Executive Orders VR-203-K and VR-204-K
VST Phase II EVR System

EXHIBIT 12

Veeder-Root Vapor Polisher
Hydrocarbon Emissions Verification Procedure

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "ARB" refers to the California Air Resources Board, and the term "ARB Executive Officer" refers to the Executive Officer of the ARB or his or her authorized representative or designate.

1. PURPOSE AND APPLICABILITY

This test procedure is used to verify the proper performance of the Veeder-Root Vapor Polisher. The test determines hydrocarbon (HC) emissions under iso-butane vapor loading conditions.

The station may remain open (normal fuel dispensing, deliveries, etc.) while conducting this procedure.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

This procedure is used to verify proper performance of the Veeder-Root Vapor Polisher in meeting the hydrocarbon (HC) emission specification listed in Exhibit 2. A 10% iso-butane compressed gas standard is used as the inlet test gas (i.e., to provide HC flow at the Vapor Polisher inlet) while monitoring HC emissions from the Vapor Polisher exhaust using a portable non-dispersive infrared (NDIR) analyzer calibrated to iso-butane. The flow through the Vapor Polisher and HC monitoring is maintained for six (6) minutes.

3. BIASES AND INTERFERENCES

3.1 This test shall not be conducted if the Vapor Polisher percent load is greater than 80% (VR-203 IOM Section 15, PMC Diagnostic Menu, or VR-204 IOM Section 12, PMC Diagnostic Menu). If load is greater than 80% then conduct the purge procedure in Appendix A.

3.2 Exhibit 11 (Vapor Polisher operability tests) must be conducted prior to conducting the Exhibit 12 test to assure valid results.

3.3 Catalytic bead HC sensors shall not be used for this test due to the absence of air in the inlet test gas.

3.4 Values measured at less than or greater than 9,000 ppm (0.9% by volume) should not be considered as quantitative results since accuracy and calibration checks are not required by this test at those levels.

4. EQUIPMENT

4.1 A flow meter, with flow control valve, with 18.3 scfh full scale range and ± 2% of full scale accuracy. The meter must be accurate within 0.4 scfh for any flow setting made during the prescribed tests.

4.2 Gasoline resistant hoses, fittings, connectors.

4.3 Portable NDIR hydrocarbon analyzer, 0 to 18,000 ppm range (1.8 % by volume for iso-butane), with a minimum accuracy of ±0.1% by volume, such as RKI Instruments “Eagle” model (with NDIR HC sensor) or equivalent. Only an NDIR analyzer calibrated to iso-butane may be used for this test. The manufacturer’s operating instructions for the HC analyzer and proof or evidence that the sensor is NDIR shall be kept with the equipment at all times so that proper procedure can be verified.

4.4 Ladder or other access means to manually sample vapor outflow from the top of the Vapor Polisher assembly.

4.5 A calibration check gas of iso-butane in nitrogen or air at a concentration of 9,000 ppm (0.9% by volume. The calibration check gas must be certified to an analytical accuracy of ±2% traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified at least every two years.

4.6 An inlet test gas of iso-butane **in nitrogen** (air balance gas not allowed) at a nominal concentration of 10% by volume (100,000 ppm). The actual value of the gas concentration shall be between 9.7 and 10.3% by volume (97,000 to 103,000 ppm). The calibration check gas must be certified to an analytical accuracy of ±2% traceable to a reference material approved by the National Institute of Standards and Technology (NIST) and recertified at least every two years.

4.7 Pressure regulators for the calibration check gas cylinder and the inlet test gas cylinder.

4.8 Stopwatch with an accuracy of ± 0.2 seconds.

5. CALIBRATION REQUIREMENTS

5.1 All flow measuring devices shall be bench tested for accuracy using a reference gauge or NIST traceable standard at least once every 180 consecutive days. Accuracy checks shall be performed, with nitrogen, at a minimum of three (3) points (e.g., 20, 50 and 80 percent of full scale) and shall meet the requirements of Section 4.

5.2 Information on the calibration check gas and inlet test gas shall be entered into a log identifying each cylinder by serial number. Documentation of certification shall be maintained with the gas cylinders at all times and shall also be attached to Form 1. The calibration check gas log shall be maintained with the gas cylinders at all times and made readily available to the district upon request. Sufficient information shall be maintained to allow a determination of the certification status of each calibration gas and shall include: (1) the date put in service, (2) assay result, (3) the dates the assay was performed, and (4) the organization and specific personnel who performed the assay.

6. PRE-TEST REQUIREMENTS

6.1 Follow the HC analyzer manufacturer's procedure for instrument start-up and warm-up.

6.2 Check the zero reading of the HC analyzer using ambient air. If the result is greater than 1,000 ppm (0.1% by volume) then re-zero the analyzer per the manufacture's recommended procedures. Record results on Form 1.

