SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 7	PAGE 1
ENGINEERING DIVISION	APPL. NO. 487163	DATE 1/16/2009
APPLICATION PROCESSING AND CALCULATIONS	PROCESSED BY Rafik Beshai	CHECKED BY

RULE 462 CONTINUOUS MONITORING SYSTEM (CMS) PLAN

COMPANY NAME	BP WEST COAST PRODUCTS LLC ARCO COLTON TERMINAL
COMPANY ADDRESS	2395 S. RIVERSIDE AVENUE BLOOMINGTON, CA 92316
EQUIPMENT LOCATION	2395 S. RIVERSIDE AVENUE BLOOMINGTON, CA 92316
FACILITY ID	800397

BACKGROUND

The BP West Coast Products LLC ARCO Colton Terminal is a Class "A" Facility under District Rule 462. As such, the facility is required to equip its vapor recovery/control system with a Continuous Monitoring System (CMS) that is approved by the District. Under 462(e)(1)(B) the facility is required to submit to the District a CMS Plan for approval. The CMS is required, under 462(f)(2) to be in compliance with Code of Federal Regulations Title 40 Part 63 Subpart R Section 63.427 and Code of Federal Regulations Title 40 Part 60 Appendix B, as applicable.

The vapor control system is required to control VOC to a maximum of 0.08 lbs per 1000 gallons loaded. The vapor control system at this site is permitted under a Permit to Construct (A/N 453411) issued on October 4, 2006 (Attachment #1).

In general, for Continuous Emissions Monitoring Systems (CEMS) serving regenerative carbon adsorption Vapor Recovery Units (VRU)s, the District has decided to impose two tiered concentration limits. An instantaneous concentration limit of 1.9% NMHC, as propane, and a limit based on a rolling 15 minute average of 0.69% NMHC, as propane, are proposed for the VRU at the BP ARCO Colton Terminal. As shown in Attachment #2, the 0.69% NMHC concentration limit is derived from source testing results obtained from this site. The concentration limits are not stated in this Rule 462 Compliance Plan approval. The limits will be incorporated into the facility permit, in the Permit to Construct/Permit to Operate issued under A/N 453411.

PROCESS DESCRIPTION

At the BP ARCO Colton Terminal, fuel (gasoline and Diesel Fuel) are loaded into transport trucks at four loading racks. There are a total of sixteen loading arms at the racks and vapors from the transport trucks are recovered with eight vapor recovery lines. The vapor recovery system has been certified by

the California Air Resources Board (CARB) in a source test performed on March 25 – 26, 2008. Based on the results of this test, the facility is approved for a throughput of 3.4 million gallons per day.

Hydrocarbon vapors from the truck loading operation are controlled by a John Zink Carbon Adsorption System. This system includes two carbon adsorption canisters with 9,600 lbs activated carbon in each canister, a vapor blower, a gasoline absorption tower, a glycol separator, two vacuum pumps, a vacuum booster blower, a gasoline supply pump, a gasoline return pump, two seal fluid glycol pumps, and a glycol cooler (shell and tube heat exchanger). Hydrocarbon vapors from the loading operation are collected in a 12" main vapor line and are passed through one of the two carbon canisters. There hydrocarbons are adsorbed on the surface of activated carbon, resulting in hydrocarbon-free air venting at the top of the canister. While one of the carbon canisters is used in hydrocarbon vapor recovery, the other canister is undergoing regeneration. The canisters alternate in service, in 15 minute cycles. Carbon canister regeneration is accomplished through the use of vacuum pumps and vacuum booster blower, which create a vacuum of 27 – 28 " Hg, resulting in volatilization adsorbed hydrocarbons. The volatilized vapors are purged from the canister with a purge air flow. Hydrocarbon vapors are passed through the vacuum pumps and a glycol separator, where some condensation/recovery takes place. The hydrocarbon vapors then pass through an absorption tower, where product recovery is accomplished through absorption with chilled liquid gasoline. The remaining vapor stream passes through the on-line carbon canister, prior to venting to the atmosphere.

