing failed liquid level controllers with new like-kind miser-type units (separator design pressures greater than 500 psig) or, where design limits will allow (separator design pressures less than 500 psig), replacing the failed controllers with "Snap Troll" control valves which have a lower failure rate. In all cases where a "SnapTroll" failure occurs, it is replaced with another "SnapTroll".

4. Summary of Vapor Control System Operations

Pursuant to Paragraph 12.a. of the CD, Noble was required to conduct an IR camera inspection of each Tank System before, during and immediately after a dump event to confirm the VCS is adequately designed and associated tanks were not emitting VOCs. VCS Verifications for the modified Tank Systems covered by this reporting period did not observe VOC emissions from storage tank PRVs or thief hatches.

Pursuant to Paragraph 59.iv. of the CD, a summary of Reliable Information[9] Noble obtained for the 167 Tank Systems covered in this Fifth Report can be found in Appendix B. The data set is

[9] Pursuant to Paragraph III of the CD, "Reliable Information" shall mean any observance or detection of VOC emissions from a Tank System using an optical gas imaging infrared camera, EPA Method 21 monitoring, CDPHE Approved Instrument Monitoring Method ("AIMM"), or audio, visual, olfactory ("AVO") inspections by EPA, CDPHE, or local government inspectors trained by CDPHE, Noble employees or Noble contractors trained to conduct inspections for emissions, or, in the case of the consultant selected by Noble to perform a third party audit, VOC emissions detected or observed using an optical gas imaging infrared camera. For purposes of this Decree only, evidence of past surface staining alone shall not be considered Reliable Information.

reflective of the period beginning with each VCS Modification date and ending December 31, 2017 (the end of the reporting period for the Fifth Semi-Annual Report). This document provides instances of VOC emissions after modifications and a description of any associated corrective actions.

5. Summary of Other Significant Observations

For this reporting period, there were no other significant observations associated with the Tank Systems and Vapor Control Systems.

6. Certification

Pursuant to Paragraph 63 of the Noble Energy Consent Decree, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

RM Patt

4/5/2018

Mark Patteson

Date

Vice President, DJ Basin Business Unit

APPENDIX A

NOBLE MODELING GUIDELINE

Noble Modeling Guideline, Well Site Tank System

STATE OF COLORADO

December 2017

Rev.	Date	Description	By	Checked	Approved
1	3/30/15	INITIAL RELEASE	JVS	AGJ	
2	5/21/2015	EDITED FOR CLARITY	JVS		
3	12/19/2017	EDITED TO CORRECT WORKING/BREATHING LOSSES	PAD	SMG	

SPECIAL NOTES

This guideline addresses engineering practices of a general nature. This guideline is intended to facilitate a design of systems using proven and sound engineering practices. This guideline can be used by anyone wishing to do so, however, this guideline does not, nor does Noble Energy, condone its use to, negate, override, or replace local, state, or federal laws and regulations. Noble Energy does not endorse or take responsibility for any non-Noble Energy product or system designed or claiming to be in accordance with this guide. Nothing contained in this guideline should be construed as insuring anyone against liability for infringement and violation of intellectual property laws and regulations. Every effort has been made to ensure accuracy and reliability of this guideline; however, Noble Energy makes no representation, guarantee, or warranty in connection with this guideline or its use by any party other than Noble Energy. This guideline is intended as an evergreen guideline and subsequent revisions of this guideline shall not be considered to be material changes pursuant to Paragraph XX of the Consent Decree.

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INTRODUCTION

This guideline is intended to determine the Potential Peak Instantaneous Vapor Flow Rate from Condensate tanks and other sources, but does not include discussion of implementation of mitigating factors or controls (e.g., limiting the liquid level in Condensate tanks or reducing valve flow coefficients).

This guideline is intended to be used in conjunction with the Vapor Control System Design Guide. The Potential Peak Instantaneous Vapor Flow Rate under Normal Operating Conditions calculated herein should be used to design and/or evaluate the Vapor Control System. Although some of the calculation tools discussed herein may also be used for reporting purposes, this document covers their use for design purposes only, and the appropriate Normal Operating Conditions (e.g. temperature, pressure) should be selected accordingly.

Any changes or deviations to critical design parameters discussed in this guideline or in the Vapor Control System Design Guide may require redetermination of the Potential Peak Instantaneous Vapor Flow Rate.

1 SCOPE

The scope of this modeling guideline includes all vapor sources that are captured by the Vapor Control System and contribute to calculation of the Potential Peak Instantaneous Vapor Flow Rate through the Vapor Control System under Normal Operating Conditions.

2 TERMS AND DEFINITIONS

“API Gravity” means a scale used to reflect the specific gravity (SG) of a fluid such as crude oil, Condensate, water, or natural gas. The API gravity is calculated as [(141.5/SG) - 131.5], where SG is the specific gravity of the fluid at 60°F relative to water at 60°F, and where API refers to the American Petroleum Institute.

“Condensate” shall mean hydrocarbon liquids that remain liquid at standard conditions (68 degrees Fahrenheit and 29.92 inches Mercury) and are formed by condensation from, or produced with, natural gas, and which have an American Petroleum Institute gravity (“API gravity”) of 40 degrees or greater.

“Condensate Tank” shall mean any tank or series of tanks (i.e., tank battery) that store Condensate at atmospheric pressure.

“Flashing” means the release of hydrocarbons and other dissolved gases from liquid to surroundings when the liquid changes temperature and/or pressure.

“Flash Vapor” means the released hydrocarbons and other entrained gases from liquid that are emitted to surroundings when the liquid changes temperature and/or pressure.

“Gas-Oil-Ratio (GOR)” means the ratio of gas produced from a barrel of crude oil or Condensate when cooling and depressurizing these liquids to final, weathered conditions, expressed in terms of standard cubic feet of gas per barrel of oil or Condensate.

“Instrument Gas” refers to hydrocarbon vapors utilized for pneumatic actuation of site components and equipment in lieu of instrument air or inert gas.

“Maximum Design Flowrate” – The instantaneous liquid flowrate, Q, is expressed in barrels/day. It is the maximum flowrate that occurs through the Condensate throughput valve. It is a function of the valve capacity, C_v, at its wide open condition.

“Normal Operating Conditions” – The maximum foreseeable operating conditions at a specific location, used in the determination of the Potential Peak Instantaneous Vapor Flow Rate. These are the conditions that result in the maximum amount of vapor flash at the Condensate Tanks, but do not include conditions due to mechanical failure or abnormal operations (e.g. a stuck-open dump valve), those conditions that are prevented from occurring due to installed safeguards (e.g. high pressure shut downs, PSV or other relief device), or any other condition that cannot reasonably be expected to occur.

“Potential Peak Instantaneous Vapor Flow Rate” shall mean the maximum instantaneous amount of vapors from a Tank System during normal operations, including flashing, working, breathing, and standing losses, as determined using the Modeling Guideline.

“Pressurized Liquids” shall mean hydrocarbon liquids separated from, condensed from, or produced with natural gas while still under pressure.

“Separator” shall mean a pressurized vessel used for separating a well stream into gaseous and liquid components.

“Tank System” shall mean one or more tanks that store Condensate and share a common Vapor Control System.

“VOC” or “VOCs” shall mean volatile organic compounds not including methane and ethane.

“Vortex Eliminator” shall mean any configuration of, or component on, a Separator designed to prevent the formation of a vortex while Pressurized Liquids are conveyed from the Separator so as to prevent natural gas from being carried through with the Pressurized Liquid to Condensate tank/tank batteries.

“Vapor Control System” shall mean the system used to contain, convey, and control vapors from Condensate (including flashing, working, breathing, and standing losses, as well as natural gas carry-through to Condensate tanks) at a Tank System. A Vapor Control System includes a Tank System, piping to convey vapors from a Tank System to a combustion device and/or vapor recovery unit, fittings, and connectors, liquid knockout vessels or vapor control piping, openings on Condensate tanks (such as pressure relief valves (“PRVs”) and thief hatches), and emission control devices .

