1. Introduction

This procedure is designed for a Vapor Recovery Vacuum Assist and Balance Vapor Recovery Systems. The procedure sets forth testing requirements and identifies the responsibilities and authorities for the Registered Service Representative (RSR) and the State Investigator. Within each section of the SOP there are four subsections. The first subsection spells out the responsibility and authorities for the RSR, the second subsection spells out the responsibility and authorities for the State Investigator, the third subsection is to be used by the State Investigator for documenting the results of test, and the fourth subsection is to be used by the State Investigator for enforcement actions.

2. Purpose

The purpose of this SOP is to set forth a consistent procedure for testing Vacuum Assist and Balance Systems based on Arizona State law and CARB Executive Orders. Additionally, it establishes consistent and equitable guidelines to be followed while inspecting and testing the vapor recovery systems. This SOP sets forth the responsibilities and authorities for both the vapor recovery RSR and the State Investigator with respect to the initial or annual vapor recovery test. The inspection and testing of these vapor recovery systems under this procedures will be conducted during scheduled inspections or investigations. Inspections will be made in advance as scheduled by the station owner and/or RSR.

3. Responsibility and Authority

3.1 Authority – This inspection is conducted under ARS 41-2065, ARS 41-2115.

3.2 Responsibility – The RSR is responsible for conducting the initial or annual test using the methods required under state statute and regulations. Failure to conduct the required testing in accordance with the requirements may result in grounds for suspension, revocation or refusal to renew the RSR license per R20-2-603.

3.3 It is the responsibility of the State Investigator to conduct his or her inspection as required under this SOP and in conformance with the Field Force Manager (FFM) protocols and represent the Department at a witnessed initial or annual test. Failure to do so by the State investigator could be grounds for disciplinary action which could include dismissal.

4. Forms

4.1 Vapor Recovery Test Forms

a. Pre-Test Checklist
b. Pressure Decay Test Method Selection Form
c. Phase II Pressure Drop During Flow & Liquid Blockage Test (DWM-77 (rev 07-10))
d. Pressure Decay Test (DWM 77A (rev 07-10))
e. Air to Liquid Ratio (A/L) Nozzle Test TriTester (DWM-96A (rev 07-10))
f. Repair or Replacement Test Verification Report

4.2 Department Forms

a. Regulatory Bill of Rights (DWM -149 (rev 09-2012)
b. Administrative Order (DWM-53 rev 07-10))
b. Administrative Order (DWM-53VR rev 07-10))
c. Inspection Comments/Notes (DWM-179 rev 07-10)

5. Equipment

5.1 RSR Necessary Equipment – It is the responsibility of the RSR to have all of the equipment necessary to conduct the required testing. If the appropriate equipment is not available, or is not calibrated, the test shall be canceled and owner/operator and/or the RSR shall be subject to a civil penalty under AAC R20-2-905.

5.2 State Inspector Necessary Equipment - Necessary Equipment: Investigators must have a state issued pickup truck equipped with 2-3 holding tanks, a laptop computer to enter data from the examination and to communicate examination data to the office, scanner, printer paper to leave copies of examination results with on-site representative if necessary, a cell phone to track mileage and record time spent on various activities, a digital camera to collect visual evidence of non-compliant issues, hand sanitizer or waterless soap, first aid kit, CARB executive orders, statute book, administrative rules, blue tags and blue tape for enforcement actions and to restrict non-compliant commodities from being sold commercially, plastic and wire seals to attach enforcement SOAPY WATER solution with SPRAYER for checking connections fittings and unions. TRI TESTER for testing air to liquid ratios, LEAK CHECK for testing nozzles fill tubes and dry breaks and caps, MANOMETER for testing systems vapor pressure or vacuum depending on system type.