6.3 Check the calibration of the HC analyzer by running the 9,000 ppm (0.9% by volume) calibration check gas following the manufacturer's procedures. The reading must be between 8,000 and 10,000 ppm (0.8% and 1.0% by volume). Record results on Form 1. If the result is outside of the required range then the analyzer shall be recalibrated per manufacturer's specifications prior to conducting this test.

6.4 Assemble the inlet test gas cylinder, regulator, flow meter and flow control valve, and transfer line as shown in Figure 1. Attach the HC analyzer sampling line to the outlet test port ¼ inch NPT fitting on the top of the polisher as shown in Figure 1.

6.5 Visually check to ensure the inlet 3-way valve (see **Figure 1**) to the Vapor Polisher is in the closed test position so the flow is coming from the inlet test gas to the inlet of the Vapor Polisher.

6.6 At the TLS console, set the Vapor Polisher to the manual open position (reference VR-203 IOM Section 15, PMC Diagnostic Menus, or VR-204 IOM Section 12, PMC Diagnostic Menus).

7. TEST PROCEDURE

7.1 Set the inlet test gas flow rate to 15 scfh. Adjust the flow rate as necessary during the test to maintain the flow rate of 14 to 16 scfh. Start the stopwatch. Record the start and end flow rates on Form 1.

7.2 Record the first HC reading three (3) minutes after starting the stopwatch. Take three (3) more readings one (1) minute apart for a total test time of 6 minutes.

7.3 Record the HC concentration for each minute from minute 3 to 6 on Form 1, with other required information. All results less than 9,000 ppm shall be recorded as "< 9000 ppm". All results greater than or equal to 9,000 ppm shall be recorded as "> 9000 ppm".

7.4 Alternative to Form 1: Districts may require the use of an alternate Form, provided it includes the same minimum parameters identified in Form 1.

7.5 Remove test equipment. Re-install the outlet test port cap by applying Teflon™ tape to the threads and tighten the cap ¼ inch turn past snug. Ensure that the 3-way inlet valve is in the normal operating ("open") position. At the TLS console re-set the Vapor Valve to the automatic mode.