“Vapor Recovery Unit” means equipment installed on tanks, vessels, piping, connections, and if necessary, flow-inducing devices, designed to capture, control, or treat gaseous emissions, or for routing gas into a process as a product, such as a fuel source. The VRUs referred to in this guide are those associated with capture of gases from the Condensate tanks / Vapor Control System.

3 EXCLUSIONS

This guideline provides guidance on estimating vapor release from equipment associated with the Tank System, it does not provide guidance on sizing or design of Tank System equipment (Condensate tanks, vessels, compressors, etc). It is left to the owner to apply the applicable design standards for those components and ensure compliance with local, state, and federal regulations.

4 ENGINEERING FACTORS

This guideline includes factors inherent to the methodology. These include:

Maximum Operating Conditions – Maximum operating conditions were assumed. This guide assumes the Separator/vapor recovery tower is operating at the pressure safety valve (PSV) set pressure or set point of the emergency pressure control system. In addition, flash vapors are determined using a temperature in the Separator that results in the maximum amount of vapor carried over to the downstream Condensate tank.

5 SOURCES OF VAPOR TO BE CONSIDERED

5.1 CONDENSATE TANKS

Vapors released from Condensate tanks are attributed to the following:

Breathing Losses, $\dot{m}_{BREATHING}$, are thermal losses due to temperature changes of the liquid in the tank. These changes are most commonly due to ambient temperature changes, although heating effects due to tank heaters and any other heat source, if present, should also be considered, as appropriate. Ambient conditions at the location should be considered when selecting the maximum rate of temperature change used to calculate breathing losses.

Working Losses, $\dot{m}_{WORKING}$, are losses that occur due to agitation and displacement.

Flash Losses, $\dot{m}_{FLASH}$, are losses that occur due to pressure drop from an upstream Separator to the Condensate tank. Flash losses can be the largest source of vent vapors. Flash losses experienced during normal operations should be considered in the sizing of the Vapor Control System. When selecting the Normal Operating Conditions used to calculate flash losses, the temperature effect of any upstream heater must be accounted for, where appropriate. Flash losses experienced during process upsets or failures are not considered in the sizing of the Vapor Control System but are considered in the design of the emergency venting system (e.g., thief hatches, PSVs, PVRVs).

5.2 SEPARATORS

Vapors from the Separator need to be captured for sale, use, or disposal. In most cases, the vapors from the Separators (there may be several Separator stages) are routed for gathering (i.e., sales). However, if the Separator vapor is not routed for gathering, it must be either routed to an alternative disposal/sale location or captured into the Vapor Control System ($\dot{m}_{SEP,}$ in scfh), in which case it should be considered when calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System.

5.2.1 MULTIPLE SEPARATORS

When multiple Separators feed one or more Condensate tanks, the maximum design flowrate to the Condensate tank(s) must be calculated assuming that all Separators dump simultaneously, unless automation or other controls are in place to prevent multiple Separators from dumping at the same time.

5.3 VAPOR RECOVERY TOWERS

Vapor recovery towers (VRTs) are secondary Separator vessels that are used to reduce the vapor pressure of the Condensate. In most cases, the vapors from VRTs are routed for gathering. If VRT vapor is not routed for gathering, the vapor must be either routed to an alternative disposal/sale location or captured into the Vapor Control System ($\dot{m}_{VRT,}$ in scfh), in which case it should be considered when calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System.

5.4 VORTEX VAPOR ENTRAINMENT

Separators and other equipment should be designed to prevent gas entrainment (vortex) into the fluid stream entering the Condensate tank. This may be accomplished by installing a vortex eliminator or by maintaining the liquid level height to a height greater than the “critical liquid height”, which can be provided by the vendor, calculated or determined based on empirical data. If the liquid level height is below the critical height, and no mitigations are made to prevent a vortex, the entrained vapor mass flowrate should be calculated and included in the Potential Peak Instantaneous Vapor Flowrate for the Vapor Control System.

Throughput valves are not expected to fail open during normal operating conditions and therefore vapor entrainment as a result of a stuck open valve should not be included in the Potential Peak Instantaneous Vapor Flowrate for the Vapor Control System.

5.5 TRUCK LOADING LOSSES

If vapor losses during Condensate transfer to trucks is captured in the Vapor Control System, truck transfer vapor losses, $\dot{m}_{TRUCK}$ (in scfh), should be included in the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System. If enrichment gas is included in the truck loading system, that flow should also be included in the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System.

5.6 OTHER SOURCES

If vapors from other sources (e.g. blanket gas, purge/inerting/diluting gas, water tanks) are captured by the Vapor Control System, ($\dot{m}_{OTHER}$, in scfh), they must be considered when calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System.

6 DETERMINING VAPOR LOSSES

6.1 CONDENSATE TANK THROUGHPUT

The initial step is to determine the maximum design flowrate of Condensate from each Separator dumping to a Condensate tank using the below equations, other industry recognized methods or alternative methods provided by the valve manufacturer. If vapor pressure and critical pressure data for the fluid is available from site specific data collected and analyzed in accordance with the Sampling and Analysis Plan (SAP) (Attachment 1) or from a representative cross section sampling analysis, the flow rate can be determined using Equation 1 below [Reference 10, 12]:

$$Q = C_V * C_F * 34.2 \sqrt{\Delta P_V * \left(\frac{API + 131.5}{141.5} \right)} \quad \text{[Eq. 1]}$$

If, $P_V < 0.5 * P_{SP}$, then the flow is choked and therefore:

$$\Delta P_V = P_{SP} - P_V \quad \text{[Eq. 2]}$$

Otherwise, if $P_V \geq 0.5 * P_{SP}$

$$\Delta P_V = P_{SP} - \left(0.96 - 0.28 \sqrt{\frac{P_V}{P_{CR}}} \right) P_V \quad \text{[Eq. 3]}$$

Where,

$Q =$ maximum design liquid flowrate in bbl/day

$C_V =$ flow coefficient of valve, gpm/psid

$C_F =$ liquid pressure recovery factor per valve manufacturer

$API =$ gravity of pressurized fluid in Separator, °API

$\Delta P_V =$ pressure drop across valve, psid

$P_{SP} =$ Separator pressure, psia

$P_V =$ absolute vapor pressure, psia, at flow temperature

$P_{CR} =$ critical pressure, psia

If vapor pressure and critical pressure data for the fluid is not available, for simplicity (but resulting in a higher flowrate), unchoked flow may be assumed and the above equations may be reduced to:

$$Q = C_V * C_F * 34.2 \sqrt{\Delta P * \left(\frac{API + 131.5}{141.5} \right)} \quad \text{[Eq. 4]}$$

Where,

$Q =$ maximum design flowrate in bbl/day

$C_V =$ flow coefficient of valve, gpm/psid

$C_F =$ pressure recovery factor per valve manufacturer (if not available $C_F = 1$)

$API =$ gravity of pressurized fluid in Separator, °API

ΔP = pressure drop across valve, psid, after considering line losses upstream and downstream of the valve. Consult References 10 and 12.

6.2 CONDENSATE TANK BREATHING VAPOR LOSSES

Condensate tank breathing (or thermal) losses $\dot{m}_{BREATHING}$, should be calculated using the methods in API STD 2000 (Section 4.3 or Annex A) or equivalent method. The normal breathing vent rate is based on the flash point of the fluid entering the Condensate tank and the size of the Condensate tank, V_{ST}. Breathing losses, $\dot{m}_{BREATHING}$, are expressed in scfh.