6. Pre-Inspection:

6.1 Registered Service Representative (RSR), Responsibilities and Authorities:

The RSR shall document on the Pre-Test Checklist whether or not a pretest was conducted at the site and the date of the pre-test. A pre-test by the RSR is not required prior to the annual test. However, if a pre-test is conducted, the RSR must have successfully completed that test and documented it on the Vapor Recovery Pre-Test Checklist. Any maintenance performed during the pre-test shall be documented on the Maintenance Log.

a. If the RSR has to cancel an initial or annual witnessed test one hour prior to the scheduled start time the RSR must remain at that location until the State Investigator arrives to review the reason for cancellation and release the location for reschedule. It is the responsibility of the RSR to call the Department at 602-771-4920 to appropriately notify of the cancellation.
b. All allowable repairs by the RSR must be complete at least one hour prior to the start time of the scheduled test with the state investigator. The RSR will only be allowed to repair/replace the P/V caps, dry breaks and conduct Air to Liquid Ratio (A/L) tests (NOTE: There is a prohibition of the addition of any fuel into the storage tanks – INCLUDING RETURN OF FUEL FROM THE A/L PRE TEST CHECKS (8 hours for the short test and 3 hours for the long test procedures - see TP96.1 and TP91.1, respectively)).
c. The RSR at the scheduled time of the witnessed annual test will present the following documents to the State Investigator prior to conducting the annual test:
    i. The signed Pre-Test Checklist
    ii. Pressure Decay Test Method Selection Form signed by the site owner/operator
    iii. Current tank inventory
    iv. Last fuel delivery (per Veeder Root or Encompass systems)
    v. Device License for the station being tested
    vi. Daily inspection logs and maintenance logs.
    vii. Tank Chart
d. The RSR or site owner/operator must remove dispenser panels from both sides.
e. For vaulted systems the RSR will have the vaults open for the State Investigator to visually inspect interior (per SOP 109, the state investigator will not enter any confined space).

f. The RSR will ensure that all hoses, nozzles, and spill buckets will be drained prior to testing as required.

Note: If the required documentation is not presented before the time of the test, the owner / operator or RSR shall be subject to a civil penalty under AAC R20-2 905.

6.2 State Investigator Responsibilities and Authorities:

a. The investigator will follow the FFM procedure prior to the start of the inspection. Once this information has been entered, the state investigator can begin the inspection.
b. The State Investigator will identify him or her self and present their Department photo identification, and state the purpose of the visit as required under Department Policies and Procedures No. 100.
c. If the RSR does not show up for the test, document the reason why (if known), check the veeder-root and/or stick the tanks to verify the fuel level in the tanks to verify if the tanks had sufficient fuel to test. Verify the last fuel delivery to identify if it met delivery time testing requirements. Note the findings in the inspection notes section of the inspection.
d. The investigator will request to see the RSR's license and verify that they are holding a valid license in order to conduct the annual or initial test for the vapor recovery system being tested.
e. The State Investigator will review with the owner, manager or responsible party, the regulatory bill of rights and have them sign, acknowledging receipt on the form (DWM 149), the State Investigator will also review the location's device license (number of devices, and all posted information is accurate and correct). If a location is not licensed, fill out a Placed in Service Report (DWM 38) in its entirety listing: device fee code, device service code, pump number, and NTEP C of C number and record the BMF number. If assistance is required, inform the person in charge of his/her responsibility to provide assistance and any special equipment needed.

7. Inspection:

7.1 The State Investigator will examine the tanks for fuel levels and water content and check drop tube length. Physically "stick" the tanks using water finding paste, to obtain volume levels. Record liquid volume amount using stick reading and appropriate tank chart, record on WM Pressure Decay form (DWM 77A), **do this with no pressure on the tanks**. If there is alcohol in the gas per the Product Transfer Documents (PTD) they are not allowed to have any water, if there is water in the tank issue a Stop

Sale/Stop Use Order (DWM 53). If there is no alcohol in the gas they are allowed to have up to 1" of water in the tank.

7.2 Check the drop tube length. There is no minimum height, but the maximum is 6" from the bottom of the tank at its highest point. If the highest point is more than 6" from the bottom of the tank a Stop Sale/Stop Use Order (DWM 53) must be issued. The state investigator will make sure that all of the questions at the bottom of the Pressure Decay form are answered correctly.

