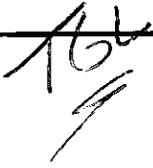


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**OWNER/OPERATOR:**

COID: 800079

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**EQUIPMENT LOCATION:**

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**Applications Batch:**

A/N 528997      TV Revision  
A/N 528479      VRS Carbon Adsorbtion  
A/N 528480      Rule 462 Plan

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**BACKGROUND:**

Petro Diamond stores and distributed petroleum distillates, oxygenates and related products. Products are received via pipeline, ship/barge, and tanker trucks.

These applications were submitted as follows:

A/N	Previous A/N : P/O	Equipment	Reason for application
528479	434295:F98298 (active)  499972 (P/C issued)	VRS Carbon Adsorber	Replacing CMS, revise/update threshold limits to reflect current SCAQMD practice of adding both instantaneous and 15 min avg CMS readings  Change of conditions
528480	324655	Rule 462 Plan	Add new CMS unit as primary, keep existing CMS unit as backup

There are no schools within 1000 feet of this facility.

There no Complaints or Notices to comply within the past two years

There is a Notice of Violation issued 1/5/2012 for a 8/3/2011 VOC emission exceedance at the exhaust of VRU (NOV P34680).

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**INTRODUCTION:**

These applications were submitted 10/20/11. A/N 528479 is for a change of condition to an existing VRS permit (Permit to Construct A/N 499972, which was in turn modification to A/N 434295:F98298) to reflect the installation and operation of a new CEMS, and to revise the threshold limits to reflect current SCAQMD practices. The current CEMS will remain as backup. A/N 528480 is for a new Rule 462 Plan (modify existing R462 plan currently covered under A/N 324655).

The current condition on the VRS limits the VOC concentration to 0.87 percent by volume as propane (which correlates to 0.08 lb/1000 gallons loaded based on engineering evaluation in A/N 324655 – R462 Plan dated 2/7/07) and is silent as to whether this is an instantaneous limit or a 15-min rolling average. However, based on the calculation method, this is an “averaged” value since CARB certification tests are over a 24-hour period.

Applicant wants to add condition limiting concentration to 1.9 percent by volume as propane instantaneous reading (carbon breakthrough indicator), which is current SCAQMD practice.

Current District policy will also add a 15-min rolling average limit to this permit. At this time, the lower allowable permit limit of 0.065 lb/1000 gallon will be used to set a 15-min average. There will be no emission increase with this change of conditions as the VOC limit will remain at 0.065 lb/1000 gallons loaded for the BASIC equipment (racks) and VRU.

Since construction under A/N 499972 is also complete and source tested May 2010 (Delta), this permit will finalize the addition of rack 1 connections in this permit action. A/N 499972 will be cancelled.

**PROCESS DESCRIPTION:**

This facility is a Class A facility under Rule 462 with a max loading rate of 1,400,000 GPD gasoline (CARB certification 2009). The required CEMS is being replaced with a new CEMS and a Rule 462 Plan application was also submitted under A/N 528480. The current VRS is a McGill Carbon Adsorption/Absorption Pressure Swing regeneration system. It is required to comply with an emission limit of 0.08 lb/1000 gal per Rule 462 and a 0.065 lb/100 gallon limit per offsets requirements.

In general, for Continuous Emissions Monitoring Systems (CEMS) serving regenerative carbon adsorption Vapor Recovery Units (VRUs), the District has decided to impose two-tiered concentration limits. An instantaneous concentration limit of 1.9% NMHC, as propane

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(breakthrough indicator), and a limit based on a rolling 15 minute average of 0.42 % NMHC, as propane, are proposed for the VRU. As shown in Attachment #1 (Excel Spreadsheet printout), the 0.42 % NMHC concentration limit is derived from source testing results obtained from this site. The concentration limits are not stated in the Rule 462 Compliance Plan approval. The limits will be incorporated into the Permit to Construct/Operate of the VRU issued under A/N 528479.

The applicant has submitted information regarding the gas analyzer and data recorder. The gas analyzer is an Infrared Draeger Analyzer. This model uses infrared absorption as the detection principle. It excludes the methane concentration from the total hydrocarbon reading, producing an output of Total Hydrocarbon (THC) concentration.