For Tank Systems with a "banked" tank configuration – where multiple groups of Condensate Tanks are part of the same Vapor Control System, but isolated via independent VOC combustion devices or one-way flow devices (e.g. check valves), the breathing loss calculation should consider each individual "bank" as well as both "banks" together. Evaluating a single bank, while reducing total calculated breathing losses, significantly reduces available headspace, which is one of the primary components of VCS design capacity calculated during the Engineering Evaluation. Considering both "banked" and "non-banked" configurations will ensure design adequacy for all operating scenarios.

6.3 CONDENSATE TANK WORKING LOSSES

Condensate tank working losses should be calculated using the methods in API STD 2000 (Section 4.3 or Annex A) or equivalent method. The normal working vent rate, $\dot{m}_{WORKING}$, is based on the flash point of the fluid entering the Condensate tank and the maximum design flowrate of the fluid entering the Condensate tank, Q. Working losses, $\dot{m}_{WORKING}$, are expressed in scfh.

6.4 CONDENSATE TANK FLASH VAPOR LOSSES

There are several methods available to determine the tank flash vapor losses, including use of process modeling programs, use of correlations and direct measurement. The appropriate method should be selected based on considerations including the stage of development (design phase or in operation), data available and limitations of each method. In many instances multiple methods may be used.

6.4.1 PROCESS SIMULATORS

There are many widely used process simulators with oil-and-gas capabilities, including, but not limited to, HYSYS, ProMax, VMGSim and E&P Tanks. In general, process simulators will provide the most accurate estimation of flash vapor losses due to their ability to calculate multiple equations simultaneously. The input to process simulators is more detailed than the input to correlations and the user will be required to collect more data before beginning the simulation. The accuracy of the process simulation will depend on the accuracy of the data input, and inaccurate input data may affect the final result more than if using a correlation. Factors that must be considered when developing the process model include, but are not limited to:

- Pressurized liquid sample analysis
- Normal Operating Conditions in upstream separator (NOTE: not conditions assumed for permitting purposes)
- Final weathered conditions of oil in the Condensate tank
- Effect of liquids already in the Condensate tank when the new liquid is introduced
- Ambient temperature effects

At the beginning of a comprehensive system study, process simulation may be the preferred method for calculating flash losses due to the lack of historical data to compare results with. As more locations are studied and comprehensive data is gathered, the user may evaluate the use of correlations and through a

comparison of available correlations, select one or more that provide accurate results for those specific operations.

6.4.2 CORRELATIONS

There are many correlations that have been developed to assist in calculating flash vapors (e.g. Valko and McCain, Vasquez-Beggs, Rollins, McCain, Creeger, Weldon Gas-Oil Ratio chart, etc). Such correlations provide simplified equations that are easy to use and validated by laboratory data. To simplify the equations used to calculate flash, each correlation makes unique assumptions based on the data available to the authors of the correlation and the specific set of conditions the correlation was developed to cover. For example, most correlations only apply to specific API, temperature or pressure ranges. Because of these simplifications, many correlations can be used to approximate flash losses without obtaining a detailed oil and gas analysis.

Before using any correlation, it should be verified that the selected correlation is appropriate for the specific conditions at the location(s) in question.

6.4.3 DIRECT MEASUREMENT

If the facility is already constructed and in operation, instrumentation may be installed to measure the flash vapors produced each time a separator dumps. This method will provide real-time flash data that is specific to the location under study. The limitations of this method include the cost of installing and monitoring the instrumentation, feasibility of applying it to a large number of locations in tandem, operational concerns and environmental factors. For example, direct measurement alone may not provide the best flash estimation if the facility is operating below the normal operating conditions or if the ambient temperatures are abnormally low. Additionally, a large scale study covering multiple locations may be completed quicker, and to the same level of accuracy, using a correlation or process simulator. When designing the test, consideration should be given to the following factors:

- Length of test necessary to capture all required operation conditions
- Selection of devices that do not alter operating conditions (e.g. flow meters that will not introduce backpressure to the Vapor Control System)
- Selection of devices appropriate to the test conditions (especially the low pressure in the Vapor Control System)
- QA/QC concerns with the measurement devices
- Any other concerns

6.5 VORTEX GAS ENTRAINMENT LOSSES

Gas entrainment losses, $\dot{m}_{VORTEX}$ (in scfh) should be calculated if the liquid level height drops below the critical height and there is no vortex eliminator installed. The equipment vendor, industry standards or empirical data may be consulted on the amount of vapor entrained in the fluid flow per barrel of throughput fluid.

6.6 SEPARATOR VAPOR LOSSES

If Separator gases are not collected for sale, the vapor must be either routed to an alternative disposal/sale location or captured into the Vapor Control System, in which case the vapor losses from the Separator, $\dot{m}_{SEP}$ (in scfh), must be considered in calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System. The amount of vapor may be determined using a process simulator, equation of state calculator, or other industry accepted method.

6.7 VRT VAPOR LOSSES

If vapor recovery tower (VRT) gases are not collected for sale, the vapor must be either routed to an alternative disposal/sale location or captured into the Vapor Control System ($\dot{m}_{VRT,}$ in scfh), in which case the vapor losses must then be considered in calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System. The amount of vapor may be determined using a process simulator, equation of state calculator, or other industry accepted method.

6.8 OTHER VAPOR LOSSES

Vapors from other sources that are captured by the Vapor Control System, ($\dot{m}_{OTHER}$, in scfh), must be obtained from vendors / vendor literature or calculated by industry accepted methods. If captured into the Vapor Control System, they must be considered when calculating the Potential Peak Instantaneous Vapor Flowrate through the Vapor Control System.

6.9 TOTAL VAPOR LOSSES

For an existing system the Potential Peak Instantaneous Vapor Flowrate (scfh) is calculated as:

$$\dot{m}_{PEAK} = \sum \left(\dot{m}_{FLASH} + \dot{m}_{BREATHING} + \dot{m}_{WORKING} + \dot{m}_{VORTEX} \right)_{TANKS} + \sum \left(\dot{m}_{SEP} + \dot{m}_{VRT} + \dot{m}_{TRUCK} + \dot{m}_{OTHER} \right)$$

[Eq. 15]

For systems where Separator and VRT gases are sent for sale/gathering, vortex entrainment is not suspected, and there is no recovery from trucks, the above equation reduces to:

$$\dot{m}_{PEAK} = \sum \left(\dot{m}_{FLASH} + \dot{m}_{BREATHING} + \dot{m}_{WORKING} \right)_{TANKS}$$

[Eq. 16]

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APPENDIX B

SUMMARY OF RELIALBE INFORMATION FOR PG III LOCATIONS CERTIFIED ON JULY 28, 2017

End of Phase Report for Tank Systems in Group III - Appendix B
Summary of Reliable Information for PG III Locations Certified on July 28, 2017
Data Reported is from Date of Vapor Recovery System Verification to December 31, 2017