7.3 The State Investigator will conduct calculations for tank capacity, ullage and the length of the test to verify that the appropriate test method is being used. CALCULATION: Subtract liquid volume from actual tank capacity. This gives you the amount of ullage in the tank(s) (A - C = ullage). For TP 91-1 Pressure Decay / Leak Test to determine length of test you take total ullage divided by 1000 and multiply by 5 this gives you length of test time in minutes. Always round the amount of ullage to the next 1000 (i.e. 8,145 rounds up to 9,000). For TP 96-1 consult chart in test procedure for test times. All this information is reported on the State form DWM 77A.

7.4 The State Investigator will conduct a visual inspection of the site, this will be done while pressuring up the system or during the pressure decay test. If there are deficiencies during visual inspection list them on the Inspection Comments/Notes Form (DWM-179) and issue an administrative order. If the failures are related to fueling device, open a fueling device inspection and note deficiencies on the Fueling Device Form (DWM 40). Include the amount of time given to correct any failures.

7.5 Inspect hanging hardware for visible damage, leaks, tears, wrong type equipment installed, etc. (See AAC R20-2-907(D))

7.6 Check for placement and readability of decals. Decals Required are:

a. Dispenser number for documentation purposes
b. Display labeling
c. Octane labels
d. Fueling Instructions/Department phone number (602-771-4920)
e. Oxygenate labeling
f. Product grade label
g. Tax sticker required by HB2034.
h. All computer displays and values must be legible

7.7 Visually inspect the inside of all dispensers for:

a. Slope of vapor recovery piping must slope down towards riser
b. Ensure Ball valves inside of dispensers are in the "open" position
c. Verify that there are no leaks (appreciable liquid and/or gasoline odors)
d. Lead wire security seals are affixed as required by NIST Handbook 44 G-UR.4.5.
e. Check dispensers for correct labeling (Manufacturer's labeling – identification plate).
f. Equipment that shows signs of tampering or the presences of any skimming device.

7.8 Vent Stacks

Ensure at least one (1) vent pipe has an eighth inch (1/8") threaded plug, installed between six (6) and eight (8) feet above grade, and make sure it is painted correctly (55% UV reflective).

a. Verify all equipment installed meets the CARB requirements for the approved vapor recovery system. Note any modifications on the CTU Vapor screen.
b. Visually inspect the vault emergency vents (via mirror etc). Note: do not enter a confined space according to Department Policy and Procedure 109.
c. Check the Veeder Root / alarm system.

If there are deficiencies during visual inspection list them on the Inspection Comments/Notes form (DWM179) or the Fueling Device Form (DWM 40) as appropriate, include the amount of time given to correct.

8. Pressure Decay Test:

Test MUST begin within thirty minutes (30) of scheduled test time, with consideration by the State Investigator for larger ullage amounts, and NO REPAIRS can be made once testing has begun. All gasoline sales will be suspended until all testing is completed.

Pressure decay testing will be conducted with caps off of vapor and liquid fills, no fuel drops within 8 hours for the short test or 3 hours for the long test of scheduled test time, ball valves inside of dispensers in the "open" position, and Vent Pipe(s) Cap off. Cap vent pipes with an appropriate leak-proof vent plug. In accordance with R20-2-905(A)(2), the test shall fail under the following conditions:

a. For TP-91-1 (long test), if the gasoline storage tanks have less than 10 percent for each tank or greater than 60 percent vapor space.

b. For TP-96-1 (short test), if the gasoline storage tanks have less than 15 percent for each tank or more than 30,000 gallons vapor space.
c. The Department shall compute the combined tank vapor space for manifolded systems.