The applicant has submitted information regarding the gas analyzer and data recorder. The gas analyzer is an Infrared Industries Inc., Summit Analyzer Model No. IR-8400D. This model uses infrared absorption as the detection principle. It excludes the methane concentration from the total hydrocarbon reading, producing an output of Nonmethane Hydrocarbon (NMHC) concentration. The instrument range is 0 – 2% NMHC. It is calibrated on with nitrogen as zero gas (or compressed air), and with 1.8% propane, as span gas. A daily auto-calibration is performed with 1% propane gas.

The facility has installed a Yokagawa DAQSTATION DX106 data recorder (Cat. No. DX106-1-2/AR2/F1/M1). This is a paper-less recorder in which data can be stored on external media, such as a floppy disk. It has a 1.2 Megabyte internal memory and 6 input channels. 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 1-hour and 24-hour rolling averages of NMHC concentration at the VRU exhaust. However, BP has been informed that in the function of the system must be amended to provide NMHC 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 NMHC concentration data are utilized by the plants 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: 217.4 scfm – Basis: Measured flow of 314,364 scf over 24.1 hours in March 25-26, 2008 Source Test

Vapor Recovery System Exhaust NMHC Concentration: 1500 ppm as C3 – Basis: March 25-26, 2008 Source Test

Maximum Loading Rate: 3,400,000 gallons per day (equal to 141.67 Mgal/hr) – Basis: CARB Certification Limit

Using the above data the result is as follows:

Emissions Rate = 1500 ppm x 44 lb/lb-mole x 217.4 scfm x 60 min/hr / $1x10^6$ ppm x 385 scf/lb-mole

= 2.24 lbs/hr

Emissions rate per 1000 gallons product loaded = 2.24 lbs/hr / 141.67 Mgal/hr

= 0.016 lbs/1000 gallons product loaded

Therefore, the vapor control system is expected to meet the Rule 462 limit of 0.08 lbs VOC/1000 gallons loaded.

The results of the March 25-26, 2008 source test, for determination of Rule 462 compliance and CARB certification (Attachment #3), follow below.

California Air Resources Board, March 25-26, 2008 Certification Test

Parameter	**Result**
Test Period	6:02 AM, March 25 – 6:08 AM, March 26
Volume of Gasoline Loading Rate, gallon	3,067,047
Vapor Recovery System Outlet NMHC Emissions Rate, lbs	61.79
Vapor Recovery System Outlet Volume, scf	314,364
Vapor Recovery System Outlet NMHC Concentration, ppm as C3	1,500
Maximum Measured Backpressure in Loading Rack, " W.C.	14
NMHC Emissions Rate, lbs/1000 gallons	0.02

The results of the March 14, 2008 source test, for determination of Rule 462 compliance (Attachment #4), follow below.

VOC Testing Inc., March 14, 2008 Test

Parameter	**Result**
Test Period	6:23 AM – 12:23 PM
Volume of Gasoline Loaded, gallons	522,389
Vapor Recovery System Outlet Volume, scf	53,100
Vapor Recovery System Outlet NMHC Concentration, ppm as C3	2,070
Vapor Recovery System Outlet NMHC Mass Emissions, lbs	13.35
Hydrocarbon Removal Efficiency, %	99.4
Maximum Measured Backpressure in Loading Rack, " W.C.	16.4
NMHC Emissions Rate, lbs/1000 gallons	0.026

The basis of the District's calculation of the NMHC concentration corresponding to the Rule 462 limit of 0.08 lbs/1000 gallons loaded (shown in Attachment #2), 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 0.08 lbs NMHC/1000 gallons loaded

q_v = VRU exhaust flow rate, in scfm

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 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 600gpm). 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 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.

RECOMMENDATIONS

Issue the rule 462 continuous monitoring system (CMS) plan with the following conditions:

1. THE OPERATOR SHALL CONDUCT THE OPERATION OF THIS CMS IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE PLAN APPLICATION UNDER WHICH THIS APPROVAL IS GRANTED, UNLESS OTHERWISE NOTED BELOW.

2. THE CMS SHALL SAMPLE AND ANALYZE GAS FROM THE OUTLET OF THE CARBON CANISTERS TO ACCURATELY MEASURE THE NONMETHANE HYDROCARBON (NMHC) CONCENTRATION AT THE EXHAUST OF VAPOR RECOVERY UNIT.