Vapor Control System (LOD)	Tank System Number	VCS Verification Date (w/ IR Camera)	Leak Reported Date	AIRS ID	Date of Corrective Action	Tank Number	Description of Corrective Action	Source of VOC Emissions
ALBERT GRASSHOPPER ASHLEY BENIRSCHKE RITCHEY T3N-R65W-S23 L01	2133	7/20/2017	9/19/2017	123-3269	9/19/2017	6741686	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
ANDERSEN HEADLEY LARSON T4N-R65W-S33 L01	2328	6/23/2016	11/27/2017	123-3292	11/27/2017	6741673	Replaced thief hatch envelope gasket.	Thief Hatch
ANDERSEN HSR MINTON T4N-R65W-S33 L01	2287	6/6/2017	7/31/2017	123-3345	7/31/2017	371129	Cleaned thief hatch center assembly and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
ANDERSON MARLEY ROBT UPRR PANAM T4N-R65W-S33 L01	2330	8/17/2016	8/14/2017	123-3331	8/14/2017	6744115	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
ANDERSON MARLEY ROBT UPRR PANAM T4N-R65W-S33 L01	2330	8/17/2016	8/14/2017	123-3331	8/14/2017	6744115	Tightened tank bolts.	Tank
ANDERSON MARLEY ROBT UPRR PANAM T4N-R65W-S33 L01	2330	8/17/2016	8/14/2017	123-3331	8/14/2017	10876977	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
ANDERSON MARLEY ROBT UPRR PANAM T4N-R65W-S33 L01	2330	8/17/2016	8/14/2017	123-3331	8/14/2017	483799	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
ARISTOCRAT T3N-R65W-S2 L01	436	5/31/2016	6/8/2016	123-9222,123-9922	6/8/2016	6134913	Tightened thief hatch nuts	Thief Hatch
ARISTOCRAT T3N-R65W-S2 L01	436	5/31/2016	6/8/2016	123-9222,123-9922	6/8/2016	6134913	Cleaned thief hatch	Thief Hatch
BADGER FED T8N-R60W-S3 L01	2068	4/14/2016	7/18/2017	123-9CEF	7/18/2017	6141682	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
BALL RANCH T7N-R63W-S3 L01	571	7/17/2017	7/31/2017	123-9A76,123-9A7A	8/1/2017	F14383	Disassembled, retaped, and reinstalled VOC line and collar/union.	VOC Line
BETZ T4N-R65W-S9 L01	270	6/22/2016	11/10/2016	123-2951,123-9178	11/10/2016	360553	Replaced thief hatch envelope gasket	Thief Hatch
BOEHNER T4N-R65W-S8 L03	719/720	5/8/2017	12/12/2017	123-2712,123-7150	12/12/2017	715401	Cleaned and replaced PRV.	PRV
BOOTH T4N-R64W-S26 L01	1573/495	1/18/2017	9/22/2017	123-1793,123-1844,123-2891,123-7658	9/22/2017	5118	Replaced thief hatch envelope gasket and spring.	Thief Hatch
BORN SITZMAN FOOS T4N-R64W-S27 L01	486	11/22/2016	5/15/2017	123-2110,123-5801,123-7061,123-7709,123-7727	5/15/2017	94469	Cleaned tank.	Tank
BORN SITZMAN FOOS T4N-R64W-S27 L01	486	11/22/2016	9/21/2017	123-2110,123-5801,123-7061,123-7709,123-7727	9/21/2017	98297	Replaced thief hatch center assembly and spring.	Thief Hatch
BORN SITZMAN FOOS T4N-R64W-S27 L01	486	11/22/2016	9/21/2017	123-2110,123-5801,123-7061,123-7709,123-7727	9/21/2017	97880	Replaced thief hatch center assembly and spring.	Thief Hatch
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	5/19/2016	123-3327	5/20/2016	6747307	Taped bull plug on tank	Tank
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	8/22/2016	123-3327	8/23/2016	6747288	Replaced tank bull plug	Tank

Vapor Control System (LOD)	Tank System Number	VCS Verification Date (w/ IR Camera)	Leak Reported Date	AIRS ID	Date of Corrective Action	Tank Number	Description of Corrective Action	Source of VOC Emissions
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	8/22/2016	123-3327	8/22/2016	6747288	Retaped and doped tank nipple	Tank
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	8/22/2016	123-3327	8/22/2016	6747283	Retaped and doped tank plug	Tank
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	8/22/2016	123-3327	8/22/2016	6747288	Retaped and doped tank connection	Tank
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	6/28/2017	123-3327	6/28/2017	6747283	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
BREHON LORENZ LYNCH T4N-R65W-S18 L01	2138	5/11/2016	7/10/2017	123-3327	7/10/2017	6747288	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
BROWNWOOD GARCIA ORR AMOCO T4N-R67W-S25 L01	2140	4/19/2017	11/30/2017	123-4645	11/30/2017	674306	Cleaned thief hatch seal surface. Replaced thief hatch center assembly and spring.	Thief Hatch
BULLEIT FED T8N-R59W-S4 L01	2371	10/27/2015	5/25/2016	123-9CF3	5/25/2016	6141861	Cleaned PRV	PRV
BUTTERBALL MILE HI T3N-R64W-S19 L01	403	8/24/2016	8/4/2017	123-8664,123-9866	8/4/2017	98395	Cleaned and replaced thief hatch envelope gasket.	Thief Hatch
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	7/7/2017	123-2932,123-2936,123-9154,123-9161	7/7/2017	443	Cleaned thief hatch seals.	Thief Hatch
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	7/7/2017	123-2932,123-2936,123-9154,123-9161	7/7/2017	392	Replaced thief hatch envelope gasket.	Thief Hatch
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	7/7/2017	123-2932,123-2936,123-9154,123-9161	7/7/2017	439	Replaced thief hatch envelope gasket.	Thief Hatch
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	10/3/2017	123-2932,123-2936,123-9154,123-9161	10/4/2017	487415	Replaced load line balon valve.	Load Line Valve
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	10/3/2017	123-2932,123-2936,123-9154,123-9161	10/4/2017	487415	Replaced balon valve.	Balon Valve
COALVIEW DINNER G01 ECONODE T4N-R65W-S1 L01	236	7/26/2016	11/16/2017	123-2932,123-2936,123-9154,123-9161	11/16/2017	487417	Closed tank vent line valve.	Tank Vent Line
CRAVEN EVANS MURRY T4N-R65W-S17 L01	137	11/15/2016	8/10/2017	123-3153	8/10/2017	3111464	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
CRAVEN GAGES GATES MNOOKIN SCARPULLA T4N-R65W-S17 L01	2216	6/23/2016	9/21/2017	123-3262	9/21/2017	6741089	Cleaned thief hatch center assembly and rim. Replaced thief hatch envelope gasket.	Thief Hatch
CRAVEN GAGES GATES MNOOKIN SCARPULLA T4N-R65W-S17 L01	2216	6/23/2016	9/21/2017	123-3262	9/21/2017	6741089	Cleaned Morrison PRV. Reset Morrison PRV O-ring.	PRV
CRAVEN GAGES GATES MNOOKIN SCARPULLA T4N-R65W-S17 L01	2216	6/23/2016	11/13/2017	123-3262	11/13/2017	6741089	Rebuilt thief hatch center assembly.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	1/9/2017	123-3230	1/9/2017	6741926	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	1/9/2017	123-3230	1/9/2017	6741323	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	5/16/2017	123-3230	5/16/2017	6741323	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	5/16/2017	123-3230	5/16/2017	6741926	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch

Vapor Control System (LOD)	Tank System Number	VCS Verification Date (w/ IR Camera)	Leak Reported Date	AIRS ID	Date of Corrective Action	Tank Number	Description of Corrective Action	Source of VOC Emissions
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	7/17/2017	123-3230	7/17/2017	6741926	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	11/14/2017	123-3230	11/15/2017	6741323	Retaped elbow on blowdown.	Blowdown
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	11/14/2017	123-3230	11/14/2017	371645	Cleaned thief hatch vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	11/14/2017	123-3230	11/14/2017	6741926	Cleaned PRV O-ring and weight.	PRV
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	11/14/2017	123-3230	11/14/2017	6741323	Cleaned thief hatch vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
DANE FRICO REI T3N-R65W-S10 L01	2105	3/8/2016	11/14/2017	123-3230	11/14/2017	371645	Cleaned PRV O-ring and weight.	PRV
DECHANT COHN CROWE UPRR T3N-R65W-S25 L01	2173	11/10/2016	8/2/2017	123-3223	8/2/2017	6743062	Cleaned PRV.	PRV
DECHANT T3N-R64W-S7 L02	380	7/6/2016	6/6/2017	123-2681,123-7324,123-9609,123-9610	6/6/2017	36116	Reseated PRV O-ring.	PRV
DECHANT T3N-R64W-S7 L02	380	7/6/2016	8/4/2017	123-2681,123-7324,123-9609,123-9610	8/4/2017	361117	Cleaned thief hatch center assembly.	Thief Hatch
DECKER KRIEG SCHMIDT T4N-R66W-S26 L01	2097	8/15/2016	8/17/2016	123-3238	8/17/2016		Replaced PRV	PRV
DECKER KRIEG SCHMIDT T4N-R66W-S26 L01	2097	8/15/2016	11/20/2017	123-3238	11/20/2017	126765	Cleaned PRV O-ring and weight.	PRV
DECKER KRIEG SCHMIDT T4N-R66W-S26 L01	2097	8/15/2016	11/20/2017	123-3238	11/20/2017	126765	Replaced thief hatch envelope gasket.	Thief Hatch
DINNER T6N-R65W-S14 L03	1725	7/11/2016	1/13/2017	123-4435	1/13/2017	17766	Cleaned thief hatch center assembly and vacuum gasket. Replaced thief hatch envelope gasket and spring. Rebuilt thief hatch center assembly.	Thief Hatch
DINNER T6N-R65W-S14 L03	1725	7/11/2016	1/13/2017	123-4435	1/13/2017		Cleaned thief hatch center assembly and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
DINNER T6N-R65W-S14 L03	1725	7/11/2016	8/15/2017	123-4435	8/15/2017	11765	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
DONOVAN BOOTH T3N-R64W-S2 L01	499	4/18/2017	7/20/2017	123-5078,123-8231	7/20/2017	1011894	Cleaned and replaced thief hatch center assembly.	Thief Hatch
DOVE DURYEA SARCHET T3N-R65W-S22 L01	2137	11/21/2016	8/10/2017	123-3243	8/10/2017	6743060	Cleaned thief hatch center assembly. Flipped thief hatch envelope gasket.	Thief Hatch
EHRLICH T4N-R67W-S13 L01	1715	4/19/2017	6/12/2017	123-2984	6/12/2017	90682	Replaced spacer plate and thief hatch.	Spacer Plate & Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	12/1/2016	123-7234	12/1/2016	6732492	Tightened thief hatch washers	Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	12/1/2016	123-7234	12/1/2016	6732486	Tightened thief hatch washers	Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	6/1/2017	123-7234	6/1/2017	6732489	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	6/1/2017	123-7234	6/1/2017	6732492	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	6/5/2017	123-7234	6/5/2017	6732281	Placed Viton washers and steal washers on leaking bolts.	Tank

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FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	7/10/2017	123-7234	7/10/2017	6732486	Cleaned thief hatch center assembly and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
FARMERS FRICO T3N-R65W-S14 L01	2217	10/11/2016	8/1/2017	123-7234	8/1/2017	6732492	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
FAULKNER CECIL FARMS USX T7N-R64W-S30 L01	599	4/6/2017	11/27/2017	123-5567,123-6957,123-9150	11/27/2017	167902	Cleaned thief hatch.	Thief Hatch
FIVE RIVERS MONFORT GILCRST T4N-R66W-S16 L01	190	6/28/2016	7/15/2016	123-3723,123-8562,123-8632	7/15/2016	98701	Replaced thief hatch envelope gasket, cleaned center assembly and seal	Thief Hatch
FIVE RIVERS USX T4N-R66W-S9 L01	189	5/10/2016	4/12/2017	123-3762,123-8232,123-8233,123-8242,123-8243	4/12/2017	169508	Tightened thief hatch center assembly bolts.	Thief Hatch
FIVE RIVERS USX T4N-R66W-S9 L01	189	5/10/2016	4/12/2017	123-3762,123-8232,123-8233,123-8242,123-8243	4/12/2017	169498	Removed and retaped 4" bull plug.	Tank
GITTLEIN UPRC ART RED FRONT RANGE T3N-R64W-S9 L01	536	9/6/2016	9/20/2017	123-2811,123-7351,123-9A6A	9/20/2017	378901	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
GOLLNER OIL T4N-R67W-S27 L01	1750	5/12/2016	5/16/2016	123-2998	5/16/2016		Applied bond glue to tank crack	Tank
GOLLNER OIL T4N-R67W-S27 L01	1750	5/12/2016	4/3/2017	123-2998	4/3/2017	12157	Cleaned PRV. Replaced thief hatch center assembly.	PRV & Thief Hatch
GOLLNER OIL T4N-R67W-S27 L01	1750	5/12/2016	8/23/2017	123-2998	8/24/2017	1	Resealed tank plug.	Tank
GOLLNER OIL T4N-R67W-S27 L01	1750	5/12/2016	8/23/2017	123-2998	8/24/2017	1	Resealed tank plug.	Tank
GOLLNER OIL T4N-R67W-S27 L01	1750	5/12/2016	8/28/2017	123-2998	8/31/2017	12157	Replaced tank fitting on top of tank.	Tank
GURTLER T3N-R65W-S24 L02	429/1885	3/8/2017	7/19/2017	123-2203,123-6880,123-9029	7/19/2017	360498	Cleaned thief hatch envelope gasket.	Thief Hatch
GURTLER T3N-R65W-S24 L02	429/1885	3/8/2017	7/19/2017	123-2203,123-6880,123-9029	7/19/2017	360497	Replaced thief hatch envelope gasket.	Thief Hatch
HARRISON KOCH RAY T4N-R65W-S32 L01	2360	6/23/2016	8/23/2016	123-3289	8/23/2016	371053	Replaced thief hatch envelope gasket, cleaned and rebuilt center assembly and seat and tightened bolts	Thief Hatch
HARTMAN KOSKELA LAURICE SHELTON T3N-R65W-S1 L01	2260	7/6/2016	8/22/2016	123-3291	8/22/2016	6754049	Replaced thief hatch center assembly	Thief Hatch
HARTMAN KOSKELA LAURICE SHELTON T3N-R65W-S1 L01	2260	7/6/2016	8/22/2016	123-3291	8/22/2016	6755033	Replaced thief hatch center assembly	Thief Hatch
HSR KINZER T5N-R67W-S23 L01	2092	4/26/2016	8/9/2016	123-2238	8/9/2016	372598	Replaced thief hatch envelope gasket, cleaned center assembly and seal	Thief Hatch
HSR KINZER T5N-R67W-S23 L01	2092	4/26/2016	6/7/2017	123-2238	6/7/2017	372598	Cleaned thief hatch. Replaced thief hatch center assembly.	Thief Hatch
HSR KINZER T5N-R67W-S23 L01	2092	4/26/2016	7/6/2017	123-2238	7/6/2017	372597	Cleaned thief hatch center assembly and envelope gasket.	Thief Hatch
HSR KIRKHAM TUDOR T4N-R65W-S31 L01	2134	8/16/2016	12/12/2017	123-3305	12/12/2017	2015247	Tightened PRV.	PRV
HSR KIRKHAM TUDOR T4N-R65W-S31 L01	2134	8/16/2016	12/12/2017	123-3305	12/12/2017	2015247	Rebuilt thief hatch center assembly.	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/18/2016	6137355	Replaced thief hatch envelope gasket and cleaned center assembly	Thief Hatch