8.1 Registered Service Representative (RSR), Responsibilities and Authorities:

a. The RSR may now start introducing nitrogen into the system for the test at a rate NOT to exceed 5 cubic feet per minute (cfm) or 1 pound per square inch (psi).
b. While waiting for pressure decay results, begin evaluation of pressure/vacuum (p/v) cap.
c. The RSR will test the vent caps to ensure they meet the requirements for 3.0±0.5 water column inch (wci) on pressure side and 6.0 to 10.0 wci for the vacuum side, test criteria includes ability to hold for both pressure and vacuum at the specified rate. If the vent cap is defective the test will proceed and the cap will be replaced and tested to verify that it is functioning. A civil penalty will be issued. (If no replacement vent cap is available at time of test, the system will be blue tagged.
d. Once the system is pressurized, continue with pressure decay test.
e. The RSR will check the zero shift on the manometer prior to pressurizing to 11 wci.
f. The RSR will then pressurize the tanks to 11 wci, with 15 minutes stabilization time per TP 91-1, and 10 min stabilization time on TP 96-1. At the end of stabilization, if the system is not pressurized to 10 wci, the RSR shall adjust the tank pressure to 10wci.
g. The RSR will check for zero shift of the manometer and the test shall begin.
h. The RSR upon completion of pressure decay test will recheck the manometer for zero shift (Note: if there is a shift (gain or loss from zero) the Investigator will make corrections to account for the drift of the manometer and record the difference to determine pass or fail).
i. Additionally, the RSR upon completion of the pressure decay test will check the dry breaks. The RSR will test each dry break to ensure they all seal with no leaks. This will be determined by quickly depressing and releasing the plunger and testing the seal with soapy water. If it fails to hold, the dry break shall be tested no more than 3 times (2 additional), before it is considered defective. If the dry break fails, it must be repaired or replaced and retested by the RSR, and documented on the Maintenance Log. A civil penalty shall be recorded and the product shut down because the equipment is not operating as designed. If this failure also results in failure of the Pressure Decay test,

the site is to be issued a Stop Sale/Stop Use Order (DWM-53) per 8.3. The results shall be faxed to the Department upon completion of repairs and retests.

j. The RSR upon completion of the pressure decay test and prior to continuing the rest of the annual test; shall replace the vent caps and start the turbines.

8.2 State Investigator Responsibilities and Authorities:

a. Ensure ZERO tank pressure.
b. Ensure ZERO on the manometer prior to the start of pressurization, after it has stabilized and at the end of the test
c. Observe introduction of nitrogen into the system – (Not to exceed 5 cfm or 1 psi). Pressure decay test will be conducted with caps off of vapor and fills.

8.3 State Investigator Documentation of Results:

All information will be entered onto Department form DWM 77A.

a. Pressure Decay Form (DWM 77A)
b. BMF No. - get off license or assignment sheet
c. Inspection No. - found on assignment sheet
d. ATC No. (Vapor No.)- found on assignment sheet
e. Date - date you are inspecting
f. Test contractor - company and individuals name located at the bottom of the test sheet.
g. Circle appropriate system type
h. Dispenser No. – found on dispenser
i. List actual grades (i.e. 87, 89, 91)
j. Actual capacity in gallons
k. Physical stick reading
l. Record liquid volume amount using stick reading and appropriate tank chart.
m. Actual time pressure decay test begins
n. Actual time pressure decay test ends
o. Total amount of time test ran (end time - start time = total elapsed time)
p. Record actual test gauge value at start of test
q. Record actual test gauge value at end of test. If the pressure drop exceeds 1 wci in TP91-1 or exceed the listed values in TP96-1 the site fails, and you must issue a Stop Sale/ Stop Use Order (DWM53). (Note: if there is a shift (gain or loss from zero) the Investigator will use the difference to determine pass or fail)

r. Record pass or fail for the test. (Failure to pass this test is considered to be a site failure and you must issue a Stop Sale/Stop Use Order DWM 53)
s. Have owner/operator sign form or indicate that they "Refused to sign".

9. LIQUID BLOCKAGE TEST: (This requires 2 people to conduct the test)

9.1 Registered Service Representative (RSR), Responsibilities and Authorities

a. RSR will check to ensure all dispensers have a 1 inch tee port on vapor recovery riser, with easy access. If not WM will issues Stop Sale/Stop Use Order (DWM 53) for the dispenser(s) that don't meet the requirements. (Note: rubber hose is not acceptable for making the connection from the dispenser to the riser).
b. On annual tests pour 5 gals from the nozzle down the riser located at the furthest points from the storage tank on each branch/island, unless there is an indication of construction or modification of the VR system. Allow 15 minutes for gasoline to clear back to the storage tanks
c. On a VR Initial test pump 5 gallons down each vapor recovery tee port and re-cap each port. On systems with vapor pots, use 1 gal per branch/island, you will need to allow more time up to 30 minutes with the appropriate turbine engaged to clear the vapor pot. (This allows the investigator to verify that there is no blockage in the vapor system).
d. For balance systems, re-cap the tee port following introduction of gasoline to conduct the blockage test through the nozzles.
e. Failure to pass this portion of the test is considered to be a site failure and DWM 53 is to be issued per fail code 714 (41-2132D, R20-2-905C or R20-2-910D) on any portion of the tests.
f. If the introduction of nitrogen goes more than double the first value (of 20 cfh), the test will be restarted and fuel reintroduced (except for systems with vapor pot)