The facility will install a C-More Touch screen/data recorder and a custom built PC with HMI software to record data in a secure, tamper-proof read only format. This is a paper-less recorder in which data can be stored on external media, such as a floppy disk. This recorder meets all of the District's criteria for paperless recorders as outlined in the "Paperless Chart Recorder Check List." Currently, the recorder calculates and records instantaneous THC concentration and instantaneous, 1-hour and 6-hour rolling averages of THC mg/l readings at the VRU exhaust. However, PD has been informed that in the function of the system must be amended to provide THC concentrations on both instantaneous and rolling 15-minute average basis. This requirement is consistent with what has been required at other gasoline bulk loading terminals in the South Coast Air Basin, under Rule 462. The measured THC concentration data are utilized by the plants Allen Bradley Programmable Logic Controller (PLC), which controls operation of the vapor recovery system. The PLC controls operation of rotating equipment (i.e. vacuum pumps) associated with this system.

## **EMISSIONS CALCULATION**

The potential-to-emit for VOC at the exhaust of the vapor recovery system can be calculated based on the following:

Vapor Recovery System Exhaust Flow Rate: 146 scfm – Basis: Measured flow May 2010 Source Test by Delta

Vapor Recovery System Exhaust NMHC Concentration: 127 ppm (Total NonMethane as C - Basis: May 1010 Source Test

Loading Rate: 61,984 gal/hr – Basis: May 2010 Source Test

Duration of test: 120 minutes

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Using the above data the result is as follows:

$$\begin{aligned}
\text{Emissions Rate} &= 127 \text{ ppm} \times 16 \text{ lb/lb-mole} \times 146 \text{ scfm} \times 60 \text{ min/hr} / \\
&\quad 1 \times 10^6 \text{ ppm} \times 379 \text{ scf/lb-mole} \\
&= 0.04697 \text{ lbs/hr}
\end{aligned}$$

$$\begin{aligned}
\text{Emissions rate per 1000 gallons product loaded} &= 0.04697 \text{ lbs/hr} / 61.984 \text{ Mgal/hr} \\
&= 0.001 \text{ lbs/1000 gallons product loaded} \\
&\quad (\text{Carbon bed capture efficiency} = 99.94\% \text{ Delta 2010})
\end{aligned}$$

Therefore, the vapor control system is expected to meet the Rule 462 limit of 0.08 lbs VOC/1000 gallons loaded, the permit requirement of 0.065 lb/1000 gallons loaded and the efficiency of 98.5%.

**Additional Test Results:**

California Air Resources Board, January 21-22, 2009 Certification Test

<b>Parameter</b>	<b>Result</b>
Test Period	6:00 AM, Jan. 21 – 6:00 AM, Jan. 22
Volume of Gasoline Loading Rate, gallon	1,234,609
Vapor Recovery System Outlet NMHC as C3 Emissions Mass, lbs	1.412
Vapor Recovery System Outlet Volume, scf	
Vapor Recovery System Outlet NMHC Concentration, ppm as C3	
Maximum Measured Backpressure in Loading Rack, " W.C.	15
<b>NMHC Emissions Rate, lbs/1000 gallons</b>	<b>0.0011</b>

Delta Air Quality Services, October 2008

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Parameter	Result
Test Period	120 minutes
Volume of Gasoline Loading Rate, gallon	122,237
Vapor Recovery System Outlet NMHC as C3 Emissions Rate, lbs/hr	0.254
Vapor Recovery System Outlet Volume, scf	16,560
Vapor Recovery System Outlet NMHC Concentration, ppm as C	728
<b>NMHC Emissions Rate, lbs/1000 gallons</b>	<b>0.004</b>

California Air Resources Board, November 15-16, 2006 Certification Test

Parameter	Result
Test Period	08:00 AM Nov 15– 08:00 Nov 16
Volume of Gasoline Loaded, gallons	1,049,310
Vapor Recovery System Outlet NMHC as C3 Emissions Mass, lbs	2.172
Vapor Recovery System Outlet Volume, scf	176,571
Maximum Measured Backpressure in Loading Rack, “ W.C.	8
<b>NMHC Emissions Rate, lbs/1000 gallons</b>	<b>0.002</b>