Vapor Control System (LOD)	Tank System Number	VCS Verification Date (w/ IR Camera)	Leak Reported Date	AIRS ID	Date of Corrective Action	Tank Number	Description of Corrective Action	Source of VOC Emissions
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/19/2016	6137013	Replaced tank connection	Tank
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/18/2016	6136967	Tightened thief hatch bolts	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/18/2016	6136967	Rebuilt thief hatch center assembly	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/18/2016	6137074	Retaped and doped PRV threads	PRV
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	8/18/2016	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	8/19/2016	6137074	Repaired tank blow down	Tank
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	2/21/2017	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	2/21/2017	6137014	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	9/5/2017	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	9/5/2017	6137552	Replaced thief hatch envelope gasket.	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	12/5/2017	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	12/5/2017	37013	Cleaned thief hatch.	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	12/5/2017	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	12/5/2017	6137074	Replaced thief hatch center assembly.	Thief Hatch
IRENE ROY SCHMIDT T4N-R65W-S30 L01	101	5/23/2016	12/5/2017	123-9A24,123-9A25,123-9A2D,123-9A6F,123-9B34	12/5/2017	37355	Cleaned thief hatch.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/8/2016	123-8706,123-8707,123-8708,123-8709,123-8750	9/8/2016	98698	Cleaned and tightened thief hatch nuts and bolts	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/8/2016	123-8706,123-8707,123-8708,123-8709,123-8750	9/8/2016	98754	Cleaned and tightened thief hatch nuts and bolts	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	11/16/2016	123-8706,123-8707,123-8708,123-8709,123-8750	11/16/2016	9445	Replaced thief hatch envelope gasket	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	11/16/2016	123-8706,123-8707,123-8708,123-8709,123-8750	11/16/2016	9445	Sanded down thief hatch and cleaned center assembly	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	11/16/2016	123-8706,123-8707,123-8708,123-8709,123-8750	11/16/2016		Replaced thief hatch envelope gasket	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	3/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	3/1/2017	9134	Replaced thief hatch envelope gasket.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	3/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	3/1/2017	9463	Replaced thief hatch envelope gasket.	Thief Hatch

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JOHNSON T4N-R65W-S12 L01	624	6/28/2016	4/7/2017	123-8706,123-8707,123-8708,123-8709,123-8750	4/7/2017	9466	Cleaned thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	4/7/2017	123-8706,123-8707,123-8708,123-8709,123-8750	4/7/2017	9463	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	6/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	6/1/2017	9445	Cleaned thief hatch.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	6/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	6/1/2017	9134	Cleaned thief hatch.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	6/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	6/1/2017	9466	Cleaned thief hatch.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	6/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	6/1/2017	9470	Cleaned thief hatch.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	7/10/2017	123-8706,123-8707,123-8708,123-8709,123-8750	7/10/2017	9134	Cleaned thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/14/2017	123-8706,123-8707,123-8708,123-8709,123-8750	9/14/2017	9466	Rebuilt thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/14/2017	123-8706,123-8707,123-8708,123-8709,123-8750	9/14/2017	9445	Rebuilt thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/14/2017	123-8706,123-8707,123-8708,123-8709,123-8750	9/14/2017	9463	Rebuilt thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/14/2017	123-8706,123-8707,123-8708,123-8709,123-8750	9/14/2017	9134	Rebuilt thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	9/14/2017	123-8706,123-8707,123-8708,123-8709,123-8750	9/14/2017	9470	Rebuilt thief hatch center assembly.	Thief Hatch
JOHNSON T4N-R65W-S12 L01	624	6/28/2016	11/1/2017	123-8706,123-8707,123-8708,123-8709,123-8750	11/1/2017	9466	Cleaned thief hatch center assembly.	Thief Hatch
KARAKAKES T3N-R65W-S13 L02	2009	9/27/2016	9/27/2016	123-9B27	9/27/2016	4	Tightened bull plug	Bull Plug
KATE WHITE JESSIE T3N-R64W-S29 L01	1120	1/21/2016	1/7/2017	123-3683	1/7/2017	87198	Cleaned thief hatch envelope gasket.	Thief Hatch
KEISHA WHITE WOODY ABBEY T3N-R64W-S1 L01	542	6/30/2016	2/10/2017	123-2767,123-9487	2/10/2017		Replaced thief hatch envelope gasket.	Thief Hatch
KISSLER BOOTH T4N-R64W-S23 L01	468	3/23/2017	3/27/2017	123-4837,123-7650	3/27/2017		Cleaned Morrison PRV gasket.	PRV
KISSLER BOOTH T4N-R64W-S23 L01	468	3/23/2017	3/27/2017	123-4837,123-7650	3/27/2017		Cleaned thief hatch center assembly.	Thief Hatch
KLEIN T5N-R64W-S16 L01	308	5/4/2016	8/8/2016	123-9343,123-9378,123-9491	8/8/2016	709	Taped and doped PRV threads	PRV
KOHLHOFF T7N-R63W-S9 L01	1970	7/14/2016	6/9/2017	123-99C3	6/9/2017	0000	Inspected that all thief hatches and valves at location were shut.	Thief Hatch

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LEHFELDT HERBST T4N-R64W-S27 L02	480	5/24/2016	8/18/2016	123-1819,123-6677,123-8027,123-9A07,123-9A08	8/18/2016	127262	Cleaned thief hatch	Thief Hatch
LEHFELDT HERBST T4N-R64W-S27 L02	480	5/24/2016	6/8/2017	123-1819,123-6677,123-8027,123-9A07,123-9A08	6/8/2017	127262	Cleaned and replaced thief hatch center assembly.	Thief Hatch
LEHFELDT HERBST T4N-R64W-S27 L02	480	5/24/2016	6/8/2017	123-1819,123-6677,123-8027,123-9A07,123-9A08	6/8/2017	331346	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
LEHFELDT HERBST T4N-R64W-S27 L02	480	5/24/2016	9/26/2017	123-1819,123-6677,123-8027,123-9A07,123-9A08	9/26/2017	868107	Replaced thief hatch center assembly.	Thief Hatch
LEHFELDT HERBST T4N-R64W-S27 L02	480	5/24/2016	9/26/2017	123-1819,123-6677,123-8027,123-9A07,123-9A08	9/26/2017	331346	Replaced thief hatch envelope gasket.	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	10/21/2016	123-3485,123-7354,123-7397,123-9098	10/21/2016	72717	Repaired thief hatch vacuum gasket	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	8/3/2017	123-3485,123-7354,123-7397,123-9098	8/3/2017	72717	Tightened tank reducer.	Tank
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	11/14/2017	123-3485,123-7354,123-7397,123-9098	11/14/2017	98164	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	11/14/2017	123-3485,123-7354,123-7397,123-9098	11/14/2017	98157	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	11/14/2017	123-3485,123-7354,123-7397,123-9098	11/14/2017	98158	Replaced thief hatch center assembly.	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	11/14/2017	123-3485,123-7354,123-7397,123-9098	11/14/2017	72717	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
LOWER LATHAM WEEZER T4N-R65W-S3 L01	240	8/15/2016	11/14/2017	123-3485,123-7354,123-7397,123-9098	11/14/2017	98095	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
MARSHALL MEL SMOOKLER RURAL LAND T4N-R65W-S32 L01	365	5/18/2016	12/13/2016	123-2106,123-3635,123-9870	12/13/2016		Repaired VOC pilot and mother board.	VOC Burner
MARTINSON T4N-R66W-S25 L01	159	9/9/2016	4/10/2017	123-4883,123-7989,123-7990	4/11/2017	98360	Retaped nipple out of the top of the tank to the PRV. Doped PRV elbow.	PRV
MARTINSON T4N-R66W-S25 L01	159	9/9/2016	4/10/2017	123-4883,123-7989,123-7990	4/10/2017	98360	Cleaned thief hatch vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
MARTINSON T4N-R66W-S25 L01	159	9/9/2016	9/15/2017	123-4883,123-7989,123-7990	9/15/2017	98360	Took apart PRV. Cleaned O-ring and sealing surfaces. Cleaned theif hatch center assembly. Replaced theif hatch envelope gasket.	PRV & Thief Hatch
MASSEY SIAMA RURAL T4N-R65W-S31 L01	2215	9/1/2016	7/5/2017	123-3333	7/5/2017	735300836	Cleaned PRV inside and O-ring.	PRV
MASSEY SIAMA RURAL T4N-R65W-S31 L01	2215	9/1/2016	7/5/2017	123-3333	7/5/2017	1011633	Cleaned thief hatch base gasket. Replaced thief hatch envelope gasket.	Thief Hatch
MASSEY SIAMA RURAL T4N-R65W-S31 L01	2215	9/1/2016	11/13/2017	123-3333	11/13/2017	735300836	Rebuilt thief hatch center assembly.	Thief Hatch
MASSEY SIAMA RURAL T4N-R65W-S31 L01	2215	9/1/2016	11/13/2017	123-3333	11/13/2017	1011633	Rebuilt thief hatch center assembly.	Thief Hatch