9.2 State Investigator Responsibilities and Authorities:

a. On the initial test all the dispensers will be tested and on the witnessed annual test check the furthest dispenser on each branch.
b. Have tester introduce nitrogen into the system to 20 cubic feet per hour (cfh). Record reading off of the Magnehelic (Maximum allowable @ 20 cfh is .15 on 1 wci Magnehelic). (ANY INTRODUCTION OF NITROGEN GREATER THAN THIS AMOUNT WILL INVALIDATE THE TEST AND THE TEST MUST BE RESTARTED AND FUEL REINTRODUCED) PER 9.1.

c. Have tester introduce nitrogen into the system to 60 cfh. Record reading off of the Magnehelic. (Maximum allowable @ 60 cfh is .45 on 1 wci Magnehelic).
d. Have tester introduce nitrogen into the system to 100 cfh. Record reading off of the Magnehelic. (maximum allowable @ 100 cfh is .95 on 1 wci Magnehelic)
e. For balance sites, repeat sections b through d until all nozzles are tested and recorded. Draining of hoses prior to testing is recommended. If there is liquid in the VR side of the dispensing hoses, this will be considered a failure for the entire system due to the inability to determine if the affected equipment would have passed/failed the pressure decay testing and the site/equipment will be tagged out of service and retesting will be mandated.

9.3 State Investigator Documentation of Results:

All information will be entered onto Department form DWM 77.

a. BMF No. - found on license or assignment sheet
b. Inspection No. - found on assignment sheet
c. ATC No. - found on assignment sheet
d. Date – date you are inspecting
e. Circle appropriate system type
f. Dispenser No. - found on dispenser
g. Product – use octane rating
h. List test company and tester
i. Print your name and Investigator number
j. Have owner/operator sign form

Note: Any reading or value above the maximum allowable values constitutes a failure for all grades on that dispenser. Blue tag that nozzle and issue a Stop Sale/Stop Use Order (DWM 53).

10. COMMUNICATION TEST:

10.1 Registered Service Representative (RSR), Responsibilities and Authorities:

a. Close all dry breaks.
b. Introduce nitrogen @ 100 cfh.
c. It is the responsibility of the RSR to depress the dry break using a “wooden” dowel upon direction from the state investigator.
d. All communication tests will be performed from the furthest dispenser on each branch from the tank pad.

e. The communication test will be conducted from the same dispenser as the blockage test. For an initial test the communications test will be conducted from the furthest point on each branch.
f. The RSR will reinstall the cap for the tee ports using "pipe dope."

NOTE: If there is no state investigator, the law still requires the RSR to complete this test.

10.2 State Investigator Responsibilities and Authorities:

a. State Investigator will observe the test and record results on the state forms.
b. Observe gauge, once gauge reaches a value more than 20 points higher than the highest reading on blockage test, (on 1 wci gauge), release the pressure at the dry break.
c. Identify dispenser.
d. Identify and record the tank grade and value, with dry break closed and open.
e. Repeat for each tank from each branch and record values

Note: Once you release the pressure at the dry break there should be an immediate and significant drop, at least .1 on a 1wci gauge. If there is a blockage, those particular dispensers (depending on alignment of vapor lines) needs to be blue tagged and a Stop Sale/Stop Use Order is issued (DWM 53).