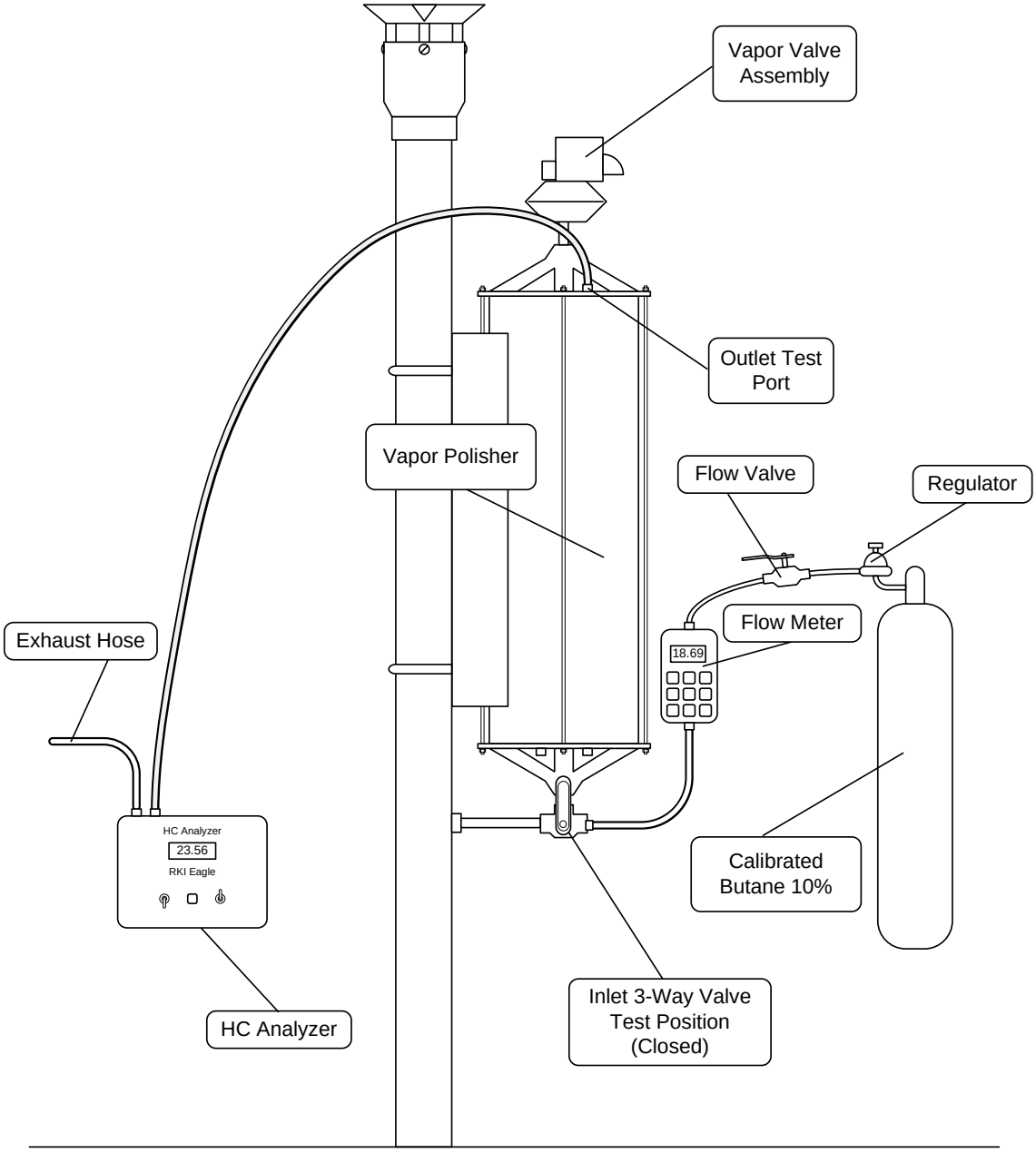
8. RESULTS

If the emission concentration is ≥ 9000 ppm (0.9% by volume during any part of the test, then the Vapor Polisher is not in compliance with the Exhibit 2 HC emission requirements.

9. ALTERNATIVE TEST PROCEDURES

This procedure shall be conducted as specified. Modifications to this test procedure shall not be used to determine compliance unless prior written approval has been obtained from the ARB Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

Figure 1


Vapor Valve Assembly
Outlet Test Port
Vapor Polisher
Flow Valve
Regulator
Flow Meter
18.69
Exhaust Hose
HC Analyzer
23.56
RKI Eagle
Calibrated Butane 10%
Inlet 3-Way Valve Test Position (Closed)
HC Analyzer

FORM 1
VEEDER ROOT VAPOR POLISHER HC EMISSIONS TEST

DATE OF TEST:

SERVICE COMPANY NAME	**SERVICE COMPANY'S TELEPHONE**
SERVICE TECHNICIAN	**VEEDER-ROOT TECH CERTIFICATION #(as applicable)** **ICC or DISTRICT TRAINING CERTIFICATION (as applicable)**
STATION NAME	**DISTRICT PERMIT #**
STATION ADDRESS	**CITY** **STATE** **ZIP**

STEP 6.2 **6.3**	**CAL GAS DOCUMENTATION ATTACHED?** ☐ **HC ANALYZER ZERO CHECK READING:** _____ **HC ANALYZER CAL CHECK READING:** _____ **IS THE ZERO READING < 1,000 ppm? Yes No** **IS THE CAL CHECK READING BETWEEN 8,000 and 10,000 ppm? Yes No** (IF NO: THE HC ANALYZER MUST BE RE-CALIBRATED.)
STEP 6.5 **6.6**	**3-WAY VALVE IN CORRECT POSITION (PER FIG. 1)?** ☐ **PMC VALVE MODE SET TO MANUAL OPEN?** ☐
STEP 7.1	**START FLOW RATE:** _____ **END FLOW RATE:** _____
STEP 7.3	**HC READING AT 3 MIN:** _____ **HC READING AT 4 MIN:** _____ **HC READING AT 5 MIN:** _____ **HC READING AT 6 MIN:** _____ **IS THE HC CONC. < 9,000 ppm FOR ALL READINGS? Yes No** (IF NO: THE VR POLISHER IS NOT IN COMPLIANCE WITH THE HC EMISSION REQUIREMENTS OF EXHIBIT 2.)
STEP 7.5	**3-WAY VALVE SET TO NORMAL OPEN POSITION?** ☐ **(UST Ullage to Vapor Polisher)** **RE-SET VAPOR VALVE TO AUTOMATIC MODE?** ☐