The basis of the District’s calculation of the THC concentration corresponding to the Rule 462 limit of 0.065 lbs/1000 gallons loaded, is a mass balance equation. This equation is shown below:

$$E_M = q_v \times y_v \times M_v / [(Q_L/1000) \times 385]$$

Where

$E_M$  = emissions rate, equal to 0.065 lbs NMHC/1000 gallons loaded

$q_v$  = VRU exhaust flow rate, in scfm

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$y_v$  = VRU exhaust NMHC concentration, fraction

$M_v$  = Mole weight of NMHC, equal to 44 lb/lb-mole for propane

$Q_L$  = Liquid product loading rate, in gpm

Using the VRU exhaust flow rate, liquid product loading rate, and other data cited above, the allowable VRU exhaust NMHC concentration is back-calculated.

#### **REASONS FOR INSTANTANEOUS AND AVERAGED EMISSIONS**

The reasons for choosing the instantaneous concentration limit and the concentration limit based on a 15 minute rolling average are as follows:

- The concentration limit of 1.9% NMHC, on an instantaneous basis, is selected to ensure that venting to the VRU does not take place under breakthrough conditions. Breakthrough condition is associated with saturation of the surface of carbon granules in the carbon adsorber with VOC.
- A concentration limit based on a rolling 15 minute average, is selected since this is the approximate cycle time for each canister. At the beginning of the cycle, the carbon bed would be expected to be essentially free of VOC and most effective in adsorbing VOC. As the cycle time continues, a degradation of control efficiency would be expected. A concentration limit over 15 minutes, ensures that the limit is met over the entire cycle time for each canister.
- Rule 462 does not state an averaging time over which the limit applies. Absence of this averaging time implies that the limit is applicable for every 1,000 gallons transferred. Depending on the number of loading arms in operation, 1000 gallons can be loaded at the facility in a time period as short as 12.5 seconds to long as 100 seconds (each arm has a loading rate of 600 gpm). However, the CEMS is only measuring the hydrocarbon concentration of the exhaust stream and does not measure the volumetric flow rate. In addition, there is a time lag between the time the emissions are vented to the carbon canister and the time emissions are vented to the atmosphere. This is especially true for emissions associated the re-generating bed. Therefore, the instantaneous CEMS concentration reading alone is not direct indicator of mass emissions.
- Gasoline Bulk Loading Facilities have argued for a CEMS averaging time of an hour which is an equivalent of four carbon bed cycles. This averaging time is excessive in that the emissions from two independent carbon beds are averaged. Averaging any period longer

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than a single cycle would include emissions from both carbon beds, one of which could be malfunctioning. In such a case, the malfunction may not be apparent for a long period of time until the one good bed is adversely affected. Averaging over a single cycle, on the other hand, would provide a fair approach in that it takes into account both the initial stage of the cycle when the control efficiency is high and also the last stage of the cycle where efficiency has decreased due to partial saturation of the carbon.

Rules:

- 402: Nuisance is not expected
- 462: The VRS controls emissions from the loading operations and is expected to comply with the 0.08 lb/1000 gallon limit. VRS will replace their existing CMS with a new CMS to continue to comply with this requirement.
- 1149: Tank degassing and cleaning operations will comply with this rule.
- Reg 13: Not applicable since there is no emission increase from this change of condition. Current emissions from the bulk loading are accounted for in the bulk loading permits (BASIC equipment)
- 1401: There will be no increase in risk from change of conditions

40CFR60 XX: This equipment is subject to XX and complies with all applicable requirements including emission limit of TOC less than or equal to 35 mg/L.

Title V: This permit will be issued as a revision to the existing Title V Permit (under A/N 528997) after a 45-day EPA review period.

RECOMMENDATION(S):

A Permit to Construct/Operate for the VRU is recommended with the attached conditions (see sample permit)

A Rule 462 Plan Approval is recommended with the attached conditions (see sample plan)