10.3 State Investigator Documentation of Results:

All information will be entered onto Department form DWM 77.

a. List testing company and tester
b. Print your name and Investigator No
c. Document all test results.
d. Have owner/operator AND RSR sign form

11. Additional Tests For Vacuum-Assist Sites -

11.1 Air To Liquid Ratio Test, (Utilizing Roots Meter Or Tritester):

11.1.1 Registered Service Representative (RSR), Responsibilities and Authorities:

Note: You can only use the Roots Meter in determining A/L if a Tritester is not available.

a. Use OPW nozzle adapter for all nozzles, except Husky. (Use Husky nozzle adapter for Husky nozzles), and for 800 (use Healy adaptor).

b. Each time you move the roots meter to a different grade or dispenser, dispense 1 gallon of gasoline to reset gears. Then record new starting point/value for A/L test.
c. Ensure nozzle is inserted completely into nozzle adapter and that both caps on adapter are tight.
d. Make sure that the outlet port of the roots meter is unobstructed.
e. Make sure the appropriate number of gallons are dispensed for the test (minimum 7 gallons) per TP 201.5.

11.1.2 State Investigator Responsibilities and Authorities:

a. To determine allowable air to liquid ratios see CARB Executive Order for the type of VR system being tested.
b. Monitor and record test results.

11.1.3 State Investigator Documentation of Results:

All information will be entered onto Department form DWM96A.

a. BMF No. - found on the license or assignment sheet
b. Inspection No. - found on the assignment sheet
c. ATC No. - found on the assignment sheet
d. Date - date you are inspecting
e. Testing company
f. Testing contractor (RSR)
g. Enter dispenser number
h. Enter product octane rating
i. Record stop watch reading for 2 gallons
j. Determine gallons per minute (120/stop watch reading for 2 gallons)
k. Record starting value on roots meter
l. Record ending value on roots meter
m. Record difference
n. Record dispenser starting gallons value
o. Record dispenser ending gallons value
p. Determine number of gallons dispensed
q. Enter any re-test figures or remarks
r. Print your name and Investigator No
s. Signature of owner operator

Note: If a nozzle is not within the allowable air to liquid ratio, with average of 3 drafts, blue tag the nozzle and issue a Stop Sale/Stop Use Order (DWM 53).

12. Additional Tests For Balance Sites

12.1 Flow Rate Test

12.1.1 Registered Service Representative (RSR), Responsibilities and Authorities:

a. RSR shall insure that the flow rate has been checked prior to the inspector's test.
b. RSR on a balance system the RSR shall check the display on both sides of the dispenser to ensure that the value displays on the dispenser are identical.

12.1.2 State Inspector Responsibilities and Authorities:

a. State Inspector on a balance system the flow rate shall be conducted by the state inspector using a stopwatch. The test shall be conducted on each grade of fuel on a different dispenser. On a single hose dispenser you only test one grade and record on the report that this is for all grades. If the rate is determined to be greater than 10 gallons per minute that grade shall be blue tagged out of service.
b. State Inspector criteria for passing the flow test is a maximum of 10.0 and the minimum there is none. The rest are set forth in the executive order.

12.1.3 State Inspector Documentation of Results: All information will be entered onto Department form DWM. The results shall be recorded on the Liquid Blockage result sheet corresponding to the grade of fuel being tested in gallons per minute.

13. Enforcement Guidelines:

13.1 Blue Tags:

13.1.2 During a witnessed test, any documented failure during Pressure Decay, Liquid Blockage, Communication, or A/L Test or Flow Test will result in a blue tag being issued. The system or component shall be taken out of service.

13.1.3 During an unwittnessed test, in the event of a documented failure, it is the responsibility of the RSR to place the system or component out of service until it can be repaired, retested, and send in the appropriate test report (including results), along with a placed in service report to the Department, and notify the Department as required under R20-2-602(B) (2).

14. Post Inspection Procedure:

14.1 DATA ENTRY, EXIT INTERVIEW; Complete CTU Screens for test results, DWM-40, and DWM-53 and/or DWM-53VR Administrative

Order(s) to record deficiencies regarding tags affixed to devices etc.). Report findings to on-site representative and explain the reports and re-inspection process.

14.2 Close the inspection activity in the FFM by ending Shift. And log into the new activity.

This policy supersedes all other editions of Standard Operating Procedure VPR305 and replaces previous versions of Standard Operating Procedures VPR306.