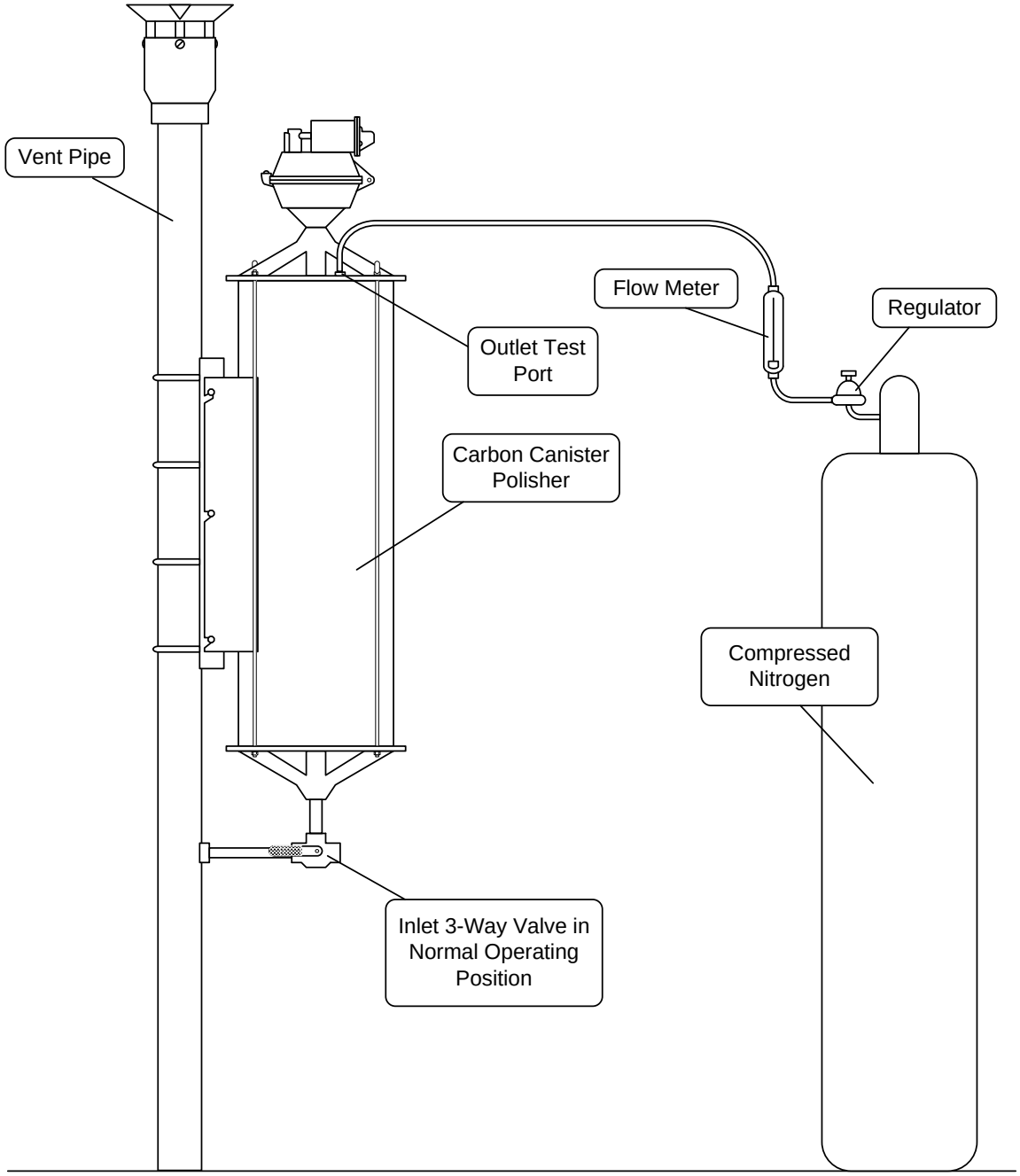
Appendix A: Partial Manual Purge Procedure

The purpose of this procedure is to purge a fully or mostly loaded canister to ensure that the HC load is less than 80% so that a Hydrocarbon Emissions Verification Test (Exhibit 12) can be performed.

1. Use the TLS PMC Diagnostic menus to manually close the canister vapor valve to be sure nitrogen supply gas will flow through the carbon and not out the exhaust vent.
2. Refer to Figure 2. Temporarily move the manual inlet test port three way valve to the test port position to disconnect the canister from the UST vent stack.
3. Connect a nitrogen gas supply with regulator and flow meter to the outlet test port.
4. Return the manual test port three way valve back to the normal operating position to reconnect the canister to the UST vent stack.
5. Open the nitrogen gas supply valve and set a flow rate of 18 CFH. This starts the purging process.
6. After 35 minutes of flow, which provides approximately 10 cubic feet of purge volume, close the nitrogen gas supply valve. The load on the carbon will now be less than 80% so that a normal Vapor Emission Operability Test can be performed after finishing this procedure. Note that the PMC Diagnostic Load % does not change as a result of this procedure because the canister vapor valve was manually closed in Step1.
7. Temporarily move the manual inlet test port three way valve to the test port position to disconnect the canister from the UST vent stack.
8. Disconnect the nitrogen gas supply from the canister outlet test port and replace the test port plug using fuel resistant sealing compound to seal off the port.
9. Return the manual test port three way valve back to the normal operating position to reconnect the canister to the UST vent stack.
10. Using the TLS PMC Diagnostic menus, return control of the canister vapor valve to automatic mode.

A Hydrocarbon Emissions Verification Test can now be performed.

Figure2



Purging Test Equipment Setup