3. THE CMS SHALL PROVIDE AND THE DATA RECORDER SHALL RETAIN THE INSTANTANEOUS NMHC CONCENTRATION AND A CONTINUOUS 15-MINUTE AVERAGE NMHC CONCENTRATION, MEASURED AT THE EXHAUST OF THE VAPOR RECOVERY UNIT.

4. THE OPERATOR SHALL MAINTAIN A DISPLAY OF THE NMHC CONCENTRATIONS IN A LOCATION ACCESSIBLE TO DISTRICT PERSONNEL.

5. DAILY CALIBRATION ERROR TESTS SHALL BE PERFORMED ON THE CMS AT THE LOW (0-20 PERCENT) AND HIGH (80-100 PERCENT) RANGES OF CONCENTRATION. THE CALIBRATION ERROR SHALL NOT EXCEED 2.5 PERCENT OF THE FULL SCALE RANGE.

6. TESTING OF THE CMS FOR RELATIVE ACCURACY (RA) AND CALIBRATION DRIFT, AS DESCRIBED IN 40 CFR 60 APPENDIX B, SHALL BE CONDUCTED IN CONJUNCTION WITH THE VAPOR RECOVERY SYSTEM PERFORMANCE TESTING REQUIRED BY THE PERMIT FOR THE VAPOR RECOVERY SYSTEM.

7. THE OPERATOR SHALL ENSURE THAT THE CMS IS PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES AND THAT IT MEETS APPLICABLE REQUIREMENTS OF 40 CFR 63.427 AND 40 CFR 60 APPENDIX B, SPECIFICATION 8. THE APPLICABILITY OF 40 CFR 63.427 IS PURSUANT TO AQMD RULE 462(F)(2) AND DOES NOT NECESSARILY IMPLY THAT THE FACILITY IS A MAJOR SOURCE OF HAZARDOUS AIR POLLUTANTS (HAP)S.

8. THE OPERATOR SHALL MAINTAIN THE RECORDING DEVICE IN PROPER OPERATION AT ALL TIMES SUCH THAT IT IS ACCURATELY SYNCHRONIZED WITH THE CORRECT TIME OF DAY.

9. THE RECORDING DEVICE SHALL ARCHIVE DATA IN A SECURE ENCRYPTED FORMAT TO NONVOLATILE DATA STORAGE. DATA SHALL BE RECORDED AT A FREQUENCY OF NOT LESS THAN ONCE PER MINUTE. THE RECORDER/SOFTWARE SHALL BE CAPABLE OF DISPLAYING AND PRINTING OUT PLOTS OF THE NMHC CONCENTRATION WITHIN 3 HOURS OF A REQUEST. WHERE EXTERNAL STORAGE MEDIA IS USED, IT SHALL BE REPLACED AT A SUFFICIENT FREQUENCY TO ENSURE THAT THE AMOUNT OF STORED DATA IS AT NO MORE THAN 90% OF THE STORAGE CAPACITY OF THE MEDIA.

10. THE OPERATOR SHALL NOTIFY THE EXECUTIVE OFFICER, WITHIN 24 HOURS, IN THE EVENT OF A CMS OR RECORDER FAILURE OR SHUTDOWN FOR REPAIR, WHICH EXCEEDS ONE HOUR. THE NOTIFICATION SHALL INCLUDE THE CAUSE

AND TIME OF THE FAILURE, THE TIME THE RECORDER RETURNED TO OPERATION, MAINTENANCE OR CORRECTIVE WORK PERFORMED AND ACTIONS TAKEN TO PREVENT SUCH FAILURES IN THE FUTURE. THE CMS OR RECORDER SHALL BE RESTORED TO NORMAL OPERATION WITHIN 96 HOURS OF THE FAILURE.

11. THE OPERATOR SHALL KEEP RECORDS ON SITE TO SHOW COMPLIANCE WITH CONDITIONS NOS. 3, 5, 6, 9 AND 10 ABOVE. SUCH RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO DISTRICT PERSONNEL UPON REQUEST.