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MCMILLEN T4N-R65W-S19 L01	131	6/8/2016	8/22/2016	123-3687,123-3737,123-7566,123-7570	8/22/2016	68374	Replaced thief hatch center assembly and cleaned center assembly	Thief Hatch
MILLER BURTON T4N-R66W-S25 L01	877	2/16/2016	3/8/2016	123-2644,123-2750,123-8488,123-9D0F	3/8/2016	487367	Replaced thief hatch envelope gasket	Thief Hatch
MILLER BURTON T4N-R66W-S25 L01	877	2/16/2016	5/2/2016	123-2644,123-2750,123-8488,123-9D0F	5/2/2016	487367	Replaced thief hatch envelope gasket	Thief Hatch
MILLER BURTON T4N-R66W-S25 L01	877	2/16/2016	11/6/2017	123-2644,123-2750,123-8488,123-9D0F	11/6/2017	487371	Rebuilt thief hatch center assembly.	Thief Hatch
MILLER BURTON T4N-R66W-S25 L01	877	2/16/2016	12/5/2017	123-2644,123-2750,123-8488,123-9D0F	12/5/2017	487373	Replaced thief hatch center assembly.	Thief Hatch
MILLER BURTON T4N-R66W-S25 L01	877	2/16/2016	12/5/2017	123-2644,123-2750,123-8488,123-9D0F	12/5/2017	487367	Replaced thief hatch center assembly.	Thief Hatch
OCOMA T4N-R65W-S25 L01	1171	8/25/2016	9/13/2017	123-3650	9/13/2017	79664	Replaced thief hatch envelope gasket.	Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	11/18/2016	123-7188,123-7189,123-7190,123-7248,123-7263	11/18/2016	98013	Replaced thief hatch envelope gasket and cleaned center assembly	Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	6/20/2017	123-7188,123-7189,123-7190,123-7248,123-7263	6/21/2017	97964	Performed maintenance on PRV and thief hatch center assembly. Replaced thief hatch envelope gasket.	PRV & Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	6/20/2017	123-7188,123-7189,123-7190,123-7248,123-7263	6/21/2017	97965	Performed maintenance on PRV and thief hatch center assembly. Replaced thief hatch envelope gasket.	PRV & Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	6/20/2017	123-7188,123-7189,123-7190,123-7248,123-7263	6/21/2017	97963	Performed maintenance on PRV and thief hatch center assembly. Replaced thief hatch envelope gasket.	PRV & Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	6/20/2017	123-7188,123-7189,123-7190,123-7248,123-7263	6/21/2017	98013	Performed maintenance on PRV and thief hatch center assembly. Replaced thief hatch envelope gasket.	PRV & Thief Hatch
PEDRO ST T4N-R65W-S36 L01	682	8/4/2016	7/11/2017	123-7188,123-7189,123-7190,123-7248,123-7263	7/11/2017	97965	Replaced PRV with Morrison PRV.	PRV
PEDRO ST T4N-R65W-S36 L03	1928	6/7/2016	10/17/2016	123-9516	10/17/2016	360910	Tightened thief hatch bolts	Thief Hatch
RURAL T4N-R65W-S31 L01	2277	5/18/2016	9/26/2016	123-3521	9/27/2016	4	Taped and doped bushing threads	Automation
RURAL T4N-R65W-S31 L01	2277	5/18/2016	9/26/2016	123-3521	9/26/2016	10875041	Cleaned thief hatch vacuum gasket and replaced envelope gasket	Thief Hatch
RURAL T4N-R65W-S31 L01	2277	5/18/2016	9/26/2016	123-3521	9/27/2016	10875779	Replaced bull plug	Tank
RURAL T4N-R65W-S31 L01	2277	5/18/2016	9/26/2016	123-3521	9/26/2016		Cleaned thief hatch vacuum gasket and replaced envelope gasket	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	1096724	Replaced thief hatch envelope gasket and cleaned thief hatch center assembly.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	1096724	Replaced thief hatch envelope gasket and cleaned thief hatch center assembly.	Thief Hatch

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SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	6115964	Replaced thief hatch envelope gasket and cleaned thief hatch center assembly.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	1096726	Tightened thief hatch bolts.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	1096724	Replaced thief hatch envelope gasket and cleaned thief hatch center assembly.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	96727	Replaced thief hatch envelope gasket and cleaned thief hatch center assembly.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	8/18/2016	123-9D0F	8/18/2016	1096727	Tightened thief hatch bolts.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	4/19/2017	123-9D0F	4/19/2017	1096845	Adjusted handle on vapor recovery line valve.	Vapor Recovery Line
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	6/28/2017	123-9D0F	6/28/2017	6115965	Cleaned thief hatch vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
SANDAU T4N-R66W-S25 L01	2373	4/4/2016	7/3/2017	123-9D0F	7/3/2017	1096845	Adjusted handle on vapor recovery line valve.	Vapor Recovery Line
SARCHET T3N-R65W-S24 L02	1935	4/21/2016	3/13/2017	123-9666	3/13/2017	1170	Cleaned thief hatch center assembly.	Thief Hatch
SARCHET T3N-R65W-S24 L02	1935	4/21/2016	9/14/2017	123-9666	9/14/2017	1171	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch center assembly.	Thief Hatch
SATER T4N-R63W-S18 L01	2374	5/25/2016	5/16/2017	123-9D20	5/16/2017	6141710	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
SAUER T5N-R65W-S33 L02	2031	5/3/2016	7/7/2017	123-9BE6	7/7/2017	486553	Cleaned thief hatch seals and rim.	Thief Hatch
SAUER T5N-R65W-S33 L02	2031	5/3/2016	7/7/2017	123-9BE6	7/7/2017	486554	Cleaned thief hatch seals and rim.	Thief Hatch
SCHMIDT T4N-R66W-S25 L01	158	6/20/2016	7/14/2016	123-2627,123-2643,123-8246	7/14/2016	57891	Replaced thief hatch envelope gasket	Thief Hatch
SCHMIDT T4N-R66W-S25 L01	158	6/20/2016	7/14/2016	123-2627,123-2643,123-8246	7/14/2016	72034	Tightened thief hatch bolts	Thief Hatch
SCHMIDT T4N-R66W-S25 L01	158	6/20/2016	7/14/2016	123-2627,123-2643,123-8246	7/14/2016	72034	Replaced thief hatch center assembly	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	12/8/2016	123-3589,123-9605	12/8/2016	360943	Replaced thief hatch envelope gasket	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	12/8/2016	123-3589,123-9605	12/8/2016	361051	Cleaned thief hatch center assembly	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	12/8/2016	123-3589,123-9605	12/8/2016	361050	Replaced thief hatch envelope gasket	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	6/13/2017	123-3589,123-9605	6/13/2017	360943	Cleaned thief hatch center assembly.	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	9/14/2017	123-3589,123-9605	9/14/2017	361050	Cleaned Morrison PRV. Reset Morrison PRV O-ring.	PRV
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	9/14/2017	123-3589,123-9605	9/14/2017	361050	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch

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SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	9/14/2017	123-3589,123-9605	9/14/2017	361051	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
SCOOTER HORNTON T3N-R64W-S18 L01	379	9/19/2016	9/14/2017	123-3589,123-9605	9/14/2017	360943	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
SCOTT WESTERMAN T7N-R64W-S32 L01	1787	5/15/2017	8/18/2017	123-7287	8/18/2017	12230	Replaced and rebuilt thief hatch center assembly.	Thief Hatch
SEMMEN USX UPRR SLOAN T2N-R64W-S17 L01	564	5/12/2017	11/9/2017	123-1712,123-8683	11/9/2017	3111569	Cleaned Morrison PRV cap and O-ring.	PRV
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	3/1/2017	123-2653	3/1/2017	15950	Replaced thief hatch center assembly.	Thief Hatch
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	3/1/2017	123-2653	3/1/2017	15949	Replaced thief hatch center assembly.	Thief Hatch
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	9/19/2017	123-2653	9/20/2017	1096628	Cleaned and replaced tank bull plug.	Tank
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	9/19/2017	123-2653	9/19/2017	15950	Cleaned PRV O-ring and weight.	PRV
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	9/19/2017	123-2653	9/19/2017	15950	Cleaned thief hatch seals. Replaced thief hatch envelope gasket.	Thief Hatch
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	9/19/2017	123-2653	9/19/2017	1096626	Cleaned thief hatch seals. Replaced thief hatch envelope gasket.	Thief Hatch
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	10/16/2017	123-2653	10/16/2017	15971	Rebuilt thief hatch center assembly.	Thief Hatch
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	10/16/2017	123-2653	10/16/2017	6627	Tightened PRV.	PRV
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	10/16/2017	123-2653	10/16/2017	6635	Tightened PRV.	PRV
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	11/14/2017	123-2653	11/14/2017	1096629	Tightened inspection plate bolts.	Inspection Plate
SHABLE T4N-R66W-S7 L01	1299	4/26/2016	11/14/2017	123-2653	11/14/2017	1096630	Cleaned vapor recovery line ball valve.	Vapor Recovery Line
SHELTON STROH T3N-R65W-S1 L01	692	5/31/2016	2/13/2017	123-9203,123-9A10,123-9A11	2/14/2017	4	Retaped, doped, and tightened automation fitting.	Automation
SHELTON STROH T3N-R65W-S1 L01	692	5/31/2016	6/13/2017	123-9203,123-9A10,123-9A11	6/13/2017	98521	Cleaned thief hatch center assembly.	Thief Hatch
SHELTON STROH T3N-R65W-S1 L01	692	5/31/2016	7/17/2017	123-9203,123-9A10,123-9A11	7/17/2017	37886	Cleaned PRV gasket.	PRV
SHELTON T3N-R65W-S2 L01	2171	3/17/2017	8/1/2017	123-4120	8/1/2017	372953	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
SHELTON T3N-R65W-S2 L01	2171	3/17/2017	8/1/2017	123-4120	8/1/2017	6735821	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
SHELTON T3N-R65W-S2 L01	2171	3/17/2017	11/14/2017	123-4120	11/14/2017	6735821	Cleaned thief hatch seals.	Thief Hatch
SHELTON T3N-R65W-S2 L01	2171	3/17/2017	11/14/2017	123-4120	11/14/2017	372953	Cleaned thief hatch seals.	Thief Hatch
SHELTON T3N-R65W-S2 L01	2171	3/17/2017	11/14/2017	123-4120	11/14/2017	372953	Cleaned PRV O-ring and weight.	PRV
SKYWAY T5N-R67W-S11 L01	2325	1/5/2016	6/21/2017	123-5647	6/22/2017	6746208	Removed and retaped all connections.	Connections

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SPAYD T4N-R65W-S29 L01	2293	9/2/2016	4/24/2017	123-3121	4/24/2017	10876878	Cleaned PRV and thief hatch center assembly. Replaced thief hatch center assembly and envelope gasket.	PRV & Thief Hatch
SPAYD T4N-R65W-S29 L01	2293	9/2/2016	12/11/2017	123-3121	12/11/2017	10876881	Rebuilt thief hatch center assembly.	Thief Hatch
ST T4N-R64W-S36 L01	500/804	4/21/2016	9/28/2016	123-2215,123-9360,123-9361,123-9375,123-9429	9/28/2016	360776	Repaired union connection on tank	Tank
ST T4N-R64W-S36 L01	500/804	4/21/2016	9/28/2016	123-2215,123-9360,123-9361,123-9375,123-9429	9/28/2016	860484	Retaped tank connection	Tank
ST T4N-R64W-S36 L01	500/804	4/21/2016	9/28/2016	123-2215,123-9360,123-9361,123-9375,123-9429	9/28/2016	360776	Cleaned thief hatch	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	8/22/2016	123-2881,123-8252,123-8986	8/23/2016	91198	Cleaned thief hatch	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	10/19/2016	123-2881,123-8252,123-8986	10/19/2016	169520	Cleaned thief hatch	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	360428	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket.	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	360577	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	8184	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	360430	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	360429	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
STROH T3N-R65W-S12 L04	701	5/31/2016	9/21/2017	123-2881,123-8252,123-8986	9/21/2017	169520	Cleaned thief hatch center assembly, envelope gasket, seal surface, and vacuum gasket. Replaced thief hatch envelope gasket.	Thief Hatch
TANIA BLUE GUTTERSEN T3N-R64W-S2 L01	522	8/17/2016	11/6/2017	123-1738	11/6/2017	123637	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch

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THOMPSON T4N-R64W-S28 L03	508	4/28/2017	7/7/2017	123-4867,123-4905,123-9595,123-9596,123-9602	7/7/2017	361076	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
THOMPSON T4N-R64W-S28 L03	508	4/28/2017	10/10/2017	123-4867,123-4905,123-9595,123-9596,123-9602	10/10/2017	361080	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
THOMPSON T4N-R64W-S28 L03	508	4/28/2017	10/10/2017	123-4867,123-4905,123-9595,123-9596,123-9602	10/10/2017	361080	Tightened thief hatch base gasket nuts and bolts.	Thief Hatch
THOMPSON T4N-R64W-S28 L03	508	4/28/2017	10/10/2017	123-4867,123-4905,123-9595,123-9596,123-9602	10/10/2017	361077	Cleaned thief hatch center assembly. Replaced thief hatch envelope gasket.	Thief Hatch
TULO SCHMIDT T4N-R65W-S19 L01	135	6/20/2016	9/8/2016	123-7983,123-9AA8	9/8/2016	62433	Replaced thief hatch envelope gasket and cleaned center assembly	Thief Hatch
TULO SCHMIDT T4N-R65W-S19 L01	135	6/20/2016	9/8/2016	123-7983,123-9AA8	9/8/2016	375632	Replaced thief hatch envelope gasket and cleaned center assembly	Thief Hatch
UPRC T3N-R65W-S23 L02	405	1/21/2016	8/16/2016	123-3718,123-6847	8/16/2016	4	Repaired bushing on tank monitoring system	Bushing
UPRC T4N-R65W-S8 L01	1911	2/24/2016	7/10/2017	123-9351	7/10/2017	360743	Cleaned thief hatch center assembly.	Thief Hatch
UPRC T4N-R65W-S8 L01	1911	2/24/2016	10/12/2017	123-9351	10/12/2017	360744	Replaced thief hatch center assembly.	Thief Hatch
UPRC T4N-R65W-S8 L01	1911	2/24/2016	10/12/2017	123-9351	10/12/2017	360743	Replaced thief hatch center assembly.	Thief Hatch
UPV SADIE BOOTH T4N-R63W-S31 L01	1013	7/25/2016	12/12/2017	123-3710,123-4930	12/12/2017	4975	Tightened access panel nuts and bolts.	Access Panel
UPV SATER T4N-R64W-S13 L02	473	4/24/2017	10/11/2017	123-2219,123-7640,123-7641	10/13/2017	4885	Applied new tank patch.	Tank